UNIVERSITY OF HEALTH SCIENCES LAHORE

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NOTIFICATION

This is with reference to approval of Board of Governors for introduction of Modular Integrated MBBS Curriculum 2023, granted in its 53rd meeting, held on 23rd May 2023.

Consequent upon approval of the Syndicate, on the recommendation of Board of Studies (Medicine) and Academic Council, in its meeting held on 29th December 2023, '*Modular Integrated Curriculum 2K23 Version 2.0'* for First and Second Years of MBBS studies, including 'Assessment Policy' therein, is hereby notified for implementation in all constituent and affiliated medical colleges of the university w.e.f., academic session 2023-2024.

REGISTRAR

No. UHS/REG-24/295 Dated: 02-02-2024

Copy forwarded for information to:

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REGISTRAR

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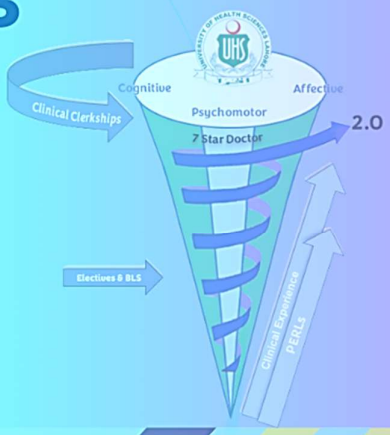
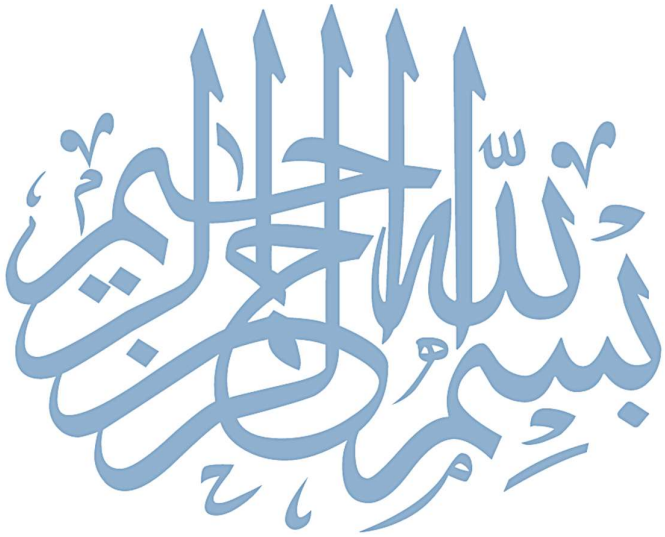
MODULAR INTEGRATED CURRICULUM 2K23

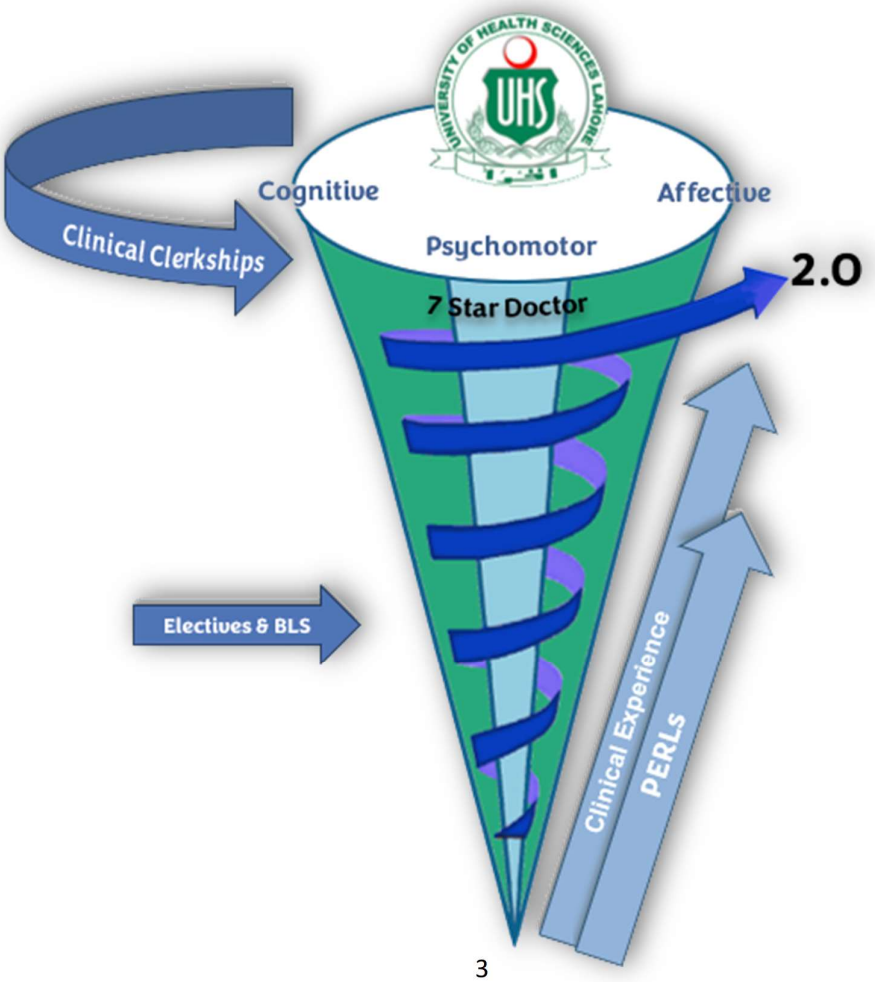


version 2.0

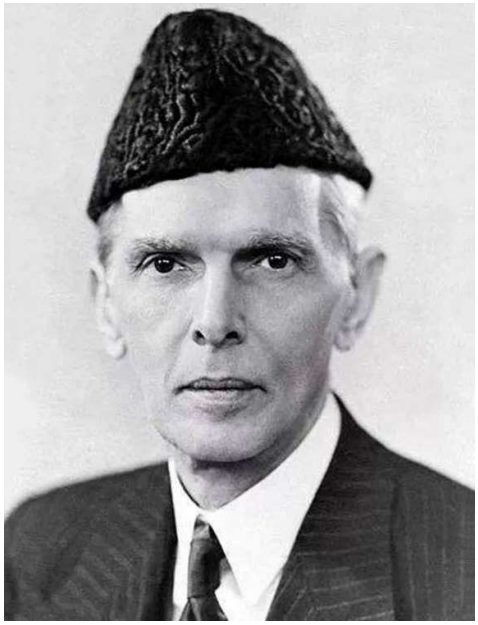

بسم الله الرحمن الرحيم

Modular Integrated Curriculum 2K23

version 2.0



Section 1



Without education it is complete darkness and with education it is light. Education is a matter of life and death to our nation. The world is moving so fast that if you do not educate yourselves, you will be not only completely left behind, but will be finished up.

Quaid e Azam Muhammad Ali Jinnah
Islamia College Lahore 1945

GOVERNOR PUNJAB

MESSAGE

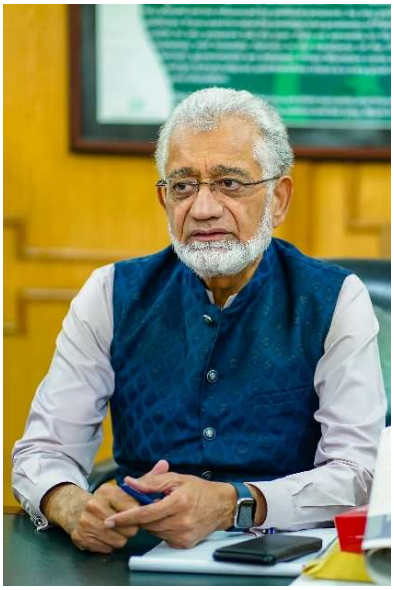
The progressive step taken by the University of Health Sciences Lahore (UHS) to bring forth an integrated undergraduate curriculum for medical students is a much-needed and futuristic move. Curriculum 2K23 by UHS will prove to be a historical milestone for the healthcare academia, faculty of the medical colleges, and specifically for the students in translating theory into practice and in becoming educational leaders of global standards.

The curricular document is concise and systemized to embrace our rich professional heritage, to contextualize local practices, conform to international standards, and incorporate the existing educational and societal needs. The development and implementation of this modular integrated curriculum, proves that the UHS strives to serve as a platform for providing innovative thinking, global vision, and social responsibility through contemporary instructional methodologies and excellence in terms of standards of medical and healthcare education. Punjab, being the largest province of Pakistan, holds a unique position in terms of producing the maximum number of doctors who serve as the healthcare workforce for the nation as well as globally.

I envision our young doctors and students to be able to transform into research-oriented healthcare leaders with a holistic perspective in the education of today's world while developing values, attitudes, and skills to face the challenges of an interconnected world. In addition, this integration shall foster empathy in these graduates where they would be able to recognize, accept and internalize the paradigms of humanism, equality, and professional ethics.

I believe and wish that the newly introduced curriculum will contribute in achieving all these attributes and competencies for the benefit of our nation.

(MUHAMMAD BALIGH UR REHMAN)
GOVERNOR PUNJAB

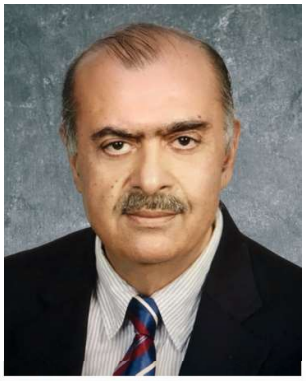


University of Health Sciences Lahore has a history to constantly reinvent and evolve for the benefit of its affiliated learners, upkeep of its standards and to lead the institutional strides as an internationally ranked university. The currently introduced '**Curriculum 2K23'** is yet another landmark for the greater good of the public health and an outreach to the future healthcare planning. I believe that by adopting the new curriculum all the beneficiaries and learners will be able to put the theory to professional action and excel globally in areas of research, public service, sustainable healthcare solutions and equitable healthcare services. A curriculum is always as good as the professionals adopting it. The dynamicity of a curricular document can only be achieved through the conjoint efforts of the trainers and the trainees. I am confident that these educational efforts based on the integrated curriculum will equip our young doctors for all the global challenges of environment related disease pattern, equity for marginalized, global health solutions and societal service.

Professor Javed Akram, Tamgha-e-Imtiaz
Minister of Health,
Government of Punjab,

I congratulate the University of Health Sciences for crafting the second version of the newly implemented Integrated Modular **Curriculum 2K23**. The newly crafted Modular **Curriculum 2K23** is a comprehensive document with detailed competencies and outcomes that we want to see in our next yield of doctors. The inclusion of stakeholder input has made it a contextualized document and can address the health challenges of the province. Specialized Health Care & Medical Education Department promotes advanced and innovative educational efforts to enhance the quality of medical education. We endorse implementation in the true letter and spirit. Implementation of Curriculum 2K23 version 2.0 will prove to be a positive change for our students. I believe that University of Health Sciences will continue the flow of feedback and address the implementation requirements if any. I wish the University of Health Sciences Lahore and its affiliated institutes the best of luck in their pursuit of educational excellence.

Mr. Ali Jan Khan
Secretary
Specialized Health Care & Medical Education Department
Government of Punjab, Lahore.



Vice Chancellor

UNIVERSITY OF HEALTH SCIENCES LAHORE
Khayaban-e-Jamia Punjab, Lahore - 54600, Pakistan.
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MESSAGE

I am thankful to Allah that the vision of structuring a standardized, comprehensive and implementable curriculum, has been fulfilled by the inception of Curriculum 2K23. The new curriculum has the potential to host futuristic educational strategies & methodologies.

University of Health Sciences Lahore commits to global trends and best practices of medical education and Curriculum 2k23 is a historical milestone to this claim. We have categorically made sure that the curriculum should embrace all the elements of cognition, skill acquisition, professionalism, ethics, research, and leadership. Such a comprehensive undertaking necessitated an approach which was 'integrated' and had strong 'clinical relevance' in the early years. We have made sure that the curriculum is designed in a way to address the needs and diversity of all our affiliated medical institutes for implementation. This diverse institutional conformity to the curriculum is the main strength, which will enable even our learners of the peripherally placed medical institutes, to benefit from the learning opportunities. Another strength of Curriculum 2K23 is its broad-based foundation which was laid down by the subject experts, medical educationists and healthcare leaders, representing our affiliate institutes. The collaborative effort and centripetal contributions by the team of dedicated professionals made Curriculum 2K23 possible and it will be implemented in true letter and spirit. I pay these leaders my gratitude for their untiring and selfless contributions towards completion of this curriculum in time.

We are confident that with this modular integrated curriculum, our affiliate institutes will be able to generate a yield of doctors who are equipped with competencies to cope up with professional challenges locally and globally.

Prof Ahsan Waheed Rathore
Vice Chancellor
University of Health Sciences Lahore

University of Health Sciences Lahore, in accordance with its vision, continuously endeavors to offer standardized, structured, and quality education to all its registered students through its affiliated institutes. Keeping all affiliate standards well gauged and educational standards finely calibrated UHS ensures the development of a competent, ethical, and skillful professional. ensures all these parameters meticulously. **Curriculum 2K23** has been drafted in accordance with the national and international standards of Basic Medical Education, thus having a futuristic stride and a local context. University of Health Sciences Lahore, being the custodian of the curriculum, will also manage, aid, govern, and dynamically refine the curriculum and its implementation.

We at the University of Health Sciences Lahore remain committed to the educational training, ethical grooming, and competency acquisition of all the registered learners who are the prime asset of UHS.

Prof Nadia Naseem
Pro-Vice Chancellor
University of Health Sciences Lahore

As a member of a well interwoven collaborative nexus of Medical Educationists, I am confident that Departments of Medical Education, of all the affiliated institutes will be able to professionally translate, academically implement and reap the intended benefits of **Curriculum 2K23**. The inculcation of the **Curriculum 2K23** intended outcomes for the future doctors, will keep our fraternities, our research work, our sustainable oriented role, our global healthcare contributions, and our humane potentials, at par with the international requirements.

The process of development included revisiting our practices, contextualizing the global standards, incorporating the existing norms, and onboarding the cognitive leads of the profession and onboarding the cognitive leads of the profession.

Medical Educationists using their professional potential and through the latitude offered in **Curriculum 2K23** can easily steer the educational strategies in accordance to their institutional vision. Levitating the institutional work potential while calibrating the learners process for high order yield, has already been embedded in the curriculum's design by the academic leads. All these have to be utilized for learner's benefit by a meticulous adoption of the curriculum by the healthcare leaders.

Lt. Col. (R) Dr. Khalid Rahim Khan, Tamgha-e-Imtiaz (M)
Director Medical Education & International Linkages
University of Health Sciences Lahore

University of Health Sciences
Lahore

Vision Statement

UHS is a leading University aiming to keep its graduates apt with the ever emerging global health challenges evolving educational methodologies and emerging technological advancements to maintain its distinguishable position as a Medical University.

Mission Statement

UHS shall continue to strive for producing a human resource par at excellence to cater for the health needs of the people of Punjab and Pakistan.

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03	Musculoskeletal & Locomotion - I	Dr. Noor i Kiran and Prof. Musarrat ul Hasnain
04	Cardiovascular- I	Dr. Noor i Kiran and Dr. Khalid Rahim Khan
05	Respiratory - I	Dr. Rafia Minhas and Dr. Noor i Kiran
06	GIT and Nutrition – I	Prof. Shahid Sarwar and Dr. Remsha Mustafa
07	Renal – I	Dr. Abeer Anjum
08	Endocrinology and Reproduction-I	Prof. Irum Manzoor and Prof. Alia Bashir
09	Head & Neck, Special Senses	Dr. Nighat Nadeem
10	Neurosciences – I	Dr. Komal Atta
11	Inflamation	Dr. Ayesha Sadiq and Dr. Qurat ul Ain
12	Quran – I	Prof. Saima Chaudhry
13	Clinical Skills FRC	Dr. Komal Atta
14	PERLs and IT	Prof. Saima Chaudhry and Dr. Khalid Rahim
15	Planners and Timetable	Dr. Abeer Anjum

CURRICULUM LEADS
Prof. Ahsan Waheed Rathore, **Vice Chancellor, UHS**
Prof. Nadia Naseem, **Pro-Vice Chancellor, UHS**
Prof. Sarah Ghafoor **Registrar, UHS**
Lt. Col. (R) Dr. Khalid Rahim Khan TI (M), **Director Medical Education & International Linkages**

WRITE UP, RESEARCH, EVALUATION & ANALYSIS	
1	Dr. Rameen
2	Ms. Shehla Noor
3	Dr. Mamoona Shabbir
4	Mr. Faisal Imran
5	Dr. Hummad Hussain

Section 2

CURRICULUM 2K23
version 2.0

FOREWORD TO CURRICULUM 2K23
version 2.0

Experiential Learning & the Feedback Process

Curriculum 2K23 is a live document. It was developed with the cognitive insight of experienced subject experts and skilled medical educationists, dedicated to the process of designing an integration which is practical and inclusive of all contextual elements.

The implementation process of the **Curriculum 2K23** was backed by two significant elements. The primary being the intensive faculty training at the inception through workshops and written guidelines. Secondly the continuous feedback from all the stakeholders.

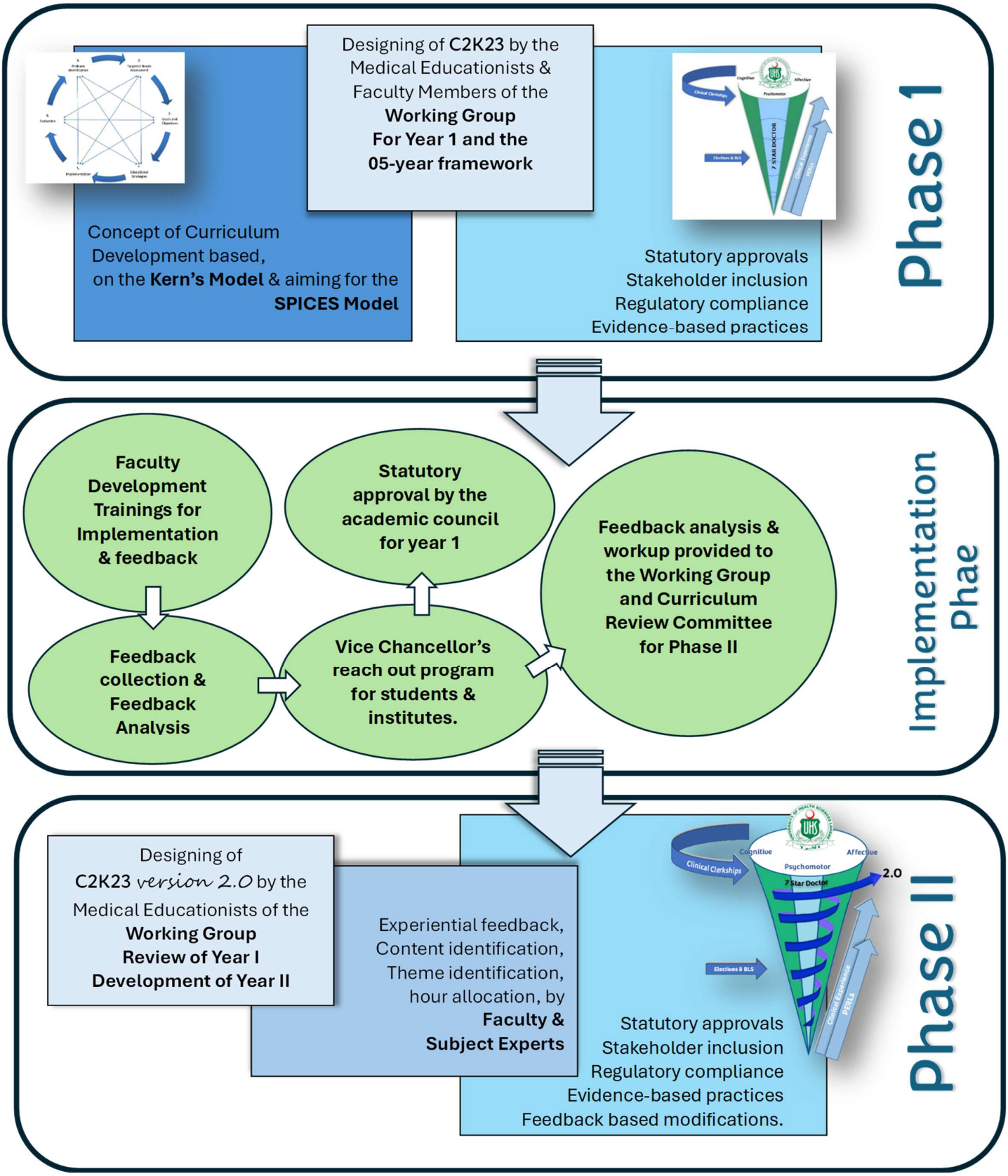
Initial faculty development trainings were done across the affiliate colleges by the team of medical educationist who were involved in the principal designing and a reach out with the subject experts at the time of the development. These multiple interactions between the stakeholders not only ensured the comprehensiveness of the document but also guaranteed the validity of the content drafted. The framework of the designing process itself was authentication to the validity of the document.

Second significant aspect that was grounded into the process of development was to ensure a continuous feedback channel. Section 12 of **Curriculum 2K23** had a detailed but easy process of providing feedback regarding any aspect of the curriculum. All potential stakeholders had an easy and free access to the curriculum feedback channel. Over this last year, we have actively sought feedback from every tier of our learner community and engaged with stakeholders to ensure that the curriculum reflects the evolving needs of our students, faculty, and the community disease patterns at large.

Vice Chancellor, University of Health Sciences Lahore, was meticulous regarding the structure, content, usability, feasibility, interpretation and familiarity by the end-users, the students. He adopted a methodology to himself reach out to the students and have one-on-one feedback. Students were called over from different colleges for meetings in a frank, conducive and informal way also to the university for their candid opinions, possible problems and suggestions for improvement. SPICES model of curriculum development holds ‘student-centeredness’, as a primary feature, so does Curriculum 2K23. The open channels for feedback have allowed us to hear diverse perspectives, understand concerns, and incorporate valuable insights into the new version of the curriculum.

The department of medical education at the University of Health Sciences Lahore has a dedicated cell for the analysis of feedback received, ensuring timely submission of the results of the block exams and collection of the study guides as well as instructional materials for archiving. After analysis of the feedback received it was further processed in one of the two patterns. If the analysis proved an action requiring an immediate incorporation into the curriculum, then a statutory process for approval by the board of studies and the academic council was started. All other analyzed feedback was categorized, and solutions were developed through the same set of medical educationists of the 'Working Group'. The feedback and their suggested solutions were put up the review committee, subject experts, working group and the university's senior tier, for further changes and additions.

With all these actions of student centeredness, feedback collection, feedback analysis, continuous stakeholder input and transparent process of approval, the validity and viability of the **Curriculum 2K23** was continuously ensured. The experiential learning in the last one year was primarily for all the stakeholders at different points of development and implementation.


Designing of C2K23 by the Medical Educationists & Faculty Members of the Working Group For Year 1 and the 05-year framework
Concept of Curriculum Development based, on the Kern's Model & aiming for the SPICES Model
Statutory approvals
Stakeholder inclusion
Regulatory compliance
Evidence-based practices
Phase 1
Faculty Development Trainings for Implementation & feedback
Statutory approval by the academic council for year 1
Feedback analysis & workup provided to the Working Group and Curriculum Review Committee for Phase II
Feedback collection & Feedback Analysis
Vice Chancellor's reach out program for students & institutes.
Implementation Phae
Designing of C2K23 version 2.0 by the Medical Educationists of the Working Group Review of Year I Development of Year II
Experiential feedback, Content identification, Theme identification, hour allocation, by Faculty & Subject Experts
Statutory approvals
Stakeholder inclusion
Regulatory compliance
Evidence-based practices
Feedback based modifications.
Cognitive
Affective
Psychomotor
7 Star Doctor
2.0
Clinical Clerkships
Electives & BLS
Clinical Experience
DPERLS
Phase II

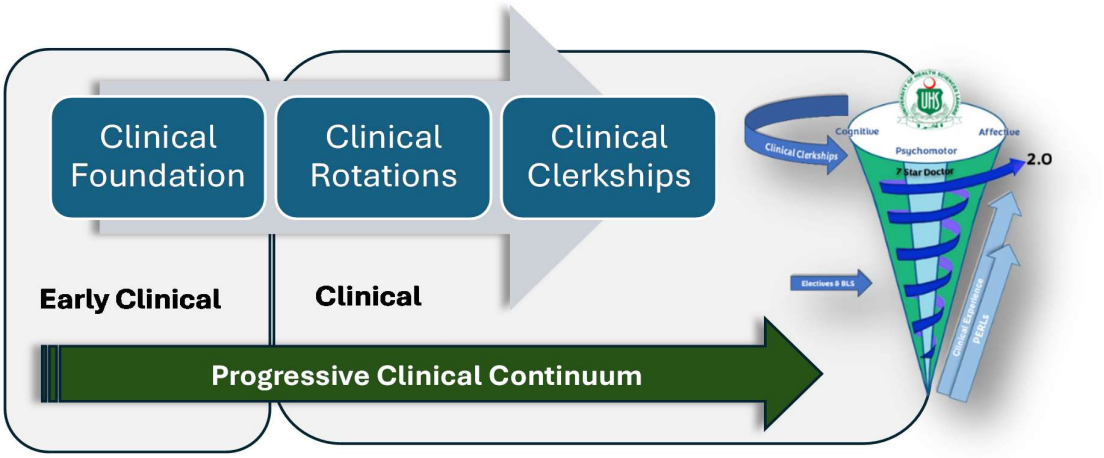
Preamble to Curriculum 2K23 *version 2.0*

Curriculum 2K23 ***version 2.0*** is ready for implementation. As previously this version has also been developed and designed through a structured process for stakeholder inclusion, validation, content identification, impediment rectification, feedback analysis, and contextualization.

Curriculum 2K23 ***version 2.0*** has been refined and calibrated from the end user's perspective which is the 'student'. An elaborate effort was made all along the year to extend the openness of feedback to the faculty members who were busy engaging in the challenge of transitioning to a modular integrated practice of education. Our experiential learning has led us to a better concept of contexts for the curricular updates. Building upon the success of our initial year of implementation, this revised curriculum is a testament to our commitment to excellence, adaptability, and continuous improvement in medical education. The process of improvement owes its gratitude to our dedicated subject experts, medical educationists & the curriculum review committee, who played a pivotal role in analyzing and responding to the feedback received. Through meticulous deliberation, we have integrated suggestions that enhance the overall quality and relevance of the curriculum.

The Curriculum Review Committee, comprising seasoned professionals, was instrumental in the final drafting of the curriculum. Their expertise and insights have ensured that the curriculum aligns seamlessly with the current trends in medical education and addresses the evolving needs of the healthcare landscape.

In addition to refining existing components, we have introduced new features to further enrich the learning experience for our students. The pre-clinical year competency framework is the standard that the University expects the student to achieve before entering to the clinical rotation years. The first two years also had a clinical orientation through the 'Clinical Foundation' segment of C-FRC. However, this level of sub competencies described in the next section will enable the student to have an enriching experience when s/he enters the rotations for all clinical disciplines in the next year. A significant highlight of this integrated curriculum is the proposed competency framework for the pre-clinical years. This framework is designed to empower students to seamlessly apply their knowledge of basic medical sciences to problem-solving scenarios in clinical years and clerkships. It serves as a bridge that ensures a cohesive transition between foundational knowledge and practical application.



Recognizing the challenge of transitioning the **Curriculum 2K23** *version 2.0* has been designed to facilitate continuity and depth in the educational journey.

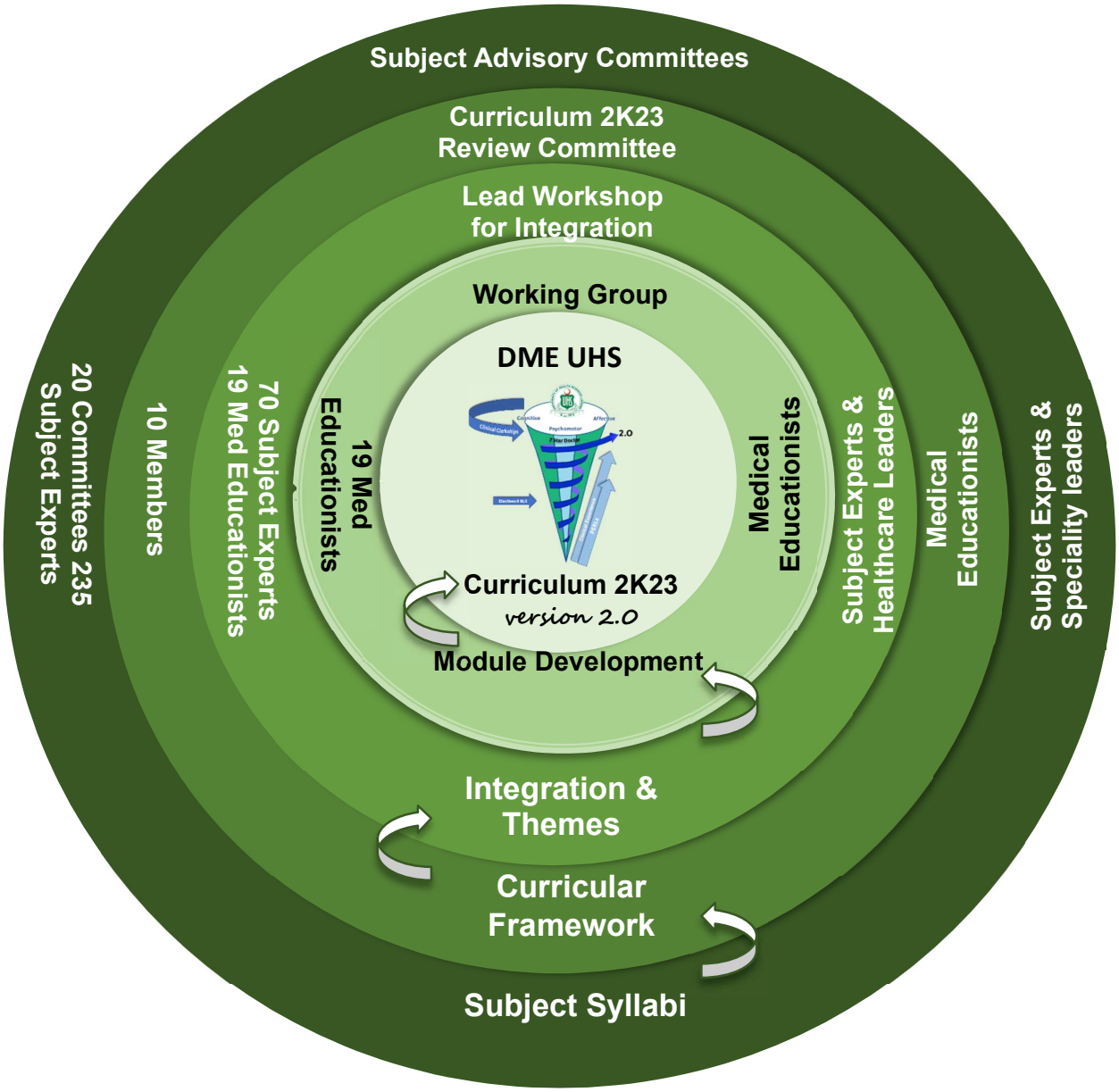
Simultaneously, the **University of Health Sciences** has undertaken exam reforms to introduce more standardized and structured assessments. These reforms, complementing the new curriculum, aim to provide a comprehensive evaluation framework that aligns with the competencies expected from medical professionals.

To maintain the integrity of individual disciplines, special attention has been given to preserve the identity of each subject within the integrated framework. This approach guarantees that no discipline is marginalized or overshadowed by others during the integration process.

Lastly, resource identification is a cardinal aspect of our curriculum development. We aim to align the understanding of content and assessment requirements among faculty, examiners, paper setters, and, most importantly, our students. This shared understanding will contribute to a more cohesive and effective learning environment.

In conclusion, this integrated curriculum stands as a proof to our collective commitment to advancing medical education. It is the result of collaboration, feedback, and a shared vision for excellence.

Iterative Model of Curriculum Development by UHS for Phase 2

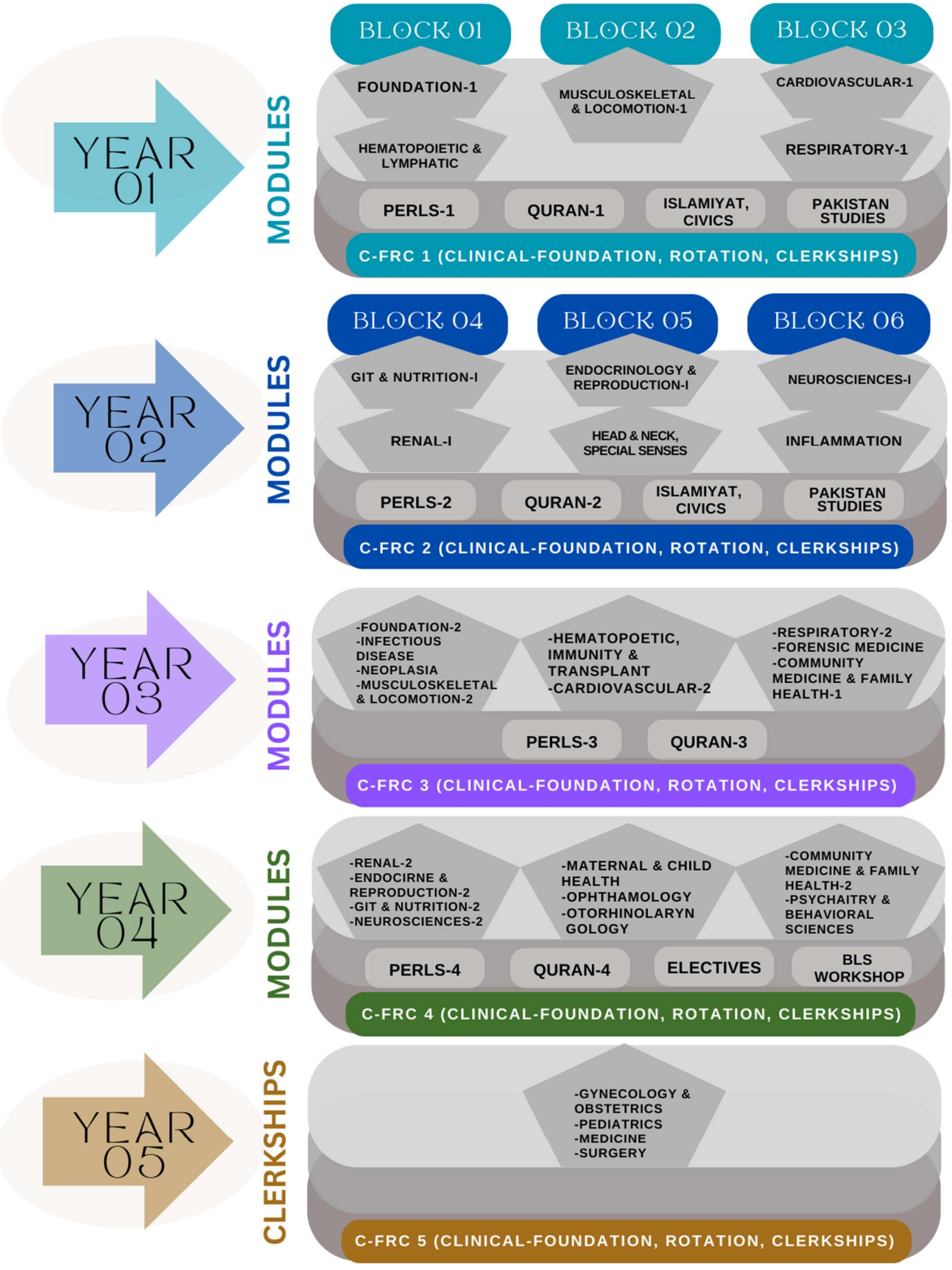


Section 3

Curriculum Framework

Curriculum 2K23 *version 2.0*

CURRICULUM FRAMEWORK



Section 4

Competency Framework

(Early Clinical Year 1 & 2)

Curriculum 2K23 *version 2.0* has been purposefully developed and using the expertise of a group of medical educationists from the affiliated colleges, with the input of subject experts & healthcare leaders to have outcomes which are not only locally contextualized but also globally acceptable. With the final professional profile as the foundational underpinning for a framework, the need for precisely defined competencies and outcomes becomes a must.

University of Health Sciences Lahore emphasizing on the knowledge base, attributes, professional behaviours, and skills set that the yield of the doctors which are brought forth into the healthcare landscape of the country possess at the time of graduating from its affiliated colleges.

A competency is a blend of background knowledge, skills, and attitude that enables a professional to perform as a job requirement.

The competency framework defined during the development of **Curriculum 2K23** *version 2.0* has further been categorized into the competencies and behavioral descriptors required to enter the clinical segment of the competency continuum and the exit competencies at the end of the 5-year program.

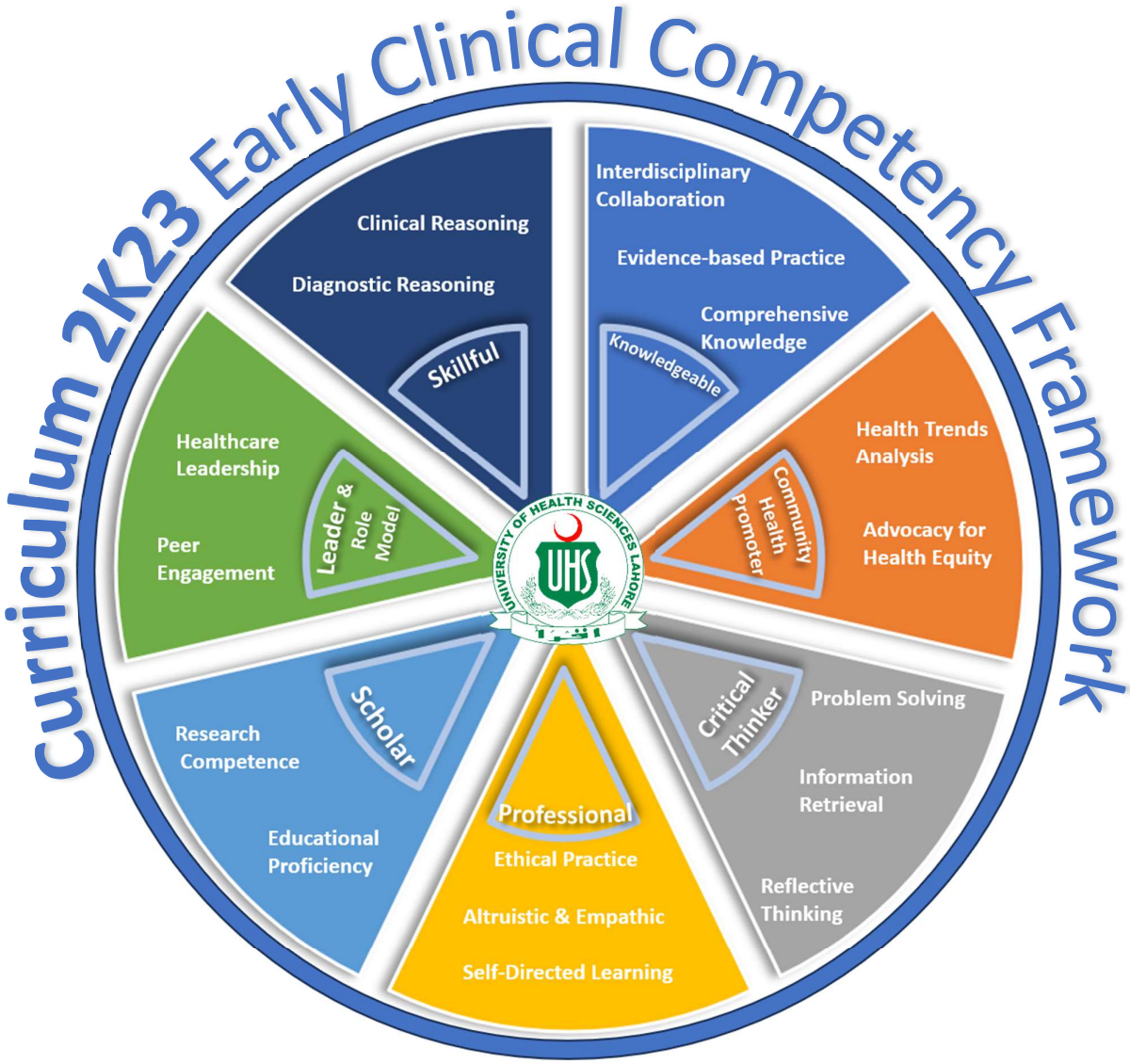
Current edition of **Curriculum 2K23** *version 2.0* contains the competency framework for the preclinical years. This framework elaborates the competencies, sub competencies and their behavioral descriptors which the student must possess before entering the clinical years. The module and assessments of the C-FRC and the early clinically oriented activities that have commenced in the first two years will help steer the students to achieve these goals.

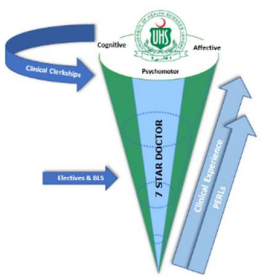
Competency framework anchors the professional requirements, training benchmarks and societal expectations in a concise manner. The relatable aspect of attainment sets the path for the institutional implementation. The students should be capable of a deeper understanding of the concepts of competencies and what professional requirements do they need to fulfill before every next stage of their educational journey and skill acquisition. The departments of Medical Education should not only endorse these expectations but should also help establish a culture of professing to the community and stakeholders for an upkeep of laid down standards. The professed standards defined by the regulatory authority, community or religious integrity.

The current chapter contains the competency framework for the ‘Preclinical’ years, only. This may serve as a base guideline framework for the institutional designing for their undergraduate training protocols. The sub competencies and their behavioral descriptors are all aligned to the

requirements of the 7-star doctor which has been defined by the national regulatory authority and mentioned verbatim in chapter 5. The same set of sub competencies and their behavioral descriptors will diversify into the attributes, clinical competencies, and sub competencies for the remainder of the competency framework which will follow in the next and final version.

The current framework scopes the behaviour requirements and attributes to be achieved. However, all the affiliate institutions have the latitude to further define the sub competencies and their behavioral descriptors to be achieved, based on their own institutional core values and ideology.





Core Competencies & Sub- Competencies to be achieved before entering the Clinical Years

Competency	Sub Competency	Behavioral Descriptors for Early Clinical Years
Skillful	**Clinical Reasoning**	1. Demonstrate the ability to apply fundamental scientific knowledge to clinical scenarios, such as patient histories and hypothetical case presentations showcasing the integration of theoretical learning into practical clinical reasoning. 2. Critically assess and evaluate existing medical literature and research to inform decision-making in hypothetical patient scenarios during preclinical case studies. 3. Engage in collaborative problem-solving exercises with peers, actively participating in preclinical problem-based discussions to enhance clinical reasoning skills through dialogue and debate.
	Diagnostic reasoning	1. Apply foundational knowledge from basic sciences to critically evaluate the clinical scenarios, to formulate differential diagnoses during preclinical case discussions.
Knowledgeable	**Holistic Understanding and Comprehensive Knowledge**	1. Demonstrate a thorough understanding of normal and abnormal structures and functions of the body. 2. Apply comprehensive knowledge in identifying molecular, cellular, biochemical, and physiological mechanisms. 3. Evaluate the impact of growth, development, and aging. 4. Explain the various etiological causes and causative agents for specific injuries, illnesses, and diseases. 5. Identify and analyse biological and social determinants and risk factors of diseases. 6. Recognize and explain patterns of normal and abnormal human behavior
	Synthesis of Interdisciplinary Knowledge	1. Integrate knowledge from various medical disciplines to inform hypothetical clinical decision-making and synthesize information for a comprehensive understanding of hypothetical patient cases. 2. Apply a holistic approach by considering the interconnectedness of biological, social, and psychological factors in theoretical healthcare scenarios, and propose integrated solutions to hypothetical clinical problems using interdisciplinary knowledge.
	Evidence Based Practice	1. Critically assess and evaluate existing medical literature and research to inform decision-making in hypothetical patient scenarios during preclinical case studies. 2. Integrate knowledge from various scientific disciplines to develop comprehensive and evidence-based explanations for medical phenomena encountered in preclinical coursework.

Community Health Promoter	**Health Trends Analysis**	1. Critically review scientific literature to stay informed about health trends.
	Advocacy for Health Equity, Promotion, and Prevention	1. Engage in discussions on health disparities and social determinants of health. 2. Demonstrate an understanding of community health concerns
Critical thinking	**Information Retrieval**	1. Seeks information from various academic sources, including textbooks, research articles, and online resources.
	Problem solving	1. Critically assesses experimental data during laboratory sessions, showing attention to detail and an understanding of its relevance to medical concepts. 2. Demonstrates effective identification and analysis of medical issues during case-based and problem based discussions. 3. Applies logical reasoning to propose viable solutions in problem-solving exercises. 4. Displays adaptability in integrating knowledge to address complex medical challenges. 5. Shows proficiency in utilizing evidence-based strategies to resolve clinical puzzles during preclinical training.
	Reflective Thinking	1. Sets specific learning goals, creates plans to achieve them, and reflects on progress regularly. 2. Reflects on problem-solving processes, identifying strategies that were effective and areas for refinement.
Professional	**Self-directed Learning**	1. Regularly evaluates personal academic progress and adjusts study strategies accordingly. 2. Actively engages in collaborative peer study groups to enhance learning. 3. Demonstrates effective use of technology to manage and organize study materials.
	Altruistic and Empathetic:	1. Displays empathy and understanding in peer, faculty, and staff interactions.
	Ethical Practice	1. Demonstrates self and professional accountability, honesty, and ethical behaviour. 2. Uphold principles of academic integrity in all coursework. 3. Consistently exhibits professional conduct, respecting academic and ethical standards, serving as a positive example for classmates.
Scholar	**Research Competency**	1. Displays foundational skills in research, including the identification of researchable problems, formulation of clear research questions, and engagement in literature reviews, setting the groundwork for future research endeavors.

	Educational Proficiency	1. Demonstrates consistent high performance in coursework, showcasing a deep understanding of foundational medical sciences during preclinical years. 2. Actively engages in self-directed learning, displaying a strong commitment to mastering educational content and fostering a solid academic foundation in the early years of MBBS.
Leader and Role Model	**Healthcare Leadership**	1. Demonstrating effective communication and teamwork skills during PBLs, simulations or practical sessions. 2. Actively seeks collaboration on group projects, fostering teamwork and collective problem-solving skills.
	Peer Engagement	1. Actively seeks opportunities to assist peers in understanding complex medical concepts, displaying a collaborative and supportive attitude that fosters a culture of shared learning and growth.

Institutional Implementation

Curriculum 2K23 *version 2.0* requires to be implemented by all institutions based on their own unique identity but with true letter and spirit.

Competency framework should be adopted, translated, and implemented through all the methodologies and integrated into all the educational processes of the institutions.

The pre-clinical competency framework will serve as the main scaffold for developing the clinical competencies and clerkship related attributes. So, the significance of implementing this is foundational for developing a seven-star doctor.

Section 5

Preamble

Introduction

A curriculum that is responsive to societal changes is necessary for positive development and growth of students. It is thus crucial to continually assess and update the curriculum through program evaluations and revamping to fulfill the goal of creating exceptional education program. The medical field provides an excellent example of the need for continual up gradation of the curriculum as the definition of disease itself has evolved over time. Disease was previously defined as a physical change in organ; however, this understanding has now expanded to include the multifaceted influence of social, psychological, and cultural factors on health.

To achieve the mission of producing a seven-star doctor having the generic competencies of "Skillful, Knowledgeable, Community Health Promoter, Critical Thinker, Professional, Scholar, Leader and Role Model", The **University of Health Sciences Lahore**, is introducing a modular integrated undergraduate curriculum for its constituent and affiliated medical colleges. These competencies are further outlined by various enabling traits specifying knowledge, skills, and attitude.

Our concept and process of curriculum development is grounded in the Kern's model for medical curriculum development.

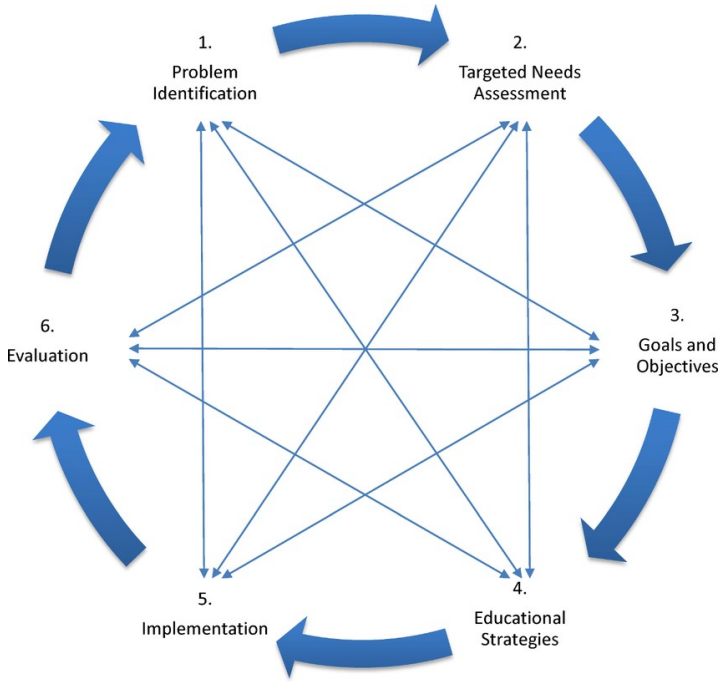


Figure. 1

Kern's Cycle of Medical Curriculum Development

The purpose of integrated modular curriculum is to encourage the students to think as doctors from the day they enter medical school. In vertical integration approach, basic science learning is placed in the

context of clinical and professional practice along with behavioral sciences, thus leading to a broader conception of ways to teach and learn medicine. Overlap of content in different subjects hampers the pace of concept development and increases reluctance to learning. This must be curtailed through integrated approach. Readiness of knowledge availability is another factor which encourages a priority of knowledge acquisition in the formal undergraduate settings. Such calibrations and refinement through an integrated approach prioritizes core concepts and the 'must know' principles for a student.

Role of University of Health Sciences Lahore

University of Health Sciences Lahore is a public sector internationally ranked university with a QS ranking of #651-670. Since its inception in October 2002, it has come a long way in terms of training healthcare professionals, developing educational disciplines and contributing to the healthcare infrastructure of the province.

University of Health Sciences Lahore (UHS) is a vibrant, internationally recognized, student-centered, research university with 128 colleges and institutes affiliated and around 106,916 undergraduate and 9157 postgraduate students registered with it.

It was the first dedicated health sciences university established in the province with a vision to bring qualitative and quantitative revolution in medical education and research through evolution. Almost all the public and private medical and dental colleges of the Punjab province are affiliated with UHS.

The University is focused on delivering high-quality instruction in Basic Medical Sciences, revitalizing the essential fields of Nursing and Allied Health Sciences, pioneering courses in Medical Education, Human Genetics, Behavioral Sciences, and fostering indigenous research activities through its state-of-the-art laboratories and the Research and Development center. It is one of the five main degree awarding institutes of the country and the Degrees awarded are recognized by the HEC & PMDC.

University of Health Sciences Lahore (UHS) bears the onus of the structured accredited training, and skill acquisition of the students for MBBS in the province. A constant upkeep in terms of the content identification, structured framework of training, enlisting tangible resources and inculcation of newer methodologies for faculty trainings is undertaken.

University of Health Sciences Lahore (UHS) being the degree awarding institute ensures that the learning outcomes are achieved by respective medical colleges before the students are assessed by exit exams. The clarity of assessment policy aligned with the program outcomes endorses the transparency of the assessment and structured training of the graduates.

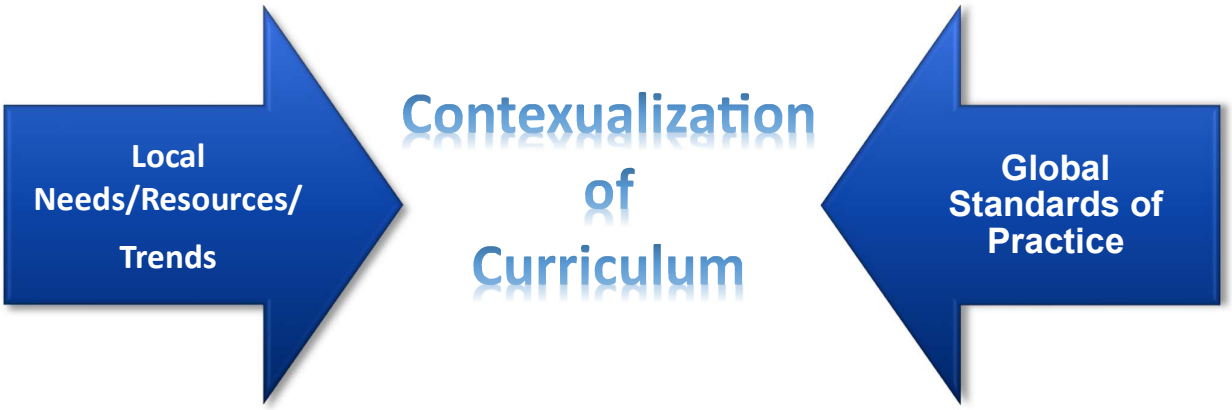
University of Health Sciences Lahore (UHS) endorses, patronizes, guides, and monitors all educational standards for the benefit of the principal stakeholder and the main beneficiary of the entire process which is the 'student'.

Rationale & Need for Contextualization

University of Health Sciences Lahore is a dynamic institution having a vision for conforming to any global health standards and is ever evolving for any newer innovative methodologies. Since its inception in 2002 the University of Health Sciences Lahore has catered for the affiliation protocols, faculty development and institutional practices.

Contextualization in the curriculum refers to the process of integrating the local needs and global standards into the curriculum. It ensures that the curriculum is relevant to the needs of the local community, while also meeting the global standards.

In the context of health professionals, contextualization is essential as it helps students to be better prepared for the real world, where they will be providing healthcare services to diverse populations.



Content identification, contextualization, and validation at the time of curriculum development requires consideration of the local needs and global standards simultaneously, by the relevant leaders and experts. To achieve this, University of Health Sciences Lahore involved the subject experts and medical educationists. The university plans to have an input from all the local stakeholders. This will help to ensure that the curriculum meets the currently required needs.

Why Contextualization is Required for Pakistan Where Old Discipline-Based Curriculum is Used?

In Pakistan, where an old discipline-based curriculum is used, contextualization is required to ensure that the curriculum is relevant to the needs of the local community. The need for contextualization in curriculum development in Pakistan is evident due to the country's unique healthcare challenges such as the high burden of infectious diseases, malnutrition, and maternal and child mortality, in addition to the socioeconomic factors. The high burden of communicable and non-communicable diseases, limited healthcare resources, and cultural and linguistic diversity require a tailored approach to medical education.

How Contextualization of Curriculum Will Affect the Performance of Graduates?

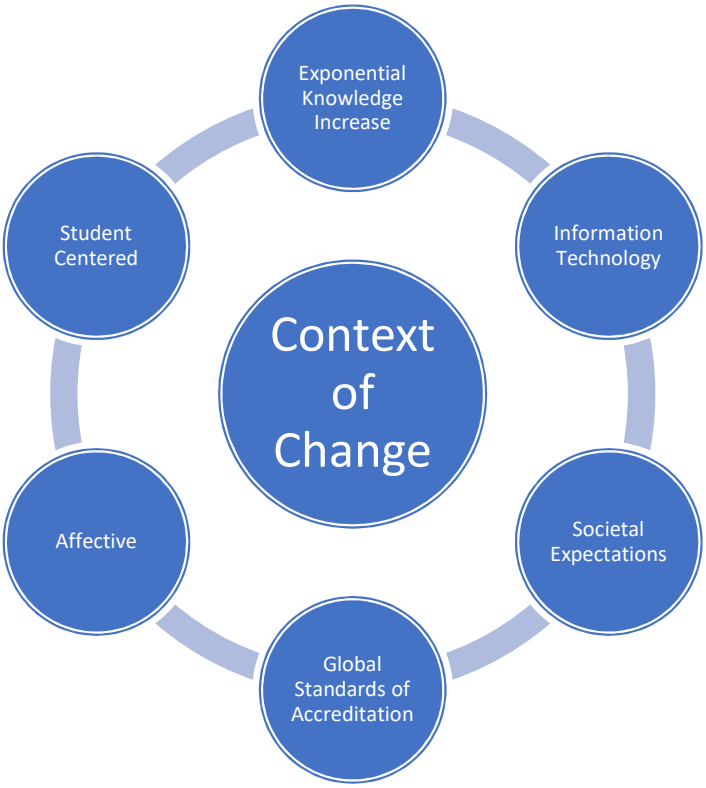
Contextualization of the curriculum is likely to have a positive impact on the performance of graduates. By integrating basic and clinical subjects, by having early clinical orientation, by developing an understanding of the context of learning with the practical approach the graduates will be better prepared to address the health challenges in their local communities. This will improve their competence, confidence, and ability to provide high-quality healthcare services to diverse populations.

Context Facets of Curriculum 2K23

University of Health Sciences Lahore believes in the globally accepted best practices for any formal undertaking of development. All the processes of syllabi identification, thematic structure, content validation and contextualization of curricula a structured process was designed by the Department of Medical Education UHS. The scaffolding principle of development remained the incorporation of the existing teaching and learning practices merged with the global recommendations for change.

A few perspectives for the context of change were:

- Exponential increase in the course content has been identified over the past few years. This increased volume of knowledge base is due to educational advancements, technological enhancements, and scientific discoveries, which have made their way into the mainstream body of work. This increase in the required knowledge base requires prioritization, expunging of redundant concepts, and modern modes of information transfer.
- Societal expectations from the healthcare workers are always in an evolving mode. The patient satisfaction and health system responsiveness ideally should be equally poised. Paradigms like the societal needs, healthcare access, equity of resources and systems awareness are the undercurrents that steer the healthcare systems. These elements evolve and redefine constantly thus setting the pace and specifics for the social accountability for the healthcare workforce. These elements need to be formally addressed in the curriculum for the professional trainings, social grooming, and sense of accountability of the graduates.
- Post pandemic world has transformed to a newer level of educational and meetups paradigms. With the advent of hybrid learning, online monitoring, and blended courses the methodologies need to shelter the possibility, to blend methodologies for a hybrid framework if required. Such a framework was only possible with the advent of the technological advancements.
- As the curriculum was being revamped, evaluated, and drafted it was calibrated against in vogue globally accepted standards of Basic Medical Education. Conformity to the national regulatory authorities is a mandatory requirement. However, aligning with the international accrediting bodies gives a purposeful direction to the curriculum thus ensuring international acceptance and global employability.



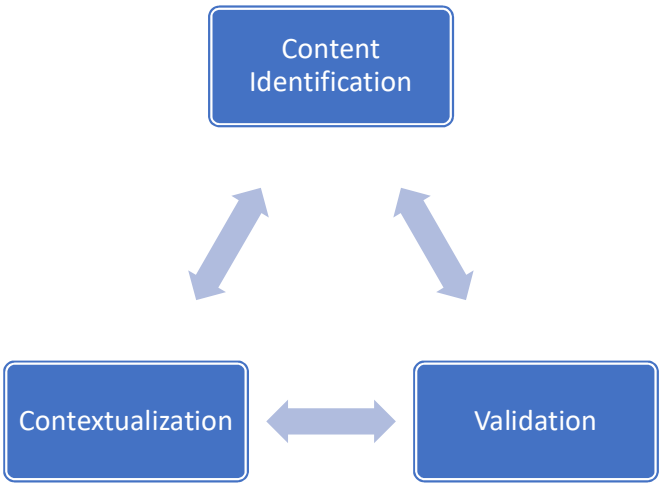
- Previously the curriculum was always expanded for the knowledge base and skill acquisition. However now the societal expectations, social awareness, legal bindings, increasing accountability and community interactions required a categorical structured training of the 'affective' domain of the young learners. This perspective was also kept forth while designing a dedicated 'spiral' for the affective training. To ensure the training of this domain and to make it objective-driven the spiral of 'PERLs' will be subjected to assessment also.
- Finally, the most significant underpinning to the success of any curriculum, the 'student-centeredness' was grounded into the modus of delivery. Introduction of Problem based learning and the elements like 'Electives', Self-directed learning sessions and portfolio development, will place the control of learning with the students, per se.

Process of Curriculum Development

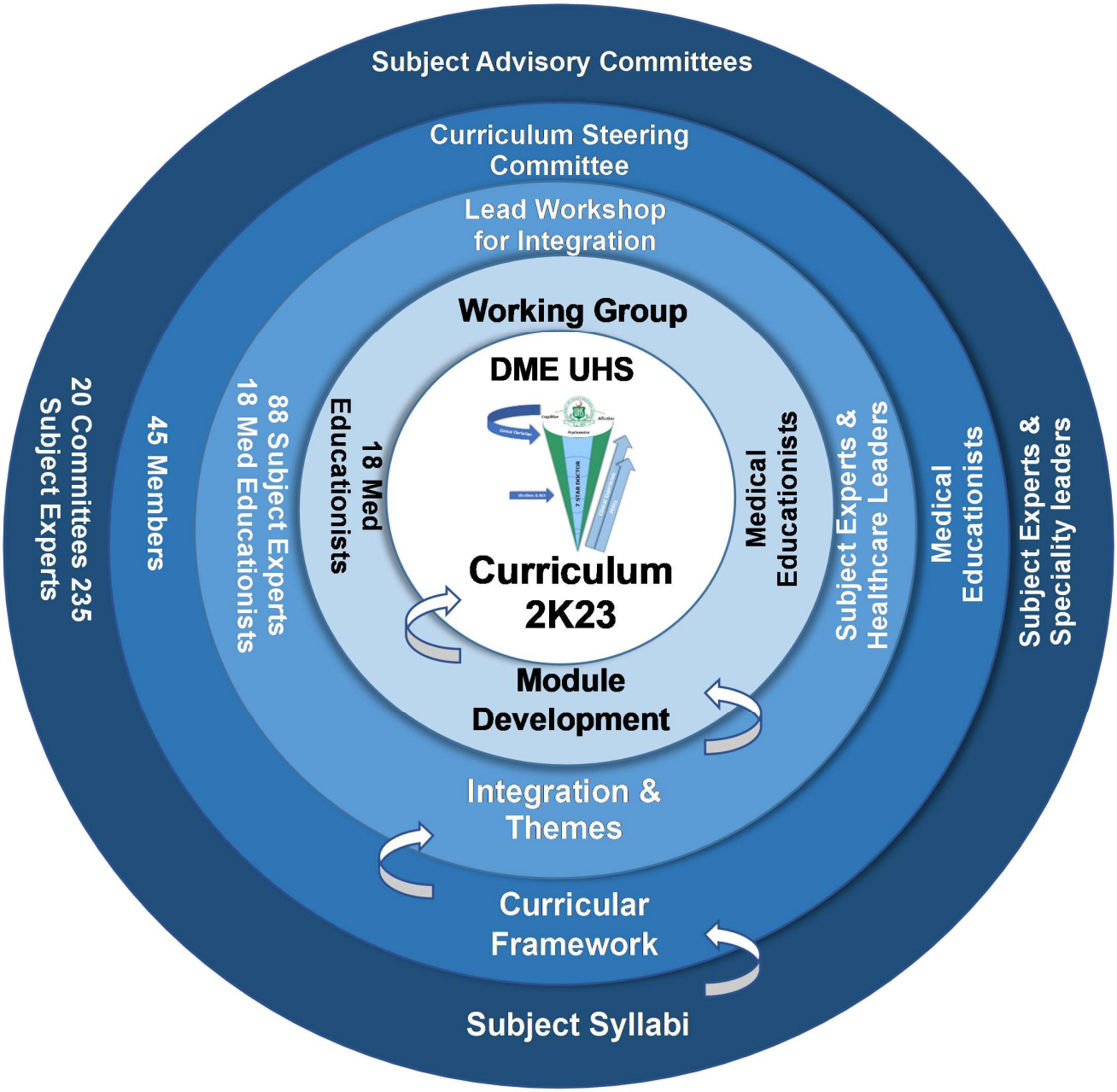
With a backdrop for contextualization of curricular elements and a need for developing a newer curriculum while maintaining a connect with the previously established educational and professional practices a clearly demarcated process was designed to have a standardized input by the subject experts. **University of Health Sciences Lahore**, has a claim to immense cognitive richness based on the faculty members and subject experts which represent all the affiliated colleges of UHS. These subject experts and medical educationists were called in sequentially to play the cardinal roles of syllabi identification, thematic listings, hours allocation, defining scope of integration, module nomination, sequencing of content and identification of integrating components. An iterative process of deliberation and decision making was adopted through numerous meetings and workshops to refine all the previously mentioned elements of curriculum.

- The initial syllabi identification was undertaken by 20 subject advisory committees all represented by respective subject experts. These subject experts ensured the inclusion of all the essential components of the subject into the respective syllabi, leaving behind any redundant, outdated, or non-contextual element. These committees are comprised of more than 233 subject experts.
- As a next step the Curricular Steering committee was called in. The steering committee is comprised of Medical Educationists from all the affiliated medical colleges. A 42 membered committee evaluated and approved the process of finalizing the 05 years framework of a 'Modular Integrated Curriculum' with all its proposed elements, spirals, patterns, modules, and clerkships. They primarily focused on the curricular framework, module identification, module placements, clerkships, and alignment with the assessment methodologies.
- The next step of curricular design and development entailed the theme identifications, placement of elements of syllabi in the respective modular patterns in accordance to the identified themes, defining topics to be covered for each learning objective and allocation of hours for different components. This was done in a continuous activity as a hands-on-development-&-design-workshop. It was carried out by 88 subject experts and 18 medical educationists. The subject experts mostly represented the subject advisory committees. However, all the subject experts were leaders of their own respective specialties and had noteworthy educational experience for their disciplines.
- As a final step a working group all comprising of Lead Medical Educationists and the Department of Medical Education finalized the modules with the decided structure, themes, allocation of hours, syllabi content, respective topics and recommended clinical relevance.
- The finalized modules, assessment policy and framework have gone through the statutory process of Board of Studies, Academic Council, ASRB and the Syndicate.

- The Curriculum being a live document, any recommendations, additions, or deletions that were recommended throughout the statutory approvals were incorporated in the curriculum guidelines.
- It has also been ensured that a pattern of feedback and curricular evaluations becomes a part of the entire implementation process so that the revamping and time to time additions could be undertaken. This final maneuver is necessary to guarantee inclusion of any educational element and ensure no redundancy in the delivery of content.
- The entire method of stakeholder inclusion, discipline perspective, medical educationists monitor and leadership participation for the curricular development.



Iterative Model of Curriculum Development by UHS for Phase 1



Challenges to Curriculum Development

The stakeholder and healthcare leader inclusion expunged any conventional challenges for developing curriculum, reluctance to paradigm shift or possible impediments to implementation of the curriculum.

However, there was just one challenge which UHS identified for the process. One challenge which a university with a broad base of affiliated institutes faces is the 'diversity'. University of Health Sciences Lahore has a diverse set of affiliations. This diversity spans in terms of geographical locations of the colleges as well as in terms of tangible and human resources available to different medical colleges. A dichotomy of public/private sector institutional perspectives is yet another factor to be addressed in terms of diversity. However even from the diverse stand points the most challenging was the number of students per institution, which varied from 100 to > 300 in certain colleges.

Any curricular revamping or educational reform undertaken or implemented have to cater for the needs of all its affiliated and constituent institutes.

This challenge of 'diversity' was accepted by University of Health Sciences Lahore by endorsing the 'diversity'. By formulating guidelines which are compatible with the institutional needs while addresses the revamp required. The guidelines ensure that conformity to the principal change is plausible and implementable for all the stakeholders. However, a latitude of adoption in terms of modes of information transfer and timetable designing etc. was left for the institutional discretion.

Curriculum 2K23 is a modular integrated outcome-based curriculum. The conformity to its standards and implementation of its learning outcomes is possible for all the affiliated colleges keeping their own institutional identity and college vision aligned. Conformity to the curricular standards and elements will be possible in an explicit, structured and methodical way by any affiliated institute irrespective of its available tangible or human resources.

Scope of Integration

The curricular reforms and program evaluations are a dynamic need for the upkeep of learning, to implement innovations, contextualize educational processes with the societal needs and to keep pace with the advancements in the healthcare systems and technology. **University of Health Sciences Lahore** fully endorses these denominators of change and such a dynamic sustainment is in line with the university's vision.

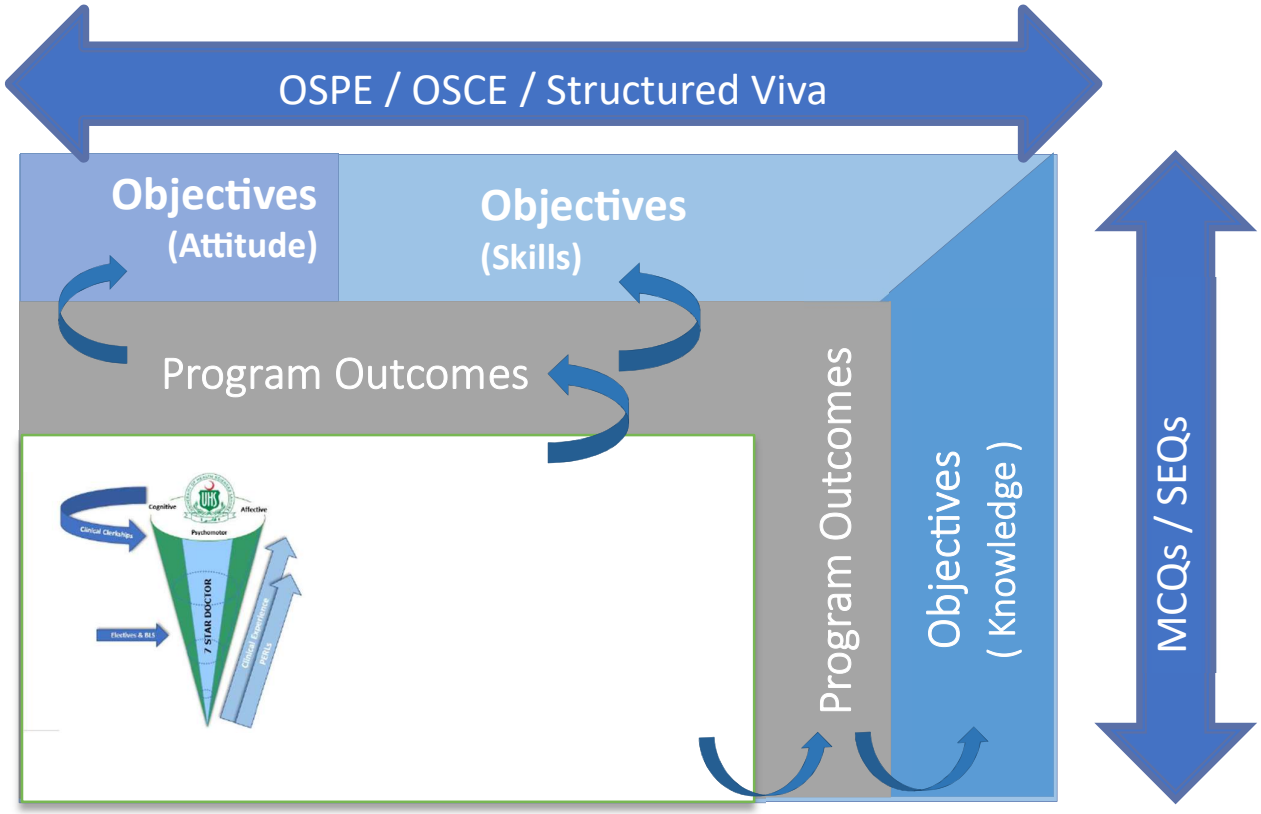
We are living in times when a century old concept based on the Flexner's report for division into pre-clinical and clinical stages has now evolving into newer paradigms of integration across years & integration across disciplines. Meizrow's theory of 'transformative learning' which roots into creating dynamic

relationships between teachers, students, and a shared body of knowledge to promote student learning and personal growth, is forming another basis for curricular reforms.

The modular integrated curriculum aligns the MBBS program outcomes with the nationally defined competencies of seven-star doctors. The program outcomes are at par with the outcomes that the national regulatory authorities have processed till date for the MBBS graduates. Curriculum 2K23 outcomes translate the seven-star competencies to the objectives specific learning outcomes for the sessions. The outcomes are fragmented to objectives representing the three domains of learning and then graduated in spirals and horizontally integrated so as to acquire a professional approach, develop a broad-based practical knowledge, to nurture the learner's epistemic curiosity and to promote higher order thinking.

Another aspect of curricular designing that has been kept forth is to incorporate element of individual learning embedded into the broader practices and collective learning situations. MITs like PBL and small group discussions foster the individual learning tendencies flourishing.

Practicality and applied knowledge require early clinical exposure which has been the foremost perspective while drafting the spiral of C-FRC (Clinical Skills Foundation, Rotation and Clerkships). An early clinical exposure in the first two years despite being limited still augments the curiosity and generates clinical contexts of learning.



Seven Star Competencies

A few salient features that have been incorporated in **Curriculum 2K23** for all the three domains of training, after deliberations and through an iterative process by subject experts, medical educationists and the University lead are as follows:

Horizontal Integration

Cognitive

The framework of **Curriculum 2K23** has 44 modules spanning 05 years. The horizontal integration is evident in the modular configuration where different basic disciplines approach the themes simultaneously. Modules have been structured where all the basic disciplines are represented based on their respective weightage of content. Assessment framework ensures that the applied/clinical aspect also is inculcated in the concept development of the learner keeping the clinical relevance and context at the core.

Clinical Relevance & Themes

All module objectives are preceded by the recommended themes and clinical relevance. These are grounded in the rationale of the module so that pattern of learning could be steered for a practical professional approach. However institutional discretion does not prohibit adopting any other thematic approach provided that the program outcomes are adequately achieved.

Vertical Integration

Spiral placement of the modules within the framework ensures a revisit of the basic sciences. In the first step the applied / clinical learning objectives orientate the learner and the repetitive module horizontally rhymes with the clinical rotations with a backdrop of basic sciences. The final year of clerkship is the final revisit, which is primarily workplace based and principally involves the perfect integrated blend of tri-domain learning.

C-FRC

Psychomotor

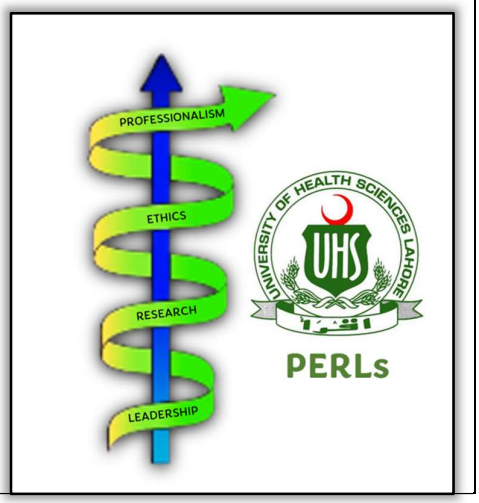
Clinical Skills follow a spiral which is entirely skills dominant. This spiral is the core of psychomotor training. The first two years will be of **Clinical Skills- Foundation** which will represent clinical orientation. The clinical orientation will be conducted in wards, skills lab and simulation centers (depending on the available resources). The clinical orientation along with the applied/clinical component of the knowledge base will channelize the learner for the practical and professional aspect of learning.

The subsequent two years the spiral will move on to **Clinical Skills – Rotations**. The rotations in different wards will be based on foundational developmental already commenced in yesteryears. The year 3 and year 4 which have the rotations will also have the second visit of the modules which would now be more clinically inclined with a stronger base of Pharmacology and Pathology. Community oriented practices and family medicine will also be broadening the element of systems thinking and diversity of practice for a healthcare leader of tomorrow.

Finally, **Clinical Clerkships** are aimed to be entirely facilitated in workplace environments. The clerkship model will involve the delegation of duties thus adding to the acquisition of professional accountability as a competency. The psychomotor training and skills acquisition will be the maximum in the year of clerkship. The entire process of C-FRC will be endorsed in a logbook which would be the training base of the learner for future references and exam evaluations.

PERLs

Affective



Affective training has been formally inculcated in the curricular framework. The model of PERLs has been introduced so that the yield of doctors has a strong, resilient, ethically driven character. PERLs stands for Professionalism, Ethics, Research and Leadership skills. PERLs rounds up professional development for the effective application of the knowledge and skills base achieved. For a professional to be social accountable and to be able to play the healthcare leadership role for societal elements like advocacy, equity or

resources and healthcare access, a formal training is a must. The categorical approach for this training has been achieved by rolling in the assessment of the competencies acquired along with development of portfolios. PERLs will run throughout the year via portfolio development. The portfolio development itself is a methodology which ensures student centered learning. The method of self-reflection which is integral for portfolio development places the learner in the right spot to steer his/her own learning needs.

The spiral of PERLs will be monitored directly by the respective department of Medical Education. However, the teaching sessions, and mentoring process, can and will be assigned to other disciplines. For example, communication skills can have an input from the faculty of Family Medicine and research can be facilitated by the Community Medicine & Public Health faculty. Ethics can be jointly covered by the Forensic department and Behavioral sciences. Leadership is an ambit where the students will be motivated if the institutional leads themselves get involved and can also have the input of the successful alumni. The Faculty of Medical Education will look after the entire process and will also engage in the teaching sessions, when and wherever required.

Type of evidence, activities to be performed, learning situation for the acquirement of the competencies, for the portfolio should be defined and enlisted by the academic council along with the help of the department of medical education. A 'mentoring platform' can flaunt the spirit of affective learning through the PERLs spiral. So, it is recommended that a mentorship program should be developed at the respective institutes.

Other Curricular Elements

The framework of **Curriculum 2K23** has certain other newer elements. These elements define our local context, our existing educational practices and conformity to evidence relating best international practices. Some will be commencing from the first year, however, rest will be a part of the following years. A few of these are:

- Quran
- Clinical Entrepreneurship
- Family Medicine
- Minimal Service Delivery Standards
- Electives
- Basic Life support

The purpose of developing a medical curriculum is to produce competent, empathetic, and efficient healthcare practitioners who can provide quality care to the sick. To achieve this goal, a modular integrated curriculum has been created that aligns the MBBS program outcomes with the seven-star doctor competencies defined nationally.

STANDARDS FOR A SEVEN STAR DOCTOR

The expected generic competencies in a medical graduate are as follows:

1. Skillful
2. Knowledgeable
3. Community Health Promoter
4. Critical Thinker
5. Professional
6. Scholar
7. Leader and Role Model

A 'seven-star doctor' Pakistani medical graduate should be able to demonstrate various traits as detailed under each competency. These attributes are the bare minimum requirements.

The program outcomes are at par with the outcomes that the national regulatory authorities have processed till date for the MBBS graduates. **Curriculum 2K23** outcomes translate these Seven-star competencies to the objectives specific learning outcomes for the sessions.

According to national regulatory authority a Pakistani medical graduate who has attained the status of a 'seven-star doctor' is expected to demonstrate a variety of attributes within each competency. These qualities are considered essential and must be exhibited by the individual professionally and personally.

1. SKILLFUL (CLINICAL, COGNITIVE AND PATIENT CARE SKILLS)

Competent medical graduates require sound clinical skills grounded in knowledge of patient-centered care. They should be able to demonstrate that they can:

a. Take a focused history and identify the patient's risk factors with appreciation of the bio-psycho- social model taking into consideration the environment, ethnicity, race, religion, gender,

age, sexual orientation, occupation, and cultural practices.

b. Perform physical and psychological examinations in order to identify specific problems and differentiate those from others and non-conformity to anatomical or physiological configurations.

c. Formulate a provisional diagnosis with justification, and two to three most likely differential diagnoses.

d. Order appropriate investigations and interpret their reports to either confirm the diagnosis or differentiate from others.

e. Perform various common procedures ensuring infection control in giving injections (I/M, I/V, S/C, I/D), managing infusion lines and blood transfusion, providing first aid, basic life support (including cardiopulmonary resuscitation), nebulization, wound care and dressings, oxygen therapy, taking swabs and smears, recording ECG, performing peak flow spirometry, blood sugar testing by glucometer, proctoscopy, urinary catheterization, urinalysis, and simple skin suturing.

f. Debate the advantages, disadvantages, indications, contra-indications, limitations, and complications of the current treatment modalities, justifying the use of each by best available evidence.

g. Formulate management plans in partnership with patients ensuring their safety by:

h. Diagnosing and managing common health problems independently.

i. Using cost-effective best evidence patient-safe approaches, reporting adverse drug reactions and drug interactions.

j. Recognizing alternate medicine as an option with its effect on health.

k. Incorporating patients' concerns, expectations & understanding, determining the extent to which the patients wish to be involved in decision-making, and respecting the decisions and rights of the patients.

l. Recognizing, stabilizing (first aid and basic life support), investigating, and managing the patient as necessary (Transport, Triage, Neglect, Abuse).

m. Being readily accessible when on duty.

n. Alleviating pain and distress, including end-of-life care.

o. Recognizing and working within the limits of own competence, making use of available resources, and taking advice from colleagues where appropriate, following the consultation process.

p. Advice and counsel the patient and their family members for appropriate health promotion, rehabilitation and support, prevention of risk factors for family members including genetic counseling, immediate treatment and medications, complication, and prognosis, using simple terms and lay man language.

q. Educate the patient regarding the health problem, available choices, management plan, self-care, and use of prescribed drugs and equipment.

r. Recognize and take into consideration issues of equality, equity and diversity, and that opportunities are missed if not perceived to be useful by others.

s. Describe and debate the reasons for the success or failures of various approaches to increase prevention and to decrease social inequities.

t. Manage time and prioritize tasks and use of resources.

u. Ensure patient safety always including strict infection control practices.

2. KNOWLEDGEABLE (SCIENTIFIC KNOWLEDGE FOR GOOD MEDICAL PRACTICE)

This embodies knowledge of basic medical and clinical sciences required for the practice of medicine.

A medical graduate should be able to:

a. Differentiate between:

- Normal and abnormal structure and functions of the body, to recognize and identify abnormalities in body structure in the context of different diseases.

Normal and abnormal molecular, cellular, biochemical, and physiological and pathophysiological mechanisms and processes (physical and mental) that maintain and derange homeostasis, in health and disease.

- Normal and abnormal human behavior and relate the abnormality to its psycho-pathological and pathophysiological basis.

- Effects of growth, development and ageing upon the individual, family, and community in the human life cycle.

- Biological and social determinants and risk factors of disease,

- Various etiological cause(s) and causative agents for specific injuries, illnesses, and diseases.

- Available therapeutic options to select the most appropriate treatment modality or drug(s) for common diseases based on pharmaco-dynamics and/or efficacy.

Other relevant biochemical, pharmacological, surgical, psychological, social interventions in acute and chronic illness, rehabilitation and end-of-life care and recognizing the role of religious and cultural interventions in such situations.

b. Relate:

- The effects and interactions of physical, emotional, and social environments to health and disease of humans.

- The natural history of acute and chronic, communicable, and non-communicable diseases with respective etiologic agents and effect of appropriate interventions on the progress of disease

c. Apply:

- Evidence-based medicine concepts to provide best possible cost-effective care.

d. Ensure:

- Compliance with the legal system as it impacts health care and regulations.

Patient safety guidelines.

3. COMMUNITY HEALTH PROMOTER (KNOWLEDGE OF POPULATION HEALTH AND HEALTHCARE SYSTEMS)

To deal with problems of population-based primary health care, including health promotion and disease prevention with special emphasis on vulnerable populations, medical graduates require knowledge of population health and healthcare systems. The graduates should understand their role and be able to take appropriate action for protecting and promoting the health of populations. They should be able to:

a. **Understand their role and be able to take appropriate action** for protecting and promoting thehealth of their community.

b. Relate effects of lifestyles, genetic, demographic, environmental, social, cultural, economic, and psychological **determinants of health** and their impact on the community.

c. Take appropriate action for **infectious, non-communicable disease and injury prevention**, and in protecting, maintaining, and promoting the health of individuals, families, and communities.

d. **Evaluate national and global trends in morbidity and mortality** of diseases and injuries of social significance, the impact of migration and environmental factors on health and the role of national and international health organizations on health status.

e. **Work as an effective member of the healthcare team** and demonstrate acceptance of the roles and responsibilities of other health and health related personnel in providing health care to individuals,populations, and communities.

f. **Adopt a multidisciplinary approach for health promoting** interventions which require shared responsibility and partnerships of the health care professions with the population served as well as inter-sectoral collaboration.

g. **Apply the basics of health systems including policies**, organizations, financing, cost-containment measures of rising healthcare costs, and principles of effective management to the care of populations, families, and individuals.

Promote and implement mechanisms that **support equity** in access to healthcare and its quality.

4. CRITICAL THINKER (PROBLEM SOLVING AND REFLECTIVE PRACTICE)

The ability to critically evaluate existing knowledge, technology, and information, and to be able to reflecton it, is necessary for solving problems. Medical and dental graduates should be able to demonstrate:

a. **Use of information** obtained and correlated from different sources.

b. **Critical data evaluation** (interpret, analyze, synthesize, evaluate to form decisions)

c. **Dealing effectively with complexity, uncertainty, and probability** in medical decision-making,reflecting on the latest evidence and its application to health issues.

d. **Regular reflection on their practice** and standards of medical practice.

e. **Initiating, participating in, or adapting to change as required**, to ensure that the profession andthe patients benefit.

f. **Flexibility and a problem-solving approach**

g. **Commitment to quality assurance** and monitoring by participating in chart audits and reportingcritical incidents to improve medical practice and decrease risk to self, patients and the public.

h. **Raising concerns about public risk and patient safety**.

5. PROFESSIONAL (BEHAVIOR AND PROFESSIONALISM)

Competent medical graduates require professional values, attitudes and behaviors that embody good medical practice i.e., life-long learning, altruism, empathy, cultural and religious sensitivity, honesty, accountability, probity, ethics, communication skills, and working in teams. Medical graduates should be cognizant of the PMC competencies. Graduates should be role models of their code of conduct, professionalism, and values, on and off duty, throughout their lives, and thus lead by example, to justify the trust reposed in them by the public. Their behavior must enhance public trust in theprofession.

i. Life-long Self-directed Learner

Medical graduates must continually acquire new scientific knowledge and skills to maintain competence and incorporate it into their day-to-day medical practice. For life-long learning, they should demonstrate a desire for continuing medical education during their professional life through personal development activities to continuously acquiring and using new knowledge and technologies. Medical graduates should be able to:

a. **Demonstrate continuous learning** based on regular self-assessment.

b. **Seek peer feedback**. This also includes a continuous undertaking of self-directed study and credited,continuous medical education activities up to re-licensure and recertification.

c. **Manage information effectively** to use it for efficient and effective self-learning, medical problem solving and decision-making:

- **Accurately document** and maintain records of their practice for better patient care and foranalysis and improvement.
- **Retrieve patient-specific information** from a clinical data system.
- **Using information** and communication technology based on its value and limitations.
- **Search, collect, organize, and interpret** health and biomedical information from credibledatabases and sources.

- **Match patient information to evidence available in literature** to form judgments for diagnostic, therapeutic, preventive or prognostic decisions and for surveillance and monitoringof health status.

d. **Provide evidence of continuing career advancement** by pursuing further training in specific fields or continuing professional development (CPD) by attending CPD programs in their primary discipline or as a professional. This evidence may be collated by maintaining professional development portfolios.

e. **Function effectively as a mentor and a trainer** in order to appraise, assess, teach, and provide.
feedback to themselves, peers, colleagues, and students.

f. **Respond positively to appraisals and feedback**.

ii. <u>Altruistic and Empathetic</u>

Medical graduates should be able to demonstrate professional values of empathy, altruism and culturalsensitivity in arranging or coordinating the best possible care with:

- Appropriate **demeanor and dress code**.
- **Responsibility, compassion, empathy, honesty, and integrity**.
- **Tolerance for diversity**.
- **Caring** attitude towards patients and health problems.
- **Put patients first** and the patient's needs before their own.
- **Have patient safety** as a top priority.
- **Culturally sensitive and respectful** of all religious beliefs.

Special sensitivity towards vulnerable populations.

iii. <u>Ethical</u>

Medical graduates should be able to demonstrate professional values of self and professional accountability, honesty, probity, and ethics.

a. Without discrimination on the basis of age, gender, religion or beliefs, color, race, ethnic or national origin, culture, disability, disease, lifestyle, marital or parental status, sexual orientationand social or economic status.

b. Strive for constant improvement of self and health delivery systems.

c. **Respect the views and interests** of the patient and patient's family.

d. **Uphold principles** of patient autonomy, beneficence, non-maleficence, justice, confidentialityand informed consent.

e. **Use moral reasoning in decision-making** while dealing with conflicts amongst ethical, legaland professional issues including those raised by economic constraints, commercialization of healthcare, and scientific advances.

Being accountable for regulation of self and the profession, through audits and performance reviews, in setting up one's practice and in dealing with pharmaceutical and othercommercial enterprises.

iv. Collaborator

The medical graduate should be able to demonstrate skills of teamwork to best serve the interests of thepatient, profession and institution by:

a. Working as an effective team member, understanding the importance of each role.

b. Demonstrating collegiality and respect for juniors, peers, seniors and the healthcare team.

c. Continuously assessing themselves and others in their roles and acting accordingly.

d. Sharing information and handing over care appropriately.

Focusing on a collegial but problem-solving approach.

v. Communicator

The medical graduates should be able to demonstrate:

a. **Non-Verbal communication skills**, including active listening, empathy and a caring attitude; and demonstrating considerate and sensitive manners while dealing with patients and their families, nurses, other health professionals, community, the general public and the media.

b. **Verbal communication skills**, clearly expressing themselves in layman's language; counselling patients sensitively and effectively, providing information in a manner which ensuresthat patients and families have understood the full information, so that they make educated decisions when consenting to any procedure or therapy; clear, effective and sensitive communication for breaking bad news, dealing with an angry or violent patient, difficult circumstances and vulnerable patients; presentation skills.

c. **Written and electronic communication skills**, with well-organized, legible, accurate, complete and concise documentation of prescriptions, medical records, procedural and progress notes, discharge summaries and referral letters including all important information and fulfilling medico legal requirements.

d. **Confidentiality,** and balance confidentiality with public risk.

Dissemination of information and research findings to improve health care.

6. SCHOLAR & RESEARCHER

The medical graduates are expected to demonstrate constructive criticism, a spirit of enquiry, creativity and a research-oriented attitude. The graduates should be able to:

a. Identify a researchable problem and critically review the literature

b. Phrase succinct research questions and formulate hypotheses

c. Identify the appropriate research design(s) in epidemiology and analytical tests in biostatistics to answer the research question.

d. Collect, analyze, and **evaluate** data, and present results.

e. Demonstrate ethics in conducting research and in ownership of intellectual property.

7.LEADER AND ROLE MODEL

The medical graduates are expected to demonstrate exemplary conduct and leadership potential in:

a. Advancing healthcare.

b. Enhancing medical education.

c. Initiating, participating in and adapting to change, using scientific evidence and approaches.

d. Enhancing the trust of the public in the medical and dental profession by being exceptional rolemodels at work and when away.

e. Accepting leadership roles if required.

f. Providing leadership in issues concerning society.

List of Abbreviations

LIST OF ABBREVIATIONS

Abbreviations	Subjects
A	Anatomy
ABG	arterial blood gas
Ag	Aging
AKI	acute kidney injury
ALT	alanine transaminase
AMP	Adenosine monophosphate
ANS	Autonomic Nervous System
AST	aspartate aminotransferase
AV	Atrioventricular
B	Biochemistry
BhS	Behavioral Sciences
C	Civics
CBC	Complete Blood Count
C-FRC	Clinical-Foundation Rotation Clerkship
CK	Creatine kinase
CM	Community Medicine
CNS	Central Nervous System
CO	Carbon monoxide
CO2	Carbon dioxide
COPD	Chronic obstructive pulmonary disease
COX	cyclooxygenase
CPR	Cardio pulmonary Resuscitation
CT	Computed tomography
CV	Cardiovascular
CVA	cerebral vascular accident
DALY	Disability-Adjusted Life Year
DCMLS	Dorsal column medial lemniscus system
DLC	differential Leukocyte Count
DNA	Deoxy Ribonucleic Acid
ECF	Extra Cellular Fluid

ECG	Electrocardiography
ECP	Emergency contraceptive pills
EEG	Electroencephalogram
EnR	Endocrinology & Reproduction
ENT	Ear Nose Throat
ER	Emergency Room
F	Foundation
FEV1	Forced Expiratory Volume 1
FM	Forensic Medicine
FVC	Forced Vital Capacity
GFR	Glomerular Filtration Rate
GIT	Gastrointestinal tract
GMP	guanosine monophosphate
GO	Gynecology and Obstetrics
GTO	Golgi Tendon Organ
HCL	Hydrochloric acid
H & E	Hematoxylin and eosin
HL	Hematopoietic & Lymphatic
HMP	Hexose Monophosphate
HNSS	Head & Neck and Special Senses
ICF	Intra Cellular Fluid
IL	Interleukin
IN	Inflammation
INR	International Normalized Ratio
IUD	Intrauterine device
IUGR	Intra Uterine Growth Restriction
JVP	Jugular Venous Pulse
LDH	Lactate Dehydrogenase
M	Medicine
MALT	Mucosa Associated Lymphoid Tissue
MCH	Mean Corpuscular Volume
MCV	Mean Corpuscular Volume
MRI	Magnetic resonance imaging
MS	Musculoskeletal

MSD	Musculoskeletal disorders
NEAA	non-essential amino acids
NMJ	Neuro Muscular Junction
NS	Neurosciences
O	Ophthalmology
Or	Orientation
P	Physiology
Pa	Pathology
PAF	Platelet activating factor
PBL	Problem Based Learning
PCR	Polymerase Chain Reaction
PDGF	Platelet derived growth factor
Pe	Pediatrics
PEM	Protein Energy Malnutrition
PERLs	Professionalism, Ethics, Research, Leadership
Ph	Pharmacology
PNS	Peripheral Nervous System
Psy	Psychiatry
PVC	Premature Ventricular Contraction
QALY	Quality-Adjusted Life Year
QI	Quran and Islamiyat
R	Renal
Ra	Radiology
RBCs	Red Blood cells
RDA	Recommended Dietary Allowance
Re	Respiratory
RFLP	Restriction Fragment Length Polymorphism
RMP	Resting Membrane Potential
RNA	Ribonucleic Acid
S	Surgery
SA	Sinoatrial
TCA	Tricarboxylic acid cycle
TNF	Tumor Necrotic Factor
USG	Ultrasonography

UTI	Urinary Tract Infections
WBCs	White Blood Cells

Section 6

MODULAR INTEGRATED CURRICULUM 2K23

Version 2.0

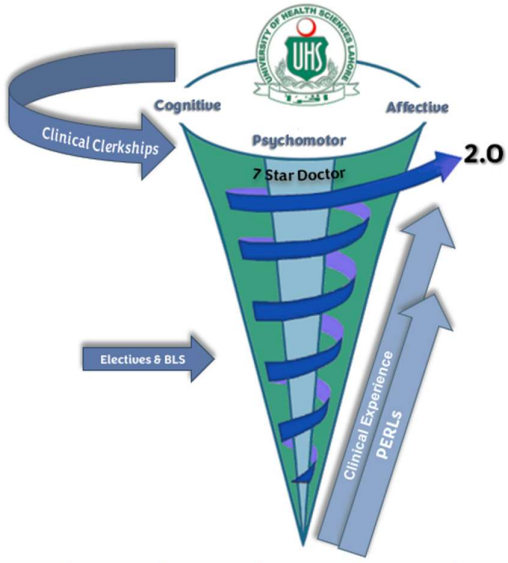
YEAR-1

(REVIEWED & UPDATED)

MODULAR INTEGRATED CURRICULUM 2K23

version 2.0

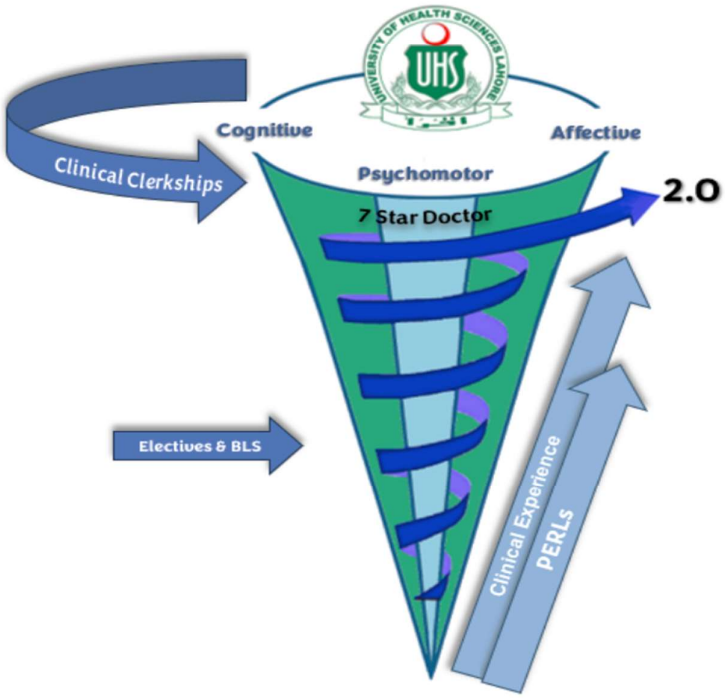
BLOCK-1



MODULE NO. 01:

FOUNDATION-1

MODULAR INTEGTARTED CURRICULUM 2K23 *version 2.0*



MODULE RATIONALE

Tomorrow's doctor is required to acquire competencies, which could align his knowledge base and skill set for his professional practices. The foundation of knowledge needs to commence from 'The Cell'. The cell is a structural and functional unit of life and has a role in normal homeostasis ensuring appropriate cellular functions. Hence, this module has been designed to introduce a blend of molecular, genetic, anatomical, physiological, and psychosocial information essential for developing a perspective on the function of the human body in health and disease. Besides, an initial orientation to pharmacology and pathology subject has been provided so that students are able to use this information in the coming modules.

MODULE OUTCOMES

- Describe the microscopic features of nerve cells, muscle cells, general features of epithelia of the body.
- Appraise the functional characteristics of various components of cell membrane and organelles of cell.
- Differentiate between the dynamics of various transport mechanisms along the cell membrane.
- Compare the functional differences between RBCs, WBCs and blood groups.
- Explain the significance of homeostatic mechanisms in keeping body's internal environment nearly constant.
- Appraise the formation and functions of autonomic nervous system.
- Correlate the structural design of each organ to its function.
- Acquire information about the different fascial planes in the different regions of the body & their surgical importance.
- Use descriptive anatomical terms of position to describe the different body structures in relation to each other.
- Describe the movements of body using proper anatomical terms of movement.
- Describe and demonstrate the various bony landmarks.
- Describe the types of joints and correlate them to the mechanisms of movement.
- Classify the bone, joints and muscles based on the structure, function, phylogenetic origin.
- Describe the structures associated with muscles and explain their functional correlations.
- Classify and describe the cardiovascular system and correlate it functionally.

- Amplify the anatomical basis for radiological, cross-sectional, anatomy.
- Correlate clinicopathologically the apoptosis in health & diseases.

THEMES

- Cell structure
- Cell transport and signaling
- Cell chemistry
- Homeostasis and blood
- Autonomic nervous system
- Body movement
- Muscles
- Growth and development

IMPLEMENTATION TORs
• The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1200. • The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. • However, the level of cognition can be kept at a higher level by the institution. • The Table of Specifications provided will be used for the three papers of the first professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.

SYLLABUS OF FOUNDATION-1 MODULE

THEORY			
DAY-01			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 01+02+04**	
		DISCIPLINE	**TOPIC**
F-Or-001	Analyze the societal expectations, impact and role of physicians. Meet with doctors in various leadership roles to gain insights into the multifaceted responsibilities in the medical field. Define and explain the concept of a "Seven-Star Doctor."	Foundation orientation	Understanding the Medical Profession and the Physician's Role
F-Or-002	Comprehend the values and mission of the institution. Familiarize themselves with the college campus, its facilities (educational psychologist, career counseling, and research department etc.), faculty, and administrative framework. Comprehend the medical facilities available to the student.	Foundation orientation	Exploring the Academic Environment

F-Or-003	Examine and differentiate various teaching methodologies, assessing their applicability and effectiveness. Develop and maintain professional portfolios and logbooks to reflect on their educational progression. Understand the assessment strategies of the program, considering their types and influence on learning. Practice the PBL (Problem Based Learning) mock to understand its process, including problem identification, teamwork, research, and presentation skills.	Foundation orientation	Acquainting with the MBBS Program
DAY-02			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 02+05**	
		DISCIPLINE	**TOPIC**
F-Or-004	Describe and understand the structure of Pakistan's Healthcare System (primary, secondary, and tertiary), recognizing the roles of different sectors and key health policies. Identify and comprehend cultural and ethical aspects unique to the Pakistani Healthcare context. Describe the principles of family practice within the Healthcare System.	Foundation orientation	Delving into the Healthcare System and Delivery

F-Or-005	Use the IT and library facilities such as eBooks', Year planners, access to scientific journals etc. Effectively use the university's learning management system and other online educational tools. Demonstrate proficiency in essential academic software tools such as Microsoft office such as (word, spreadsheets, and presentation software. Recognize and adhere to ethical practices in the use of digital resources, focusing on digital literacy and academic integrity.	Foundation orientation	Integrating Information Technology in Learning
DAY-03			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 05+04**	
		DISCIPLINE	**TOPIC**
F-Or-006	Articulate the structure and requirements of their MBBS program, including core and elective subjects. Understand the significance of interdisciplinary studies and the interconnection of various courses. Identify opportunities for experiential learning, research, and career advancement within the curriculum.	Foundation orientation	Understanding the Curriculum Structure
F-Or-007	Apply various metacognition strategies for learning. Apply digital tools effectively to organize and synthesize information for their academic projects. Create a personal action plan integrating stress management techniques and personal development	Foundation orientation	Self-Directed Learning

	strategies to enhance their academic and personal life.		
NORMAL STRUCTURE			
THEORY			
CODE	**GROSS ANATOMY**	**TOTAL HOURS = 15**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
F-A-001	Briefly describe the applied branches of anatomy Describe the "Anatomical Position" Describe the anatomical planes of body. Describe the terms of relationship, commonly used in Anatomy. Describe the anatomical terms used specifically for Limbs. Describe the terms related to movements.	General Anatomy	Introduction to General Anatomy
F-A-002	Describe, identify, and exemplify the general morphological features of bones. Describe the developmental classification of bones. Describe the regional classification of bones. Describe the morphological classification of bones. Describe and exemplify Sesamoid, Pneumatic, Wormian and Heterotopic bones. Describe the general features of adult typical long bone. Describe the types of epiphyses Discuss the general concept of ossification (primary and secondary centers and rule of ossification) Describe the relationship of growing end of bones with the direction of nutrient foramen Describe the blood supply of various types of bones Describe the salient features of common types of fractures and basic concept of healing of fracture.	General Anatomy	Bones (Osteology)
F-A-003	Describe the general features of cartilage and its	General	Cartilage

	importance in gross anatomy.	Anatomy	(Chondrology)
	Describe the subtypes and gross features of Hyaline, elastic and fibro Cartilage. Differentiate the three types of cartilages		
F-A-004	Describe and exemplify the structural classification of Joints (synovial, cartilaginous & fibrous) along with their sub-classification. Describe the components and characteristic features of a Synovial Joints. Describe the blood supply, innervation of Synovial Joints, cartilaginous joints, and fibrous joints. List the factors stabilizing a synovial joint. Define common joint injuries and diseases	General Anatomy	Joints (Arthrology)
F-A-005	Describe the structure and function of Skin on the basis of its two layers; Epidermis and Dermis Describe the structure of Hair as an appendage of skin. Describe the structure of Nail as an appendage of skin. Describe the structure of Sweat and Sebaceous Glands Describe the structure and function of Superficial Fascia Describe the structure, function, and modifications of Deep Fascia Describe important clinical correlates of skin (skin infections, sebaceous cyst, skin burns and skin grafting)	General Anatomy	Integumentary System
F-A-006	Classify and describe Muscle Tissue based on Structure, Function and Development Describe Somatic and Visceral Muscles Describe and differentiate the Red and White Variety of Skeletal Muscles	General Anatomy	Muscle Tissue (Myology)

	Classify and describe the skeletal muscles based on architecture. Classify skeletal muscle based on action. Describe the parts of a skeletal muscle. Describe and differentiate the basic organization of innervation to skeletal, smooth, and cardiac muscle. Describe the structure of Synovial Bursae Comprehend the meaning of Hypertrophy, Hemiplegia, quadriplegia, paraplegia, hemiparesis	General Anatomy	
F-A-007	Classify the types of blood circulation. Classify and exemplify various types of blood vessels. Describe and exemplify various types of anastomoses. Explain the importance of End Arteries Describe the general organization of Lymphatic Circulation Define the terms: Lymphoid Tissue, Tissue Fluid, Lymphatic, Capillaries, Lymph and Lymphatic Vessels Define the terms; Lymphangitis, Lymphadenitis.	General Anatomy	Vascular System (Angiology)
F-A-008	Define neuron. Describe the anatomical structure of a neuron. Classify neurons based on morphology with examples.	General Anatomy	Nervous Tissue (Neurology)
	Classify neurons based on function. Describe the components of the central nervous system. Describe the components of the peripheral nervous system. Name the supporting cells (neuroglia) of the central nervous system. Describe the structure and functions of the neuroglia of the central nervous system. Enumerate the supporting cells (neuroglia) of the peripheral nervous system.	General Anatomy	

	Describe the structure and functions of the neuroglia of the peripheral nervous system. Enlist the cranial nerves I to XII Describe the types of nerve fibers carried by and distribution of the cranial nerves. Describe the formation, types of modalities carried by, and distribution of the spinal nerves. Explain Dermatome (s) Explain Myotome (s) Describe the formation of Plexuses. Differentiate between Somatic and Visceral nervous system. Define Receptors Describe the functions of receptors. Classify sensory receptors based on modality (with location) Define Effectors Describe the functions of effectors. Describe ANS (Autonomic Nervous System) and differentiate between sympathetic and parasympathetic nervous system		
F-A-009	Identify displacement of fracture segments of the bone Identify dislocation of joints	Integrate with Radiology	Imaging in Anatomy
CODE	**EMBRYOLOGY & POST-NATAL DEVELOPMENT**	**TOTAL HOURS = 25**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
F-A-010	Define Chromosome Theory of inheritance Enlist different stages of Mitosis and Meiosis Compare and contrast Mitosis and Meiosis Enlist the numerical chromosomal anomalies Describe the anatomical basis for numerical chromosomal abnormalities. Describe the clinical presentation of numerical chromosomal abnormalities	Embryology	Cell division and Chromosomal abnormalities

	& justify them embryologically Describe the clinical presentation of structural chromosomal abnormalities and justify them embryologically. Describe the embryological basis for mosaicism Describe the embryological basis for teratoma Describe Concept of Gene Mutation. Enlist common diagnostic techniques for identifying genetic abnormalities.		
F-A-011	Describe the Process of spermatogenesis and spermiogenesis Describe the embryological basis for Abnormal gametes	Embryology	Gametogenesis Spermatogenesis
F-A-012	Describe the Prenatal and postnatal maturation of oocyte	Integrate with Gynecology	Gametogenesis Oogenesis
F-A-013	Describe the significance of arrested development of oocyte	Embryology	Gametogenesis Oogenesis
F-A-014	Compare and contrast oogenesis and spermatogenesis		Gametogenesis
F-A-015	Describe the hormonal control of female reproductive cycles Enumerate and describe the steps of the ovarian cycle Describe the process of ovulation Describe the formation, function and fate of corpus luteum Define Mittelschmerz pain Define menstrual cycle Describe the phases of menstrual cycle	Integrate with Gynecology	Female Reproductive Cycle
F-A-016	Describe the transportation of Oocyte	Embryology	Transportation of gametes
F-A-017	Describe Capacitation & Acrosomal Reaction Define fertilization		Fertilization

	Describe the phases of fertilization Draw and label a diagram illustrating the phases of fertilization Enumerate and describe the results of fertilization		
F-A-018	Define contraception Explain the mechanisms of following contraceptive techniques: 1. Barrier methods 2. Hormonal methods 3. Intrauterine device (IUD) 4. Emergency contraceptive pills (ECPs) 5. Male and female sterilization	Integrate with physiology	Contraception
F-A-019	Describe the anatomical and physiological basis of male and female infertility Define assisted reproductive techniques Describe the mechanisms of In vitro fertilization (IVF) & embryo transfer Explain the correlation of multiple births with assisted reproductive techniques	Integrate with Gynecology	Infertility & assisted reproductive techniques
F-A-020	Describe the process of cleavage of embryo and blastocyst formation Describe the origin and uses of embryonic stem cells and the techniques of obtaining these cells from the embryo (reproductive cloning & therapeutic cloning) Explain the embryological basis of spontaneous abortion.	Embryology	Cleavage, blastocyst formation
	Compare and contrast the villi.	Integrate with Gynaecology	
	Describe the process of Compaction. Describe the Formation of morula (division into inner and outer cell mass)	Embryology	
F-A-021	Describe the Uterus at the time of implantation (decidua reaction) Illustrate the concept of Implantation.	Embryology	Implantation Week 2 of Development

	Describe the Abnormal implantation/ extra uterine implantations. Define the Molar pregnancy. Describe the formation of amniotic cavity, embryonic disc, and umbilical vesicle Describe the formation of chorionic sac.		
F-A-022	Describe the Establishment of uteroplacental circulation.		Utero-Placental circulation
F-A-023	Describe the Formation & fate of primitive streak. Draw a concept map highlighting the sequence of events responsible for transformation of bilaminar germ disc into trilaminar germ disc. Describe the embryology behind sacrococcygeal teratoma and justify its clinical picture. Describe the molecular factors responsible for gastrulation.	Embryology Integrate with Gynaecology	Gastrulation
F-A-024	Describe the Invagination and movement of prenotochordal cells Describe the Notochordal plate formation Describe the Neuroenteric canal formation Describe the fate of the notochord Describe the Establishment of body axis Draw and label the fate map establishment Describe the Fate map establishment Describe the molecular basis for notochord formation	Embryology	Formation of notochord
	Describe the role of notochord as an inducer Describe the embryological basis for situs inversus, Sirenomelia, holoprosencephaly Describe the development of trophoblast and chorionic villi during 3rd week of development		
F-A-025	Describe the Formation of neural tube from neural plate. Justify embryologically the clinical picture seen in	Embryology	Derivatives of ectoderm

	various neural tube defects Describe the process of Migration of neural crest cells Enlist the Derivatives of neural tube and describe the fate of each Enlist the Derivatives of neural crest cells Enlist the ectodermal derivatives Describe the molecular and genetic factors for the process of neurulation Describe important Neural tube defects		
F-A-026	Describe the Differentiation of mesoderm into its constituting components Describe the Somite formation and its fate Describe the Estimation of age by somites Describe the formation of intra-embryonic coelom	Integrate with pediatrics	Mesodermal derivatives
F-A-027	Describe the processes of vasculogenesis & angiogenesis Explain the features of primordial cardiovascular system Describe the anatomical justification for Capillary hemangiomas	Integrate with Cardiology	Early development of CVS
F-A-028	Describe the Cephalo-caudal folding Describe the Lateral folding	Integrate with Gynaecology	Folding of embryo
F-A-029	Enlist the derivatives of germ layers Enlist and Describe the Derivatives of intermediate and lateral plate mesoderm Enlist & Describe the Derivatives of endoderm	Embryology	Germ layer derivatives
	Enlist & describe the derivatives of ectoderm	Integrate with Gynaecology/ Pediatrics	
F-A-030	Describe the Regulation of embryonic development by HomeoBox genes	Embryology	Control of the embryonic development
F-A-031	Enlist the characteristic features of the embryo during		Folding of Embryo

	2nd month Describe the criteria for estimating the developmental staging in human embryos Explain the estimation of gestational & embryonic age		Embryonic period
F-A-032	Explain the measurement and characteristics of fetus/Key events during Embryonic Period. Describe the Overview of External appearance of fetus during fetal period. Enlist developmental horizons during fetal life event. Describe Viability of fetuses and low birth weight babies Explain the factors influencing fetal growth Describe the clinical problems encountered by babies born with IUGR (Intra Uterine Growth Restriction)		Fetal Period
F-A-033	Tabulate the criteria for estimating fertilization age during the fetal period Describe the procedures for assessing fetal status Describe the clinical picture of IUGR & factors resulting in IUGR (Intra Uterine Growth Restriction) Define Pre-eclampsia	Integrate with Gynaecology	Fetal Status
F-A-034	List the fetal membranes Describe the macroscopic & microscopic features of Decidua Enlist the various parts of decidua Functionally correlate the parts of the decidua with its structure Describe the Changes in the trophoblast leading to the development of placenta Describe the Structure (macroscopic & microscopic) of placenta	Integrate with Gynaecology	Placenta
	Enlist & correlate the Functions of placenta with its structure Describe the Microscopic anatomy of Placental		

	membrane Describe the Placental circulation (fetal & maternal) Embryologically justify the hemolytic disease of the neonate (Erythroblastosis fetalis) Describe the functions of placenta		
F-A-035	Describe the Formation & fate of Umbilical cord Describe the Cord abnormalities Justify embryologically the clinical features observed in Absence of umbilical artery Describe the formation and circulation of Amniotic fluid Describe the Procedure of diagnostic amniocentesis Explain the significance of amniotic fluid Describe the factors responsible for Polyhydramnios and oligohydramnios Describe the consequences of oligohydramnios and polyhydramnios Define Amniotic Bands Explain the formation and fate of umbilical vesicle (yolk sac) Define Physiological Umbilical Hernia	Integrate with Gynecology	Fetal membranes
F-A-036	Describe the development of Dizygotic twins Describe the development of Monozygotic twins Describe the fetal membranes in twin pregnancy Describe Fetus Papyraceous Explain the zygosity of the twins Describe the characteristics of various types of conjoined monozygotic twins	Embryology	Multiple pregnancies
F-A-037	Define preterm Birth Describe parturition & three stages of Labor. Describe the Various methods of prenatal diagnosis Describe the Fetal therapy Describe Maternal serum Screening Corelate levels of Alpha feto protein levels and fetal anomalies		Prenatal diagnosis and fetal therapy

	Describe stem cell transplantation and gene therapy		
F-A-038	Define morphogens, protein kinases, notch delta pathway, transcription factors, epigenetics		Molecular regulations and signaling pathways
F-A-039	Define teratology and causes of birth defects Define genomic imprinting Define human disorders associated with genetic mutations Describe birth defects caused by genetic factors: numerical and structural anomalies Define and enlist the teratogens Describe the role of following in causing teratogenicity in humans: 1. Drugs 2. Environmental agents 3. Chemicals & heavy metals 4. Infectious agents 5. Radiation 6. Hormones 7. Maternal diseases Describe the basis for male-mediated teratogens Describe prevention of birth defects		Teratogenicity
CODE	**MICROSCOPIC ANATOMY (HISTOLOGY AND PATHOLOGY)**	**TOTAL HOURS = 08**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
F-A-040	Describe different types of microscopies Describe Staining methods and their significance	Basic technique in Histology	Introduction to microscopy & Basic staining technique
F-A-041	Describe the electron microscopic structure and fluid mosaic model of plasma membrane Draw the fluid mosaic model of plasma membrane Describe the structure of glycocalyx coat and lipid raft and correlate it with function	Basic Histology	Cell membrane

	Describe different types of membrane proteins and their functions		
	Explain different modes of transport across the cell membrane		
F-A-042	List the membranous and non-membranous cellular organelles Describe the structure of the following cellular organelles and correlate with their function: 1. Ribosomes 2. Endoplasmic reticulum (rough & smooth) 3. Golgi apparatus 4. Lysosomes 5. Proteasomes 6. Mitochondria 7. Peroxisomes	Integrate with Pathology	Cell organelles
	Describe the structural components of cytoskeleton, and correlate them with their functions Explain the histological basis of immotile cilia syndrome		
	Describe the histological features of cytoplasmic inclusions	Integrate with Pathology	
	Describe the structure of nuclear envelope and nuclear pores	Integrate with Physiology	
F-A-043	Describe the structure of chromatin Describe the structure of chromosome Describe the structure of nucleolus Describe the structure and types of DNA (Deoxy Ribonucleic Acid) and RNA (Ribonucleic Acid) Describe the histological basis for apoptosis and necrosis	Histology	Cell nucleus
	Describe structure of different types of cell junctions	Integrate with Pathology	
	Describe the cell cycle & cell division Define important clinicopathological terms:		

	Atresia, Hypertrophy, Atrophy, Hyperplasia, Metaplasia, Anaplasia, Neoplasia, Inflammation, Metastasis		
F-A-044	Describe the histological structure and function of basement membrane (light and electron) Draw and label a diagram illustrating the electron microscopic structure of basement membrane Describe the basal surface modifications of epithelia Describe the electron microscopic structure and functions of intercellular junctions (lateral surface modifications) and give their locations	Histology	Epithelium
	Describe the Biochemical composition of the basolateral modifications		
	Describe the electron microscopic structure & functions of the following apical cell surface specializations: 1. Microvilli 2. Stereocilia 3. Cilia	Integrate with Biochemistry	
	Classify and exemplify the epithelia with their histological structure, locations and functions	Integrate with Pathology	
	Describe the structure of exocrine glands Explain the mechanism of transport across the epithelia Describe the classification of exocrine glands on the basis of: 1. Shape of secretory portions and ducts 2. Mode of secretion 3. Type of secretion	Histology	
F-A-045	Describe the composition and list the constituents of connective tissue Classify the connective tissue with examples Describe the composition of ground substance of connective tissue	Histology	Connective tissue

	Describe the composition, distribution, and function of glycosaminoglycans in connective tissue Describe connective tissue fibers, cells. Define Fibrosis		
	Describe the structure, distribution, and functions of the cells of macrophage mononuclear phagocytic system	Integrate with Biochemistry/ Physiology	
	Describe the role of macrophages in innate immunity & formation of foreign body Giant cell Describe the structure & functions of Mast cells. Role of Mast cells in immediate hypersensitivity reactions. Describe structure of Plasma cells and their role in antibody formation.		
	Describe the types of adipose tissue (white & brown), their histogenesis, locations and function	Histology	
	Describe lipid storage and mobilization in and from adipocytes and compare the brown and white adipose tissue	Integrate with Pathology	

PRACTICAL

CODE	ANATOMY	TOTAL HOURS = 03	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
F-A-046	Demonstrate the anatomical terms of position and movement, in particular on limbs.	Anatomy	Osteology Imaging and cross-sectional Anatomy Arthrology
	Demonstrate various anatomical movements of body Identify various elevations and anatomical landmarks on bones. Identify and interpret normal radiographs of various body regions Identify and interpret joint dislocations and displaced fracture bone segments radiographically.		

CODE	EMBRYOLOGY	TOTAL HOURS = 05	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
F-A-047	Calculate fertilization age, gestational age, embryonic/fetal age and expected date of delivery.	Anatomy	Embryology
	On models, charts, aborted embryos and fetal specimens, identify the: Events of embryonic period, i.e., cleavage, morula and blastula formation, yolk sac, amniotic cavity, connecting stalk,		
	Gastrulation (notochord & primitive streak, three germ layers and their parts/derivatives), angiogenesis, neurulation, somites and embryonic age determination based on it, chorionic villi (primary, secondary & tertiary), developmental defects (sacrococcygeal teratoma, neural tube defects) Placenta and it's positional & Implatational variations, umbilical cord and its contents Fetal features during fetal period. Determine age of fetus based on these features.		
	Describe the USG (Ultrasonography) report for the: Fetal features, fetal age estimation, placental attachment with variations, fetal membranes and multiple pregnancies		
	Gastrulation (notochord & primitive streak, three germ layers and their parts/derivatives), angiogenesis, neurulation, somites and embryonic age determination based on it, chorionic villi (primary, secondary & tertiary), developmental defects (sacrococcygeal teratoma, neural tube defects) fetal features during fetal period. Determine age of fetus based on these features.		
	Describe the USG (Ultrasonography) report for the:		

	Fetal features, fetal age estimation, placental attachment with variations, fetal membranes and multiple pregnancies		
CODE	**HISTOLOGY**	**TOTAL HOURS = 14**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
F-A-048	Describe different types of staining techniques and their significance with special emphasis on H&E (Hematoxylin and Eosin) staining	Microscopic Anatomy	Staining techniques
F-A-049	Enlist important features of different parts of light microscope		Microscope
F-A-050	Identify and draw & label different cell shapes under the microscope		Cell shape
F-A-051	Identify under light microscope and Draw & Label the following types of epithelia: 1. Simple squamous 2. Simple cuboidal 3. Simple columnar (ciliated & non-ciliated) 4. Pseudostratified columnar (ciliated & non-ciliated) 5. Stratified squamous (keratinized & non keratinized) 6. Stratified cuboidal 7. Stratified columnar 8. Transitional		Epithelium
F-A-052	Identify under light microscope and Draw & Label serous & mucous secreting glands under light microscope	Microscopic Anatomy	Epithelium
F-A-053	Identify under light microscope and Draw & Label the various types of connective tissue		Connective tissue

NORMAL FUNCTION			
THEORY			
CODE	**MEDICAL PHYSIOLOGY**	**TOTAL HOURS = 40**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
F-P-001	Define Homeostasis Explain control system of body by giving examples Differentiate between Extracellular and Intracellular Fluids Explain the positive and negative feedback mechanisms with examples Explain the significance of feed forward/ adaptive control/delayed negative feedback mechanisms Explain the structure of cell membrane Enlist the types of cell membrane proteins Enumerate the functions of membrane proteins Define and enumerate the functions of cell Glycocalyx	Medical Physiology	Cell Biology
	Enlist membranous and non-membranous organelles Enlist the self-replicative organelles Differentiate between the functions of smooth and rough endoplasmic reticulum Explain the functions of Golgi apparatus Enlist the enzymes of lysosomes Explain the functions of lysosomes Enlist the enzymes of peroxisomes Explain the functions of peroxisomes Enumerate the components and functions of cytoskeleton Define and enlist types of endocytosis Explain the mechanism of pinocytosis Classify different transport mechanisms Compare the composition of Na (Sodium), K		

	(Potassium) and Cl (Chloride) in extracellular and intracellular fluid Define and enlist different types of diffusion Explain the process of facilitated diffusion with the aid of diagram Define and classify different types of active transport Describe primary and secondary active transport with examples Explain voltage and ligand gated channels with examples Name Na, K channel Blockers. Discuss functions and significance of Na/K ATPase pump.		
F-P-002	Enumerate the functions of blood Explain the composition of blood Enumerate the plasma proteins	Medical Physiology	Blood
	Discuss functions of plasma proteins Describe the pathophysiology of edema		
F-P-003	Discuss the characteristics of red blood cells Explain different types of Bone marrows Enumerate the different sites of erythropoiesis at different ages Explain the stages of erythropoiesis Enumerate factors that regulate erythropoiesis Discuss the site and role of erythropoietin in red blood cell production Explain the significance of vitamin B12 and folic acid in maturation of red blood cell		Red Blood Cells
F-P-004	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	Medical Physiology	Hemoglobin

	Enlist the abnormal types of hemoglobin		
F-P-005	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	Medical Physiology	White Blood Cells
	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.		
F-P-006	Enumerate different blood group types. Explain the basis of ABO and Rh blood system Explain the Landsteiner law	Medical Physiology	Blood Types
F-P-007	Discuss Components of ANS (Autonomic nervous system) 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	Medical Physiology Also integrate with Anatomy part of ANS	Autonomic nervous system

PRACTICAL

CODE	PHYSIOLOGY	TOTAL HOURS = 12	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
F-P-008	Explain laboratory/clinical procedure to the subject. Obtain verbal consent from subject before starting a procedure. Reassure the subject after the procedure.	Medical Physiology	Consent
F-P-009	Determine Erythrocyte Sedimentation Rate and packed cell volume		RBCs (Red Blood Cells)
F-P-010	Determination of blood group		Blood Group
F-P-011	Interpret Total Leucocyte Count, Differential Leucocyte Count (normal & abnormal) in a CBC (Complete Blood Count) report generated by Automated Cell Counter Identify various types of WBCs in a prepared DLC (Differential Leukocyte Count)		WBCs (White Blood Cells)

THEORY

CODE	MEDICAL BIOCHEMISTRY	TOTAL HOURS = 36	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
F-B-001	Differentiate between different types of cells. Explain the concept of organization of cells to tissue, tissues to organ, organs to system. Differentiate between the eukaryotic and prokaryotic cells.	Biochemistry Cell Biology	Structure of cell
F-B-002	Describe the composition and structure of cell on biochemical basis and justify it as fluid mosaic model. Describe the structure and function of cell membrane with particular reference to the role of 1. Lipids 2. Carbohydrates 3. Proteins		Cell Membrane

	Explain why the cell membrane is called fluid mosaic model		
F-B-003	Discuss the various ways of cell-to-cell communication and to the environment. Describe cell to cell communications. Cell signaling pathways (only G protein signaling I e. Gs, Gi and Gq) Describe cell to cell adhesion.		Signal transduction
F-B-004	Explain the biochemical markers and importance of subcellular organelles and their inherited disorders especially: 1. cell disease 2. Refsum disease 3. Parkinsonism 4. Progeria		Subcellular organelles
F-B-005	Describe the chemistry of purines and pyrimidines and their linkage in nucleic acid synthesis and their metabolism		Chemistry of purine and pyrimidines
F-B-006	Discuss the organization of DNA with special reference to Watson and crick model, composition, structure, role of Pairing Describe the structural forms of DNA		DNA (Deoxy Ribonucleic Acid)
F-B-007	Discuss the structure of different types of RNAs with special reference to composition, linkage, functions of RNA, micro-RNA Illustrate the structure and functions of various types of RNAs Describe the functions of various small RNAs present in cell	Biochemistry Cell Biology	RNA (Ribonucleic Acid)
F-B-008	Explain the structure and nomenclature of nucleotides, biomedical importance of natural and synthetic analogues Interpret the role of synthetic analogues of	Biochemistry Cell Biology	Nucleotides

	nucleotides in medicine based on sign/symptoms and data e.g Methotrexate, 5 Flurouracil and Allupurinol.		
F-B-009	Explain the higher organization of DNA. Difference between DNA, chromatid and chromosome		Chromosome
F-B-010	Describe enzymes with reference to: 1. Active sites 2. Specificity 3. Catalytic efficiency 4. Cofactor 5. Coenzyme 6. Holoenzyme 7. Apoenzyme 8. Prosthetic group 9. Zymogens 10. Location		Enzymes
	Classify enzymes according to the reaction they catalyze and their nomenclature		
	Explain the mechanism of enzyme action from reactants to products (catalysis).		
	Discuss the effect of various factors on enzymatic activity: 1. Substrate concentration 2. Temperature 3. PH 4. Enzyme concentration		
	Explain the regulation of enzymatic activity (Michaelis Menten and Line weaver Burk's equation). Discuss inhibitors of enzymatic activity (with special reference to Km/V max) 1. Competitive 2. Non competitive	Biochemistry Cell Biology	

	3. uncompetitive		
	Explain the application of enzyme in clinical diagnosis and therapeutic use		
F-B-011	Classify amino acids based on polarity, nutritional importance and glucogenic/Ketogenic properties		Amino acids
	Explain the structure, physical, chemical properties of amino acids and their biomedical importance		
F-B-12	Classify proteins on the basis of functions, solubility and physicochemical properties 1. Explain its biomedical importance 2. Distinguish between class A and B proteins		Protein
	Explain the structural levels of proteins 1. Differentiate between alpha helix and beta pleated protein structures 2. Identify bonding at different levels of proteins		
	Describe the role of chaperons in protein folding 1. Interpret disorders related to protein misfolding on basis of given data 2. Describe the biochemical basis of Alzheimer's disease/ prion disease	Biochemistry Cell Biology	
F-B-13	Classify and explain the bio-chemical role of each class of plasma proteins		Plasma proteins

F-B-14	Explain the structure and biochemical role of immunoglobulins 1. Describe the production, structure and functions of B cells, plasma cells, and antibodies (IgA, IgD, IgE, IgG, and IgM). 2. Discuss the functions of the cytokines (Interleukins (ILs), Tumor Necrosis Factor (TNFs), IFs, Platelet derived growth factor (PDGF), and Platelet activating factor (PAF)). 3. Interpret multiple myeloma on basis of given data		Immunoglobulins

PRACTICAL

CODE	BIOCHEMISTRY	TOTAL HOURS = 09	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
F-B-015	Demonstrate the step taken to prevent or rectify the Laboratory Hazards	Biochemistry	Lab hazards
F-B-016	Identify the structure of cells under microscope		cell
F-B-017	Identify the methods of isolation of cell organelles'		Cell organelles
F-B-018	Identify the different parts of equipment i.e., centrifuge, Microlab, Electrophoresis, Hot Oven, water bath		Equipment
F-B-019	Detection of amino acids by paper chromatography Prepare different types of solution Molar, Molal, Normal and %		Chromatography Solutions

THEORY

CODE	PATHOLOGY	TOTAL HOURS = 12	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
F-Pa-001	Discuss the significance of pathology.	General Pathology	Cell Injury

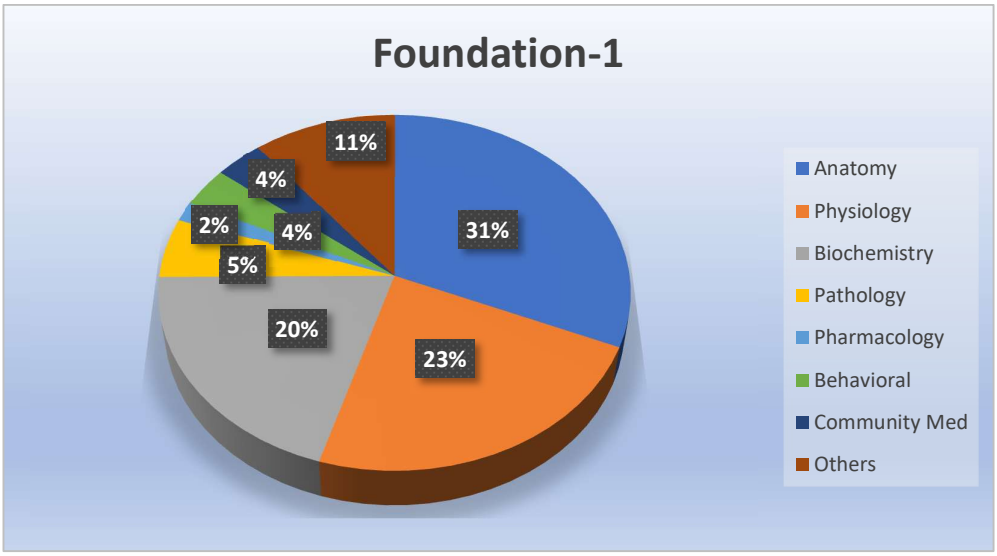
	Discuss the causes of cell injury. Identify the types of cell injury. Describe the mechanism of cell injury. Identify the types of cell death. Define necrosis and apoptosis. Describe different types of necrosis. Compare apoptosis with necrosis. Identify different types and mechanism of cellular adaptations to stress Discuss the mechanism and types of intracellular accumulations and pathological calcifications		
F-Pa-002	Enumerate the microbes causing infectious diseases. Describe the structure of bacterial cell Differentiate cell walls of gram positive and gram-negative bacteria. Compare the structure of bacterial cell and virus Discuss the growth curve of bacteria. Enlist steps of viral replication Identify types of bacterial infections Enlist stages of bacterial pathogenesis	General Microbiology	Introduction to Microorganisms
	Discuss the determinants of bacterial pathogenesis		
F-Pa-003	Define sterilization and disinfection. Describe the principles of sterilization and disinfection. Describe clinical uses of common disinfectants and their mode of sterilization Discuss physical and chemical agents of sterilization		Sterilization & Disinfection
PHARMACOLOGY AND THERAPEUTICS			
THEORY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 04**	
		DISCIPLINE	**TOPIC**

F-Ph-001	Definitions of Pharmacology, drug, pro-drug, placebo, active principles, sources of drugs; Brief outline of Absorption, Distribution, Metabolism and Excretion	General Pharmacology	Absorption, Distribution, Metabolism and Excretion of drugs
F-Ph-002	Definitions of receptor, agonist, partial agonist, inverse agonist, antagonist and types of receptors and second messengers; Diagrammatic concept of signaling mechanisms	General Pharmacology	Basic terminologies of Pharmacology
F-Ph-003	Pharmacological aspects of Autonomic Receptors (types of autonomic receptors, important sites and actions)		Autonomic System
COMMUNITY MEDICINE & PUBLIC HEALTH			
THEORY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 08**	
		DISCIPLINE	**TOPIC**
F-CM-001	Describe the changing concepts and new philosophy of health Explain responsibility for health	Community Medicine and Public Health	Concept of Health
F-CM-002	Explain dimensions and determinants of health and their role in achieving positive health Discuss concept of health and wellbeing Describe the Physical quality of Life Index & Human Development Index		Positive Health Dimensions, Health Determinants
F-CM-003	Describe the importance of health indicators Classify health indicators Calculate Morbidity and Mortality Describe Disability indicators Compare indicators among countries		Health indicators
F-CM-004	Conceptualize disease causation and natural history of disease	Community Medicine and Public	Disease causation

	Explain Germ theory & multifactorial causation Describe Epidemiological Triad Discuss Web of disease causation Describe Gradient of infection	Health	
F-CM-005	Describe principles of prevention and control on prevalent diseases Explain difference between elimination and eradication Describe disease surveillance, types and cycle Explain Primary, secondary, & tertiary prevention Describe five levels of interventions	Community Medicine and Public Health	Disease Prevention

IMPACT (EPIDEMIOLOGY, SOCIOLOGY/SOCIETY, COMMUNITY MEDICINE & PUBLIC HEALTH)			
THEORY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 08**	
		DISCIPLINE	**TOPIC**
F-BhS-001	Identify the Biological Basis of human behavior and discuss social behavior Describe processes such as neurobiology of memory, emotions, sleep, learning, motivation, sex, arousal, reward and punishment	Behavioral Sciences	Biological Basis of Behavior
F-BhS-002	Identify the burden of mental illness on the person, family and society Describe Intellectual disability, Mental Disorders and Personality Disorders		Psychological Disorders
F-BhS-003	Identify the role of psychosocial factors in various illnesses Describe psychosocial aspects of various system diseases such as Cardio-vascular system (CVS), Central Nervous System (CNS), Gastro Intestinal Tract (GIT), Respiration, renal, endocrine and Cancer		Psychology and Disease

F-BhS-004	Identify the behavioral factors associated with pharmacological treatment of diseases Discuss Health belief model, treatment compliance and its psychosocial factors, social factors in drugs prescription and drug resistance		Behavioral Factors & Pharmacological Treatment
F-BhS-005	Identify the rehabilitation work for patients on dialysis and any kind of physical disability Discuss the care requirements in chronic debilitating conditions like Diabetes, Multi-infarcts Dementia, chronic renal disease, limb amputation	Behavioral Sciences	Palliative Care
F-BhS-006	Identify the various physiological effects of stress Explain ANS response to stress, Describe Behavioural manifestations of stress, Stress related multiple sclerosis and autoimmune diseases		Stress
AGING			
THEORY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 01**	
		DISCIPLINE	**TOPIC**
F-Ag-001	Discuss telomeres and telomerase and their clinical significance in aging.	Geriatrics Integrate with Biochemistry	Process of Aging



Module Weeks	Recommended Minimum Hours
08	223

MODULE NO. 02:

HEMATOPOIETIC & LYMPHATIC

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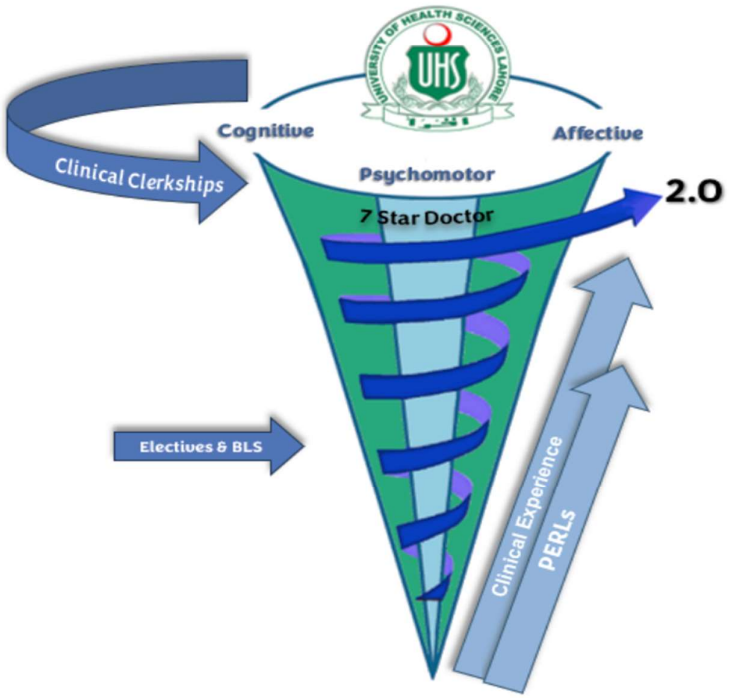


MODULE RATIONALE

"Blood is Life". Unlike any other organ, components of blood and immunity reflect/reveal disease processes in other organs as well. Therefore, studying blood is like opening a book to all aspects of medicine. Hence, this module has been designed to enable students to have a basic understanding about the normal structure, function and biochemistry of blood, immune and Lymphatic systems. Not only that, but students would also learn, when normal physiology and composition of blood and immune system is disturbed, what disorders result in our community. Emphasis has been given to incorporate deranged laboratory findings into the clinical problem solving.

MODULE OUTCOMES

- Explain the function of all the organs / structures involved in this system and the mechanisms controlling them. (Spleen, lymph nodes, thymus, bone marrow, RBC's, WBCs and platelets
- Explain the etiology and pathogenesis of common blood & lymphatic diseases, particularly those of importance in Pakistan.
- Explain the rationale for the use of common therapeutic agents for the diseases related to Blood and immunity.
- Describe the role of immunity in the body
- Discuss the working & uses of laboratory instruments in diagnostic lab visit
- Relate red cell indices with health and disease
- Recognize ABO/RH blood grouping system
- Describe the role of Reticuloendothelial system in the body
- Describe the events of hemostasis
- Extrapolate the biochemical aspects of plasma proteins
- Discuss the pharmacological treatment of iron deficiency anemia
- Discuss Blood composition and function
- Discuss the role of liver in hemolytic anemia
- Practice history taking of a patient presented with blood disorders

THEMES

- Red blood cell
- Platelets

- White blood cell

CLINICAL RELEVANCE

- Aplastic anemia
- Hemolytic anemia
- Blood loss anemia
- Nutritional anemia
- Polycythemia
- Hemoglobinopathies
- Jaundice
- Acute and chronic lymphocytic and myelogenous Leukemia
- Allergy (Type I, Type II & Type III)

IMPLEMENTATION TORs
• The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1200. • The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. • However, the level of cognition can be kept at a higher level by the institution. • The Table of Specifications provided will be used for the three papers of the first professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.

SYLLABUS OF HEMATOPOIETIC & LYMPHATIC MODULE

NORMAL STRUCTURE			
THEORY			
CODE	**GROSS ANATOMY**	**TOTAL HOURS = 02**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
HL-A-001	Identify and describe the components of the Hematopoietic & Lymphoid Tissue and their function	Human Anatomy	Hematopoietic & Lymphoid Tissue
	Location, coverings, relations of Spleen		
	Origin, course branches and distribution of Splenic artery		
	Venous drainage of Spleen, Portal vein formation, tributaries, and area of drainage.		
	Location and relations of Thymus. Age related changes in Thymus		
CODE	**EMBRYOLOGY & POST-NATAL DEVELOPMENT**	**TOTAL HOURS = 01**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
HL-A-002	Intrauterine Development of spleen	Embryology	Developmental Anatomy of Spleen
PRACTICAL			
CODE	**HISTOLOGY**	**TOTAL HOURS = 02**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
HL-A-003	Light microscopic structure of Spleen, thymus, Lymph nodes, tonsils and Mucosa Associated Lymphoid Tissue (MALT) including appendix.	Histology	Histological features of lymph node, spleen & thymus

NORMAL FUNCTION			
THEORY			
CODE	**MEDICAL PHYSIOLOGY**	**TOTAL HOURS = 20**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
HL-P-001	Define, classify and explain anemia on the basis of morphology and cause	Medical Physiology	Anemia
	Discuss the effects of anemia on the body		
HL-P-002	Define polycythemia		Polycythemia
	Explain types of polycythemias		
	Discuss the effects of polycythemia on the body		
HL-P-003	Define hemostasis		Hemostasis
	Describe the mechanisms by which hemostasis is secured		
HL-P-004	Discuss the characteristics and functions of platelets		Platelets
	Explain the mechanism of formation of platelet plug		
HL-P-005	Enlist the clotting factors in blood		Coagulation factors
	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 (INR), and its clinical significance.		

HL-P-006	Enlist and explain the conditions that cause excessive bleeding		Coagulation disorders
	Define thrombocytopenia	Integrated with Medicine	
	Enlist the causes and consequences of Thrombocytopenia		
HL-P-007	Define immunity	Medical Physiology	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.		
HL-P-008	Elaborate Immune tolerance	Medical Physiology	Tolerance
	Explain the process of clone selection during T cell processing		
	Discuss the failure of tolerance mechanism		
HL-P-009	Discuss immunization.	Medical Physiology Integrate with Pediatrics	Immunization
	Define passive Immunity		Immunization
	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.		

HL-P-010	Discuss the pathophysiology, features and treatment of ABO and RH incompatibility. Enlist the changes that take place in the stored Blood.	Medical Physiology	Blood group Incompatibility
HL-P-011	Discuss the features and complications of mismatched blood transfusion reaction Describe the Hazards of blood transfusion. Elaborate the Transplantation of Tissues and Organs	Integrate with Pathology	Blood mismatch Transfusion reactions
HL-P-012	Explain the process of tissue typing Explain the prevention of Graft Rejection by suppressing immune system	Medical Physiology Integrate with Nephrology	Transplantation of tissues
THEORY			
CODE	**MEDICAL BIOCHEMISTRY**	**TOTAL HOURS = 19**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
HL-B-001	Explain the steps of synthesis of hemoglobin and interpret Porphyrias on basis of sign symptoms and data. Discuss the biochemical role and types of hemoglobin 1. Differentiate Hemoglobin and myoglobin 2. Explain oxygen dissociation curve of hemoglobin and myoglobin and factors regulating them 3. Interpret Carbon monoxide (CO) toxicity on the basis of sign and symptoms 4. Explain the role of 2,3 Bisphosphoglycerate (2,3 BPG) in fetal circulation	Medical Biochemistry	Hemoglobin and its types/ RBCs
HL-B-002	Discuss haemoglobinopathies and their biochemical and genetic basis with special emphasis on sickle cell anemia, Thalassemia and methemoglobinemia a) Discuss the following types of anemia on the basis of signs and symptoms and laboratory data: 1. Hypochromic microcytic 2. Normochromic microcytic	Medical Biochemistry Integrate with Pathology	Hemoglobino pathies/ RBCs/ Homeostasis

	3. Normochromic normocytic 4. Macrocytic (megaloblastic)		
HL-B-003	Explain the iron metabolism with mechanism of absorption and factors affecting it. 1. Interpret Iron deficiency anemia on basis of given data and microscopic findings 2. Interpret folic acid and cobalamin in relation to anemias on given data and microscopic findings 3. Discuss biochemical role of pyridoxine and vitamin C in microcytic anemia	Medical Biochemistry Integrate with medicine	Iron Metabolism/ RBCs
HL-B-004	Discuss the degradation of heme in macrophages of reticuloendothelial system 1. Describe the formation of bile pigments, their types and transport 2. Discuss the fate of bilirubin	Medical Biochemistry	Heme Degradation/ RBCs
HL-B-005	Discuss hyperbilirubinemias and their biochemical basis 1. Differentiate types of jaundice on basis of sign/symptoms and data 2. Evaluate the genetic basis of jaundice on the basis of lab investigations		Hyperbilirubinemias / RBCs/ Blood Groups
HL-B-006	Classify and explain the biomedical importance of each class of plasma proteins		Plasma Proteins/ Homeostasis

HL-B-007	Explain the structure and biochemical role of immunoglobulins 1. Describe the production, structure and functions of B cells, plasma cells, and antibodies (IgA, IgD, IgE, IgG, and IgM). 2. Discuss the functions of the cytokines (ILs, TNFs, IFs, PDGF, and PAF). Interpret multiple myeloma on basis of given data		Immunoglobulins/ WBCs/ Immunity
HL-B-008	Explain and interpret pedigree of single gene defect i.e. sickle cell anemia (Autosomal recessive) and Beta Thalassemia (X linked recessive)		Genetics

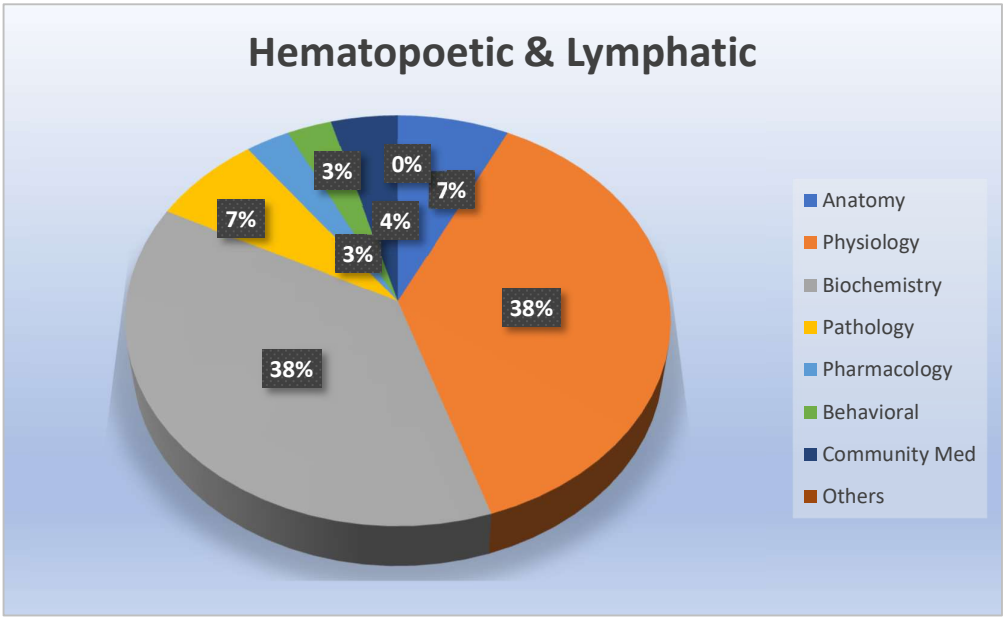
PRACTICAL

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 6+6=12	
		DISCIPLINE	TOPIC
HL-P-013	Interpret the Red Blood Cell Count, Hemoglobin concentration, Hematocrit and RBC Indices by Automated Cell Counter	Medical Physiology	Bleeding/ Clotting time
	Interpret the Total Leucocyte Count Differential Leucocyte Count Platelet Count by Automated Cell Counter.		
HL-P-014	Determine Bleeding Time. Determine Clotting Time.		Jaundice & Anemias/ RBCs/ Homeostasis
HL-B-009	Interpret types of jaundice on the basis of data Perform estimation of bilirubin	Medical Biochemistry	Jaundice & Anemias/ RBCs/ Homeostasis

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS			
THEORY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 2+5=07**	
		DISCIPLINE	**TOPIC**
HL-Ph-001	Describe the oral and parenteral iron preparations including their pharmacokinetics, uses, adverse effects	Pharmacology & Therapeutics	Anemia
	Vitamin B12 preparations, Iron Antidotes		
HL-Pa-001	Should know the terms: Hematopoietic growth factors, their name, mechanism of actions, uses and adverse effects	Pathology	Blood Cells, Platelets and Blood Group
	Define and classify anemias according to underlying mechanism and Mean Corpuscular Volume/ Mean Corpuscular Hemoglobin (MCV/MCH)		
	Discuss the causes and investigations of iron deficiency anemia and megaloblastic anemia		
	Classify the benign and malignant disorders of WBCs		
	Discuss the causes leading to reactive leukocytosis		
	Interpretation of anemias on the basis of peripheral blood smear and bone marrow findings		
	Classify bleeding disorders		
	Discuss first line laboratory investigations for bleeding disorders		
	Describe the basic concept of blood grouping and acute hemolytic transfusion reaction		

DISEASE PREVENTION AND IMPACT			
THEORY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 05**	
		DISCIPLINE	**TOPIC**
HL-CM-01	Describe the nutritional aspects of iron deficiency anemia and psychological aspects of diseases	Community Medicine and Public Health	Anemia
HL-CM-02	Enlist most common blood borne diseases in Pakistan Describe the routes of spread of blood borne diseases		communicable diseases
HL-CM-03	Genetic counseling of parents		Genetic diseases
HL-BhS-01	Psychological Counselling of patients and their families	Behavioral Sciences	Counselling, informational care
HL-BhS-02	Identify and deal with the various psychosocial aspects of Hematopoietic System disorders (such as Sickle Cell Disease, Hemophilia, and Conditions of the Blood) on Individual, Family and Society.		Personal, Psychosocial and vocational issues

AGING			
THEORY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 01**	
		DISCIPLINE	**TOPIC**
HL-Ag-01	Discuss the role of platelets in Platelet-Rich Plasma (PRP) treatment in old age (for skin, hairs and joints)	Biochemistry /Dermatology	Platelet Rich Plasma Therapy
HL-Ag-02	Explain the role of glutathione in skin whitening		Glutathione



Module Weeks	Recommended Minimum Hours
03	69

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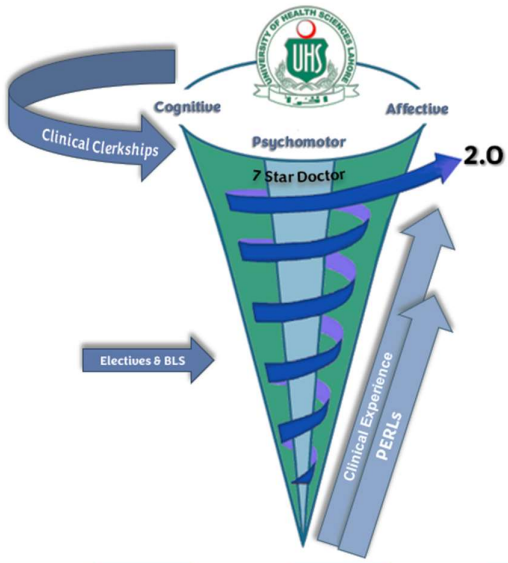
BLOCK-2



MODULE NO. 03:
MUSCULOSKELETAL & LOCOMOTION-1

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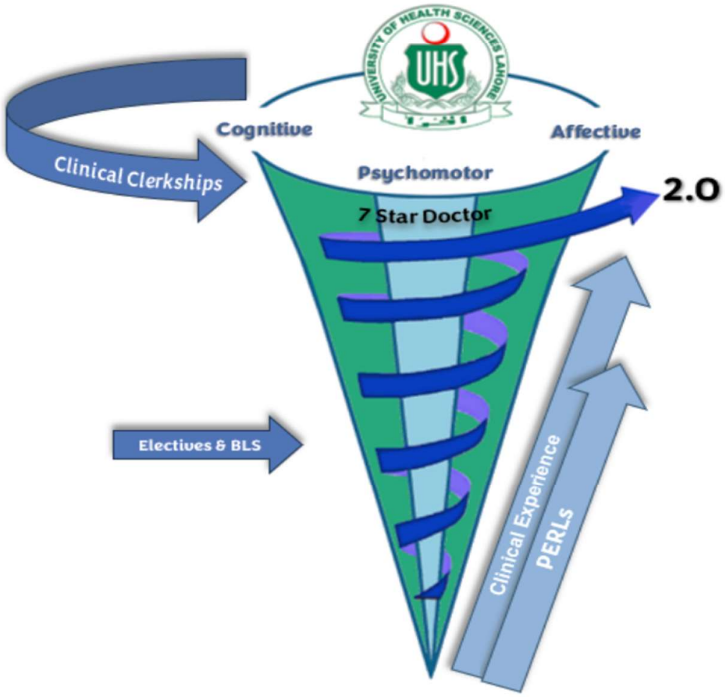


MODULE RATIONALE

The musculoskeletal system comprises the bones, muscles, cartilage, tendons, ligaments, and other connective tissues that provide the framework, support, and movement of the body. The initial learning activities will help in understanding the normal structure, development, and normal physiological mechanisms of the organs of the system. This will help in better understanding the possible pathological conditions of the system, including common injuries, diseases, and disorders that affect it, followed by discussion on some important group of drugs used for treatment and/or prevention of these conditions (administration route, mechanism of action and side effects). The impact of musculoskeletal diseases on society and the effect of ageing on occurrence of musculoskeletal diseases will be discussed. Emphasis has been given to incorporate deranged laboratory and imaging findings into the clinical problem solving.

MODULE OUTCOMES

- Develop an understanding of the fundamental components of the musculoskeletal system.
- Explain the development of the structure & function of the musculoskeletal components of limbs, back & correlate it with organization and gross congenital anomalies of the limbs.
- Identify the anatomical features of bones, muscles & neurovascular components of the limbs with clinical correlation.
- Describe how injury and disease alter the Musculoskeletal structure & function.
- Integrate concepts relating to various metabolic processes, their disorders and relevant lab investigations in the study of human Musculoskeletal system.
- Describe the role of the limbs (upper/lower) in musculoskeletal support, stability, and movements.
- Describe the types, formation, stability, function & clinical significance of joints of the upper and lower limb.
- Describe the basic histology of muscle fibers including their molecular structure (Sarcomere).
- Explain the mechanism of excitation and contraction of skeletal and smooth muscles.
- Discuss the psychosocial impact of musculoskeletal diseases in society.

THEMES
• Pectoral Region & Axilla • Upper limb • Pelvic Girdle • Lower Limb
CLINICAL RELEVANCE
• Congenital anomalies of limb • Joint Dislocation • Fracture • Multiple Sclerosis, Astrocytoma, Alzheimer's Disease • Myopathy, Muscular Dystrophy

IMPLEMENTATION TORs
• The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1200. • The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. • However, the level of cognition can be kept at a higher level by the institution. • The Table of Specifications provided will be used for the three papers of the first professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.

SYLLABUS OF MUSCULOSKELETAL & LOCOMOTION-1 MODULE

NORMAL STRUCTURE			
THEORY			
CODE	**GROSS ANATOMY**	**TOTAL HOURS = 105**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
UPPER LIMB			
MS-A-001	Describe the topographical anatomy of Pectoral Region	Human Anatomy	Pectoral Region
	Perform dissection of the Pectoral Region or use models to identify the key structures		
	Describe muscles of the Pectoral Region with their origin, insertion, nerve supply and actions.		
MS-A-002	Describe the cutaneous nerves. and Superficial veins of the Upper Limb.	Human Anatomy	Dermatomes and cutaneious innervation of Upper Limb
	Describe the extent, attachments, and structures passing through Clavipectoral Fascia	Human Anatomy	
MS-A-003	Describe the extent, structure, vascular supply, lymphatic drainage of Breast (Mammary Glands)	Human Anatomy	Pectoral region & Back + Mammary Glands
	Define the boundaries of auscultation and state its clinical significance	Integrate with Medicine	
	Demonstrate palpation of breast and define its relation to the Fibrous septa in Carcinoma of Breast	Integrate with Surgery	
	Explain the anatomical basis of position adopted for breast examination and mammography.	Integrate with Radiology	
	Describe the osteology of the bones in pectoral region. Enumerate the superficial muscles of back, connecting shoulder girdle with vertebral column. Describe the 1. Attachments 2. Nerve supply Actions of Trapezius, Latissimus Dorsi, Rhomboid	Human Anatomy	

	major and minor. Mention the neurovascular supply of pectoral region and Correlate with important clinical conditions. Describe superficial muscles of the back with their origin, insertion, nerve supply and actions.		
MS-A-004	Describe the Osteology of Clavicle (Morphological features, side determination, attachments, ossification)	Human Anatomy	Bones of Upper Limb: Clavicle & Scapula
	Describe the correlates functions of Clavicle (clavicle fracture, its role in terms of weight transmission of upper limb, compression of neurovascular structures)		
	Describe the Osteology of Scapula (morphological features, attachments, ossification)		
	Determine the side and identify the landmarks of scapula		
	Describe the movements of Scapula associated with movements of Shoulder Girdle		
	Tabulate the muscles of scapular region and give their attachments, nerve supply and action		
	Tabulate the attachments, origin, insertion, innervation, and actions of Anterior Axio-appendicular Muscles		
MS-A-005	Describe the Sternoclavicular Joint in terms of articulating surfaces, ligaments, articular disc, nerve supply.	Human Anatomy	Bones of thorax, Joints of Upper Limb: Sternoclavicular Joint
MS-A-006	Develop clear concepts of the topographical anatomy of Axilla and its contents	Human Anatomy	Axila
	Describe the boundaries of Axilla. (Identification of muscles forming the boundaries of axilla)		
	List the contents of Axilla		
	Perform dissection/ Identify the Axilla and its		

	contents		
	Describe Axillary Artery with reference to its 3 parts _ their relations, branches, and anastomoses		
	Describe the formation, tributaries, and drainage of Axillary Vein	Human Anatomy	
	Identify and demonstrate the course/ relation and branches/tributaries of axillary vessels		
	Describe the Axillary Lymph Nodes in terms of location, grouping, areas of drainage and clinical significance		
	Describe the course, relations, root value and distribution of Axillary nerve. Describe the boundaries and contents of quadrangular space.		
MS-A-007	Describe the Osteology of Humerus (Side Determination, morphological features, attachments, ossification)	Human Anatomy	Bones of upper limb: Humerus
MS-A-008	Describe the Shoulder Joint under the following headings: Articulation, Type/ Variety, Capsule, Ligaments, Innervation, Blood supply, Movements.		Joints of Upper Limb: Shoulder Joint
	Describe the 3 parts of Deltoid Muscle and correlate them with its unique functions. Explain its role in abduction of shoulder joint. Explain mechanism of Abduction of arm		
	Identify and demonstrate the movements of scapula and shoulder joint.		
	Draw and label the arterial anastomosis around shoulder joint		
	Describe, in detail, the Scapula-Humeral Mechanism in relation to movement of abduction. Discuss important clinical conditions		

MS-A-009	Describe Rotator Cuff Muscles, state their Anatomical significance and explain Rotator Cuff Tendinitis	Human Anatomy	Rotator Cuff
	Clinical correlates of shoulder joint. (shoulder joint stability, dislocation and shoulder pain)	Integrate with Surgery	
MS-A-010	Describe the formation of Brachial Plexus; Infra and Supraclavicular parts. Discuss Brachial plexus injuries	Human Anatomy	Nerves of Upper Limb
	Demonstrate and identify the formation of brachial plexus and its branches		
	List the branches of brachial plexus and give their areas of distribution and muscles they innervate		
	Enlist and tabulate the muscles of anterior compartment of arm with their attachments, nerve supply and action. Identify & Describe Musculocutaneous Nerve in terms of its Origin, Course, Termination, Relations, Branches, and distribution. Describe and illustrate the cutaneous innervation of the arm.		
MS-A-011	Describe the Brachial Artery in terms of its course, relations, branches, and distribution	Human Anatomy	Blood supply of arm
	Tabulate the attachments, innervation, and actions of Triceps brachii as a muscle of Posterior Fascial Compartment of Arm		
	Identify & Describe the Profunda Brachii Artery giving its course, relations, branches, and distribution		
MS-A-012	Describe Cubital Fossa with emphasis on its boundaries, contents, and clinical significance		Muscles of Arm
	Demonstrate surface marking of superficial veins of arm and forearm for IV (Intra venous) injections		
	Demonstrate biceps brachi reflex, triceps reflex and		

	brachioradialis reflex		
MS-A-013	Determine the side and identify the landmarks of radius and ulna. Describe the Osteology of Radius (Side Determination, morphological features, attachments).	Human Anatomy	Bones of Forearm
	Describe the Osteology of Ulna (Side Determination, morphological features, attachments).		
MS-A-014	Describe osseofascial compartment of forearm. Tabulate flexor and pronators muscles of forearm, their attachments, actions and nerve supply. Describe the action of paradox with examples	Human Anatomy	Muscle of Anterior/Flexor Compartment of Forearm
MS-A-015	Tabulate the attachments, innervation, and actions of Extensor Muscles of the Forearm		Muscle of Lateral and Posterior/Extensor Compartment of Forearm
	Tabulate the attachments, innervation, and actions of Lateral Muscles of the Forearm		
MS-A-016	Identify the muscles and nerves of flexor and extensor compartments of forearm		Nerves of Forearm
	Describe and illustrate the cutaneous innervation of the Forearm		
	Describe ulnar, median and radial nerves in fore arm.		
MS-A-017	Describe the Origin, Course, Relations, and branches of Ulnar and radial Artery in Forearm Describe the Origin, Course, Relations and list the tributaries of veins of Forearm. Surface marking of Brachial artery, Cephalic, Median cubital, Basilic Vein, Radial & Ulnar arteries, anterior &posterior interosseous artery		Blood supply of forearm
MS-A-018	Identify the Extensor & Flexor Retinacula and describe their attachments and relations	Human Anatomy	Retinacula of Forearm
MS-A-019	Demonstrate the formation of carpal tunnel and	Human	

	identify the contents Describe Carpel Tunnel Syndrome	Anatomy-Integrate with surgery	Carpal tunnel syndrome
	Describe the features, attachments, relations and structures passing under Flexor Retinaculum	Human Anatomy	
MS-A-020	Describe the Origin, Course, Relations, and branches of Ulnar Artery in Forearm		Forearm: Blood supply and Venous drainage
	Describe the Origin, Course, Relations and list the tributaries of veins of Forearm		
	Surface marking of Brachial artery, Cephalic, Median cubital, Basilic Vein, Radial & Ulnar arteries, anterior &posterior interosseous artery		
	Describe the Elbow Joint in terms of articular surfaces, type, variety, ligaments, muscles producing movements, blood supply {Anastomosis around elbow joint}, nerve supply and radiological imaging.	Human Anatomy	Joints of Upper Limbs: Elbow Joint
MS-A-021	Describe Carrying Angle and justify its importance in limb movement	Integrate with Surgery	
MS-A-022	Describe the Radioulnar Joints in terms of articular surfaces, type, variety, ligaments, muscles producing movements, nerve supply and radiological imaging. Describe the wrist joint in terms of articular surfaces, type, variety, ligaments, muscles producing movements, nerve supply and radiological imaging.	Human Anatomy	Joints of Upper Limbs: Radioulnar Joint
	Demonstrate mechanisms of movements of Pronation & Supination		
MS-A-023	Describe the features of Interosseous Membrane with structures that pierce through it	Human Anatomy	Interosseous membrane
MS-A-024	Describe the features and explain the importance of Fibrous Flexor Sheaths, synovial flexor sheaths and	Human Anatomy	Fascia & Muscles of Hand

	extensor expansion		
MS-A-025	Demonstrate the attachments and actions of the muscles of hand Identify the muscles and neurovasculature of palm. Explain the morphology and tabulate the attachments, innervation and actions of intrinsic muscles of hand. Explain the fascial spaces of palm and pulp space of fingers Describe Dupuytren contracture, mallet finger and buttonaire deformity.	Human Anatomy	Hand & Actions of Muscles of Upper Limb as a Functional Unit
	Describe hand as a functional unit. (position of hand, movement of thumb and fingers while performing different functions) Discuss cupping of hand and fist formation.		
MS-A-026	Draw the Radial Artery course, relation and termination in hand with its clinical significance in the region	Human Anatomy	Blood vessels of forearm and hand
	Describe the Ulnar Artery's Course, relation and termination in hand with its clinical significance in the region		
	Describe the formation, branches, and areas of distribution of Superficial and Deep Palmar Arch		
MS-A-027	Describe the course, relations and branches of Ulnar, Median and Radial Nerves in the Hand	Human Anatomy	Nerves of forearm and hand
MS-A-028	Describe the First Carpometacarpal Joint in terms of; Type, Variety, Articular Surfaces, Ligaments, Relations, Blood Supply, Innervation, movements.	Human Anatomy	Joints of Hands
	Demonstrate the movements of the 1st carpometacarpal joint		
	Describe the Metacarpophalangeal & interpharyngeal Joints in terms of; Type, Variety, Articular Surfaces, Ligaments, Relations, Blood		

	Supply, Innervation & Movements		
MS-A-029	Palpate the arteries of the upper limb on a subject	Integrate with Medicine	Skills
	Identify the topographical features of upper limb in a cross-sectional model/ specimen.	Integrate with Radiology	
	Demonstrate and identify the anatomical landmarks of upper limb on radiographs/ CT (Computed tomography)/ MRI (Magnetic resonance imaging)		
	Mark the anatomical landmarks and surface marking on a subject/ simulated model	Human Anatomy	
LOWER LIMB			
THEORY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DISCIPLINE**	**TOPIC**
MS-A-030	Draw and label the Parts of the hip bone, with its attachments.	Human Anatomy	Hip Bone
	Describe the parts, attachments of hip bone		
	Identify the parts and bony features of the hip bone, with its attachments, important relations		
	Demonstrate the side determination of hip bone, its bony features, attachments		
MS-A-031	Describe the parts, attachments, side determination of femur	Human Anatomy	Femur
	Identify the parts and bony features of the femur, with its attachments.		
	Demonstrate the side determination of femur, its bony features, attachments, and important relations (correlate these with fractures)		
	Describe coxa Vara and coxa valga and their clinical significance		
MS-A-032	Describe the extent, attachments, and modifications of Fascia Lata	Human Anatomy	Fascia Lata
	Demonstrate the attachment of fascia Lata, iliotibial tract		

MS-A-033	Describe the cutaneous nerves and vessels of thigh	Human Anatomy	Neurovascular Supply of thigh
	Draw and label the cutaneous nerve supply of thigh		
	Describe the formation, course, relations, tributaries, and termination of the superficial veins		
	Explain the anatomical justification of venesection, varicose veins, and saphenous venous grafts		
	Describe the lymphatic drainage of the region with special emphasis on afferent and efferent of inguinal lymph nodes		
	Identify the superficial and deep lymph nodes		
	Explain the anatomical justification for enlargement of inguinal lymph nodes		
MS-A-034	Describe and identify the Boundaries and contents of femoral triangle	Human Anatomy	Femoral Triangle & Canal
	Draw and label the Boundaries and contents of femoral triangle		
	Identify the femoral sheath with its compartments		
	Describe the formation of femoral sheath and its significance		
	Describe the formation of femoral canal and its contents and significance		
	Describe the formation and significance of femoral ring		
	Compare and contrast the anatomical features of femoral and inguinal hernias	Integrate with Surgery	
MS-A-035	Tabulate the muscles of anterior compartment of thigh with their attachments, nerve supply and actions	Human Anatomy	Muscles of Anterior Compartment of Thigh
	Demonstrate and identify the muscles of anterior compartment of thigh with their proximal and distal attachments		

	Demonstrate the actions of muscles of anterior compartment of thigh		
	Explain the anatomical basis of psoas abscess	Integrate with Surgery	
MS-A-036	Identify and demonstrate the nerves and vessels of anterior compartment of thigh along with their branches	Human Anatomy	Neurovascular supply of Anterior Compartment of Thigh
	Describe the origin, course, relations, branches, distribution, and termination of femoral artery		
	Describe the origin, course, relations, tributaries, area of drainage and termination of femoral vein		
	Describe the origin, course, relations, branches, distribution, and termination of femoral nerve		
	Tabulate the muscles of anterior compartment of thigh with their attachments, nerve supply and actions.		
MS-A-037	Describe the formation, boundaries, contents of adductor canal	Human Anatomy	Adductor Canal
	Identify and demonstrate the boundaries and contents of adductor canal		
MS-A-038	Describe Muscles of medial compartment of thigh with their proximal and distal attachments, innervation and actions		Muscles of Medial Compartment of Thigh
	Identify the muscles of medial compartment of thigh with their proximal and distal attachments		
	Demonstrate the actions of the muscles of the compartment on self/ subject		
MS-A-039	Describe the origin, course, relations, branches/ tributaries, distribution, and termination of neurovascular structures of medial compartment of thigh	Human Anatomy	Neurovascular supply of Medial Compartment of Thigh
	Identify the nerves and vessels of medial compartment of thigh along with their branches		

	Describe and identify the lumbar and sacral plexus and its branches supplying the lower limb		
	Describe the cutaneous nerve supply and lymphatics of the region		
MS-A-040	List the structures passing through the greater and lesser sciatic foramen.		Gluteal Region
	Describe the muscles of gluteal region with their proximal and distal attachments, innervation, and actions		
	Identify the muscles of gluteal region with their proximal and distal attachments		
	Describe the origin, course, relations, branches/ tributaries, distribution, and termination of neurovascular structures of gluteal region		
	Demonstrate the actions of the muscles of gluteal region		
	Explain the anatomical basis of the consequences of wrongly placed gluteal intramuscular injections Damage to Gluteus medius & minimus due to poliomyelitis	Integrate with Medicine	
	Demonstrate and identify the origin, course, relations, branches/tributaries and termination of nerves and vessels of gluteal region	Human Anatomy	
MS-A-041	Describe the Attachments of muscles of posterior compartment of thigh with the innervation and action	Human Anatomy	Muscles of Posterior Compartment of Thigh
	Identify the muscles of posterior compartment of thigh with their proximal and distal attachments		
	Demonstrate the actions of muscles of posterior compartment of thigh		
	Describe the anatomical basis of signs and symptoms of sciatica.	Integrate with Surgery	
MS-A-042	Describe the origin, course, relations, branches, distribution, and termination of Profunda femoris	Human	Blood supply of Posterior

	artery	Anatomy	compartment thigh
	Describe blood supply on back of thigh		
MS-A-043	Describe the origin, course, relations, branches, distribution, and termination of sciatic nerve	Human Anatomy	Sciatic Nerve
	Describe the anatomical basis, signs and symptoms of compression of or injury to sciatic nerve	Integrate with Surgery	
MS-A-044	Describe the hip joint with its type, articulations, ligaments, stabilizing factors		Hip Joint
	Movements, and neuro-vascular supply with clinical significance.	Human Anatomy	
	Perform the movements of hip joint at various angles and be able to describe the muscles producing the movement. Discuss important associated clinical conditions (Hip dislocation, Arthritis, Hip joint stability and Trendelenburg sign) movements, and neuro-vascular supply with clinical significance.		
MS-A-045	Describe the Boundaries and contents of popliteal fossa. Discuss clinical correlates (Popliteal aneurysm, Palpation of Popliteal artery, semi membranous bursa swelling and Baker's cyst	Human Anatomy	Popliteal Fossa
	Draw and label boundaries and contents of popliteal fossa		
	Identify the boundaries and contents of popliteal fossa		
	Describe the origin, course, relations, branches/tributaries, distribution and termination of popliteal artery and vein		
MS-A-046	Describe parts of tibia and fibula, with their attachments, important relations and side	Human Anatomy	Knee Joint

	determination		
	Identify the parts and bony features of the tibia & fibula, their bony features, attachments, important relations.		
	Draw and label Parts of patella with its attachments		
	Describe features of patella, and name the factor responsible for stabilizing Patella		
	Describe the knee joint with its type, articulations, ligaments, movements, and neuro-vascular supply		
	Explain the mechanism of locking and unlocking of knee joint with the foot on ground and off the ground Describe the attachments and role of popliteus in locking and unlocking of the knee joint		
	Describe the factors responsible for stability of knee joint. Discuss important associated clinical conditions.		
MS-A-047	Describe the Muscles of anterior, lateral, and posterior compartments of leg with their proximal & distal attachments, innervation, and actions	Human Anatomy	Muscles of leg
	Identify the muscles of anterior, lateral, and posterior compartments of leg with their proximal and distal attachments		Neurovascular supply of Leg
MS-A-048	Describe the origin, course, relations, branches/tributaries and termination of nerves and vessels of anterior, lateral, and posterior compartments of leg- Compartment Syndrome, Foot Drop		Neurovascular supply of Leg
	Describe the cutaneous nerves and veins of leg.		
	Draw and label the cutaneous nerve supply and dermatomes of leg		
MS-A-049	Identify the extensor, flexor, and peroneal retinacula		Flexor,

	and demonstrate the structures related to them		Extensor, and peroneal Reticula
	Describe the attachments, relations, and structures passing under cover of, extensor, peroneal, and flexor retinacula		
	Identify and demonstrate the nerves and vessels of anterior, lateral, and posterior compartments of leg along with their branches		
	Describe the formation of noncalcareous (Achilles tendon)		
MS-A-050	Describe the articulations, muscles and nerve supply and movements at Tibiofibular joints	Human Anatomy	Tibio-fibular Joint
MS-A-051	Describe the ankle joint with its type, articulations, ligaments, movements, and nerve supply	Human Anatomy	Ankle Joint
	Describe the factors stabilizing the ankle joint. Discuss important associated clinical conditions.		
	Identify and demonstrate the articulating surfaces and ligaments of ankle joint		
MS-A-052	Describe the formation, attachments, and clinical significance of plantar aponeurosis	Human Anatomy	Plantar Fascia
	Explain the anatomical basis of the signs and symptoms of plantar fasciitis.	Integrate with Orthopedics	
MS-A-053	Identify the parts and bony features, attachments, and important relations of the articulated foot	Human Anatomy	Muscles of foot
	Describe the muscles of the dorsum and sole of foot with their proximal & distal attachments, innervation and actions emphasizing the role of interossei and lumbricals.		
	Draw and label the muscles of the layers of sole of foot		
	Demonstrate and identify the muscles and tendons with their proximal and distal attachments in the sole of foot		
MS-A-054	Describe the interphalangeal, subtalar and midtarsal		Small joints of

	joints with their types, articulation, movements, ligaments.	Human Anatomy	foot
MS-A-055	Describe the formation, components, stabilizing and maintaining factors of the arches of foot	Integrate with Orthopedics	Arches of foot
	Describe the clinical significance of arches of foot with respect to flat foot, claw foot.		
MS-A-056	Describe the fibrous flexor sheaths, extensor expansions and synovial flexor sheaths	Human Anatomy	Retinacula of foot
MS-A-057	Describe the origin, course, relations, branches/tributaries, distribution, and termination of plantar vessels	Human Anatomy	Neurovascular supply of foot
	Identify the nerves and vessels on the foot along with their branches		
	Describe the cutaneous nerves of foot		
	Draw and label the cutaneous nerve supply and dermatomes of foot		
	Identify the nerves and vessels in the sole of foot along with their branches		
	Describe the palpation of dorsalis pedis artery &explain the clinical significance of dorsalis pedis artery		
MS-A-058	Describe the surface anatomy, course, relations, tributaries, and communications of the superficial veins of the lower limb	Human Anatomy	Arterial and Venous drainage of lower limb
	Draw a concept map of the superficial veins of lower limb		
	List the factors favoring venous return of the lower limb		
MS-A-059	Explain the anatomical basis of the formation,		
	and signs and symptoms of deep venous thrombosis	Integrate with Surgery	Human Gait
	Discuss Clinical correlations of Lower Limb Arteries (palpation of femoral, popliteal, posterior tibial &	Integrate with Medicine	

	dorsalis pedis arteries, collateral circulation, intermittent claudication, occlusive arterial disease)		
MS-A-060	Draw a concept map of the lymphatic drainage of lower limb	Human Anatomy	Lymphatic drainage of lower limb
MS-A-061	Draw and label the cutaneous nerves & dermatomes of the lower limb Discuss clinical correlates of Lower limb nerves (Femoral nerve injury, Sciatic Nerve injury, Common fibular, tibial & obturator nerve injury) Describe the anatomical basis of knee jerk, ankle jerk, and plantar reflex	Human Anatomy	Cutaneous dermatomes & nerve supply of lower limb
MS-A-062	Demonstrate the surface marking of nerves and vessels of lower limb		Topographical and radiological anatomy of lower limb
	Demonstrate the surface marking of bony landmarks of lower limb		
	Identify the topographical features of lower limb in a cross-sectional model		
	Demonstrate and identify the features of bones and joints of lower limb on radiograph/ CT scan/ MRI	Integrate with Radiology	
MS-A-063	Describe the common fractures of the following bone with the risk factors, clinical presentations, and management: 1. Clavicle 2. Humerus 3. Radius 4. Ulna 5. Small bones of hand 6. Hip bone 7. Femur 8. Tibia	Orthopedics and trauma	Bone Fracture

	9. Fibula 10. Small bones of foot		
MS-A-064	Describe the dislocations of the following joints with the risk factors and clinical presentations, and brief management: Shoulder joint 1. Elbow joint 2. Interphalangeal joint of hand 3. Hip joint 4. Knee joint 5. Ankle joint	Orthopedics and trauma	Joint Dislocation
THEORY			
CODE	**EMBRYOLOGY & POST-NATAL DEVELOPMENT**	**TOTAL HOURS = 06**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
MS-A-065	Name the molecular and genetic factors involved in the development of musculoskeletal system	Human Embryology	Development of Muscles
	Describe the development of skeletal muscle and innervation of axial skeletal Muscles-developmental basis of myotome		
	Briefly discuss the development of cardiac and smooth muscle (Detail to be covered in respective modules later).		
MS-A-066	Describe the process of limb development and limb growth	Human Embryology	Development of Limb
MS-A-067	Describe the embryological basis of cutaneous innervation of limb	Human Embryology	Development of Nerve supply of limbs
	Describe the embryological basis of blood supply of limbs and concept of axial artery		

MS-A-068	Describe the embryological basis of congenital anomalies related to muscular system.	Human Embryology	Congenital anomalies of limbs
	Describe the clinical presentations and embryological basis of; i. Amelia ii. Meromelia iii. Phocomelia iv. Cleft Hand and Foot v. Polydactyly, Brachydactyly, Syndactyly vi. Congenital club foot	Integrate with Paedriatics	
MS-A-069	Describe the developmental process of cartilage and bone	Human Embryology	Development of Cartilage
	Describe the process of histogenesis of cartilage and bone		
MS-A-070	List the factors contributing to the development of Axial skeletal system	Human Embryology	Development of Axial skeleton
	Describe the clinical picture and explain the embryological basis of Axial skeletal anomalies		
	Describe the developmental process of Vertebral Column		
THEORY			
CODE	**MICROSCOPIC ANATOMY**	**TOTAL HOURS = 06**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
MS-A-071	Describe the microscopic structure and ultramicroscopic structure of skeletal muscle	Histology	Histology of Muscles
	Explain the basis of myasthenia gravis.	Integrate with Medicine	
	Describe the microscopic and ultramicroscopic structure of cardiac muscle	Histology	
	Describe the microscopic and ultramicroscopic structure of smooth muscle		
	Compare and contrast the histological features of		

	three types of muscle tissue		
MS-A-072	Describe Myosatellite Cells & their role in regeneration of muscle, hyperplasia, and hypertrophy of muscle fiber	Histology/ Integrate with Pathology	Functional Histology
	Explain the histopathological basis of leiomyoma	Histopathology	
MS-A-073	Describe the light and electron microscopic structure of bone cells Describe the light and electron microscopic structure of compact and spongy bone	Histology	Histology of Osseous tissue
	Describe the histological justification for osteoporosis, Osteopetrosis	Integrate with Pathology	
	Describe the histological basis for bone repair after fractures.		
MS-A-074	Compare and contrast the microscopic features of compact and spongy bone	Histology	Histology of Bone
	Explain the characteristic features of ossification (Intramembranous & Endochondral ossification)		
	Describe the zones seen in an epiphyseal growth plate		
MS-A-075	Describe the metabolic role of bone -	Integrate with Medicine	Functional Histology of Bone
	Describe the clinical presentation of osteoporosis, osteopenia	Integrate with Orthopedics	
MS-A-076	Describe the microscopic and ultramicroscopic structure of all types of cartilage	Histology	Histology of Cartilage
	Compare and contrast the structure of cartilage and bone matrix		
	Tabulate the differences between three types of cartilage		
MS-A-077	Describe the histological basis for bone & Cartilage growth and repair	Histology	Mechanism of Bone growth

PRACTICAL			
CODE	HISTOLOGY	TOTAL HOURS = 08	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
MS-A-078	Draw and label the histology of skeletal muscle	Histology	Histology of Muscles
	Draw and label the histology of smooth muscle		
	Draw and label the histology of cardiac muscle		
MS-A-079	Draw and label the histological picture of compact bone	Histology	Histology of Bones
	Draw and label the histological picture of spongy bone		
MS-A-080	Draw and label the microscopic structure of hyaline cartilage	Histology	Histology of Cartilage
	Draw and label the microscopic structure of elastic cartilage		
	Draw and label the microscopic structure of fibro cartilage		
NORMAL FUNCTION			
THEORY			
CODE	MEDICAL PHYSIOLOGY	TOTAL HOURS = 32	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
MS-P-001	Explain the Physiological basis of membrane potential	Medical Physiology	Diffusion / Equilibrium Potentials
	Explain diffusion potentials of Na & K		
MS-P-002	Define Nernst potential		Nernst potential
	Explain Physiological Basis of Nernst potential		
	Write the Nernst equation.		
	Calculate Nernst potential for Na & K		
	Explain the effects of altering the concentration of Na+, K+, Ca on the equilibrium potential for that ion		

MS-P-003	Describe the normal distribution of Na+, K+, Ca and Cl- across the cell membrane		Goldman Equation
	Explain physiological basis of Goldman equation		
	Clarify the role of Goldman equation in generation of Resting Membrane Potential (RMP).		
MS-P-004	Describe the Physiological basis of generation of RMP.		Resting Membrane Potential in Neurons
	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.	Medical Physiology Integrate with Anesthesiology	
MS-P-005	Describe the Physiological anatomy of Neurons	Medical Physiology	Neurons
	Discuss the axonal transport		
	Enlist & give functions of Neuroglial cells		
	Explain process of myelination in Central Nervous System (CNS) & Peripheral Nervous System (PNS)		
MS-P-006	Classify neurons functionally.		Classification of Neurons & Fibers
	Classify nerve fibers according to Erlanger & Gasser Classification		
MS-P-007	Define Action Potential		Action Potential of Neurons
	Enlist the Properties of action potential		
	Describe the ionic basis of an action potential.		
	Explain the phases of action potential.		
	Explain the effects of hyperkalemia and Hypokalemia on the action potential.		
	Draw monophasic action potential.		
	Explain absolute and relative refractory period		
MS-P-008	Explain the role of other ions in action potential.		Role of other ions in action potential
	Elaborate the effect of hypocalcemia on neuron		

	excitability.		
MS-P-009	Explain Physiological basis& properties of Graded potential		Local / Graded potentials
	Draw & explain Physiological basis & properties of 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).	Medical Physiology	
MS-P-010	Classify and explain Physiological basis of different types of synapses		Synapse
	Elaborate how signal transmission takes place across chemical synapse		
MS-P-011	Explain the mechanism of conduction of Nerve impulse in myelinated and unmyelinated nerve fibers.		Conduction of Nerve Impulse
	Elaborate significance of saltatory conduction		
MS-P-012	Enlist the types of nerve injury		Nerve Degeneration
	Explain Wallerian degeneration.		
	Describe the process of regeneration of nerve fiber.		
	Describe the causes, features & pathophysiology of Multiple sclerosis, GB syndrome.	Medical Physiology Integrate with Medicine	
MS-P-013	Discuss the physiological anatomy of skeletal muscles.	Medical Physiology	Skeletal muscle
	Differentiate b/w skeletal, smooth, and cardiac muscle		
	Describe the structure of Sarcomere		
MS-P-014	Differentiate between isometric and isotonic contraction by giving examples.		Characteristics of whole muscle contraction
	Compare the fast and slow muscle fibers.		
MS-P-015	Explain the mechanism of summation and		Mechanics of

	Tetanization.	Medical Physiology	muscle contraction
	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.		
	Explain the physiological basis of rigor mortis	Medical Physiology Integrate with Forensic Medicine	
MS-P-016	Describe the physiological anatomy of Neuro Muscular Junction (NMJ)	Medical Physiology	Neuromuscular junction
	Mechanism of Neuromuscular transmission & generation of End Plate Potential		
	Explain features, pathophysiology & treatment of myasthenia Gravis	Medical Physiology Integrate with Medicine	
	Describe the enhancers or blockers of neuromuscular transmission at the neuromuscular junction.	Medical Physiology	
	Discuss the steps/ events of excitation contraction coupling in skeletal muscle.	Medical Physiology	
MS-P-017	Differentiate between types of smooth muscles.	Medical Physiology	Smooth Muscle
	Describe mechanism of smooth muscle contraction in comparison to skeletal muscle.		
	Explain the physiological anatomy of neuromuscular junction of smooth muscle		
	Explain the excitatory and inhibitory transmitters secreted at Neuro Muscular Junction (NMJ) of smooth muscles.		
	Explain the depolarization of multiunit smooth muscles without action potentials. Explain the local tissue factors and hormones that		

	can cause smooth muscle contraction without action potential.		
	Explain the regulation of smooth muscle contraction by calcium ions.		
	Explain membrane potential and action potentials in smooth muscles.		
	Explain the phenomena of stress relaxation and reverse stress relaxation in smooth muscles.		
	Explain the LATCH mechanism		
	Describe the significance of LATCH mechanism.		
	Explain the nervous and hormonal control of Smooth Muscle Contraction.		

THEORY			
CODE	**MEDICAL BIOCHEMISTRY**	**TOTAL HOURS = 30**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
MS-B-001	Classify carbohydrates along with the structure and biomedical importance of each class	Biochemistry	Classification carbohydrates
MS-B-002	Explain the isomerization of carbohydrates	Biochemistry	Carbohydrates
MS-B-003	Describe the physical and chemical properties of carbohydrates	Biochemistry	Extracellular matrix
	Differentiate between proteoglycan and glycoproteins		
	Describe the components of extracellular matrix: 1. Describe structure, functions and clinical significance of glycosaminoglycans 2. Discuss structure and functions of Fibrous proteins (collagen and Elastin) 3. Interpret diseases associated with them on basis of sign/symptoms and data 4. Interpret the importance of vitamin C in collagen synthesis	Biochemistry	

	5. Describe sources, active form, functions and deficiency diseases of vitamin C 6. Identify the defects in collagen synthesis based on given data (Ostegenesis Imperfecta)		
	Interpret genetic basis of Duchene muscular dystrophy	Biochemistry	
	Explain the transport and uptake of glucose in cells, steps of glycolysis and citric acid cycle along with enzymes, co enzymes and cofactors involved		
MS-B-004	Discuss the provision of energy to the muscles and cells through glycolytic pathway and TCA cycle	Biochemistry	Glycolysis and Tricarboxylic acid cycle (TCA)
	Explain the hormonal and allosteric regulation of glycolysis and TCA	Biochemistry	
MS-B-005	Describe the digestion and absorption of proteins in mouth, stomach and small intestine. Discuss the uptake of amino acids by cells	Biochemistry	Protein Digestion & Transport across cell
MS-B-006	Explain following reactions with enzymes involved in it: 1. Transamination 2. Deamination decarboxylation 3. Deamidation 4. Trans deamination. 5. Oxidative deamination.	Biochemistry	Reactions involve in catabolism
MS-B-007	Role of pyridoxal phosphate, glutamate, glutamine, alanine	Biochemistry	Transportation of ammonia to the liver
MS-B-008	Illustrate steps of urea cycle with enzymes and its importance Discuss ammonia intoxication	Biochemistry	Urea cycle
MS-B-009	Interpret different types of hyperammonia on basis of sign symptoms and data		
MS-B-010	Discuss the catabolic pathways of aliphatic, aromatic, branched chain, sulfur containing,	Biochemistry	Protein metabolism

	hydroxyl group containing amino acids with the products formed and enzymes and vitamins involved in them		
MS-B-011	Interpret the following on basis of given data: 1. Phenylketonuria 2. Tyrosinemia 3. Albinism 4. Homocystinuria 5. Maple syrup urine disease 6. Alkaptonuria	Biochemistry	Inborn errors of amino acid metabolism

PRACTICAL

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS=06	
		DISCIPLINE	TOPIC
MS-P-018	Demonstrate and categorize the following movements: Pushing against the wall, Biceps curls, squats, yoga chair pose, standing on toes, running on an inclined treadmill, yoga tree pose, deadlift as isotonic and isometric skeletal muscle contraction.	Physiology	Locomotion
MS-B-012	Estimation of total proteins by kit method/dipstick methods.		Total proteins
MS-B-013	Estimation of albumin and globulin		Albumin/ globulin

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS

THEORY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 4+7=11	
		DISCIPLINE	TOPIC
MS-Ph-01	Explain the mechanism by which drugs can stimulate NMJ. Explain the mechanism by which drugs can block NMJ.	Pharmacology & Therapeutics	Drugs acting on Neuromuscular Junction (NMJ)

MS-Ph-02	Discuss briefly the therapeutic effect of drugs used in myasthenia gravis.		Drugs in Myasthenia Gravis
MS-Ph-03	Discuss briefly the therapeutic effect of drugs used as local anesthetics.		Local Anesthetics
MS-Pa-01	Describe the hyperplasia, hypertrophy, and atrophy of muscle fiber	Pathology	Muscle remodeling
	Explain the histopathological basis of leiomyoma		
MS-Pa-02	Describe the histological basis of Duchenne Muscular Dystrophy and myopathy.		Diseases of Muscle
MS-Pa-03	Describe the clinical presentation and histological justification for osteoporosis, osteopetrosis		Diseases of Bone
	Describe the histological basis for bone repair after fractures		
MS-Pa-04	Describe the histological basis for cartilage growth and repair		Disease of Cartilage

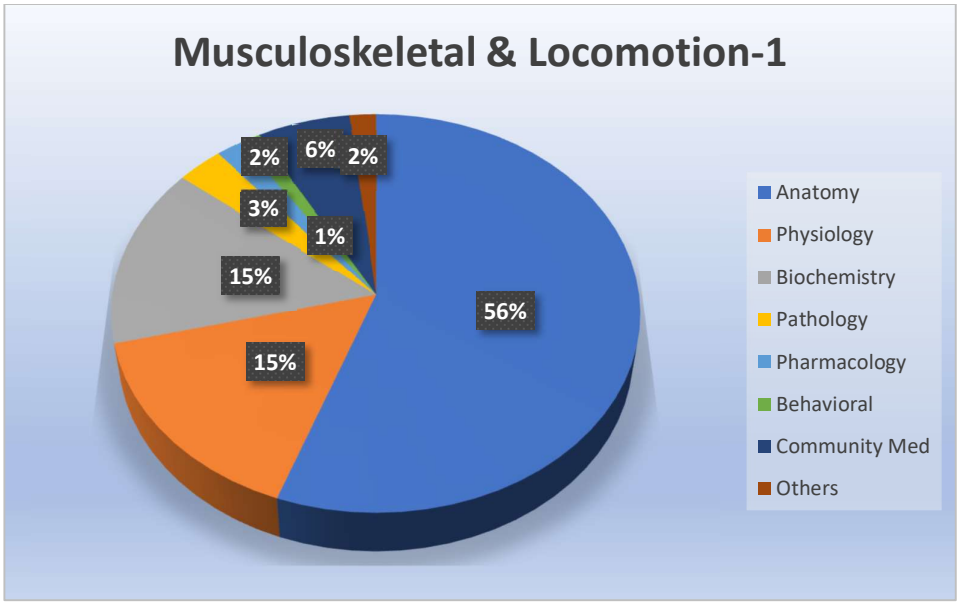
AGING

THEORY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 04	
		DISCIPLINE	TOPIC
MS-Ag-01	Discuss the effect of age on bone fragility and its implications with management.	Geriatrics/ Medicine/ Biochemistry	Bone
MS-Ag-02	Discuss the effect of age on loss of cartilage resilience and its implications and management		Cartilage
MS-Ag-03	Discuss the effect of age on Muscular strength and its implications and management		Muscle
MS-Ag-04	Explain the protective effect of estrogen (female sex hormone) on bone mineral density and relate it to increased prevalence of postmenopausal fractures in women.		Effect of estrogen on BMD

DISEASE PREVENTION AND IMPACT			
THEORY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 14+3=17**	
		DISCIPLINE	**TOPIC**
MS-CM-001	Explain causes of low back pain	Community Medicine and Public Health	Back Pain
	Describe prevention of low back pain		
MS-CM-002	Describe work related musculoskeletal disorders addition with its burden/epidemiology		Work related Musculoskeletal disorders
	Identify risk factors of Musculoskeletal disorders MSD at workplace		
	Describe prevention of exposure to risk factors related to workplace		
MS-CM-003	Describe MSD related to mobile addition with its burden/epidemiology	Community Medicine and Public Health	MSD related to mobile usage
	Describe MSD related to mobile usage (Text neck, Trigger thumb, DeQuervain Syndrome, Carpel Tunnel Syndrome) Identify risk factors related to MSD due to excessive mobile usage.		
	Describe the preventive strategies for mobile addiction-related MSD.		
MS-CM-004	Describe the application of ergonomics in MSD related to the above disorders.	Community Medicine and Public Health	Ergonomics
MS-CM-005	Describe the concept of non-communicable Musculoskeletal diseases		Noncommunicable disease
MS-CM-006	Identify the risk factors in the community for Osteoporosis		Risk factor assessment of Musculoskeletal diseases
	Learn and apply interventions to prevent the risk factors for various musculoskeletal diseases in the community.		
MS-BhS-001	Identify and deal with the various psychosocial	Behavioral	Psychosocial

	aspects of Musculoskeletal conditions (such as Osteoarthritis, Osteomyelitis, Rheumatoid arthritis, Gout, chronic back pain, psychosomatic complaints) and Neuromuscular conditions (Muscular dystrophy, Myasthenia Gravis, Sclerosis) on Individual, Family and Society	Sciences	factors influencing chronic illnesses
MS-BhS-002	Identify the psychosocial risk factors as mediating factors between illness and its effect. Discuss the role of psychological variables like coping, social support, and other health cognitions in mediating between illness and its effect.		Psychosocial Impact of Disease and its management

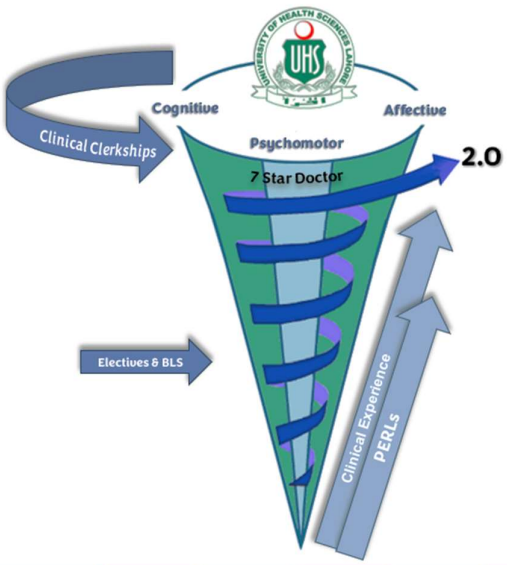


Module Weeks	Recommended Minimum Hours
08	225

MODULAR INTEGRATED CURRICULUM 2K23

version 2.0

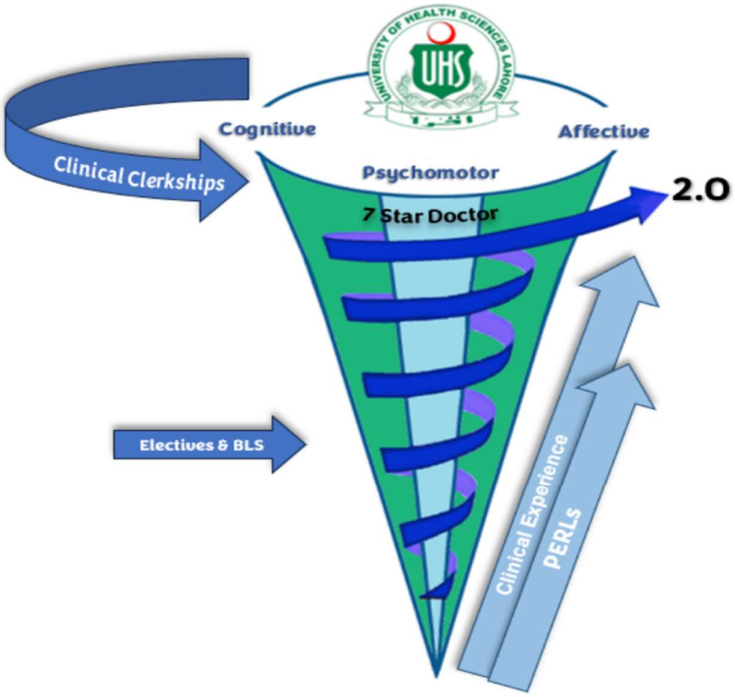
BLOCK-3



MODULE NO. 04:

CARDIOVASCULAR-1

MODULAR INTEGTARTED CURRICULUM 2K23 *version 2.0*



MODULE RATIONALE

The Cardiovascular system comprises the study of the heart & circulatory system. The initial learning activities will help in understanding the normal structure & development of the organs of the system. Understanding of anatomical details of each component of Cardiovascular System (CVS) will be accompanied by study of normal physiological mechanisms. This will help in better understanding the possible pathological conditions of the system, including some of the most prevalent conditions in society like ischemic heart disease, hypertension, shock, heart block, heart failure. This will be followed by discussion on some important group of drugs used for treatment and/or prevention of these conditions (administration route, mechanism of action and side effects). The impact of cardiovascular diseases on society and the effect of ageing on cardiovascular system will be discussed.

MODULE OUTCOMES

- Describe the normal structure of heart including development, topographical anatomy, neurovascular supply, and histology.
- Review the arrangement of circulatory system (arteries, veins, lymphatics).
- Define the congenital anomalies of cardiovascular system with reference to normal development and early circulation.
- Define functions of cardiac muscle along with its properties
- Interpret pressure changes during cardiac cycle along with regulation of cardiac pumping.
- Interpret normal & abnormal Electrocardiogram (ECG), ST-T changes, and its abnormalities.
- Identify the risk factors and role of lipids in coronary blockage and atherosclerosis (hyperlipidemia/ dyslipidemia).
- Define cardiac output and its modulating/controlling factors.
- Differentiate left and right sided heart failure and correlate it with the importance of pressure differences.
- Enumerate different types of arrhythmias and describe the electrical events that produce them.
- Discuss the psychosocial impact of cardiovascular diseases in society.

THEMES

- Heart

- Circulation

CLINICAL RELEVANCE

- Cardiac Failure
- Arrhythmias
- Atherosclerosis and Ischemic heart diseases
- Hypertension
- Shock
- Congenital Heart diseases
- Peripheral arterial diseases

IMPLEMENTATION TORs
• The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1200. • The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. • However, the level of cognition can be kept at a higher level by the institution. • The Table of Specifications provided will be used for the three papers of the first professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.

SYLLABUS OF CARDIOVASCULAR-1 MODULE

NORMAL STRUCTURE			
THEORY			
CODE	**GROSS ANATOMY**	**TOTAL HOURS = 10**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
CV-A-001	Define mediastinum giving its boundaries and compartments. List the contents of its various compartments.	Human Anatomy	Mediastinum
	Describe the formation, tributaries, and termination of superior vena cava		
	Describe the formation, branches, and relations of ascending aorta, aortic arch and descending thoracic aorta.		
	Discuss the distribution of ascending aorta, aortic arch and descending thoracic aorta in reference to their branches		
	Describe formation, course and tributaries of azygous, hemizygous and accessory hemizygous veins.		
	Describe the course, relations, and distribution of vagus and thoracic splanchnic nerves in relation to nerve supply of heart.		
CV-A-002	Describe Pericardium and its parts with emphasis on their nerve supply.	Human Anatomy	Pericardium
	Describe the pericardial cavity mentioning transverse and oblique sinuses. Discuss their clinical significance		
	Describe the anatomical correlates of various pericardial conditions like pericardial rub, pericardial pain, pericarditis, pericardial effusion, and cardiac tamponade.	Integrate with Medicine	
	Describe the anatomical basis for Paracentesis /pericardiocentesis.		

	Describe the external features of heart.	Human Anatomy	Heart
	List various chambers of heart mentioning their salient features and openings.		
	Describe the arterial supply of heart: coronary arteries and their distribution with special emphasis on collaterals established during ischemia.		
	Describe the sites of anastomosis between right and left coronary arteries with the participating vessels.		
	Discuss the anatomical correlates of cardiac arterial supply	Integrate with cardiology/ Medicine	
	Describe the anatomical correlates of electrocardiography, cardiac referred pain.	Integrate with Cardiology/ Medicine	
	Describe the anatomical basis for angioplasty, and coronary grafts.		
CV-A-003	Describe the features of angina pectoris and myocardial infarction and correlate them anatomically	Human Anatomy	
	Describe the venous drainage of heart.		
	Describe the alternative venous routes to the heart		
	Identify the vessels supplying the heart with their origins/terminations.		
	Describe the formation, relations, and distribution of cardiac plexus.		
	Describe components and significance of fibrous skeleton of heart		
	Describe the cardiac valves		
	Explain the anatomical basis for valvular heart diseases	Integrate with Cardiology/ Medicine	
	Perform surface marking of various anatomical landmarks of heart and great vessels	Human Anatomy	
	Perform percussion and auscultation of heart	Integrate with Medicine	
	Identify the salient features of heart and great vessels	Integrate with Radiology	

	on Computed tomography/ Magnetic Resonance Imaging CT/ MRI		
THEORY			
CODE	**EMBRYOLOGY & POST-NATAL DEVELOPMENT**	**TOTAL HOURS = 14**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
CV-A-004	Describe the early development of heart and blood vessels	Human Embryology	Introduction
	Describe the development of pericardial cavity	Human Embryology	
CV-A-005	Define parts of primitive heart tube and give its folding	Human Embryology	Development of Heart
	Describe the development of various chambers of heart with emphasis on their partitioning		
	Identify various parts of developing heart tube and structures derived from them during embryonic and fetal life (Models and specimens)	Human Embryology	
CV-A-006	Describe the embryological basis of dextrocardia and ectopia cordis		Development of Heart and Development of Lymphatic System
	Describe the partitioning of primordial heart: atrioventricular canal and atrium		
	Describe the development of sinus venosus		
	List clinically significant types of atrial septal defects along with their embryological basis and features. Describe probe patent foramen ovale	Integrate with Pediatrics	
	Describe the partitioning of truncus arteriosus and bulbus cordis	Human Embryology	
	Describe the formation of ventricles and interventricular septum		
	Describe the clinical features and embryological basis of ventricular septal defects	Integrate with Pediatrics	
	Describe the development of cardiac valves and conducting system.	Human Embryology	

	Describe the development of lymphatic system	Human Embryology	
CV-A-007	Describe the embryological correlates and clinical presentation of developmental defects of heart: Tetralogy of Fallot, Patent ductus arteriosus, Unequal division of arterial trunks, Transposition of great vessels and Valvular stenosis, Coarctation of aorta	Integrate with Pediatrics	Development of Arteries
	Describe the formation and fate of pharyngeal arch arteries	Human Embryology	
	Describe the anomalies of great arteries emerging from heart: Coarctation of aorta, anomalous arteries	Integrate with Cardiology/ Medicine	
CV-A-008	Describe the development of embryonic veins associated with developing heart: Vitelline veins, Umbilical Veins and Common cardinal vein and their fate	Human Embryology	Development of Veins
	Describe the formation of superior & inferior vena cava and portal vein with their congenital anomalies		
	With the help of diagrams illustrate the development of superior vena cava, inferior vena cava and portal vein		
CV-A-009	List the derivatives of fetal vessels and structures: Umbilical vein, ductus venosus, umbilical artery, foramen ovale, ductus arteriosus	Human Embryology	Fetal Vessels & Circulation
	Describe Fetal and neonatal circulation mentioning transitional neonatal circulation with its clinical implication	Integrate with Pediatrics/ Obgyn	
CV-A-010	List clinically significant types of atrial septal defects along with their embryological basis and features. Describe patent foramen ovale.	Pediatrics	Congenital Heart defects
	Describe the embryological correlates and clinical presentation of developmental defects of heart: Tetralogy of Fallot, Persistent ductus arteriosus, Unequal division of arterial trunks, Transposition of		

	great vessels and Valvular stenosis		
THEORY			
CODE	**MICROSCOPIC ANATOMY (HISTOLOGY & PATHOLOGY)**	**TOTAL HOURS = 04**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
CV-A-011	Describe microscopic structure of Heart wall (Endocardium, Myocardium, Epicardium) Describe histology of Cardiac skeleton, SA (sinoatrial) node, AV (atrioventricular) node, Purkinje fibers.	Histology	Heart & Cardiac Muscle
	Describe the microscopic and ultramicroscopic structure of cardiac muscle emphasizing on Tubules, sarcoplasmic reticulum and intercalated discs. Identify, draw and label histological structure of cardiac muscle		
CV-A-012	Describe general histological organization of blood vessels: Tunica intima, media and adventitia.	Histology	Blood Vessels Organization
	Identify, draw and label histological sections of elastic artery, muscular artery, arterioles, vein, capillaries and sinusoids		
CV-A-013	Describe histological features of arteries: Muscular arteries, elastic arteries, Arterioles	Histology	Arteries
CV-A-014	Describe histological features of veins and exchange vessels: large veins, medium sized veins, venules, Capillaries, and sinusoids	Histology	Veins
	Compare and contrast the light microscopic structure of arteries and veins		
CV-A-015	Describe the histopathological basis of thrombus and embolus formation.	Integrate with Pathology	Thrombus/ Embolus formation
CV-A-016	Explain the histological basis of arteriosclerosis and atherosclerosis. Describe role of arterioles in hypertension	Histology	Arteriosclerosis atherosclerosis Hypertension
CV-A-017	Describe histological features of Lymph vascular		Lymph vascular

	system (Lymph capillaries, Lymph vessels & Lymphatic duct)		System
PRACTICAL			
CODE	**HISTOLOGY**	**TOTAL HOURS = 03**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
CV-A-018	Identify, draw and label histological structure of cardiac muscle	Histology	Histological features of Cardiac Muscle
CV-A-019	Identify, draw and label histological sections of elastic artery, muscular artery, arterioles, vein, capillaries and sinusoids	Histology	Histological features of Blood Vessels
NORMAL FUNCTION			
THEORY			
CODE	**MEDICAL PHYSIOLOGY**	**TOTAL HOURS = 68**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
CV-P-001	Explain the physiological anatomy of cardiac muscle.	Physiology	Cardiac Muscle
	Explain the functional importance of intercalated discs.		
	Discuss the properties of cardiac muscles.		
	Describe and draw the phases of action potential of ventricle.		
	Describe and draw the phases of action potential of SA node along with explanation of the mechanism of self-excitation/ Auto rhythmicity of SA node.		
	Define and give the duration of the Absolute and relative refractory period in cardiac muscle.		
	Describe the mechanism of excitation-contraction coupling and relaxation in cardiac muscle.		

	Draw & explain pressure & volume changes of left ventricle during cardiac cycle.		
	Explain & draw relationship of ECG (Electrocardiography) with cardiac cycle.		
	Explain & draw the relationship of heart sounds with cardiac cycle.		
	Enlist, draw, and explain the physiological basis of atrial pressure waves in relation to cardiac cycle.		
	Define & give the normal values of the cardiac output, stroke volume, end diastolic volume & end systolic volume	Integrate with Medicine	
CV-P-002	Describe the Frank starling mechanism.	Physiology	Regulation of heart pumping
	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		
CV-P-003	Draw and explain the conducting system of heart	Physiology	Conducting system of heart
	Describe the physiological basis and significance of AV nodal delay.		
CV-P-004	Explain the ectopic pacemaker	Integrate with Cardiology/Medicine	Fundamentals of ECG
	Enlist, draw, and explain the physiological basis & give durations of waves, intervals, and segments of normal ECG.	Physiology	
	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.		
	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.	Integrate with Medicine	
	Enlist the ECG changes in myocardial infarction.		
	Plot the mean cardiac axis.	Physiology	
	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	Integrate with Medicine	
CV-P- 005	Describe the effect of hypokalemia and hyperkalemia on ECG	Integrate with Biochemistry	Effect of electrolyte on ECG
	Describe the effect of hypocalcemia and hypercalcemia on ECG.		
CV-P- 006	Define tachycardia and enlist its causes.	Integrate with Medicine	Cardiac arrhythmia
	Define bradycardia and enlist its causes.		
	Classify arrhythmias	Physiology	
	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.	Integrate with Cardiology/ Medicine	
	Explain the types of atrioventricular blocks.		
	Explain the ECG changes in 1^{st}, 2^{nd} & 3^{rd} degree heart block.		
	Explain the cause, physiological basis & ECG changes in Stokes Adam syndrome/ventricular	Physiology	

	escape.		
	Enlist the causes of premature contractions.	Integrate with Cardiology/ Medicine	
	Explain the causes and ECG changes of premature atrial contractions.		
	Explain the physiological basis of pulses deficit.	Physiology	
	Explain the causes and ECG changes in Premature Ventricular Contraction (PVC)	Integrate with Cardiology/ Medicine	
	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.	Physiology	
	Compare Flutter and Fibrillations	Physiology	
CV-P-007	Explain the functional parts of circulation (arteries, arterioles, capillaries, veins, venules).	Physiology	Organization of Circulation
CV-P-008	Explain the pressures in systemic & pulmonary circulation.	Physiology	Blood flow
	Explain the types of Blood flow and significance of Reynolds number.		
CV-P-009	Describe local control of blood flow according to tissue needs.	Physiology	Local & Humoral Control of Blood flow
	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 during changes in arterial pressure (metabolic & myogenic mechanisms).		
CV-P-010	Explain the role of autonomic nervous system for regulating the circulation.	Physiology	Nervous Regulation of circulation
	Explain 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 underlie starling's hypothesis for capillary function.		
CV-P-011	Explain the role of nervous system in rapid control of arterial blood pressure.	Physiology	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.		
	Make a flow chart to discuss the role of Atrial volume reflexes/ Bainbridge reflex in control of blood pressure.		
	Make a flow chart to show the reflex responses to increased blood volume which increase blood pressure and atrial stretch.		
	Describe the role of CNS ischemic response in regulation of the blood pressure.		
	Explain the Cushing reflex		
	Explain the role of abdominal compression reflex to increase the arterial blood pressure.		
CV-P-012	Make a flow chart to discuss the role of renin		Role of

	angiotensin system for long term control of blood pressure.	Physiology	kidneys in long term Regulation of Arterial Blood Pressure
	Make a flow chart to show the regulation of blood pressure in response to increase in ECF (Extra Cellular Fluid) volume.		
	Make a flow chart to show the regulation of blood pressure in response to increase in salt intake.		
CV-P-013	Define cardiac output, cardiac index & venous return with their normal values.	Integrate with Cardiology/ Medicine	Cardiac output
	Discuss the factors regulating cardiac output		
	Discuss factors regulating venous return	Physiology	
CV-P-014	Explain the regulation of skeletal muscle blood flow at rest & during exercise.	Physiology	Skeletal muscle circulation
CV-P-015	Explain the physiological anatomy of coronary circulation.	Physiology	Coronary circulation
	Explain the regulation of coronary blood flow.		
	Explain the physiological basis of angina, myocardial & subendocardial infarction		
CV-P-016	Define & enlist different types of shock.	Physiology	Circulatory 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.	Integrate with Pathology	
	Explain the causes, features, and pathophysiology of anaphylactic shock.		
	Discuss the treatment of different types of shock.	Integrate with Medicine	
	Explain the different stages of shock.		

	Explain the mechanisms that maintain the cardiac output & arterial blood pressure in non-progressive shock.	Physiology	
	Enlist different types of positive feedback mechanisms that can lead to the progression of shock.		
CV-P-017	Enlist the different types of heart sounds and explain the physiological basis of each.	Physiology	Heart sounds
	Enlist the causes of 3rd and 4th heart sounds.		
	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	

THEORY

CODE	MEDICAL BIOCHEMISTRY	TOTAL HOURS = 21	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
CV-B-001	Classify lipids	Biochemistry	Classification of lipids
CV-B-002	Discuss the biomedical functions & properties of lipids	Biochemistry	Functions of lipids & Properties of lipids
CV-B-003	Classify fatty acids. Discuss the role of trans saturated, saturated, poly- and mono-unsaturated fatty acids in diet on lipid profile.	Biochemistry	Classification of fatty acids
CV-B-004	Discuss lipid peroxidation and its significance	Biochemistry	
CV-B-005	Explain the biochemical and therapeutic roles of eicosanoids (prostaglandins, leukotrienes, thromboxane, and prostacyclin)	Biochemistry	Eicosanoids
CV-B-006	Interpret the disorders associated with impairment	Biochemistry	Hyperlipidemias
CV-B-007	of lipoprotein metabolism especially atherosclerosis and LDL (Low-Density Lipoprotein) oxidized	Biochemistry	Cholesterol

CV-B-008	Discuss the signs and symptoms of hyperlipidemia Interpret data related to hyperlipidemia	Biochemistry	Type I to V hyperlipidemias
CV-B-009	Discuss the sources, biomedical importance, active states, deficiency and excess of fat-soluble vitamins: Vitamins A.D. E and K	Biochemistry	Fat soluble vitamins
CV-B-010	Discuss the sources, biomedical importance, active states, deficiency and excess of water-soluble vitamins: Vitamins B group	Biochemistry	Water soluble vitamins
CV-B-011	Discuss the sources, biomedical importance, active states, deficiency and excess of minerals and trace elements especially zinc, Mg, Na, K, I, Ca, P, Se, S, Cu	Biochemistry	Minerals and trace elements

PRACTICAL

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 10+3=13	
		DISCIPLINE	TOPIC
CV-P-018	Record an electrocardiogram by correct lead placement and connections a to identify normal heart sound	Physiology	ECG
CV-P-019	Determine the effect of posture and exercise on blood pressure by auscultatory method.		Blood Pressure
CV-P-020	Measure the blood pressure of the subject by palpatory and auscultatory methods.		Blood Pressure
CV-P-021	Examine arterial pulse to recognize normal characteristics of pulse.		Arterial Pulse
CV-P-022	Examine neck veins to determine Jugular Venous Pulse (JVP)		JVP
CV-B-012	Perform cardiac markers Creatine Kinase and Lactate Dehydrogenase (CK and LDH) Interpret lab reports based on enzymes for diseases	Biochemistry	Performance Interpretation of Lab report

	like cardiac disorders and hyperlipidemias		
AGING			
THEORY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 05**	
		DISCIPLINE	**TOPIC**
CV-Ag-001	Discuss the effect of age on blood vessels with reference to hypertension	Physiology/ Geriatrics/ Medicine	Hypertension
CV-Ag-002	Discuss the risk of cardiac attack in old age and weather conditions		Cardiac Attack
CV-Ag-003	Discuss the effect of age on valvular system of the heart.		Valvular diseases
CV-Ag-004	Discuss the effect of age on neural conduction of the heart in relation to arrythmia.		Arrythmia
CV-Ag-005	Discuss the protective role of female hormone against CVS diseases in women of reproductive age group	Physiology/ Obstetrics and Gynecology	Role of female hormone on CVS disease
PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS			
THEORY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 6+5=11**	
		DISCIPLINE	**TOPIC**
CV-Pa-001	Classify types of thrombosis, embolism, and infarction	Pathology/ Integrate with medicine	Atherosclerosis
	Discuss the pathophysiology of thrombosis, embolism, and infarction		
CV-Pa-002	Identify the types and causes of hypertension		Hypertension
	Discuss the clinical consequences of hypertension and atherosclerosis		
CV-Pa-003	Discuss the pathophysiology of shock		Shock
CV-Pa-004	Classify the types of heart failure		Cardiac Failure
	Identify the causes leading to heart failure		

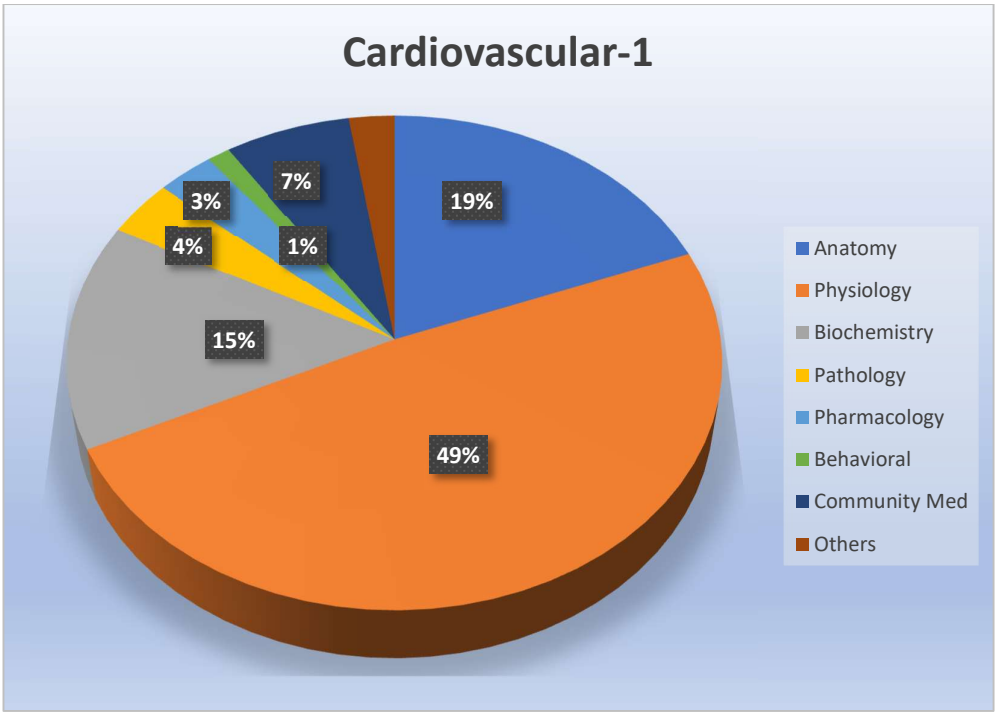
CV-Pa-005	Identify the types of ischemic heart disease Discuss the pathophysiology of different types of ischemic heart disease		Ischemic Heart Disease
CV-Pa-006	Explain the pathological causes of high & low cardiac output.		Cardiac Output
CV-Ph-001	Discuss briefly the therapeutic effect of various antihypertensive drugs.	Pharmacology	Anti-hypertensive drugs
CV-Ph-002	Discuss briefly the therapeutic effect of various antianginal drugs		Antianginal drugs
CV-Ph-003	Discuss briefly the therapeutic effect of various antiarrhythmic drugs		Antiarrhythmic mics drugs
CV-Ph-004	Discuss briefly the therapeutic effect of drugs used in cardiac failure.		Drugs for cardiac failure

DISEASE PREVENTION AND IMPACT

THEORY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 11+2=13	
		DISCIPLINE	TOPIC
CV-CM-001	Describe the various strategies and models to prevent diseases.	Community Medicine and Public Health	Disease Prevention Models
CV-CM-002	Describe primordial prevention and its application to preventing CVS diseases. Depict the concept of primary prevention in context to CVS and able to apply on CVS diseases.		Primordial Prevention
CV-CM-003	Discuss the basic concept of health promotion and its application to CVS.		Health Promotion
CV-CM-004	Discuss various methods of behavioural change interventions at community level.		Behavioural Change Intervention
CV-CM-005	To apply secondary and tertiary preventions on CVS diseases (coronary heart disease, ischemic heart disease, hypertension)		Secondary & Tertiary Prevention

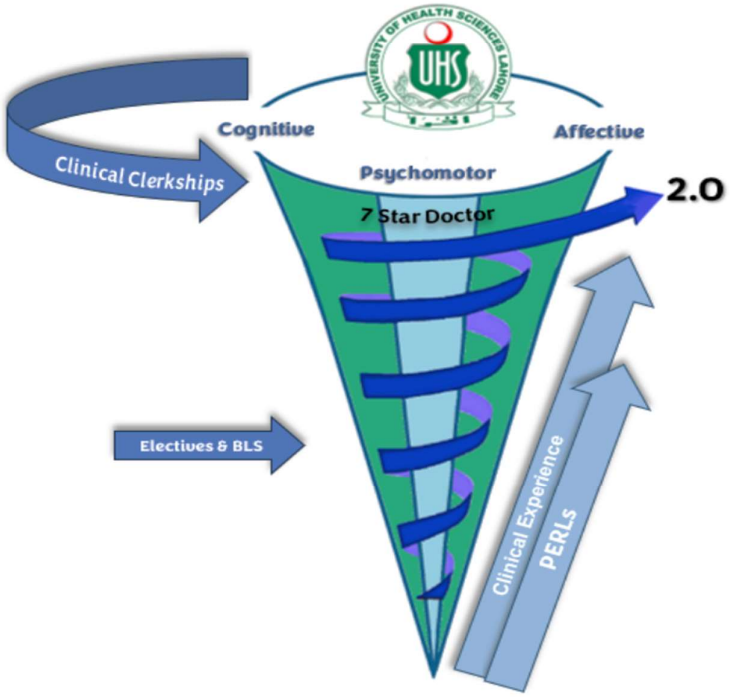
CV-CM-006	Describe the concept of cardiovascular diseases as non-communicable diseases		Noncommunicable disease
CV-CM-007	Identify the risk factors in the community for CVS diseases.		Risk factor assessment of CVS diseases
	Learn and apply interventions to prevent the risk factors in community.		
CV-BhS-001	Identify and deal with the various psychosocial aspects of Cardiovascular conditions (such as Hypertension, Coronary artery disease, Heart failure, Arrythmias, and other cardiovascular conditions) on Individual, Family and Society.	Behavioral Sciences	Personal, Psychosocial and vocational issues
CV-BhS-002	Psychological basis of emotional fainting & its impact		Emotional fainting



Module Weeks	Recommended Minimum Hours
07	162

MODULE NO. 05:
RESPIRATORY-1

MODULAR INTEGTARTED CURRICULUM 2K23 *version 2.0*



MODULE RATIONALE

The diseases related to the respiratory system are on the rise not only in developing countries but also in developed countries. The infant mortality rate in Pakistan is highest in Southeast Asia and one of the important reasons is common respiratory infections in children. With the world suffering from COVID-19 not only physically but also mentally, it is very important for medical students to study in detail the structures, functions, prevention, epidemiology, genetic basis of diseases and their management.

The respiratory system is responsible for bringing oxygen into the body and removing carbon dioxide. It is made up of several organs and structures, including the nose, pharynx, larynx, trachea, bronchi, lungs, and diaphragm.

MODULE OUTCOMES

- Apply basic sciences` knowledge to understand the causes of common respiratory problems.
- Explain the pathogenesis of respiratory diseases.
- Enlist the main investigations relevant to respiratory disorders.
- Recognize risk factors and preventive measures of main respiratory diseases.

THEMES

- Rib cage
- Thoracic vertebrae
- Upper respiratory system
- Lower Respiratory system

CLINICAL RELEVANCE

- Acute Respiratory Distress Syndrome
- Bronchial Asthma
- Tuberculosis
- Pneumonia

IMPLEMENTATION TORs
• The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1200. • The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. • However, the level of cognition can be kept at a higher level by the institution. The Table of Specifications provided will be used for the three papers of the first professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.


SYLLABUS OF
RESPIRATORY-1
MODULE

NORMAL STRUCTURE			
THEORY			
CODE	**GROSS ANATOMY**	**TOTAL HOURS = 24**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
Re-A-001	Describe the anatomical features and neurovascular supply of nasal cavity	Human Anatomy	Upper Respiratory tract
	Describe the anatomical features and neurovascular supply of pharynx	Human Anatomy	
	Describe the anatomical features and neurovascular supply of larynx	Human Anatomy	
Re-A-002	Describe the anatomical features of the Trachea with its extent, relations, neurovascular supply and lymphatics.	Human Anatomy	Trachea
Re-A-003	Give the boundaries of thoracic cavity, superior and inferior thoracic apertures and list the structures contained/ traversing them.	Human Anatomy	Thoracic Cavity
	Describe the anatomical correlates of Thoracic outlet syndrome	Integrate with Surgery	
Re-A-004	Identify and differentiate the typical from atypical ribs.	Human Anatomy	Rib Cage
	Describe the anatomical features of ribs		
	Describe the anatomical correlates of supernumerary cervical rib.	Integrate with Surgery	
	Classify the articulations of the ribs.	Human Anatomy	
	Describe the anatomical features of these articulations.		
	Describe the movements with the muscles producing articulations.	Human Anatomy	
	Describe the effects of fracture to the neck of rib and give its anatomical justification	Integrate with Orthopedics	
	Describe the anatomical correlates of Flail Chest.		
Re-A-005	Describe the anatomical correlates of Thoracotomy	Integrate with Surgery	Intercostal space
	Define the attachments, relations, nerve supply and actions of intercostal muscles	Human Anatomy	

	Define an intercostal space and give details of its contents		
Re-A-006	Describe the anatomical features of typical & atypical thoracic vertebrae.	Human Anatomy	Thoracic Vertebrae
	Differentiate between typical and atypical vertebrae		
	Explain the thoracic part of the vertebral column (normal curvature, intervertebral joints & fascia of the back, blood supply, lymphatic drainage, nerve supply of back) Associated Clinical conditions -Kyphosis, Scoliosis		
Re-A-007	Describe the bony features of the sternum	Human Anatomy	Sternum
	Describe the anatomical correlates of sternal biopsy. and sternotomy	Integrate with Surgery	
	Describe the presentation of sternal fractures and correlate it anatomically	Integrate with Orthopedics	
Re-A-008	Define endo thoracic fascia	Human Anatomy	Connective tissue of Thorax
	Describe the supra-pleural membrane with its attachments.		
Re-A-009	Classify the joints of the thorax mentioning their articulations, movements with the muscle producing them.		Joints of Thorax
	Describe the mechanics of inspiration and expiration		
Re-A-010	Describe the origin, course, relations and distribution of intercostal nerves and vessels		Neurovascular supply of Thorax
	Describe the alternate routes of venous drainage in blockage of superior/ inferior vena cava		
Re-A-011	Describe the cutaneous nerve supply and dermatomes of thorax.	Integrate with Medicine	
	Give anatomical justification of the manifestations of herpes zoster infection on thoracic wall.	Human Anatomy	Cutaneous nerve supply of Thorax
	Discuss anatomical correlates of intercostal nerve block	Integrate with Medicine	
Re-A-012	Name the parts of diaphragm mentioning their	Integrate with	Diaphragm

	attachments and neurovascular supply	Anesthesia	
	Explain the role of diaphragm in respiration	Human Anatomy	
	Enumerate the diaphragmatic apertures with their vertebral levels, mentioning the structures traversing them.		
Re-A-013	Describe the pleura giving its parts, layers, neurovascular supply, and lymphatic drainage		Pleural cavity
	Describe the pleural cavity giving its recesses and the lines of pleural reflection	Human Anatomy	
	Describe the anatomical correlates of pleural pain pleurisy, pneumothorax, pleural effusion		
	Describe the anatomical features, relations of lungs	Integrate with Medicine	
Re-A-014	Describe the neurovascular supply and lymphatic drainage of lungs.	Human Anatomy	Lungs
	Compare and contrast the anatomical features and relations of right and left lung		
	Describe the root of the lung and pulmonary ligament with arrangement of structures at the hilum		
	Define Bronchopulmonary segments. Give their vascular supply, lymphatic drainage and clinical significance		
	Describe the anatomical correlates of chest tube intubation	Integrate with Surgery	
	Describe the anatomical correlates of thoracentesis		
	Describe the anatomical correlates of bronchoscopy	Integrate with Pulmonology	
	Describe the anatomical basis for medicolegal significance of lungs in determining the viability of newborn	Integrate with Forensic Medicine	
	Identify various anatomical landmarks on chest X-Rays, CT and MRI	Integrate with Radiology	

THEORY			
CODE	EMBRYOLOGY & POST-NATAL DEVELOPMENT	TOTAL HOURS = 05	
	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC
Re-A-015	Describe the development of ribs, sternum, and thoracic vertebrae. Give the associated congenital malformations	Human Embryology	Bony components of Thoracic cavity
Re-A-016	List the embryological sources of the diaphragm. Describe the events taking place in the development and descent of the diaphragm	Human Embryology	Diaphragm & Thoracic cavity
	Describe the development of Thoracic cavities (Pleural and Pericardial cavities)	Integrate with Pediatrics	
Re-A-017	Describe the development of upper respiratory tract: larynx and trachea	Human Embryology	Upper Respiratory Tract
	Describe congenital anomalies of Trachea-Tracheoesophageal fistulas of different types	Integrate with Pediatrics	
Re-A-018	List the phases of lung development with their time periods. Describe the events taking place in each phase	Human Embryology	Lungs
	Describe the embryological basis of respiratory distress syndrome/Hyaline membrane disease, Ectopic Lung lobes, Congenital cysts of Lung	Integrate with Pediatrics	

THEORY			
CODE	MICROSCOPIC STRUCTURE	TOTAL HOURS = 04	
	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC
Re-A-019	Give the general histological organization of respiratory system.	Histology	Organization of respiratory system
Re-A-020	Describe the microscopic features of respiratory epithelium & Olfactory epithelium	Histology	Respiratory epithelium
Re-A-021	Describe histology of Nasopharynx	Histology	Nasopharynx
Re-A-022	Describe the histological features of epiglottis and larynx	Histology	Epiglottis & larynx

Re-A-023	Describe the histological features of trachea and lungs Describe histology of blood-air barrier	Histology	Trachea & lungs blood-air barrier
Re-A-024	Explain the histological basis of: 1. Laryngitis 2. Singer's nodules 3. Emphysema 4. Pneumonia 5. Atelectasis 6. Infant respiratory distress syndrome	Integrate with Pathology	Clinical correlates

PRACTICAL

CODE	HISTOLOGY	TOTAL HOURS = 05	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
Re-A-025	Identify, draw and label the histologic sections of epiglottis and larynx.	Histology	Epiglottis& Larynx
Re-A-026	Describe the histological features of bronchial tree: trachea, bronchi, bronchioles, alveoli		Trachea & Organization of Respiratory System
Re-A-027	Identify, draw and label the histological sections of bronchial tree: trachea, bronchi, bronchioles, alveoli, Lung		Bronchial tree & Lung
	Describe the mucosal changes encountered in the trachea-bronchial tree		
	Compare and contrast the histological features of various components of bronchial tree: trachea, bronchi, bronchioles, alveoli.		
Re-A-028	Describe, compare and contrast the light and electron microscopic features of type I and type II pneumocytes		Pneumocytes

NORMAL FUNCTION			
THEORY			
CODE	**MEDICAL PHYSIOLOGY**	**TOTAL HOURS = 45**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
Re-P-001	Enlist the muscles of inspiration and expiration in quiet breathing	Integrate with Anatomy	Breathing
	Enlist the muscles of inspiration and expiration in labored breathing		
	Explain the components of the work of breathing	Medical Physiology	
	Discuss the mechanics of pulmonary ventilation		
	Explain periodic breathing		
	Explain the causes and pathophysiology of sleep apnea	Integrate with medicine	
Re-P-002	Define and explain lung compliance	Medical Physiology	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	
Re-P-003	Define the different lung volumes and capacities and their clinical significance	Medical Physiology	Lung volumes and Capacities
	Discuss Forced Expiratory Volume 1/ Forced Vital Capacity (FEV1/FVC) ratio and its clinical significance		
	Enlist the lung volumes and capacities that cannot be measured by spirometer.		
	Define dead space & explain its types		
	Discuss FEV1/FVC ratio in relation to Bronchial Asthma.	Integrate with Pulmonology	
	Discuss FEV1/FVC ratio in relation to Chronic Obstructive Pulmonary disease/restrictive lung		

	diseases		
	Discuss Forced Expiratory Volume 1/ Forced Vital Capacity (FEV1/FVC) ratio in relation to pulmonary embolism	Integrate with medicine	
Re-P-004	Define alveolar ventilation.	Medical Physiology	Pulmonary ventilation
	Define minute respiratory volume		
	Describe the pressures in the pulmonary system.		
Re-P-005	Describe the blood volume of the Lungs	Medical Physiology	Pulmonary Circulation
	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.		
Re-P-006	Discuss pathophysiology and common causes of pulmonary edema		Pulmonary Edema, and Pleural Fluid
	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.		
Re-P-007	Explain the ultrastructure of respiratory membrane	Medical Physiology	Principles of Gaseous Exchange
	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		
Re-P-008	Explain the different forms of transport of oxygen in the blood	Medical Physiology	Transport of oxygen in the blood
Re-P-009	Draw and explain oxyhemoglobin dissociation curve		oxyhemoglobin dissociation curve
	Enlist the factors that cause the rightward shift of oxyhemoglobin dissociation curve		
	Enlist the factors that cause the leftward shift of oxyhemoglobin dissociation curve		
	Explain the Bohr`s effect		Bohr`s effect
	Define, enlist the types and causes of cyanosis	Integrate with Medicine	Cyanosis
Re-P-010	Enlist different forms in which Carbon dioxide CO_2 is transported in the blood	Medical Physiology	Transport of CO_2 in blood
	Explain carboxyhemoglobin dissociation curve		
	Explain the Haldane effect		
	Explain the chloride shift/Hamburger phenomenon		
	Define the respiratory exchange ratio (RER)		
Re-P-011	Explain the alveolar oxygen and carbon dioxide pressure when Pulmonary ventilation (V) and Perfusion (Q), VA/Q= infinity, zero, and normal	Medical Physiology	VA/Q (ventilation perfusion ratio)
	Explain the concept of physiological shunt when VA/Q ratio is above normal		
	Explain the concept of physiological dead space when VA/Q ratio is above normal		
Re-P-012	Enlist the respiratory and non-respiratory functions of the lung	Medical Physiology	Protective reflexes
	Explain the nervous control of bronchiolar musculature		
	Trace the reflex arc of cough reflex and sneeze reflex		
Re-P-013	Explain the principle means by which acclimatization occurs	Medical Physiology	Aviation and space
	Explain the events that occur during acute mountain sickness		
	Enlist the features of chronic mountain sickness		

Re-P-014	Explain the pathophysiology, features, prevention and treatment of decompression sickness.	Medical Physiology	Deep sea diving
Re-P-015	Draw and explain the effect of CO poisoning on oxyhemoglobin dissociation curve	Medical Physiology	Carbon monoxide poisoning
	Explain the pathophysiology, features, and treatment of CO poisoning.	Integrate with Medicine	
Re-P-016	Enumerate the components of respiratory centers and explain their functions.	Medical Physiology	Nervous regulation of respiration
	Explain the inspiratory RAMP signal		
	Explain the Herring Breuer reflex/lung inflation reflex and its clinical significance		
Re-P-017	Explain the location of chemo sensitive area (central chemoreceptors) and peripheral chemoreceptors	Medical Physiology	Chemical control of respiration
	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		
Re-P-018	Explain the regulation of Respiration during Exercise	Medical Physiology	Exercise and Respiration
Re-P-019	Enlist the effects of acute hypoxia	Medical Physiology	Hypoxia
	Explain the hypoxia inducible factor a master switch for body response to hypoxia		
	Define and explain different types of hypoxias	Integrate with Medicine	
Re-P-020	Explain the pathophysiology of Tuberculosis.	Integrate with Pathology	Tuberculosis
Re-P-021	Describe the pathophysiology of Pneumonia	Integrate with Pathology	Pneumonia
Re-P-022	Define Dyspnea	General Medicine	Dyspnea
	Enlist different causes of dyspnea		
	Differentiate between cardiac and respiratory dyspnea		
	Outline management strategies for dyspnea		
Re-P-023	Enlist the causes of Pneumothorax	Integration	Pneumothora

	Describe the signs and symptoms of Pneumothorax	with Surgery	x
Re-P-024	Enlist the causes of Pleuritis Describe the signs and symptoms of Pleuritis Discuss the management of Pleuritis		Pleuritis
Re-P-025	Enlist the causes of Bronchitis Discuss the signs and symptoms of Bronchitis Discuss the management of Bronchitis	Integration with General Medicine	Bronchitis
Re-P-026	Classify different types of pneumonia Discuss the sign symptoms of pneumonia Discuss the management of pneumonia		Pneumonia
Re-P-027	Classify different types of asthma Discuss the signs and symptoms of asthma Discuss the management of asthma		Asthma
Re-P-028	Classify different types of Tuberculosis Discuss the signs and symptoms of tuberculosis Discuss the management of Tuberculosis		Tuberculosis
Re-P-029	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 General Medicine	Acute respiratory distress syndrome
Re-P-030	Define respiratory failure Describe various types of respiratory failure Enlist various causes of respiratory failure Outline management strategies of respiratory failure	Integration with General Medicine	Respiratory Failure
Re-P-031	Describe ABC in a trauma patient	Integration with Surgery	First Aid in Surgical Patients
THEORY			
CODE	**MEDICAL BIOCHEMISTRY**	**TOTAL HOURS = 14**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
Re-B-001	Explain and interpret the pedigree of single gene	Medical Biochemistry	Genetic defects

	defect i.e., Emphysema and cystic fibrosis (autosomal recessive)		
Re-B-002	Describe the biochemical basis of emphysema, Chronic obstructive pulmonary disease (COPD) and cystic fibrosis	Medical Biochemistry	Respiratory diseases
	Interpret Respiratory Distress syndrome on the basis of given data	Integrate with Physiology	
Re-B-003	Discuss the concept of acid base balance	Medical Biochemistry	Acid base balance
	Interpret metabolic and respiratory disorders of acid base balance on the basis of sign, symptoms and ABG findings		
	Describe the Clinical interpretation of acid base balance	Integrate with Medicine	

PRACTICAL

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 10	
		DISCIPLINE	TOPIC
Re-P-039	Perform the clinical examination of chest for the respiratory system (inspection, palpation, percussion, Auscultation)	Medical Physiology	Clinical Examination of Chest
Re-P-040	Determine lung volumes and capacities with spirometer		Peak Expiratory Flow rate measurement
Re-P-041	Determine Blood Oxygen Saturation with finger Pulse Oximeter		Oxygen Saturation
Re-P-044	Perform Cardio pulmonary Resuscitation (CPR) on adult and infant.		CPR
Re-B-005	Determine the pH of the solution by pH meter	Medical Biochemistry	Determination of pH

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS			
THEORY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 5+3=08**	
		DISCIPLINE	**TOPIC**
Re-Ph-001	Identify the drugs for cough suppression & expectoration	Pharmacology & Therapeutics	Cough Suppressants
	Explain the mechanism of action and adverse effects of cough suppressants		
Re-Ph-002	Explain the mechanism of action and adverse effects of anti-histamines		Antihistamines
Re-Ph-003	Explain the mechanism of action and adverse effects of anti-asthmatics		Anti asthmatics
Re-Pa-001	Describe the pathophysiology of acute respiratory distress syndrome	Pathology	Acute Respiratory Distress Syndrome
Re-Pa-002	Describe the pathophysiology of obstructive lung disease		Obstructive lung Disease
Re-Pa-003	Describe the pathophysiology of Restrictive Lung Disease		Restrictive Lung Disease

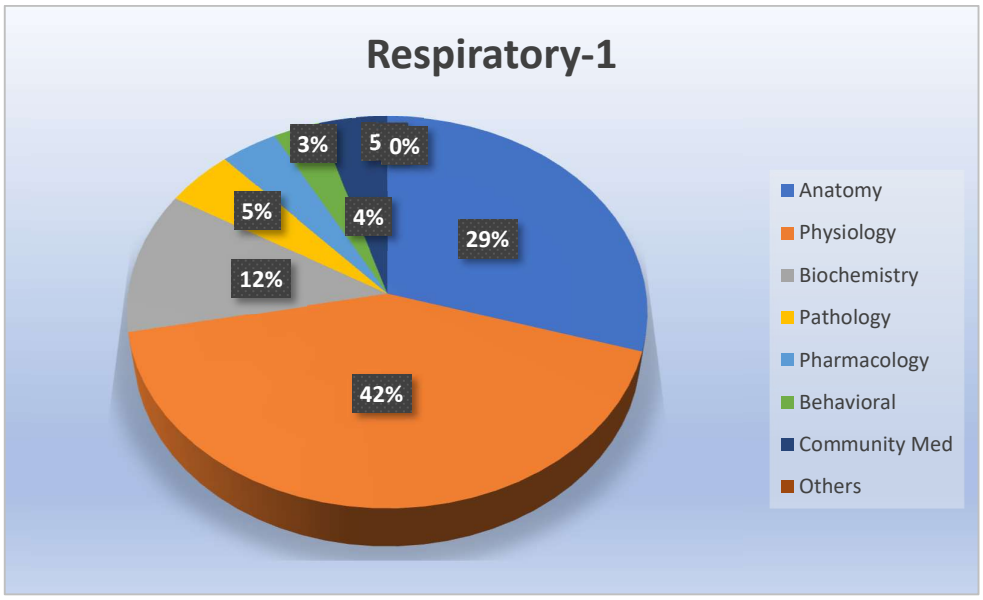
DISEASE PREVENTION & IMPACT			
THEORY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 10**	
		DISCIPLINE	**TOPIC**
Re-CM-001	Identify the common risk factors of acute respiratory infections with emphasis on smoking	Community Medicine and Public Health	Prevention of acute Respiratory Infections (ARI)
	Discuss preventive strategies of different problems related to respiratory system		
	Enlist the common vaccines used for the prevention of ARI		
	Explain the role of vitamins in the respiratory tract	Integrate with	

	infections	Biochemistry	
Re-CM-002	Explain the effect of air pollutants on the respiratory system		Interaction of environment & Respiratory System
Re-CM-003	Describe the burden of respiratory diseases	Community Medicine and Public Health	Epidemiology of respiratory Diseases
Re-CM-004	Enlist the common respiratory diseases related to occupation		Occupational Lung Diseases
Re-BhS-001	identify the psychosocial factors leading to dyspnea.	Behavioral Sciences	Dyspnea
Re-BhS-002	Identify the psychosocial factors leading to psychogenic cough.		Psychogenic Cough
Re-BhS-003	Identify and deal with the various psychosocial aspects of Respiratory conditions (such as Asthma, COPD, Tuberculosis, Cystic Fibrosis, Sleep Apnea) on Individual, Family and Society.		Personal, Psychosocial and vocational issues

AGING

THEORY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 03	
		DISCIPLINE	TOPIC
Re-Ag-001	Discuss the biochemical basis of respiratory infections in old age in cold weather	Pathology	Respiratory infections in old age
Re-Ag-002	Discuss the role of age on respiratory clearance leading to recurrent inflammatory processes at the ciliated respiratory epithelium		Increased vulnerability to infection & neoplasia
	Describe the biochemical basis of emphysema, COPD and cystic fibrosis		Respiratory diseases



Module Weeks	Recommended Minimum Hours
04	128

Section 7

MODULAR INTEGRATED CURRICULUM 2K23

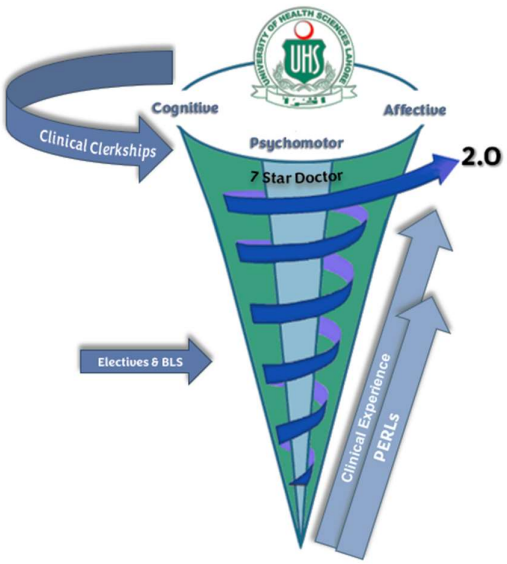
Version 2.0

YEAR-2

MODULAR INTEGRATED CURRICULUM 2K23

version 2.0

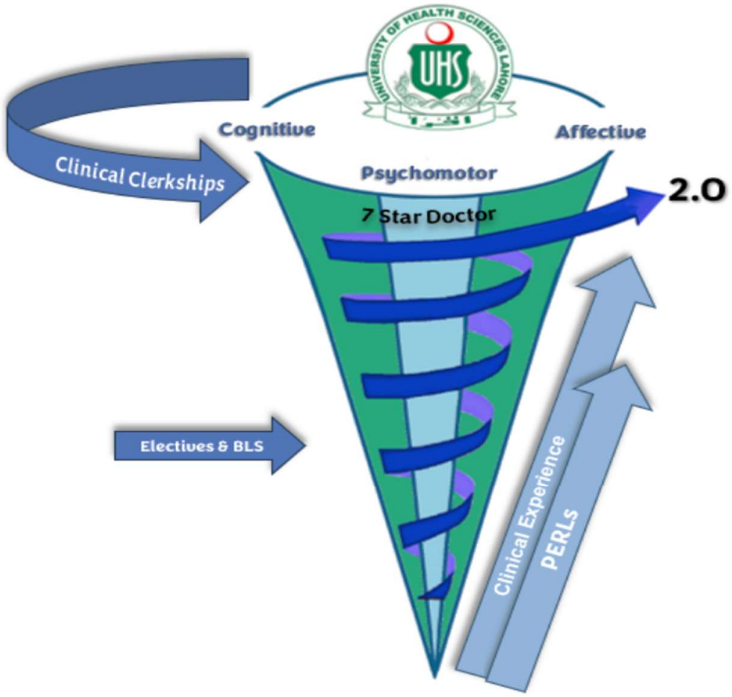
BLOCK-4



MODULE NO. 06

GIT & NUTRITION-I

MODULAR INTEGTARTED CURRICULUM 2K23 *version 2.0*



MODULE RATIONALE

Gastrointestinal system is an integral part of human body which is primarily related to consumption, digestion and assimilation of food to provide nutrition and calories on regular basis to human body which are essential for basic functioning of each organ of human beings.

We will study in detail regarding different parts of gastrointestinal system, their functional, embryological and histological anatomy, physiological and biochemical aspects of its functioning. Students will also be briefly introduced to clinical and pathological aspects, pharmacological interventions and preventive measures of common diseases related to the system.

We have assigned six (6) weeks in academic calendar of 2nd year curriculum of MBBS to Gastrointestinal Module. We have divided our module into eight (8) themes. For every theme, anatomy, physiology, biochemistry, pathology, pharmacology, community medicine, behavioral sciences, general medicine and surgery will need to plan for integrated teaching of students for better comprehension and understanding of subject. We have outlined learning outcomes for each discipline along with allocated time to be taught.

MODULE OUTCOMES

- To describe gross and microscopic anatomy of different parts of gastrointestinal system and associated organs
- To describe the embryological development of different parts of gastrointestinal system and associated organs
- To describe the functional anatomy and physiology of different parts of gastrointestinal system and associated organs
- To describe the motility, secretary and digestive function of gastrointestinal system
- To describe the biochemical aspects of carbohydrate metabolism
- To discuss pathological aspect and management of gastrointestinal related diseases
- To discuss the pharmacological treatment of diarrhea
- To discuss the psychosocial impact of gastrointestinal diseases in society
- To discuss the preventive measures related to gastrointestinal diseases
- To comprehend concept of balanced diet and malnutrition

THEMES
• Oral cavity & Esophagus (O &E) • Walls of Abdomen & Peritoneum • Stomach • Small intestine • Large intestine (Cecum, Appendix, Colon, Rectum & Anal Canal) • Liver & Biliary tree • Pancreas & Spleen • Nutrition
CLINICAL RELEVANCE
• Diseases of oral cavity, esophagus and stomach • Diseases of small and large intestine • Diseases of hepatobiliary system • Diseases related to malnutrition

IMPLEMENTATION TORs
• The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1200. • The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. • However, the level of cognition can be kept at a higher level by the institution. • The Table of Specifications provided will be used for the three papers of the Second professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.

SYLLABUS OF GIT & NUTRITION-I MODULE

NORMAL STRUCTURE			
THEORY			
CODE	**GROSS ANATOMY**	**TOTAL HOURS = 35**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
GIT-A-001	Describe the gross anatomical features of oral cavity with its neurovascular supply and lymphatic drainage	Human Anatomy	Oral Cavity and Oropharynx
	Discuss the location, anatomical features, relations and vascular supply of tonsils: nasopharyngeal, palatine and lingual.		
	Discuss the skeletal framework of hard palate with its neurovascular supply and lymphatic drainage		
	Describe the gross anatomical features of soft palate with its neurovascular supply and lymphatic drainage		
	Describe the attachments, nerve supply and actions of muscles of soft palate		
	Describe the structure of tongue with attachments of muscles, blood supply, nerve supply and lymphatic drainage Discuss the anatomical basis of injury to hypoglossal nerve		
	Describe anatomical features, relations and neurovascular supply of parotid gland and its duct, mentioning the structures entering and exiting the gland.		
	Discuss the clinical correlates of parotid gland: parotiditis, Mumps, Frey's syndrome, parotid duct injury and parotid tumor surgery with its complications.		
	Describe the Waldeyer's ring.		
	Describe anatomical features, relations and neurovascular supply of submandibular and sublingual glands with their ducts.		
	Name the parts of pharynx giving their extent, anatomical		

	features, structure, neurovascular supply and Lymphatic drainage		
	Name the pharyngeal constrictor muscles defining their attachments, innervation and structure traversing the gaps between adjacent muscles.		
GIT-A-002	Describe the planes and quadrants of abdomen	Human Anatomy	Anterior Abdomen Wall
	Draw and label the cutaneous innervation and dermatomes of anterior abdominal wall and anterolateral Abdominal wall and describe the clinical correlates (Abdominal pain, Muscle rigidity, Referred pain, anterior abdominal nerve block)		
	Describe the fascia of anterior abdominal wall with its clinical significance Describe anterolateral Abdominal wall arteries, Veins and Lymphatics and related clinical correlates—Caput Medusae		
	Describe the attachments, nerve supply and actions of muscles of anterior abdominal wall		
	Identify the muscles of anterolateral abdominal wall on anatomical model and/or cadaver		
	Describe the extent, formation and contents of rectus sheath		
	Give the formation and extent of inguinal ligament		
	Describe the formation of superficial and deep inguinal rings and conjoint tendon		
	Locate the position of superficial and deep inguinal rings on simulated subject or Cadaver		
	Describe the extent, boundaries and contents of inguinal canal		
	Define the following hernias: umbilical, epigastric, incisional, Spigelian, lumbar, femoral, internal and inguinal		

	Differentiate between direct and indirect inguinal hernias		
	Describe the location of abdominal surgical incisions		
	Mark the abdominal incisions on simulated patient/ subject and explain their anatomical basis		
	List the structures and coverings of spermatic cord		
GIT-A-004	Trace the horizontal and vertical peritoneal reflections	Human Anatomy	Peritoneum
	Describe the relationship of viscera to the peritoneum		
	Describe the gross anatomical features of the following: 1. Mesentery 2. Omentum 3. Peritoneal ligaments 4. Peritoneal fold 5. Peritoneal sac, 6. Recesses, 7. Spaces and 8. Gutters		
	Describe the nerve supply of Peritoneum		
	Describe the anatomical basis and manifestations of the following: 1. Peritonitis and ascites 2. Peritoneal adhesions (and adhesiostomy) 3. Abdominal paracentesis		
GIT-A-005	Describe the extent of esophagus, its constrictions, neurovascular supply and lymphatic drainage Discuss the anatomical basis of esophageal varices, achalasia and Gastro Esophageal Reflux Disease (GERD)		Esophagus
GIT-A-006	Describe the location, position, parts, external and internal structure, relations, vascular and nerve supply and lymphatic drainage of stomach	Human Anatomy	Stomach
	Draw and label a diagram illustrating the lymphatic drainage of Stomach		

	Describe the clinical presentation and the anatomical basis and manifestations of the following conditions: Carcinoma of stomach and peptic ulcers		
	Identify and demonstrate the parts, external and internal features of stomach on anatomical model and cadaver		
GIT-A-007	Describe the location, position, parts, relations, neurovascular supply and lymphatic drainage of duodenum	Human Anatomy	Small & Large Intestine
	Describe the anatomical basis and manifestations of the following conditions: 1. Duodenal Ulcers 2. Ileal diverticulum 3. Diverticulosis 4. Large bowel cancer 5. Appendicitis 6. Volvulus 7. Intussusception		
	Demonstrate the various positions of appendix		
	Identify and demonstrate the Parts and external features of small and large intestines on anatomical model and cadaver		
GIT-A-008	Describe the origin, course, branches (tributaries in case of veins) and distribution of the blood vessels of GIT	Human Anatomy	Liver
	Describe the formation, tributaries and drainage of hepatic-portal vein		
	Discuss the sites and vessels contributing in portosystemic anastomosis		
	Describe the clinical picture and anatomical basis for the blockage of porto-systemic anastomosis		
	Identify the blood vessels supplying GIT on anatomical model and cadaver		
	Describe location, lobes, important relations, peritoneal ligaments, blood supply, lymphatic drainage, nerve	Human Anatomy	Liver

	supply, related clinical correlates of liver and subphrenic spaces.		
GIT-A-009	Describe components of Biliary tree- hepatic duct and bile duct	Human Anatomy	Biliary System
	Describe relations, functions, blood supply, lymphatic drainage and nerve supply of Gallbladder		
	Describe related clinical correlates- gall stones, biliary colic, cholecystectomy, gallbladder gangrene		
GIT-A-010	Describe the location, surfaces, peritoneal reflections, relations, neurovascular supply and lymphatic drainage of pancreas	Human Anatomy	Pancreas
	Describe the anatomical basis and manifestations of pancreatitis and pancreatic cancer		
	Identify the parts of the pancreas		
GIT-A-011	Describe the location, surfaces, peritoneal reflections, relations, neurovascular supply and lymphatic drainage of spleen	Human Anatomy	Spleen
	Describe the anatomical basis and manifestations of splenic trauma and splenomegaly		
	Identify the borders, surfaces and Impressions of spleen		
	Demonstrate the correct anatomical positioning of spleen		
GIT-A-012	Describe the gross anatomical features, peritoneal relations, blood supply, nerve supply and lymphatic drainage of sigmoid colon, rectum and anal canal	Human Anatomy	Sigmoid Colon, Rectum & Anal Canal
	Describe the anatomical basis for Sigmoidoscopy, rectal prolapse, rectal examination, rectal cancer and hemorrhoids		
GIT-A-013	Outline the anatomical basis and surgical treatment plan for the following diseases: 1. Esophageal Injuries 2. Gastric Carcinoma	Human Anatomy integrated with Surgery	Surgical Intervention

	3. Intestinal Obstruction 4. Pancreatic Carcinoma 5. Obstructive Jaundice 6. Gall Stones		
CODE	**EMBRYOLOGY & POST-NATAL DEVELOPMENT**	**TOTAL HOURS = 08**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
GIT-A-014	Describe the development of tongue	Embryology	Oral Cavity
	Describe the embryological basis of tongue tie		
	Describe the development of palate		
	Describe the embryological basis of various facial clefts		
	Identify the parts of the developing tongue and palate		
GIT-A-015	Describe the formation and divisions of gut tube	Embryology	Foregut
	Describe the development of mesenteries		
	Describe the development of esophagus		
	Describe the embryological basis of esophageal atresia and/or tracheoesophageal fistula		
	Describe the development and rotation of stomach		
	Describe the embryological basis of pyloric stenosis		
	Describe the development of duodenum, liver and gall bladder		
	Describe the embryological basis of intrahepatic and extrahepatic biliary atresia		
	Describe the development of pancreas		
	Describe the embryological basis of annular pancreas		
GIT-A-016	Describe the development of midgut especially mentioning physiological herniation, rotation, retraction of herniated loops and mesenteries of the intestinal loops	Embryology	Midgut
	Describe the embryological basis of the following 1. mobile cecum 2. volvulus 3. retro colic hernia 4. Omphalocele		

	5. gastroschisis		
	Describe the embryological basis of Meckel's diverticulum		
	Describe the embryological basis of; 1. Gut rotation defects 2. Gut atresia and stenosis		
GIT-A-017	Describe the development of hindgut	Embryology	Hindgut
	Describe the embryological basis of; 3. Rectourethral and rectovaginal fistulas 4. Recto anal fistulas and atresia 5. Imperforate anus 6. Congenital megacolon		
	Identify the parts of the developing foregut, midgut and hindgut originating from the endoderm		
CODE	**MICROSCOPIC ANATOMY (HISTOLOGY & PATHOLOGY)**	**TOTAL HOURS = 07**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
GIT-A-018	Describe the light microscopic structure of; 1. Lips 2. Tongue including lingual papillae and taste buds 3. Oral Cavity (Cheeks, Teeth gums, hard & Soft palate) Describe the histological structure of parotid, submandibular and sublingual glands. Compare and contrast the histological structures of parotid, submandibular and sublingual glands. Describe the serous and mucous acini and give histological differences between the two. Describe the structure and location of serous demilunes. Describe histology of oropharynx	Histology	Oral Cavity & Esophagus
	Relate the characteristics of various layers of GIT with		

	their function		
	Describe the light microscopic structure of esophagus		
	Tabulate the histological differences between different parts of esophagus		
	Describe the histological changes associated with reflux esophagitis and Barrett's esophagus		
GIT-A-019	Describe the light microscopic structure of stomach	Histology	Stomach
	Describe the role of parietal cells in pernicious anemia		
GIT-A-020	Describe the light microscopic structure of 1. Duodenum 2. Jejunum 3. Ileum	Histology	Small Intestine
	Discuss the histological basis of celiac disease		
	Discuss the histological basis of Crohn's disease		
GIT-A-021	Describe the light microscopic structure of 1. Colon 2. Appendix 3. Rectum Define colorectal cancer, anal abscess, hemorrhoids	Histology	Large Intestine

PRACTICAL

CODE	HISTOLOGY	TOTAL HOURS = 12	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
GIT-A-022	Identify, draw and label the histological sections of Tongue and Lips and enumerate points of identification	Histology Practical	Oral Cavity
GIT-A-023	Identify, draw and label the histological sections of Salivary glands (Submandibular, Sublingual and Parotid)	Histology Practical	Salivary Gland
GIT-A-024	Identify, draw and label the histological structure of the esophagus and enumerate points of identification Identify, draw and label the histological structure of stomach and enumerate points of identification	Histology Practical	Upper GIT

GIT-A-025	Identify, draw and label the histological structure of small intestine (Duodenum, Jejunum, and Ileum) and enumerate points of identification	Histology Practical	Small Intestine
GIT-A-026	Identify, draw and label the histological structure of large intestine and enumerate points of identification	Histology Practical	Large Intestine
GIT-A-027	Identify, draw and label the histological sections of Gall bladder, liver and enumerate points of identification	Histology Practical	Organs associated with GIT
	Identify, draw and label the histological sections of pancreas and enumerate points of identification	Histology Practical	Organs associated with GIT
GIT-A-028	Identify, draw and label the histological sections of Palatine tonsil, appendix, peyer's patches and enumerate points of identification	Histology Practical	Lymphatic tissue associated with GIT

NORMAL FUNCTION

THEORY

CODE	MEDICAL PHYSIOLOGY	TOTAL HOURS = 20	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
GIT-P-001	Classify the components of enteric nervous system	Medical Physiology	General Principles of GIT Function - Motility, Nervous Control & Blood Flow
	Discuss the location and significance of myenteric plexus		
	Describe the Meissner's plexus		
	Differentiate between myenteric and Meissner's plexuses		
	Explain the mechanism of developing slow wave		
	Explain the mechanism of developing spike potential		
	Enlist the factors that depolarize & hyperpolarize the GIT membrane		
	Enlist the excitatory & inhibitory neurotransmitters of enteric nervous system		
	Explain the role of sympathetic & parasympathetic nervous system in controlling GIT function.		
	Enlist the gastrointestinal reflexes & explain the functions of these reflexes		

	Enlist the hormones acting on GIT, their stimuli, site of release and actions		
	Enumerate different types of movements that occur in GIT		
	Discuss the functions and control of GIT movements		
	Discuss the effect of gut activity and metabolic factors on GIT blood flow		
	Explain the nervous control of GIT blood flow		
GIT-P-002	Trace the reflex arc of mastication	Medical Physiology	Oral Cavity & Esophagus
	Explain the process and importance of chewing reflex		
	Enlist the stages of swallowing		
	Describe the mechanism of voluntary stage of swallowing		
	Trace the reflex arc of involuntary stage of swallowing		
	Enlist the steps involved in involuntary stage of swallowing	Medical Physiology	
	Explain the effect of swallowing on respiration	Medical Physiology	
	Discuss the mechanism of esophageal stage of swallowing	Medical Physiology	
	Enlist causes of dysphagia	Medical Physiology integrates with Surgery	
	Explain the types and role of different peristalsis originating in esophagus	Medical Physiology	
	Discuss the role of Lower Esophageal Sphincter (Gastroesophageal)	Medical Physiology	
	Discuss the pathophysiology of achalasia & Megaesophagus	Medical Physiology	
	Enlist the features and treatment of achalasia	Medical Physiology	
GIT-P-003	Explain storage function of stomach	Medical Physiology	Stomach
	Describe the basic electrical rhythm of stomach wall	Medical Physiology	
	Explain the role of pyloric pump and pyloric sphincter in gastric emptying	Medical Physiology	

	Explain the factors that promote Stomach Emptying	Medical Physiology	
	Discuss the duodenal (nervous & hormonal) factors that inhibit Stomach emptying	Medical Physiology	
	Enlist the factors that initiate enterogastric inhibitory reflexes	Medical Physiology	
	Enumerate the causes, features, and pathophysiology of gastritis	Medical Physiology integrates with Medicine	
	Explain the physiological basis of each feature of gastritis	Medical Physiology integrates with Medicine	
	Recommend treatment of gastritis	Medical Physiology integrates with Medicine	
	Enumerate the causes, features, and pathophysiology of peptic ulcer		
	Explain the physiological basis of each feature of peptic ulcer		
GIT-P-004	Enumerate and explain the hormones and movements of small intestine	Medical Physiology	Small Intestine
	Explain the term “peristaltic rush”		
	Explain the functions of ileocecal valve and sphincter		
	Enumerate the types of intestinal sprue	Medical Physiology integrates with Medicine	
	Enlist the features of intestinal sprue		
	Explain the consequences of sprue on the body		
GIT-P-005	Enumerate the types of movements taking place in colon	Medical Physiology	Large Intestine
	Explain the mechanism of developing movements of colon and their control through Gastrocolic and Duodenocolic Reflexes	Medical Physiology	
	Enlist the defecation reflexes	Medical Physiology	
	Explain the mechanism of defecation reflex	Medical Physiology	
	Trace the reflex arc of defecation	Medical	

		Physiology	
	Name the other autonomic reflexes that affect bowel activity	Medical Physiology	
	Explain the pathophysiology of constipation	Medical Physiology integrates with Medicine	
	Discuss the causes of diarrhea Describe the cause of Hirschsprung's disease integrate with Medicine	Medical Physiology	
GIT-P-006	Explain the functions of liver	Medical Physiology	Liver
	Differentiate between liver and gall bladder bile and the hormones acting on them	Medical Physiology	
	Enumerate the causes and composition of developing gall stones	Medical Physiology Integrate with Surgery	
GIT-P-007	Explain function and secretions of pancreas	Medical Physiology	Pancreas
	Enlist the causes and pathophysiology of acute and chronic pancreatitis	Integrate with Medicine	
	Enumerate the features of acute pancreatitis and explain the physiological basis of each feature of pancreatitis	Integrate with Medicine	
GIT-P-008.	Describe the stages of vomiting act	Medical Physiology	Vomiting Reflex
	Trace the reflex arc of vomiting	Medical Physiology	
	Explain the role of chemoreceptor trigger zone for initiation of vomiting by drugs or by motion sickness	Medical Physiology	
GIT-P-009	Define Malnutrition	Integrated with Medicine Gastroenterology	Malnutrition
	Identify various causes of malnutrition		
	Identify the risk factors of malnutrition		
	Outline treatment strategies		
GIT-P-010	Define Acute Diarrhea		Acute & Chronic Diarrhea
	Define Chronic Diarrhea		

	Enlist various causes for acute and chronic diarrhea		
CODE	**BIOCHEMISTRY**	**TOTAL HOURS = 40**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
GIT-B-001	Give the composition and importance of saliva and related clinical disorder (xerostomia)	Biochemistry	Biochemistry of GIT /GIT secretions & digestion and absorption of dietary carbohydrates
	Give the composition and importance of gastric juice with special reference to mechanism of HCl secretion and related clinical disorders (achlorhydria, gastric ulcer		
	Give the composition and importance of pancreatic juice, bile and succus entericus and related clinical disorders (pancreatitis, cystic fibrosis, cholelithiasis).		
	Describe digestion and absorption of dietary carbohydrates along with inherited and acquired disorders (lactose intolerance, sucrase-isomaltase deficiency).		
GIT-B-002	Elaborate key features of various transport systems for entry of glucose into cells.	Biochemistry	Carbohydrate metabolism/ Entry of glucose into cells
GIT-B-003	Enlist the hormones that play important roles in regulating carbohydrate metabolism.	Biochemistry	Carbohydrate metabolism/ Hormonal control of BSL
	Elaborate the metabolic effects of these hormones.		
	Infer the consequences of deficiency and excess of these hormones		
GIT-B-004	Describe the glycolytic pathway along with its regulation and significance.	Biochemistry	Carbohydrate metabolism/ Glycolysis
	Compare key features of aerobic and anaerobic glycolysis.		
	Calculate the number of ATP produced during aerobic and anaerobic glycolysis.		
	Explain hemolytic anemia in subjects with pyruvate kinase deficiency based on your biochemical knowledge.		

	Clearly differentiate between substrate level phosphorylation and oxidative phosphorylation.		
GIT-B-005	Discuss the metabolic fates of pyruvate.	Biochemistry	Carbohydrate metabolism/ Metabolic fates of pyruvate
	Describe the transport of pyruvate from cytosol to mitochondria.		
	Elaborate the reaction catalyzed by pyruvate dehydrogenase complex (PDH) along with regulation and significance.		
	Enlist inherited and acquired causes of lactic acidosis and give biochemical explanation for lactic acidosis in each condition.		
GIT-B-006	Describe the TCA cycle along with regulation & significance. Calculate the energy yield of TCA	Biochemistry	Carbohydrate metabolism/ Kreb's Cycle
GIT-B-007	Define gluconeogenesis and enumerate gluconeogenic substrates (precursors)	Biochemistry	Carbohydrate metabolism/ Gluconeogenesis
	Delineate the reactions involved in synthesis of glucose from various gluconeogenic substrates.		
	Elaborate the regulation and importance of gluconeogenesis.		
	Explain the significance of Cori cycle and glucosealanine cycle		
GIT-B-008	Illustrate the reactions of glycogenesis, glycogenolysis along with their regulation and significance	Biochemistry	Carbohydrate metabolism/ Glycogen metabolism
	Enlist various types of glycogen storage diseases (GSDs)		
	Infer the key biochemical and clinical features of various GSDs from the respective enzyme deficiencies.		
GIT-B-009	Describe the reactions and regulation of Hexose Mono Phosphate Pathway (HMP).	Biochemistry	Carbohydrate metabolism/ HMP Hexose Monophosphate Pathway
	Discuss the importance of HMP shunt		
	Explain hemolytic anemia in subjects suffering from		

	G6PD deficiency.		
	Diagnose G6PD (glucose-6-phosphate dehydrogenase) deficiency based on given data.		
GIT-B-010	Describe the reactions, regulation, and biomedical importance of uronic acid pathway and sorbitol pathway	Biochemistry	Carbohydrate metabolism/ Uronic acid pathway & sorbitol pathway
GIT-B-011	Outline the reactions involved in metabolism of galactose and fructose.	Biochemistry	Carbohydrate metabolism/ Metabolism of galactose & fructose
	Infer the key biochemical and clinical features of galactosemia, essential fructosuria, and hereditary fructose intolerance (HFI) from the respective enzyme deficiencies.		
	Explain hypertriacylglycerolemia, hypercholesterolemia, and hyperuricemia associated with fructose loading of liver.		
GIT-B-012	Outline the reactions involved in ethanol metabolism.	Biochemistry	Carbohydrate metabolism/ Ethanol metabolism
	Explain how ethanol consumption causes hypoglycemia and fatty liver.		
GIT-B-013	Diagrammatically illustrate the organization of electron transport chain (ETC) depicting the flow of electrons	Biochemistry	Respiratory chain & oxidative phosphorylation /ETC
	Enlist the components of complex I, II, III, and IV		
	Enumerate clinically important inhibitors of electron transport chain and mention their site of action.		
GIT-B-014	Elaborate the structure of ATP synthase (complex V).	Biochemistry	Respiratory chain & oxidative phosphorylation /ATP synthesis
	Explain how the free energy generated by the transport of electrons by ETC is used to produce ATP from ADP + Pi (i.e. chemiosmotic hypothesis)		
	Elaborate the effect of oligomycin and uncouplers on ATP production.		
	Describe the effect of arsenic poisoning on carbohydrate metabolism and ATP production.		
	Elaborate the glycerol 3-P shuttle and malate-aspartate		

	shuttle for the transfer of reducing equivalents from cytosol into the mitochondria.		
GIT-B-015	Define and classify nutrients into macro and micronutrients. Elaborate the concept and importance of Balanced Diet Enlist the components of balanced diet and elaborate the importance of each component.	Biochemistry	Nutrition/ Balanced diet
GIT-B-016	Delineate special nutritional requirements during pregnancy, lactation, growth, and old age. Suggest dietary advice for patients suffering from diabetes mellitus, hypertension, obesity, renal disease, lactose intolerance, gluten enteropathy, hypercholesterolemia, and hemorrhoids.	Integrate with Community Medicine	Nutrition/ Special nutritional requirements
GIT-B-017	Enlist causes and types of Protein Energy Malnutrition (PEM). Differentiate between Kwashiorkor and Marasmus based on the given data Enlist symptoms and signs Outline treatment strategies	Integrate with community Medicine/ Pediatrics	Nutrition/ PEM
GIT-B-018	Define energy balance. Compare the energy content of macro nutrients and alcohol. Suggest a simple method for estimation of caloric requirements of sedentary adults, moderately active adults, and very active adults	Biochemistry	Nutrition/ Caloric requirements
GIT-B-019	Define basal metabolic rate (BMR) Elaborate the effect of various physiological and pathological factors on BMR.	Biochemistry	Nutrition/ BMR
GIT-B-020	Define body mass index (BMI). Categorize individuals into underweight, normal, overweight, obese, and morbidly obese based on theirs BMI values.	Integrate with community Medicine	Nutrition/ BMI & Obesity

	Elaborate the role of genetic, environmental, and behavioral factors in determining body weight.		
	Clearly differentiate between upper body obesity and lower body obesity.		
	Enlist health risks associated with obesity.		
GIT-B-021	Describe sources, Recommended Dietary Allowance (RDA), biochemical functions, deficiency, and toxicity of vitamin B1, B2, B3, B5 and B7.	Biochemistry	Vitamins/ Energy releasing vitamins & vitamin E and K
	Describe sources, RDA, biochemical functions, deficiency, and toxicity of vitamin E and vitamin K.		
GIT-B-022	Define and classify minerals according to their daily requirements.	Biochemistry	Minerals
	Give sources, functions and biomedical importance of Na, K and Cl.		
	Describe sources, functions and biomedical importance of Mg, Se, I, F, Cu, Cr, Mn, Mo, Zn and Co.		
GIT-B-023	Define Marasmus and Kwashiorkor	Integrated with Pediatrics	Malnutrition
GIT-B-024	Define Acute Hepatitis	Integrated with Medicine Gastroenterology	Acute & Chronic Hepatitis
	Define Chronic Hepatitis		
	Enlist various causes for acute and chronic hepatitis		
	Describe various symptoms and signs of chronic hepatitis		
	Outline treatment strategies		

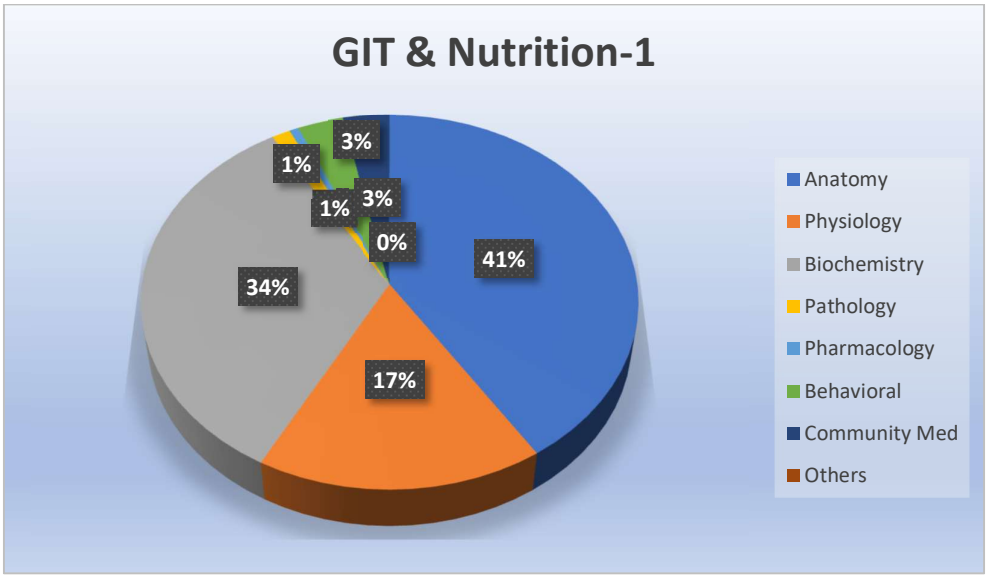
PRACTICAL

CODE	BIOCHEMISTRY	TOTAL HOURS = 11+06	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
GIT-B-025	Estimate blood glucose level by glucose oxidase method and interpret the results	Biochemistry Practical	Estimations of blood/urine analytes
	Determine blood glucose level by glucometer and		

	interpret the result.		
	Perform Glucose tolerance test (GTT) and interpret the results.		
	Determine urine glucose by dipstick method and interpret the result.		
	Estimate serum amylase and interpret the result.		
GIT-B-026	Interpret the results of Lactose tolerance test.		Interpretation of results
GIT-B-027	Determine BMI of given subject and interpret the results.		Determination & interpretation of results
GIT-P-011	Demonstrate Cranial nerve V, IX & X testing	Physiology	Cranial nerve
AGING			
CODE	**THEORY**	**TOTAL HOURS = 01**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
GIT-CM-001	Identify causes and risk factors for malnutrition in elderly Outline treatment strategies	Community Medicine	Preventive Medicine in Geriatrics
PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 03**	
		DISCIPLINE	**TOPIC**
GIT-Ph-001	Classify anti diarrheal drugs and describe the pharmacokinetics, mechanism of action, pharmacological effects, uses and adverse effects	Pharmacology	Anti Diarrheal Drugs
GIT-Pa-001	Describe the etiology, pathogenesis, morphology and clinical features of peptic ulcer disease	Pathology	Peptic Ulcer
GIT-Pa-002	Enumerate common infectious agents of diarrheal diseases Discuss pathogenesis and clinical features of common pathogens	Pathology	Infectious agents causing Diarrhea

DISEASE PREVENTION & IMPACT			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 09**	
		DISCIPLINE	**TOPIC**
GIT-BhS-001	Identify health related behaviors and apply principles of learning to modify eating and addictive patterns	Behavioral Sciences	Health related behaviors
GIT-BhS-002	Discuss health belief model and its application in managing common presentations related to gastro-intestinal system		Health related believes
	Explain the transtheoretical model of changing behaviors to modify the diseases pattern		
GIT-BhS-003	Describe motivational interviewing and outline a management plan to help the individuals with obesity and diabetes to lose weight		Management of Obesity
GIT-BhS-004	Describe and distinguish Medically Un described Symptoms (MUS)		Medically Un described Symptoms
	Describe the association of psychosocial factors with MUS		
	Outline the principles of management plan according to biopsychosocial model		
	Describe role of Cognitive Behavioral Therapy (CBT)		
GIT-BhS-005	To identify effect on mental development of nutritional deficiencies		Role of nutritional deficiencies in mental development
GIT-CM-001	Describe prevention and control of polio, viral hepatitis A, cholera, typhoid and food poisoning	Community Medicine	Epidemiology of communicable diseases (Intestinal infection)
	Describe prevention and control of amoebiasis, ascariasis, hook worm infestation		
GIT-CM-002	Describe the advice to be given for breast feeding, weaning and childhood		Preventive medicine in pediatrics
	Discuss risk factors, prevention and management of protein energy malnutrition (PEM)		

GIT-CM-003	Describe balanced diet for adult and obesity		Nutrition & Health
	Plot and interpret growth chart for children under 5 years of age		
	Describe prevention and control of deficiency of Vitamin A and D		

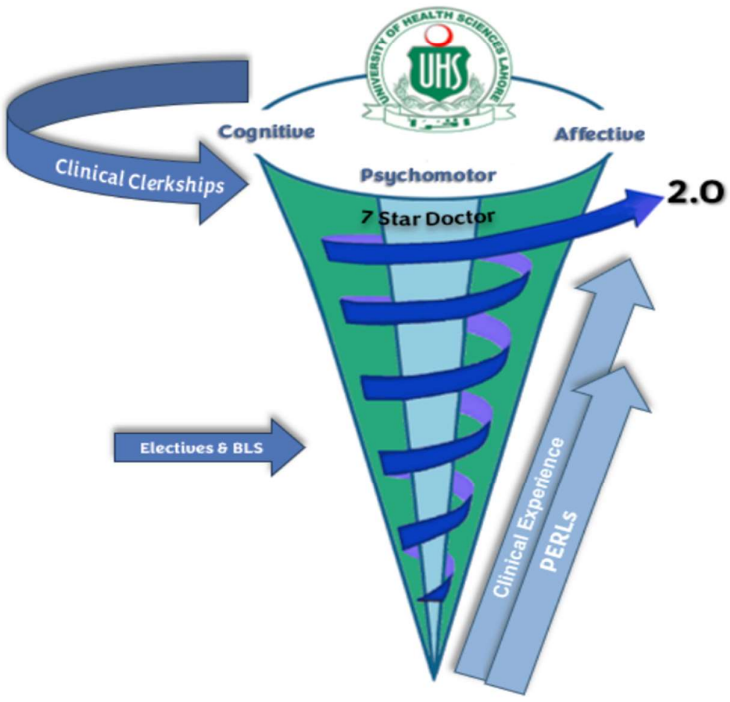


Module Weeks	Recommended Minimum Hours
06	152

MODULE NO. 07:

RENAL-I

MODULAR INTEGTARTED
CURRICULUM 2K23 *version 2.0*



MODULE RATIONALE

The renal module for second-year MBBS (Bachelor of Medicine, Bachelor of Surgery) students is a crucial component of the medical curriculum. This module is designed to provide students with a comprehensive understanding of the structure, function, and pathology of the kidneys, as well as the principles of renal physiology and the clinical management of and electrolyte balance, acid-base balance, and blood pressure. Understanding renal physiology is essential for comprehending various disease renal disorders. Here are some key rationales for including a renal module in the curriculum:

MODULE OUTCOMES

- Discuss the gross and microscopic anatomy of kidney and urinary system.
- Explain the embryological development of kidney and urinary tract
- Explain common developmental abnormalities of renal system
- Identify role of renal system in maintaining blood pressure and acid base balance
- Enlist functions of kidney and pathologies related to them.
- Explain method of electrolyte balance and pathologies related to it.
- Highlight pathologies related to kidneys and their distinctive clinical features
- Interpret investigations done to diagnose abnormal structural and functional presentations.

THEMES

- Kidney
- Ureter
- Bladder
- Acid/base balance

CLINICAL RELEVANCE

- Protein in urine.
- Kidney stones.
- Kidney pain.
- Blood in urine (hematuria)
- Kidney infection.
- Acute kidney injury (AKI)
- Kidney cancer.
- Dialysis

- Control of blood pressure

IMPLEMENTATION TORs
• The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1200. • The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. • However, the level of cognition can be kept at a higher level by the institution. • The Table of Specifications provided will be used for the three papers of the Second professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.

SYLLABUS OF RENAL-I MODULE

NORMAL STRUCTURE			
THEORY			
CODE	GROSS ANATOMY	TOTAL HOURS = 14	
	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC
R-A-001	Describe gross features and facial coverings of kidneys.	Human Anatomy	Kidney
	Compare and contrast the relations of right and left kidneys.		
	Describe blood supply, lymphatics and nerve supply of kidney		
	Discuss the clinical aspects of kidneys		
	Demonstrate the surface marking and radiographic anatomy of kidney. Identify the side of kidney		
R-A-002	Compare and contrast the relations of right and left ureter	Human Anatomy	Ureter
	Give the constrictions of ureter		
	Describe the blood supply nerve supply and lymphatics of ureter		
	Identify the ureter.		
R-A-003	Describe the gross anatomical features, relations, surfaces, blood supply, nerve supply and lymphatics of urinary bladder	Human Anatomy	Urinary bladder
	Give the clinical corelates of urinary bladder		
	Identify the gross features and surfaces of urinary bladder		
R-A-004	Interpret basic urological signs/symptoms & investigations.	Integrate with urology	Sign/symptom/investigations
R-A-005	Describe the etiology, and management of urinary retention.		Urinary retention
R-A-006	Identify and describe the various anatomic landmarks of the renal system on	Integrate with Radiology	radiograph

	radiographs.		
R-A-007	Describe the parts of urethra.	Human Anatomy	Urethra
CODE	**EMBRYOLOGY & POST-NATAL DEVELOPMENT**	**TOTAL HOURS = 05**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
R-A-008	Describe development of intermediate mesoderm and its derivatives	Embryology	Development of urinary system
	Describe the development of pronephros, mesonephros and metanephros	Embryology	
	Describe positional changes during descent of kidney with correlation to its blood supply	Embryology	
	Describe the development of urinary bladder and urethra	Embryology	
	List and describe the common congenital anomalies of kidney, urinary bladder and urethra.	Embryology	
CODE	**MICROSCOPIC STRUCTURE**	**TOTAL HOURS = 04**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
R-A-009	Describe the histological, structural organization and functions of kidney with clinicals.	Histology	Structure of kidney
R-A-010	Describe the light and ultrastructure of Juxtaglomerular apparatus and glomerular filtration barrier	Histology	Juxtaglomerular apparatus
R-A-011	Describe the histological structure of ureter	Histology	Structure of ureter
R-A-012	Describe the histological structure of urinary bladder Discuss clinical correlates (Cystitis, Urinary bladder cancer, Urinary Tract Infections (UTIs))	Histology	Structure of urinary bladder

PRACTICAL			
CODE	HISTOLOGY	TOTAL HOURS = 06	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
R-A-013	Identify and draw and label the histological structure of kidney and enumerate points of identification	Practical	Kidney
R-A-014	Identify, draw and label the histological structure of ureter and enumerate its points of identification	Practical	Ureter
R-A-015	Identify, draw and label the histological structure of urinary bladder and enumerate its points of identification	Practical	Urinary bladder
NORMAL FUNCTION			
THEORY			
CODE	MEDICAL PHYSIOLOGY	TOTAL HOURS = 36	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
R-P-001	Describe major composition of intracellular and extracellular fluids	Physiology	Body fluid compartment
	Define Hypo and hypernatremia		
	Explain the causes of hypo & hypernatremia and their effects on Composition of body fluid compartments		
	Describe difference between iso-osmotic, hyper-osmotic, hypo-osmotic fluids		
R-P-002	Enumerate causes of Intracellular and extracellular edema	Integrate with Medicine	Edema
	Describe safety factors that prevent edema		
R-P-003	Explain the functions of the kidney	Physiology	Function
R-P-004	Describe the mechanism of micturition and its control		Micturition reflex

	Explain the role of higher center on micturition		
	Explain the physiological anatomy and innervation of bladder		
	Discuss the voluntary control of micturition		
R-P-005	Explain the causes, pathophysiology, and features of atonic bladder. Discuss the causes, pathophysiology, and features of automatic bladder. Write the causes, pathophysiology, and features of uninhibited neurogenic bladder	Integrate with Pathology	Abnormalities of micturition
R-P-006	Enlist the steps of urine formation	Physiology	Urine formation
	Explain the physiological anatomy and functions of glomerular capillary membrane		
	Discuss the composition of filtrate		
	Explain the minimal change nephropathy and increase permeability to plasma protein		
R-P-007	Define Glomerular Filtration Rate (GFR).	Physiology	Glomerular filtration
	Describe the determinants of GFR		
	Explain the factors affecting GFR		
	Discuss the hormones and autocoids that affect GFR		
	Explain mechanisms of autoregulation of GFR		
	Enlist the physiological and pathological factors that decrease GFR		
	Explain the effects of angiotensin II blocker on GFR during renal hypoperfusion		
R-P-008	Enumerate different types of transport along the kidney tubules for reabsorption	Physiology	Reabsorption
	Explain the reabsorption and secretion along different parts of the Nephron		
	Explain the regulation of tubular reabsorption		
	Discuss the forces / pressure and hormones that		

	determine renal tubular reabsorption		
	Explain the reabsorption of water along different parts of nephron		
	Define obligatory and facultative reabsorption		
	Discuss the characteristics of late distal tubules and cortical collecting ducts		
	Discuss the characteristics of medullary collecting ducts		
R-P-009	Explain the use of clearance method to quantify kidney function	Physiology	Clearance method
R-P-010	Describe mechanism of re-absorption of sodium along different parts nephrons	Physiology	Transport maximum
	Define and explain the term Transport maximum for the substances		
	Define filtered load for the substance		
	Justify the difference of transport maximum and renal threshold of glucose in renal tubules		
R-P-011	Explain the renal mechanisms for excreting Dilute urine	Physiology	Urine concentration and dilution
	Explain the mechanism for forming a concentrated urine		
	Discuss the role of urea in the process of counter current multiplier mechanism		
	Describe the countercurrent exchange in vasa Recta to preserve hyperosmolarity of renal medulla		
R-P-012	Define and explain the term obligatory urine volume. Define and explain free water clearance. Define Urine specific gravity.	Physiology	Obligatory urine volume
R-P-013	Enumerate different abnormalities of urinary concentrating ability	Physiology	Disorders of urine concentrating ability
R-P-014	Enumerate the types of Diabetes insipidus	Integrate with	Diabetes

	Enlist the features of diabetes insipidus	Medicine	insipidus
	Explain the pathophysiology and treatment of central diabetes insipidus		
	Discuss the pathophysiology of nephrogenic diabetes insipidus		
R-P-015	Make the flow chart to show the Osmoreceptor-antidiuretic hormone (*ADH*) feedback mechanism for regulating extracellular fluid osmolarity in response to a water deficit.	Physiology	Osmoreceptor-ADH Feedback System
	Enlist the factors which increase and decrease the release of ADH		
R-P-016	Explain the mechanism of thirst		Thirst
R-P-017	Enumerate the factors that can alter potassium distribution between intracellular and extracellular fluids		Renal regulation of potassium
	Discuss the process of secretion of potassium by renal tubules Explain the regulation of internal potassium distribution and potassium secretion		
R-P-018	Explain the control of extracellular fluid osmolarity and sodium concentration		Control of ECF osmolarity
R-P-019	Explain the integration of renal mechanism for control of Extracellular Fluid (ECF)		Control of ECF
	Explain the importance of pressure natriuresis and diuresis in maintaining body sodium and fluid balance		
R-P-020	Explain the renal handling of calcium concentration to regulate plasma calcium concentration		Renal regulation of calcium Renal regulation of phosphate
	Enumerate the factors that alter renal calcium		
	Enlist the factors that alter renal phosphate excretion		

R-P-021	Explain the nervous and hormonal factors that increase the effectiveness of renal body fluid feedback control	Physiology	Renal body fluid feedback control
R-P-022	Explain the conditions that cause large increase in blood volume and ECF volume Explain the conditions that cause large increase ECF volume but with normal blood volume		ECF and blood volume
R-P-023	Explain the renal handling of H^+ ion.		Acid base balance
R-P-024	Analyze the acid base disturbances on the basis of pH, HCO3 and CO2	Physiology	Acid base disturbance
	Explain the causes and compensation of metabolic acidosis		
	Explain the causes and compensation of metabolic alkalosis		
	Explain the causes and compensation of respiratory acidosis		
	Explain the causes and compensation of respiratory alkalosis		
	Explain the causes and compensation of mixed acid base disorder		
R-P-025	Define and explain anion gap	Physiology	Anion gap
CODE	**MEDICAL BIOCHEMISTRY**	**TOTAL HOURS = 23**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
R-B-001	Describe digestion and absorption of dietary proteins along with the inherited and acquired disorders (peptic ulcer, Hartnup disease, gluten enteropathy and cystic fibrosis). Elaborate the mechanisms involved in renal reabsorption of amino acids and discuss related disorders (Hartnup disease and cystinuria)	Medical Biochemistry	Protein digestion and absorption, reabsorption, and related disorders
R-B-002	Clearly differentiate between protein digestion and	Medical	Protein

	degradation. Compare the salient feature of the two major mechanisms for degradation of body proteins. Elaborate the concept of protein turnover and quote examples of short lived and long-lived proteins.	Biochemistry	Metabolism/ Protein degradation and turnover
R-B-003	Define amino acid pool. Delineate the sources and fates of amino acids. Give definition of nitrogen balance and its three states. Give physiological and/or pathological conditions associated with each state of nitrogen balance.	Medical Biochemistry	Protein Metabolism/ Amino acid pool and nitrogen balance
R-B-004	Enlist 7 important reactions involved in amino acid metabolism and give a brief introduction of each. (Deamination, Transamination, Trans-deamination, Deamidation, Decarboxylation, Transmethylation & Transpeptidation)	Medical Biochemistry	Protein Metabolism/ Introduction to Reactions involved in catabolism
R-B-005	Define transamination. Describe the reactions catalyzed by ALT (alanine transaminase) and AST (aspartate aminotransferase) with special reference to the role of pyridoxal phosphate in the transfer of amino group. Give diagnostic and prognostic importance of serum ALT and AST. Elaborate the importance of transamination reaction in amino acid metabolism.	Medical Biochemistry	Protein Metabolism/ Transamination
R-B-006	Define oxidative deamination. Describe the reaction catalyzed by glutamate dehydrogenase (GDH) along with its significance.	Medical Biochemistry	Protein Metabolism/ Trans deamination

	Define trans deamination.		
R-B-007	Define deamidation. Describe deamidation reaction catalyzed by glutaminase and asparaginase along with their significance. Explain how does L-asparaginase help in the management of certain types of leukemia. Elaborate the mechanism for shunting of glutamine from liver to kidneys during acidosis. Give advantage of shunting.	Medical Biochemistry	Protein Metabolism/ Deamidation
R-B-008	Define decarboxylation. Describe important decarboxylation reactions along with their significance	Medical Biochemistry	Protein Metabolism/ Decarboxylation
R-B-009	Give sources of ammonia in human body. Describe how ammonia is transported to liver with special reference to the role of glutamine and alanine in this transport mechanism.	Medical Biochemistry	Protein Metabolism/ Sources and transport of ammonia
R-B-010	Elaborate the reactions and regulation of urea cycle. Enlist the inherited and acquired causes of hyperammonemia in each condition. Give the biochemical mechanisms underlying ammonia intoxication. Discuss dietary and therapeutic measures for the management of patients with hyperammonemia (phenylbutyrate, lactulose, antibiotics).	Medical Biochemistry	Protein Metabolism/ Urea cycle, ammonia intoxication and its management
R-B-011	Trace the pathways for synthesis of non-essential amino acids (NEAA) (alanine, aspartate, glutamate,	Medical Biochemistry	Protein Metabolism/ Biosynthesis of

	glutamine, asparagine, proline, serine, glycine, cysteine, and tyrosine)		NEAA
R-B-012	Discuss the fate of carbon skeletons of amino acids. Categorize amino acids into glucogenic, ketogenic or both depending upon the intermediates produced during their catabolism. Outline the catabolic pathways of amino acids that yield oxaloacetate. Outline the catabolic pathways of amino acids that yield α-ketoglutarate. Outline the catabolic pathways of amino acids that yield pyruvate. Outline the catabolic pathways of amino acids that yield fumarate. Outline the catabolic pathways of amino acids that yield succinyl CoA. Outline the catabolic pathways of amino acids that yield acetyl CoA or acetoacetyl CoA.	Medical Biochemistry	Protein Metabolism/ Degradation of carbon skeleton of amino acids
R-B-013	Describe the metabolism of methionine. Discuss cause, Key diagnostics features and management of homocystinuria.	Biochemistry/ integrate with Pediatrics	Protein Metabolism/ Inborn errors of amino acid metabolism
	Describe the catabolism of branched chain amino acids. Discuss cause, key diagnostic features, and management of Maple Syrup Urine disease	Biochemistry/ integrate with Pediatrics	

	(MSUD).		
	Describe the metabolism of tyrosine. Discuss the cause, key diagnostic features, and management of alkaptonuria, albinism, and type 1 tyrosinemia.	Biochemistry/integrate with Pediatrics	
	Give cause, key diagnostic features, and management of phenylketonuria (PKU)	Biochemistry/integrate with Pediatrics	
	Elaborate special roles of glycine, tryptophan, phenylalanine, tyrosine, and methionine	Biochemistry	
R-B-014	Describe ionization of water and elaborate its significance. Discuss water and electrolyte balance in health and disease.		Water, pH, Buffers/ Ionization of water
R-B-015	Define pH and describe the concept of pH scale.		Water, pH, Buffers/ pH and pH scale
R-B-016	Define weak acids and conjugate base.		Water, pH, Buffers/ weak acids and their significance
R-B-017	Define Ka and pKa and give their significance.		Water, pH, Buffers/ Ka And pKa
R-B-018	Describe Henderson-Hasselbach (HH) equation. (no derivation required) along with its application/use.		Water, pH, Buffers/ HH equation and its applications
R-B-019	Define buffers. Enumerate the component of a buffers system and describe their mechanism of action. Enlist important buffers present in blood, plasma, ECF (Extra Cellular Fluid), ICF (Intra Cellular Fluid) and renal tubular fluid. Elaborate the working of bicarbonate buffer and phosphate buffer.		Water, pH, Buffers/ HH equation and its applications

R-B-020	Elaborate the role of kidneys in the regulation of acid base balance.	Biochemistry	Acid Base balance and imbalance/ Renal mechanisms for pH regulation
R-B-021	Elaborate the concept of 1st, 2nd and 3rd line of defense against changes in H^+ ion concentration.		Acid Base balance and imbalance/ Defense mechanisms against changes in H+ concentration
R-B-022	Define acidosis and alkalosis. Classify acid base disorders. Enlist causes of metabolic acidosis and give its compensation. Enlist causes of respiratory acidosis and give its compensation. Enlist causes of metabolic alkalosis and give its compensation. Enlist causes of respiratory alkalosis and give its compensation.	Biochemistry/integrate with Medicine	Acid Base balance imbalance/ Types of acid base disorders
R-B-023	Interpret disorders metabolic and respiratory disorders of acid base balance on basis of sign, symptoms and arterial blood gas (ABG) findings Give biochemical explanation for tetany associated with alkalosis	Biochemistry	Acid Base balance imbalance/ Tetany in alkalosis

PRACTICAL

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 02+10=12	
		DISCIPLINE	TOPIC
R-P-026	Perform a complete examination of the urine sample URS-10 (using urine reagent-10) and interpret its report	Physiology Practical	Interpretation of report
	Determine the specific gravity of urine		
R-B-024	Estimate blood urea level and interpret your results.	Biochemistry Practical	Interpretation of results
	Estimate serum creatinine level and interpret your results. Compare the usefulness of blood urea and serum creatinine in assessment of renal functions.		
	Determination of proteins in urine by dipstick method and interpret your results.		
	Estimate serum acid phosphatase level and interpret your results.		

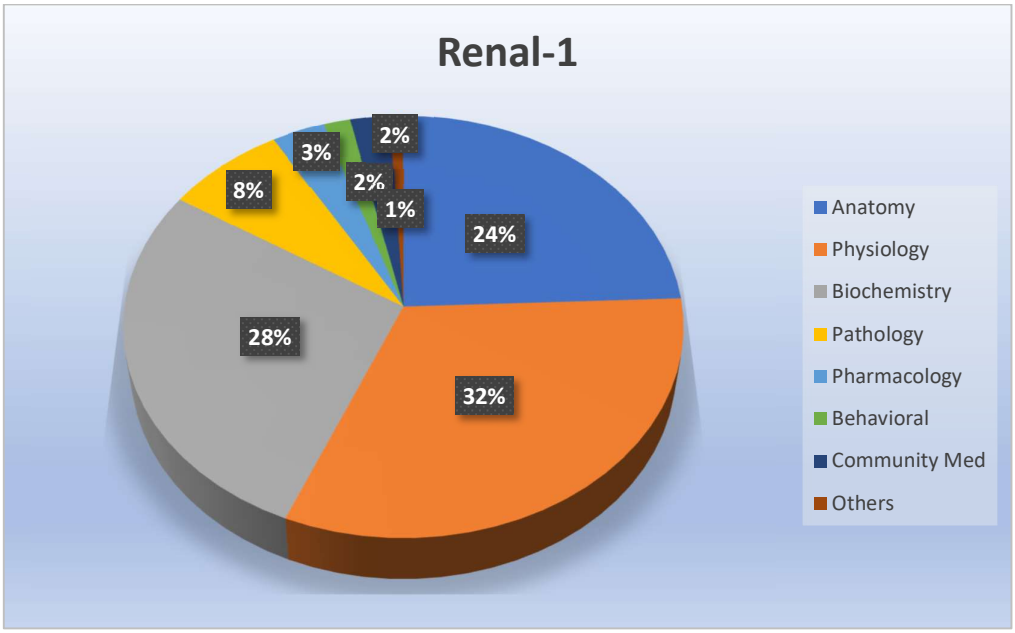
PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 13	
		DISCIPLINE	TOPIC
R-Ph-001	Classify diuretics & carbonic anhydrase inhibitor. MOA, clinical uses, and adverse effects	Pharmacology & Therapeutics	Diuretics
	Describe Thiazide & loop diuretics their Mechanism of Action, clinical uses, and adverse effects.		
	Describe Potassium sparing and osmotic diuretics their mechanism of action, clinical uses, and adverse effects.		
R-Pa-001	Discuss the etiology and pathogenesis of different types of stones.	Pathology	Renal Stones

R-Pa-002	Identify the causes, morphological aspect & outcome of hydronephrosis.		Hydronephrosis
R-Pa-003	Enlist common causative agents of urinary tract infections and describe pathogenesis and clinical features of common causative agents of UTI.		UTI causative agents
R-Pa-004	Define various presentations of glomerulonephritis. Define nephrotic and nephritic syndrome. List various risk factors and outline management of glomerulonephritis.	Integrate with Medicine	Glomerulonephritis
R-Pa-005	Define AKI (acute kidney injury) Identify various risk factors and causes for AKI. Outline management strategies.		Acute Kidney Injury
R-Pa-006	Define UTI (Urinary Tract Infection)		Urinary tract infection
	Identify various risk factors and causes of UTI.		
	Describe signs and symptoms of UTI.		
	Outline management strategies.		

DISEASE PREVENTION AND IMPACT			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 04**	
		DISCIPLINE	**TOPIC**
R-CM-001	Discuss the significance of quality of life in disease and treatment settings. Measures of health status. Disability-Adjusted Life Year (DALY) and Quality-Adjusted Life Year (QALY) Life expectancy.	Community Medicine and Public Health	Quality of life
R-BhS-001	To identify the behavioral abnormalities caused by renal function.	Behavioral Sciences	Dementia, uremic encephalopathy, delusion, muscle paralysis & Societal impact
	To identify the cognitive abnormality.		
	To identify the dangers for the patient, his family, and society.		

AGING			
CODE	THEORY	TOTAL HOURS = 02	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
R-Ag-001	To define preventive care in diseases related to urinary system(adults). Primary, secondary, and tertiary prevention.	Community	Disease prevention
R-Ag-002	Define urinary incontinence. Outline management strategies.	Medicine	Urinary incontinence

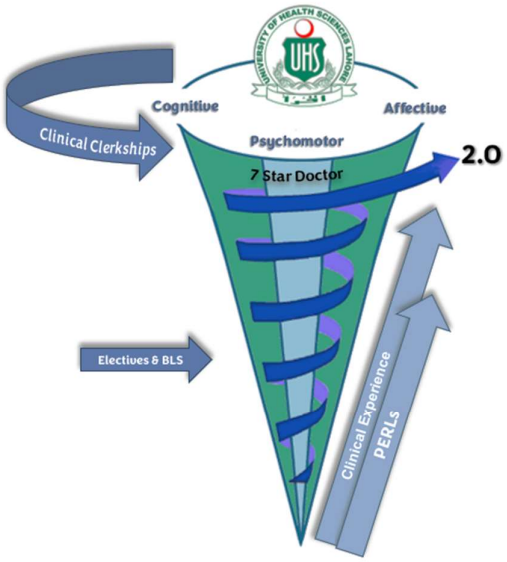


Module Weeks	Recommended Minimum Hours
04	119

CURRICULUM 2K23

version 2.0

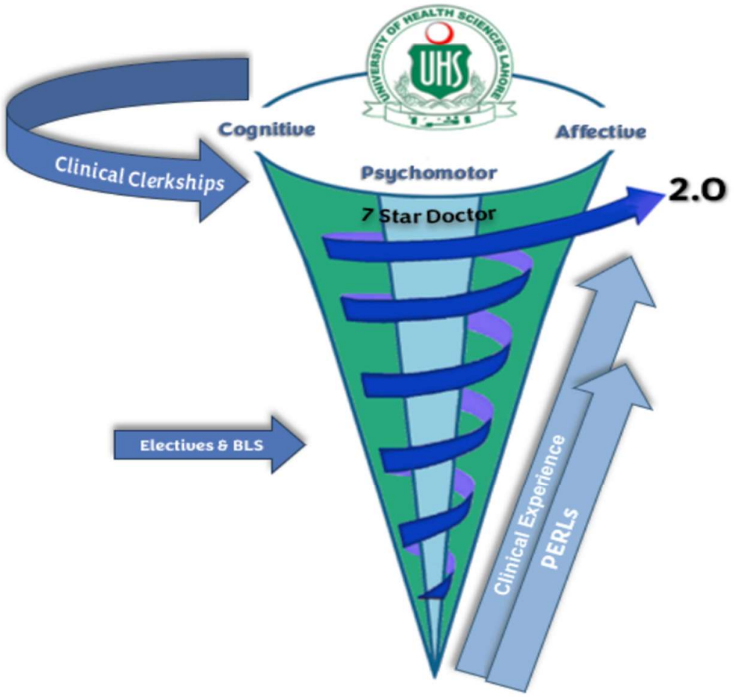
BLOCK-5



MODULE NO. 08:

ENDOCRINOLOGY & REPRODUCTION-I

MODULAR INTEGTARTED CURRICULUM 2K23 *version 2.0*



MODULE RATIONALE

Endocrinal system is a unique system consists of glands which control body systems through its secretions known as hormones. These chemical compounds known as hormones play an integral role in maintaining cell activity and organ functions through biochemical signals. Human reproduction is controlled by hormones released by gonads.

Changes in hormonal levels can affect human fertility.

In this module the anatomy and physiology of the endocrine organs, functional biochemistry of the hormones secreted will be taught in integrated fashion with reference to common disease occurring in Pakistani community.

MODULE OUTCOMES

- Explain Development, structure, hormones and regulation of pituitary gland, thyroid gland, parathyroid gland, endocrine pancreas, adrenal glands, testes and ovaries.
- Describe the etiology, pathophysiology, relevant clinical features and common investigations of disorders of these glands.
- Apply levels of prevention for common endocrinal public health issues in Pakistan.
- Elaborate events in normal pregnancy and principles of genetics.

THEMES

- Introduction to Endocrinology, Mechanism of action, Second messenger, measurements
- Pituitary gland
- Thyroid Gland & Parathyroid Gland
- Adrenal glands
- Pancreatic Hormones
- Reproduction & Genetics

CLINICAL RELEVANCE

- Diabetes
- Hypothyroidism & Hyperthyroidism
- Cushing Syndrome & Addison’s disease
- Dysfunctional Uterine Bleeding
- Infertility

IMPLEMENTATION TORs
• The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1200. • The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. • However, the level of cognition can be kept at a higher level by the institution. • The Table of Specifications provided will be used for the three papers of the Second professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.

SYLLABUS OF ENDOCRINOLOGY & REPRODUCTION-I MODULE

NORMAL STRUCTURE			
THEORY			
CODE	**GROSS ANATOMY**	**TOTAL HOURS = 35**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
EnR-A-001	Describe the location, anatomy blood supply and functions of pituitary gland	Anatomy	Diencephalon (Endocrinology)
EnR-A-002	Describe the Thyroid, Parathyroid with their type, Relations, blood supply, and nerve supply.	Anatomy	Thyroid & Parathyroid gland
	Explain the anatomical basis for surgical removal of the glands of neck with special emphasis on the complications that can be encountered	Anatomy	
	Identify the Thyroid with their type, relations, blood supply, and nerve supply.	Anatomy	
EnR-A-003	Describe the structure, fascia, coverings, blood and nerve supply of testis	Anatomy	Testis
EnR-A-004	Describe the gross anatomical features and neuro-vasculature of epididymis and vas deferens, Seminal vesicles, Bulbourethral gland	Anatomy	Accessory Male organs
EnR-A-005	Describe the morphological features and neurovascular supply of prostate. Describe, Draw & Label Lobes of prostate gland Correlate the clinical manifestations of prostate with lobes and/or zones of prostate		Prostate
EnR-A-006	Describe the anatomical basis and manifestations of the following conditions: 1) Hydrocele of spermatic cord and/or testes 2) Hematocele of testes 3) Torsion of the spermatic cord 4) Varicocele Vestigial remnants of embryonic genital duct	Anatomy	Testis clinical conditions
	Describe the anatomical basis of vasectomy, &	Anatomy	

	metastasis of cancer of testis and scrotum		
EnR-A-007	Describe shape, relations blood supply & nerve supply of suprarenal gland	Anatomy	Supra-Renal Gland
	Explain the anatomical causes of Adrenal Abnormalities	Anatomy	
EnR-A-008	Define Bony Pelvis (Girdle) and describe the structures forming it.	Anatomy	Pelvic Girdle
	Describe the bones and salient anatomical features of Bony pelvis (girdle)	Anatomy	
EnR-A-009	Describe the type, articulations and mechanics of movements {axes and planes} of the following joints: 1) Sacro-Iliac 2) Pubic Symphysis 3) Lumbosacral 4) Sacrococcygeal	Anatomy	Sacroiliac-Joint
EnR-A-010	List the contents of True and False Pelvis	Anatomy	Bony Pelvis (Girdle)
	Tabulate the differences between male and female pelvis	Anatomy	
	Describe different types of pelvises	Anatomy	
	Describes different diameters of pelvis and their application in obstetric practice	Anatomy (Obs & Gynae)	
EnR-A-011	Describe the anatomical basis of pelvic fractures and their consequences	Anatomy	Pelvic Girdle
	Describe the topographical anatomy of pelvic walls and its components	Anatomy	
	Describe the mechanics of changes occurring in pelvic ligaments and joint mobility in late pregnancy	Anatomy (Obs & Gynae)	
EnR-A-012	Describe the topographical anatomy of pelvic floor.	Anatomy	Pelvic floor
	Describe origin, insertion, nerve supply and actions of muscle forming pelvic floor	Anatomy	
EnR-A-013	Tabulate the attachments, innervations and actions of muscles forming the pelvic walls and floor	Anatomy	Pelvic Muscles

EnR-A-014	Describes injury to pelvic floor during child birth and its complications	Anatomy (Obs & Gynae)	Pelvic Girdle
EnR-A-015	Describe the peritoneal reflections in the male and female pelvis	Anatomy	Peritoneum peritoneal cavity of pelvis
EnR-A-016	Describe the gross anatomical features of Sacrum	Anatomy	Sacrum
EnR-A-017	Describe the gross anatomical features of pelvic fascia	Anatomy	Pelvic Fascia
EnR-A-018	Describe the boundaries of pelvic outlet and inlet	Anatomy	Pelvic Outlet and inlet
	Enumerate the structures passing through the pelvic inlet and pelvic outlet	Anatomy	
EnR-A-019	Tabulate the differences in peritoneal reflections in male and female pelvis	Anatomy	Peritoneal Reflection in Pelvis
EnR-A-020	Describe the origin, course, branches and distribution of common iliac artery	Anatomy	Pelvic Vessels
	Describe the origin, course, branches and distribution of external and internal iliac arteries	Anatomy	
	Describe the origin, course, tributaries and area of drainage of pelvic veins	Anatomy	
EnR-A-021	Describe the location, afferents and efferent of pelvic lymph nodes	Anatomy	Pelvic Lymph Nodes
EnR-A-022	Tabulate the origin, course, distribution and anastomosis of arteries of the pelvis	Anatomy	Pelvic Vessels & Pelvic nerves
	Describe the origin, root value, course, relations, branches and distribution of Pelvic nerves	Anatomy	
	Describe the anatomical basis and clinical picture for ligation of internal iliac artery and collateral circulation in pelvis	Anatomy	
	Describe the clinical picture and anatomical basis for the injury to pelvic nerves	Anatomy	
	Give anatomical justification for pelvic nerve blocks	Anatomy	
EnR-A-023	Describe the morphological features of urethra (male and female)	Anatomy	Pelvis

	Tabulate the parts of the male urethra with their location and salient features	Anatomy	
	Describe the clinical picture and anatomical justification for Ureteric Caliculi, Cystocele, Suprapubic Cystotomy, Rupture of Bladder	Anatomy	
	Describe the clinical picture and anatomical justification for Hypertrophy of Prostate	Anatomy	
	Describe the gross anatomical features of Ovaries and Fallopian Tubes with their relations, blood supply, nerve supply and lymphatic drainage Describe related clinical conditions: 1) Positions of ovaries 2) Cysts of ovaries 3) Ectopic pregnancy 4) Tubal ligation 5) Salpingitis	Anatomy	
	Describe the gross anatomical features, parts, peritoneal ligaments, blood supply, nerve supply & lymphatic & clinical aspects of Uterus and Vagina Describe related clinical conditions 1. Prolapse of uterus 2. Vaginal trauma 3. culdocentesis	Anatomy	
	Describe, identify, justify and demonstrate the supports of uterus	Anatomy	
EnR-A-024	Describe the gross anatomical features of Boundaries & divisions of perineum	Anatomy	Perineum
	Draw and label the boundaries of perineum	Anatomy	
	List the contents of perineum	Anatomy	
	Tabulate the differences between the Male and female	Anatomy	

	perineum		
	Describe the attachments of the perineal membrane and list its relations	Anatomy	
	Discuss the formation of Superficial and Deep Perineal Pouches	Anatomy	
	List the contents of Superficial and Deep Perineal Spaces	Anatomy	
	Tabulate the attachments, actions and nerve supply of muscles of perineum	Anatomy	
	Describe the topographical anatomy and neuro-vasculature of Penis	Anatomy	
	Tabulate the muscles forming the perineal body with their attachments and nerve supply	Anatomy	
EnR-A-025	Describe the clinical presentation and anatomical justification for: 1) Hypospadias 2) Phimosis 3) Circumcision 4) Erectile Dysfunction 5) Internal Hernias 6) Suprapubic Cystotomy 7) Rupture Of Bladder 8) Rectal Examination 9) Disposition Of Uterus	Anatomy	Pelvis
CODE	**EMBRYOLOGY & POST-NATAL DEVELOPMENT**	**TOTAL HOURS = 14**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
EnR-A-026	Describe the contributing factors, histogenesis and sequence of events of the development of Thyroid gland	Anatomy	Development of Thyroid gland
	Explain the embryological basis of the Thyroglossal Cyst	Anatomy	
	Draw a concept map highlighting the development of thyroid gland	Anatomy	

EnR-A-027	Describe the development of para-thyroid glands	Anatomy	Development Of Parathyroid glands
	Draw a concept map highlighting the development of para-thyroid gland	Anatomy	
EnR-A-028	Anatomically justify the clinical presentation of: 1. Ectopic Parathyroid 2. Aberrant Thyroid	Anatomy	Development of Thyroid, Parathyroid
EnR-A-029	Describe the development of pituitary gland Describe the embryological basis for the congenital anomalies of pituitary development	Anatomy	Development of Pituitary Gland
EnR-A-030	Describe the contributing factors, histogenesis and the development of adrenal gland	Anatomy	Development Of Adrenal Gland
	Draw a concept map for the development of adrenal gland	Anatomy	
	Describe the embryological basis for the congenital anomalies of adrenal development	Anatomy	
EnR-A-031	Identify the stages in the development of the adrenal gland	Anatomy	Adrenal Gland
EnR-A-032	Describe the indifferent gonads	Anatomy	Development of Reproductive system
	List and describe the Factors influencing the differentiation of gonads		
	Evaluate the role of the factors influencing Sex determination and differentiation		
	Describe the Development and descent of testis	Anatomy	
EnR-A-033	Describe the embryological basis and locations of undescended testes	Anatomy	Testis
EnR-A-034	Draw a concept map highlighting the development of testis	Anatomy	Development of Reproductive system
	Explain the Development and descent of ovaries	Anatomy	
	Draw a concept map highlighting the development of ovaries	Anatomy	
	Describe the anatomical basis for indifferent gonads, Klinefelter, turner syndromes & androgen insufficiency	Anatomy	

	Describe the Formation of Genital Ducts In different stage (paramesonephric and mesonephric ducts)	Anatomy	
	Describe the development of female genital ducts and glands, Development of uterus & Vagina. Describe related clinical anomalies: 1) Uterus Arcuatus 2) Uterus septus 3) Uterus Bicornis Bicollis 4) Uterus Bicornis Unicollis 5) Uterus Unicornis 6) Atresia of vagina 7) Double vagina 8) Imperforate hymen	Anatomy	
	Describe the development of male genital ducts and glands	Anatomy	
	Discuss the Development of male external genitalia	Anatomy	
	Describe the Development of female external genitalia	Anatomy	
	Explain the anatomical basis for the Associated congenital anomalies of male and female external genitalia (Hyposidiasis, Epispidiasis)	Anatomy	
	Describe the development of inguinal canal and descent of testis and embryological basis for Cryptorchidism, Ectopic Testis, Congenital Inguinal Hernia, Hydrocele	Anatomy	
	Klinefelter, turner syndromes & androgen insufficiency Describe the embryological basis for the coverings of testis	Anatomy	
CODE	**MICROSCOPIC STRUCTURE (HISTOLOGY & PATHOLOGY)**	**TOTAL HOURS = 14**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
EnR-A-035	Describe the histological basis and manifestation of Gastric Carcinoid Tumors	Anatomy/ Pathology	Stomach
	Classify the principal Enteroendocrine Cells on the basis of type, location, hormone produced and Actions	Anatomy	

EnR-A-036	Describe microscopic structure of Pituitary gland.	Anatomy	Pituitary Gland
	Classify pituitary gland on the basis of cell type, hormone produced and functions	Anatomy	
	Explain the histological basis and manifestation of Pituitary Adenomas	Anatomy	
EnR-A-037	Describe the light microscopic structure of Adrenal Gland	Anatomy	Adrenal Gland
	Explain the histological basis and manifestation of Addison disease	Anatomy	
EnR-A-038	Describe the light microscopic structure of endocrine pancreas	Anatomy	Pancreas
	Classify the pancreatic islets on the basis of cell type, hormone produced and functions	Anatomy	
	Explain the histological basis and manifestation of Diabetes Mellitus	Anatomy	
	Explain the components and functions of neuroendocrine system	Anatomy	
EnR-A-039	Describe the light microscopic structure of Thyroid Gland	Anatomy	Thyroid Gland
	Describe the light microscopic structure of Parathyroid Gland	Anatomy	
	Describe the light microscopic structure of Pineal gland	Anatomy	
EnR-A-040	Describe the light and ultramicroscopic structure of Testes, structure & function of Sertoli cells. Describe Blood testes Barrier	Anatomy	Testes
	Describe the histological basis and manifestation of Orchitis, Cryptorchidism	Anatomy Pathology	
EnR-A-041	Describe the light microscopic structure of Epididymis	Anatomy	Epididymis
EnR-A-042	Describe the light microscopic structure of vas deferens	Anatomy	Vas deferens
EnR-A-043	Describe the light microscopic structure of seminal vesicle	Anatomy	Seminal Vesicle

EnR-A-044	Describe the light microscopic structure of Prostate Gland	Anatomy	Prostate gland
	Describe the lobes of prostate and correlate with the pathologies of prostate	Anatomy pathology	
EnR-A-045	Describe the light microscopic structure of ovaries	Anatomy	Ovaries
	Describe the light microscopic structure of ovarian follicles in different stages of menstrual cycle.	Anatomy	
	Describe the histological basis and manifestation of Polycystic Ovary Syndrome	Anatomy Pathology	
EnR-A-046	Discuss the light microscopic structure of uterus	Anatomy	Uterus
	Describe the light microscopic structure of different stages of Menstrual cycle	Anatomy	
	Describe the histological basis and manifestation of Endometriosis	Anatomy Gynae & Obs.	
EnR-A-047	Describe the light microscopic structure of Fallopian Tube.	Anatomy	Fallopian Tube
EnR-A-048	Describe the light microscopic structure of Cervix	Anatomy	Cervix
	Describe the histological basis and manifestation of Cervical Carcinoma	Anatomy Pathology	
EnR-A-049	Describe the light microscopic structure of Vagina	Anatomy	Vagina
EnR-A-050	Describe light microscopic structure of mammary gland (inactive, during pregnancy, after lactation) Discuss histological basis of Breast cancer	Anatomy pathology	Mammary Gland

PRACTICAL

CODE	HISTOLOGY	TOTAL HOURS = 11	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
EnR-A-051	Identify draw & Label the Pituitary gland under light microscope	Anatomy	Pituitary gland

EnR-A-052	Identify draw & label the Thyroid & Parathyroid glands under light microscope	Anatomy	Thyroid & Parathyroid
EnR-A-053	Identify draw & Label the Adrenal gland under light microscope	Anatomy	Adrenal Gland
EnR-A-054	Identify draw & Label Testes, Epididymis & Vas deferens under the light Microscope	Anatomy	Testes Epididymis Vas Deferens
EnR-A-055	Identify draw & label the seminal vesicle & prostate gland under light Microscope	Anatomy	Seminal Vesicle Prostate Gland
EnR-A-056	Identify, draw and label the ovaries under light microscope	Anatomy	Ovaries
EnR-A-057	Identify, draw and label the slide of different phases of uterus under light microscope	Anatomy	Uterus
EnR-A-058	Identify, draw and label the fallopian tube under light microscope	Anatomy	Fallopian Tube
EnR-A-059	Identify, draw and label the cervix under light microscope	Anatomy	Cervix
EnR-A-060	Identify, draw and label the vagina under light microscope	Anatomy	Vagina
EnR-A-061	Identify, draw and label the mammary gland (different stages) under light microscope	Anatomy	Mammary gland
NORMAL FUNCTION			
THEORY			
CODE	**MEDICAL PHYSIOLOGY**	**TOTAL HOURS = 59**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
EnR-P-001	Define different chemical messengers. Enlist endocrine organs and hormones of the body. Enlist the hormones on the basis of chemical nature. Discuss the feedback control of hormone secretion. Explain the up and down regulation of receptors. Enlist the location of hormone receptors.	Biochemistry	Introduction to Endocrinology

	Explain the mechanism of intracellular signaling after hormone receptor activation. Name the hormones that use enzyme-linked hormone receptors signaling. Explain the mechanism of enzyme linked receptors. Enlist second messenger mechanisms for mediating intracellular hormonal functions. Define second messenger system. Explain the adenylyl cyclase– cAMP Second Messenger System. Enumerate the hormones that use the adenylyl cyclase–cAMP Second Messenger System. Explain The cell membrane phospholipid second messenger System. Enumerate the hormones that use cell membrane phospholipid second messenger system. Explain the mechanism of calcium Calmodulin system.		
EnR-P-001	Name the hormones/ factors of hypothalamus. Name the hormones of anterior pituitary. Name the hormones of posterior pituitary. Describe the functional relationship between hypothalamus, anterior and posterior pituitary gland. Explain the significance of hypothalamic- hypophysial portal circulation. Explain the hypothalamic pituitary tract. Explain the mechanism of action of growth hormone. Explain the actions of Growth hormone on Carbohydrate. Discuss the actions of Growth hormone on protein metabolism. Describe the actions of Growth hormone on fat metabolism.	Physiology	Hypothalamus / Pituitary Gland

	Explain the effect of growth hormone on skeletal growth and age. Explain the significance of somatomedins in mediating the actions of growth hormone. Describe the regulation of Growth Hormone. Describe the causes and features and treatment of panhypopituitarism in adults and childhood. Define Sheehan's syndrome. Enlist the types of dwarfism according to cause. Explain the pathophysiology and features of gigantism and acromegaly. Explain the mechanism of action of antidiuretic hormone. Discuss the actions of antidiuretic hormone. Regulation of antidiuretic hormone production. Elaborate the mechanism of action of oxytocin. Discuss the actions of oxytocin.		
EnR-P-002	Discuss the transport of thyroid hormone Discuss the mechanism of action of thyroid hormone Explain the actions of thyroid hormone on carbohydrate metabolism Discuss the actions of thyroid hormone on protein metabolism Explain the actions of thyroid hormones on fat metabolism Explain the non-metabolic functions of thyroid hormone Explain the regulation of thyroid hormone Enumerate antithyroid substances and explain their mechanism of action Enumerate the causes of hyperthyroidism	Physiology	Thyroid gland
	Explain the features, pathophysiology and treatment of thyrotoxicosis/ grave's disease Explain the thyroid function test to investigate hypo and		

	hyperthyroidism Enlist the causes of hypothyroidism Explain the pathophysiology of Hashimoto hypothyroidism Discuss the features and pathophysiology and treatment of myxedema Explain the pathophysiology and features of endemic colloid goiter Discuss the pathophysiology and features of nontoxic colloid goiter Enlist the causes of cretinism Discuss the features and pathophysiology of cretinism		
EnR-P-003	Name the hormones of adrenal cortex. Explain the physiological anatomy of adrenal cortex. Explain the cellular mechanism of Aldosterone action. Explain the effects of mineralocorticoid hormone. Discuss the regulation of aldosterone secretion. Discuss the metabolic and non-metabolic functions of cortisol Explain the interconversion of active cortisol and inactive cortisone by the 2, 11 beta hydroxysteroid dehydrogenase isoform. Explain the mechanism for regulation of glucocorticoid secretion by hypothalamus and pituitary Name adrenal androgens and enlist the functions of adrenal androgens. Discuss the causes, features, pathophysiology and treatment of hypoadrenalism (Addison's disease). Enlist the causes of hyperadrenalism. Explain the features, pathophysiology and treatment of Cushing's syndrome. Differentiate between Cushing's syndrome and Cushing's disease	Physiology & Pathology	Adreno cortical hormones

	Explain the clinical importance of dexamethasone suppression test to diagnose Cushing's syndrome. Discuss the features, pathophysiology and treatment of Conn's syndrome. Enlist the cause, features and pathophysiology of congenital adrenal hyperplasia/ Androgenital syndrome.		
EnR-P-004	Enumerate the types of pancreatic cells with their hormones. Explain the mechanism of action of insulin. Discuss the synthesis and mechanism of release of insulin. Explain the effects of insulin on carbohydrate, protein and lipid metabolism. Enlist the actions of insulin on liver, adipose tissue and skeletal muscle. Enlist the factors and conditions that increase or decrease insulin secretion.	Physiology	Pancreatic hormones
	Explain the role of insulin (and other hormones) in "switching" between carbohydrate and lipid metabolism. Discuss the effects of glucagon on carbohydrate and lipid metabolism. Explain the factors that regulate the secretion of glucagon. Explain the 24-hour regulation of glucose. Discuss the importance of blood glucose regulation. Explain the actions of somatostatin.		
EnR-P-005	Enlist the types of diabetes mellitus Explain the causes of Type I and type II diabetes mellitus Discuss the features and pathophysiology of diabetes mellitus Explain the role of insulin resistance, obesity and metabolic syndrome in developing type II diabetes	Physiology	Abnormalities of Glucose regulation

	mellitus Explain how to diagnose the diabetes mellitus Explain the treatment of type I and type II diabetes mellitus Explain the features, cause of insulinoma		
EnR-P-006	Discuss the physiological anatomy of parathyroid gland Explain the rapid and slow mechanism of resorption of bone by parathyroid hormone Discuss the actions of parathyroid Explain the control of parathyroid secretion by calcium ion concentration	Physiology	Parathyroid hormones
EnR-P-007	Discuss the effects of Vitamin D Discuss the effects of calcitonin on calcium Discuss the regulation of calcium (the first & second line of defense) Explain the causes and features of hypoparathyroidism Explain the causes and the features of primary and secondary hyperparathyroidism Enumerate the causes and features of osteoporosis	Physiology	Regulation of calcium in body
EnR-P-008	Enlist the functions of adrenal medullary hormones and explain pheochromocytoma	Physiology	Adreno medullary hormones
EnR-P-009	Describe the hormonal factors that affect spermatogenesis Explain the maturation and storage of sperm in epididymis Discuss the structure and physiology of a mature sperm Describe the composition of semen Discuss the functions of prostate & seminal vesicles in the formation of semen Explain the phenomenon of capacitation and its significance Describe the acrosome Reaction and its significance Discuss the role of pineal gland in reproduction	Physiology	Spermatogenesis Capacitation & Acrosome reaction
EnR-P-010	Discuss the site of secretion of testosterone	Physiology	Testosterone

	Name the active form of testosterone Explain the production of estrogen in males Describe the basic intracellular mechanism of action of testosterone		
	Explain the functions of testosterone in intrauterine life and after birth Discuss the regulation of male sexual functions by hormones from the hypothalamus and anterior pituitary gland		
EnR-P-011	Enumerate and explain the phases of ovarian cycle along with the hormonal changes Explain the postulated mechanism of ovulation Explain the formation and involution of Corpus luteum Endometrial cycle Explain the structural and hormonal changes of endometrial cycle Explain the regulation of female monthly cycle Discuss the role of progesterone on female sexual organs	Physiology	Menstrual cycle
EnR-P-012	Enumerate the ovarian hormones Discuss the synthesis of estrogen and progesterone Describe the interaction of follicular theca and granulosa cells for production of estrogens with the help of a diagram Explain the functions of the estrogens on different organs Discuss the role of progesterone on female sexual organs	Physiology	Female sexual hormones
EnR-P-013	Explain the physiological basis of puberty, menarche Define menopause Explain the cause of menopause Discuss the physiological changes in the function of the body at the time of menopause	Physiology	Puberty, menarche & menopause
EnR-P-014	Explain the non-hormonal functions of placenta	Physiology	Normal Pregnancy

	Explain the hormonal factors in pregnancy/ hormones of placenta Explain the changes in non- placental hormones during pregnancy Response of the mother's body to pregnancy Explain the mechanical and hormonal factors that increase uterine contractility during parturition		
EnR-P-015	Explain the physiology of lactation Discuss the actions of prolactin Justify the suppression of ejection of milk during pregnancy Discuss the physiological basis of suppression of the female ovarian cycles in nursing mothers for many months after delivery	Physiology	Lactation
CODE	**MEDICAL BIOCHEMISTRY**	**TOTAL HOURS = 35**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
EnR-B-001	Define different chemical messengers. Enlist endocrine organs and hormones of the body. Enlist the hormones on the basis of chemical nature. Discuss the feedback control of hormone secretion. Explain the up and down regulation of receptors. Enlist the location of hormone receptors. Explain the mechanism of intracellular signaling after hormone receptor activation. Name the hormones that use enzyme-linked hormone receptors signaling. Explain the mechanism of enzyme linked receptors. Explain the mechanism of hormones that receptors present in cytoplasm and nucleus (act on genetic machinery). Enlist second messenger mechanisms for mediating intracellular hormonal functions.	Biochemistry	Introduction to Endocrinology

	Define second messenger system. Explain the adenylyl cyclase– cAMP Second Messenger System. Enumerate the hormones that use the adenylyl cyclase–cAMP Second Messenger System. Explain The cell membrane phospholipid second messenger System. Enumerate the hormones that use cell membrane phospholipid second messenger system. Explain the mechanism of calcium Calmodulin system.		
EnR-B-002	Describe the features of Signal transduction Describe different types of receptors	Biochemistry	Signal Transduction
EnR-B-003	Discuss the classification of hormones	Biochemistry	Classification of hormones
EnR-B-004	Describe different types of second messengers Differentiate the G protein and non-G protein mediated pathways of signal transduction Discuss the hormones which act through: Cyclic AMP (Adenosine monophosphate) Discuss the hormones which act through: Cyclic GMP (guanosine monophosphate) Discuss the hormones which act through calcium phosphoinositol Describe the Receptor tyrosine kinase pathway of signal transduction Explain the Serine threonine kinase pathway of signal transduction Discuss the Nuclear Receptor mediated pathway of signal transduction Describe the Receptor coupled to Jak Stat pathway of signal transduction	Biochemistry	Second messengers
	Explain the control and negative feedback mechanism of hormone regulation	Biochemistry	

	Discuss the biosynthesis, secretion, mechanism of action and metabolic functions of Insulin, glucagon, epinephrine, cortisol, thyroid and growth hormone with special reference to carbohydrate, protein and lipid metabolism	Biochemistry	
	Interpret disorders of hormones on the basis of sign, symptoms and given data	Biochemistry	
EnR-B-005	Explain the synthesis, secretion, transport and clearance of steroid and protein hormones.	Biochemistry	Synthesis of Hormones
EnR-B-006	Enlist the steps in the synthesis of adrenocortical hormone. Explain the synthesis and secretion of ACTH (Adrenocorticotropic hormone) in association with melanocyte-stimulating hormone, lipotropin, and endorphin.	Biochemistry	Synthesis of ACTH & adrenocortical
EnR-B-007	Explain the structure, biosynthesis, secretion, transport, regulation, catabolism, mechanism of action and biochemical role of testosterone, progesterone and estrogen	Biochemistry	Synthesis of testosterone, progesterone and estrogen
EnR-B-008	Discuss the role of steroid hormones in oral contraception, Infertility	Biochemistry	Steroid in infertility
EnR-B-009	Define the following terms: chromosome, allele (dominant and recessive), gene, locus, heterozygote, homozygote, hemizygous, autosome, genotype, phenotype, haploid and diploid number of chromosomes, aneuploidy, proband, proposita, pedigree, propositus, penetrance, codominance and polygenic	Biochemistry	Nomenclature of genetics
EnR-B-010	Discuss the structures of genes, how they are organized and regulated.	Biochemistry	Genes
EnR-B-011	Describe Mendelian Law of Segregation and Law of Independent Assortment.	Biochemistry	Mendelian laws
EnR-B-012	Describe the patterns of inheritance characteristic of autosomal dominant, autosomal recessive, X- linked	Biochemistry	Patterns of inheritance

	dominant, X-linked recessive and mitochondrial traits.		
EnR-B-013	Interpret genetic symbols as they appear in pedigrees.	Biochemistry	Pedigrees
EnR-B-014	Analyze pedigree to determine the mode of inheritance of following traits: 1) X-linked recessive (Duchenne Muscular dystrophy) 2) X-linked dominant (Rickets) 3) Autosomal recessive (Xeroderma Pigmentosum) 4) Autosomal dominant (Huntington's Disease)) Mitochondrial disorder (Mitochondrial diabetes)	Biochemistry	Mode of inheritance
EnR-B-015	Discuss different structural and numerical chromosomal abnormalities.	Biochemistry	Chromosomal abnormalities
EnR-B-016	Interpret the normal human karyotype in terms of number and structure of chromosomes.	Biochemistry	Karyotypes
EnR-B-017	Describe the effect of the following chromosomal mutations on a segment of DNA: point mutation, frameshift mutation, deletion, insertion, inversion, Robertsonian Translocation and mosaicism.	Biochemistry	Mutations
EnR-B-018	Discuss the concept of central dogma from gene to protein (replication, transcription and translation)	Biochemistry	Central dogma (Overview)
EnR-B-019	Discuss the gene expression especially Lac operon and Tryptophan operon	Biochemistry	Gene Expression
EnR-B-020	Discuss the regulation of eukaryotic gene expression with special emphasis on iron metabolism and RNA interference	Biochemistry	Gene Expression
EnR-B-021	Discuss the following Recombinant DNA techniques with reference to their principles, procedures and application: 1) PCR (Polymerase Chain Reaction) 2) RFLP (Restriction Fragment Length Polymorphism) 3) Cloning 4) Human Genome Project 5) Blotting Techniques 6) DNA (Deoxyribose Nucleic Acid) sequencing	Biochemistry	Techniques

PRACTICAL

CODE	BIOCHEMISTRY	TOTAL HOURS = 06+02=08	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
EnR-B-022	Perform DNA extraction	Biochemistry	DNA
EnR-B-023	Perform Electrophoresis	Biochemistry	Electrophoresis
EnR-B-0234	Perform PCR	Biochemistry	PCR
EnR-B-025	Demonstrate ELISA (enzyme-linked immunoassay) to measure concentration of hormones	Biochemistry	ELISA
EnR-P-016	Perform Pregnancy test	Physiology	Pregnancy test

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS

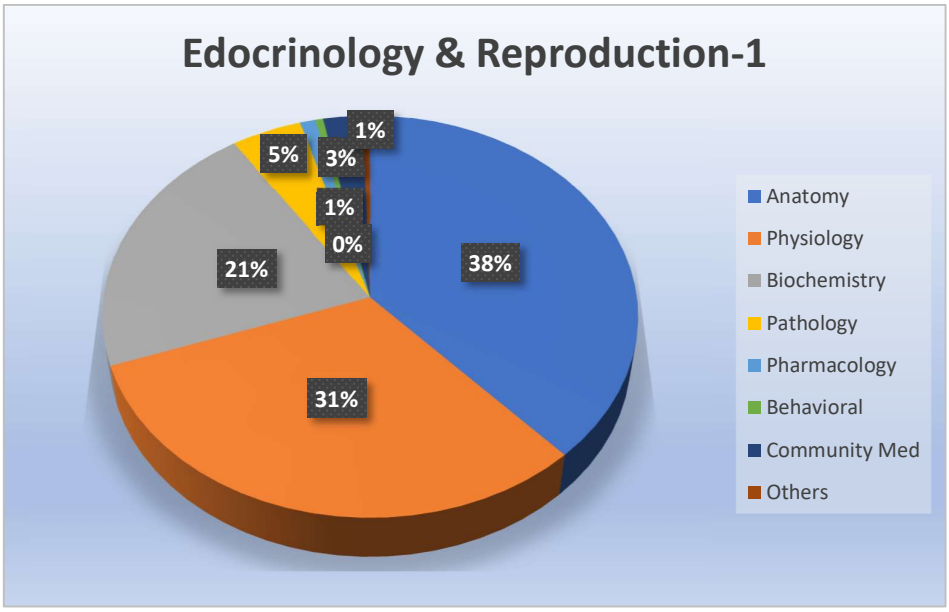
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 02	
		DISCIPLINE	TOPIC
EnR-Ph-001	Explain the mechanism of action of thyroxine Explain Clinical uses and potential adverse effects with use of Thyroxine	Pharmacology	Anti thyroid substance & MOA, uses, effects

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 09	
		DISCIPLINE	TOPIC
EnR-Pa-001	Enumerate clinical manifestations along with hormone levels of anterior pituitary Classification of pituitary adenomas	Pathology	Pathology of Anterior Pituitary Gland
EnR-Pa-002	Enumerate and describe posterior pituitary syndromes (inappropriate ADH (Anti Diuretic Hormone) secretion, diabetes insipidus)	Pathology	Pathology of Posterior Pituitary Gland
EnR-Pa-003	Enumerate causes of hypo and hyperthyroidism along with levels of thyroid hormones	Pathology	Pathology of Thyroid Gland
EnR-Pa-004	Enumerate causes of hypercalcemia, hyper and hypoparathyroidism	Pathology	Pathology of Parathyroid Gland

EnR-Pa-005	Give etiological Classification of DM (Diabetes Mellitus) Differentiating features of DM-I and DM-II on the basis of pathogenesis, clinical features, diagnosis and complications	Pathology	Pathology of Endocrine Pancreas Gland
EnR-Pa-006	Enumerate causes of Cushing syndrome with lab investigations Causes and clinical features of adrenocortical insufficiency (Addison disease)	Pathology	Pathology of Adrenal Gland
EnR-Pa-007	Enumerate causes of lower genital tract infections and PIDs along with lab investigations Enumerate causes of infertility in females along with hormonal investigations Causes of dysfunctional uterine bleeding with histopathological features Pathophysiology and lab diagnosis of eclampsia and preeclampsia Causes of placental implantations (ectopic pregnancy)	Pathology	Female Reproductive Pathology
EnR-Pa-008	Enumerate causes of inflammation of male genital tract Causes of male infertility with semen analysis Describe pathological features of testicular torsion	Pathology	Male Reproductive Pathology
DISEASE PREVENTION AND IMPACT			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 05**	
		DISCIPLINE	**TOPIC**
EnR-CM-001	Define Diabetes Mellitus according to WHO (World Health Organization) criteria Classify types of Diabetes Mellitus	Community Medicine and Public Health	Diabetes

	Describe epidemiological risk factors for Diabetes Epidemiological distribution & statistics of DM Screening of community for Diabetes Apply levels of prevention for control of Diabetes.		
EnR-CM-002	Classify types of genetic disorders common in community. Describe health promotional measures to control genetic diseases. Describe screening programs for community to prevent genetic disorders. Apply levels of preventive and social measures for control of genetic abnormalities.	Community Medicine	Genetics
EnR-CM-003	Define women health and life cycle approach for health-related events. Highlight statistics related to human reproductive health issues. Enumerate health related problems across a woman's reproductive lifetime. Explain the components of reproductive health.	Community Medicine	Reproductive health

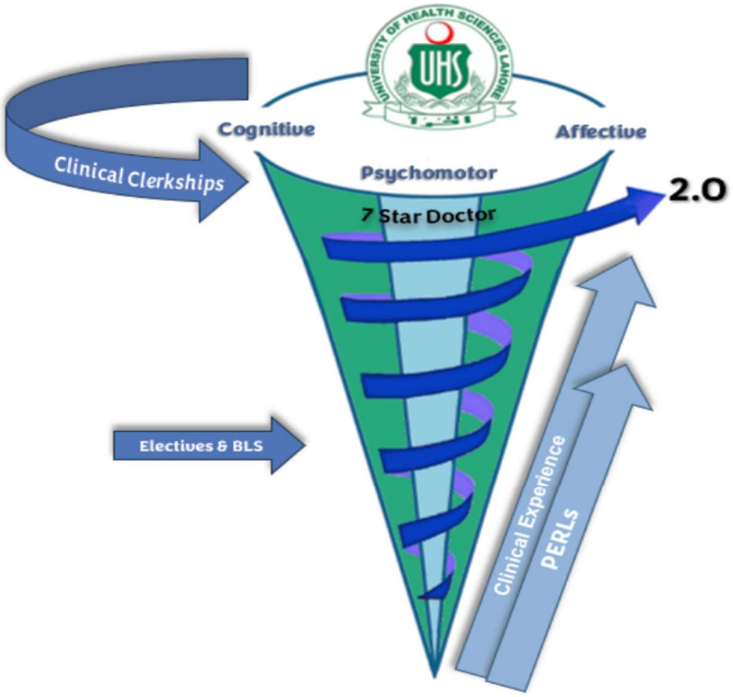
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 1	
		DISCIPLINE	TOPIC
EnR-BhS-001	Discuss common sexual dysfunctions and their prevalence, with emphasis on culture bound syndromes. Identify the various biological, psychological, and relational factors that can contribute to sexual difficulties. Discuss barriers to seek help. Discuss the importance of person centered and nonjudgmental approach when discussing sexual health concerns. Explain the ethical obligations of healthcare professionals in respecting patient confidentiality and informed consent when addressing sexual health issues.	Behavioral Sciences	Sexual difficulties and Medical Practices
AGING			
CODE	**THEORY**	**TOTAL HOURS = 01**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
EnR-Ag-001	Enlist the changes that occur in female body after menopause.	Gynae/ OBS	Menopause



Module Weeks	Recommended Minimum Hours
07	194

MODULE NO. 09:
HEAD & NECK, SPECIAL SENSES

MODULAR INTEGTARTED
CURRICULUM 2K23 *version 2.0*



MODULE RATIONALE

The second year MBBS students will have a detailed understanding of the anatomy, physiology, and clinical aspects of the Head and Neck, Special Senses. This knowledge is critical for the diagnosis and treatment of a wide range of diseases associated with these senses.

This module covers the important structures and functions of the Head & Neck, eye, ear, tongue, nose, as well as the pathologies and treatments associated with them. This includes common conditions such as cataracts, glaucoma, aging changes, hearing loss, tinnitus, otitis media, olfactory disorders.

Additionally, the special senses module includes training in relevant clinical examination skills, such as ophthalmoscopy, otoscopy, rhinoscopy, and vestibular testing. These skills are essential for identifying and diagnosing special senses conditions, and for monitoring the effectiveness of treatments.

An understanding of these structures is important for the general practice of medicine as they play a critical role in the overall health and well-being of patients. For example, vision and hearing loss can lead to a decline in cognitive function and social isolation, while smell and taste disorders can affect appetite and nutrition.

MODULE OUTCOMES

- Integrate the anatomical and pathophysiological aspects of the Head & Neck, eye, ear, nose, tongue, vestibular system and the neural pathways, receptors involved in their function with the clinical aspects.
- Develop the ability to identify and diagnose common pathologies such as cataracts, glaucoma, age-related degeneration, hearing loss, impacted wax, otitis media and olfactory disorders.
- Demonstrate the clinical examination (simulation) skills necessary for the assessment of special senses, such as ophthalmoscopy, otoscopy, rhinoscopy, and vestibular testing.
- Differentiate the differential diagnosis and options available for special senses conditions, including medical, surgical, and rehabilitative approaches.
- Illustrate awareness of the impact on overall health and well-being, the importance of preventing and early detection of related disorders.
- Develop the ability to communicate effectively with patients and their families, including explaining diagnosis and treatment options, and providing emotional support.
- Practice the attitude to work in a multidisciplinary team, collaborating with other healthcare

professionals to provide comprehensive care for patients.

Equip themselves with the ability to appreciate the significance of lifelong learning and professional development to keep up with latest advances in the clinical field.

THEMES

- Vision
- Hearing
- Taste
- Olfaction
- Head & Neck

CLINICAL RELEVANCE

- Glaucoma
- Cataract
- Night Blindness
- Conjunctivitis
- Impacted Wax
- Otitis Media
- Otomycosis
- Glue Ear
- Rhinitis

IMPLEMENTATION TORs
• The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1200. • The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. • However, the level of cognition can be kept at a higher level by the institution. • The Table of Specifications provided will be used for the three papers of the Second professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.

SYLLABUS OF HEAD & NECK, SPECIAL SENSES MODULE

NORMAL STRUCTURE			
THEORY			
CODE	**GROSS ANATOMY**	**TOTAL HOURS = 56**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
HNSS-A-001	Define the boundaries and openings of orbital cavity. List orbital contents and structures traversing these openings.	Human Anatomy	Vision
	In a tabulated manner list the extraocular and intraocular muscles of eyeball giving their nerve supply and actions		
	List and define the movements of eyeball with special reference to orbital and visual axis		
	Describe the functional modalities, course, distribution, branches of oculomotor, trochlear and abducent nerve. Describe the location, roots and distribution of ciliary ganglion.		
	Describe the course and distribution of optic nerve in reference to visual pathway. Give the effects of its lesions.		
	Give the clinical correlates of nerves supplying the eyeball and its muscles. Give anatomical justification for Horner's syndrome.		
	Describe the course and branches of ophthalmic artery mentioning its origin and termination.		
	Describe the structure of eyelids, conjunctiva and tarsal glands with their neurovascular supply		
	List the parts of Lacrimal apparatus giving their location and anatomical features. Describe the nerve supply of lacrimal gland.	Human Anatomy	
	Describe the location, roots and distribution of	Human	

	pterygopalatine ganglia.	Anatomy	
	Give the anatomical structure of eyeball emphasizing on its three coats and their neurovascular supply	Human Anatomy	
HNSS-A-002	Describe the boundaries of nasal cavity: nasal septum, lateral wall of nose, roof and floor. Give their anatomical features and neurovascular supply.	Human Anatomy	Olfaction
	Describe the anatomical features and neurovascular supply of external nose	Human Anatomy	
	List the paranasal sinuses giving their locations, openings, neurovascular supply and clinical significance.	Human Anatomy	
	Describe the course and distribution of olfactory nerve in reference to olfactory pathway. Give the effects of its lesions.	Human Anatomy	
	Describe the anatomical features and neurovascular supply of external ear	Human Anatomy	
HNSS-A-003	Describe the boundaries, contents, neurovascular supply and communications of middle ear cavity.	Human Anatomy	Hearing
	Describe the parts, anatomical features and neurovascular supply of internal ear.	Human Anatomy	
	Describe the course and distribution of vestibulocochlear neve mentioning the effects of its lesion. Describe auditory pathway.	Human Anatomy	
HNSS-A-004	Describe the anatomical features of tongue with emphasis on its mucosa, attachments, musculature, vascular supply and lymphatic drainage.	Human Anatomy	Taste
	Describe the nerve supply of tongue (general sensory, special sensory and motor) with reference to their lesions and embryological basis.	Human Anatomy	

	List taste buds mentioning their structure, location and nerve supply. Describe the taste pathway.	Human Anatomy	
	Discuss lesions of motor and sensory nerves supplying the tongue. Discuss the anatomical correlates of lingual carcinoma in reference to lymphatic drainage of tongue.	Human Anatomy	
HNSS-A-005	Describe the features of Norma Frontalis, Norma Verticalis, Norma Parietalis, Norma occipitalis and Norma Basalis	Human Anatomy	Skull
	Describe the features of Norma lateralis: temporal, infratemporal & pterygopalatine fossae giving their boundaries, contents and communications.	Human Anatomy	
	Discuss the sutures and fontanelles of skull, their age changes and clinical significance.	Human Anatomy	
HNSS-A-006	List the layers of scalp and describe the anatomical features with neurovascular supply and lymphatic drainage of scalp.	Human Anatomy	Scalp
	Give anatomical justification of spread of scalp infections, profuse bleeding in superficial scalp lacerations, gaping of scalp wounds and black eye.	Human Anatomy	
HNSS-A-007	Enlist in tabulated manner the muscles of facial expression and mastication, giving their nerve supply and actions. Define modiolus.	Human Anatomy	Muscles of facial expressions
HNSS-A-008	Describe the functional modalities, course, branches, and distribution of cranial nerves innervating the face (sensory and motor): trigeminal and facial nerves	Human Anatomy	Neurovascular supply of face
	Describe the vascular supply and lymphatic drainage of face.	Human Anatomy	
	Draw a diagram to illustrate cutaneous innervation of face.	Human Anatomy	

	Discuss anastomoses of facial artery with contralateral vessels and branches of internal carotid artery with their clinical significance.	Human Anatomy	
HNSS-A-009	Describe the danger area of face with it its clinical significance. Define the routes of spread of infection from face and scalp to intracranially.	Human Anatomy	Danger area
HNSS-A-010	Describe the bony features and muscle attachment of mandible.	Human Anatomy	Mandible.
	Classify temporomandibular joint mentioning its ligaments, relations, nerve supply and movements (with their mechanics and muscles producing them).	Human Anatomy	
HNSS-A-011	Describe anatomical features, relations and neurovascular supply of parotid gland and its duct, mentioning the structures entering and exiting the gland	Human Anatomy	Parotid gland
	Discuss the clinical correlates of parotid gland: parotiditis, Mumps, Frey's syndrome, parotid duct stones and parotid tumor surgery with its complications	Human Anatomy	
HNSS-A-012	Describe the parts and boundaries of oral cavity and give its relation to the Waldeyers' ring.	Human Anatomy	Waldeyers' ring
HNSS-A-013	Describe the anatomical features of hard and soft palate with their neurovascular supply.	Human Anatomy	Hard and soft
HNSS-A-014	Describe anatomical features, relations and neurovascular supply of submandibular and sublingual glands with their ducts.	Human Anatomy	Submandibular Sublingual glands
HNSS-A-015	Describe the location, roots and distribution of otic and submandibular ganglia.	Human Anatomy	Otic and Submandibular ganglia.
HNSS-A-016	Describe the anatomical features of Hyoid bone and give attachments on the bone.	Human Anatomy	Hyoid bone
HNSS-A-017	Enumerate the types of cervical vertebrae and list the differences between them.	Human Anatomy	cervical vertebrae

	Describe the anatomical features and attachments on cervical vertebrae.		
	Classify the joints of cervical vertebrae mentioning their ligaments, movements with muscle producing them and neurovascular supply.	Human Anatomy	
HNSS-A-018	List the prevertebral muscles of cervical region. Describe their attachments, actions and innervation.	Human Anatomy	Prevertebral muscles
HNSS-A-019	Enumerate parts of deep cervical fascia with their respective extents, attachments, relations and contents.	Human Anatomy	Deep cervical fascia
HNSS-A-020	Describe the facial spaces in head and neck mentioning their communications and their relation to spread of infection.	Human Anatomy	Facial spaces
HNSS-A-021	Describe the attachments, actions and nerve supply of infrahyoid and suprahyoid muscles of neck.	Human Anatomy	Infrahyoid and suprahyoid muscles
HNSS-A-022	Describe the location, formation and distribution of ansa cervicalis.	Human Anatomy	Ansa cervicalis.
HNSS-A-023	Describe the attachments, actions and nerve supply of sternocleidomastoid and trapezius.	Human Anatomy	Sternocleidomastoid and trapezius
HNSS-A-024	Describe the boundaries and contents of suboccipital, anterior and posterior triangles of neck.	Human Anatomy	Triangles of neck
HNSS-A-025	Describe the cervical part of trachea and esophagus with their neurovascular supply.	Human Anatomy	Trachea and esophagus
HNSS-A-026	Describe the location, anatomical features and vascular supply of thyroid and parathyroid glands. List the variations in location of parathyroid glands.	Human Anatomy	Thyroid, Parathyroid glands
HNSS-A-027	Describe the carotid arteries mentioning their origin, course, branches, distribution and termination.	Human Anatomy	Carotid arteries
HNSS-A-	Describe carotid body and carotid sinus and give	Human	Carotid body

028	their clinical significance.	Anatomy	
HNSS-A-029	Give the venous drainage of Head and Neck region. Describe the formation, tributaries and area of drainage of vessels constituting jugular venous system.	Human Anatomy	Head & Neck venous supply
HNSS-A-030	Name the superficial and deep cervical lymph nodes and give their location and drainage areas	Human Anatomy	Lymphatics
HNSS-A-031	Describe the location, formation, branches, distribution and lesions of cervical plexus	Human Anatomy	Cervical plexus
HNSS-A-032	Name the parts of pharynx giving their extent, anatomical features, structure and neurovascular supply.	Human Anatomy	Pharynx
	Name the pharyngeal constrictor muscles defining their attachments, innervation and structure traversing the gaps between adjacent muscles.	Human Anatomy	
HNSS-A-033	Name the parts of larynx giving their extent, anatomical features, musculoskeletal framework and neurovascular supply.	Human Anatomy	Larynx
HNSS-A-034	Discuss the location, anatomical features, relations and vascular supply of tonsils: nasopharyngeal, palatine and lingual.	Human Anatomy	Tonsils
CODE	**EMBRYOLOGY & POST-NATAL DEVELOPMENT**	**TOTAL HOURS = 15**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
HNSS-A-035	List the components of pharyngeal apparatus. Describe the development of pharyngeal arches, grooves, pouches and membrane and give derivatives and fate of each of them.	Embryology	Pharyngeal apparatus pharyngeal arches
HNSS-A-036	Describe the development and histogenesis of auditory tube, tympanic cavity, tonsils, thymus and parathyroid	Embryology	auditory tube, tympanic cavity, tonsils, thymus and parathyroid
HNSS-A-	Discuss the embryological basis of congenital	Embryology	Congenital

037	anomalies related to the development of pharyngeal arches, pharyngeal clefts and pharyngeal pouches: cervical sinus/fistula/cyst, 1st arch syndrome, DiGeorge syndrome, congenital malformations of thymus and parathyroid glands		anomalies
HNSS-A-038	Describe the development of tongue and thyroid gland.	Embryology	Tongue and Thyroid gland.
	List and provide embryological basis of congenital anomalies of tongue and thyroid gland.	Embryology	
HNSS-A-039	Describe the development of face and nasolacrimal duct and their respective congenital anomalies.	Embryology	Face and nasolacrimal duct
HNSS-A-040	Describe the development of nasal cavity and paranasal sinuses. Give the associated congenital anomalies.	Embryology	Nose
HNSS-A-041	Describe the development of lip and palate and their associated congenital malformations.	Embryology	Lips and palate
	Explain the types and embryologic basis of cleft lip and cleft palate.	Embryology	
HNSS-A-042	Describe the development of optic vesicle and retina.	Embryology	Eye & ear
	Describe the development of cornea, sclera, choroid, iris, ciliary body and lens and relate it to their respective congenital anomalies.	Embryology	
	Describe the development of internal ear and give the embryological basis of associated congenital anomalies.	Embryology	
CODE	**MICROSCOPIC ANATOMY (HISTOLOGY & PATHOLOGY)**	**TOTAL HOURS = 08**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
HNSS-A-043	Describe the light and electron microscopic structure of tongue mentioning the histological structure of lingual papillae and taste buds.	Histology	Tongue

HNSS-A-044	Describe the histological structure of parotid, submandibular and sublingual glands.	Histology	Glands
	Compare and contrast the histological structures of parotid, submandibular and sublingual glands.	Histology	
HNSS-A-045	Differentiate between serous and mucous acini. Describe the structure and location of serous demilunes. Describe the serous and mucous acini and give histological differences between the two.	Histology	Head & Neck
HNSS-A-046	Describe the histological structure of thyroid gland and parathyroid gland.	Histology	Thyroid, Parathyroid glands
HNSS-A-047	Describe the histological structure of layers of eyeball, eyelid and retina.	Histology	Eye
	Describe the light and electron microscopic structure of cornea.	Histology	
HNSS-A-048	Describe the histological and ultramicroscopic structure of internal ear with special reference to Organ of Corti.	Histology	Ear

PRACTICAL

CODE	HISTOLOGY	TOTAL HOURS = 09	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
HNSS-A-049	Identify, draw and label diagrams to show histological structure of tongue, lingual papillae and taste buds.	Histology	tongue
HNSS-A-050	Identify, draw and label a diagram to show histological structure of parotid, submandibular and sublingual glands.	Histology	Glands
HNSS-A-051	Draw and label diagrams to show histological structure of serous demilunes, serous and mucous acini.	Histology	Head & Neck

HNSS-A-052	Draw and label a diagram to show histological structure of thyroid and parathyroid gland.	Histology	Thyroid, Parathyroid
HNSS-A-053	Draw and label diagrams to show histological structure of eyelid and cornea.	Histology	Eye
	Draw and label a diagram to show histological structure of retina. List its histological layers and their respective components	Histology	
HNSS-A-054	Draw and label a diagram to show histological structure of internal ear.	Histology	Ear
NORMAL FUNCTION			
THEORY			
CODE	**MEDICAL PHYSIOLOGY**	**TOTAL HOURS = 30**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
HNSS-P-001	Define and describe the visual acuity	Physiology	Visual Acquity
	Define Emmetropia	Physiology	
	Enlist the errors of refraction	Physiology	
	Explain the cause, features, physiological basis, and correction of Hyperopia	Physiology	
	Explain the cause, features, physiological basis, and correction of myopia	Physiology	
	Explain the cause, features, physiological basis, and correction of astigmatism	Physiology	
	Describe the pathophysiology and treatment of cataract	Integrate with Ophthalmology	
HNSS-P-002	Interpret common treatment modalities for Refractive errors	Physiology	Refractive Errors
HNSS-P-003	Describe the mechanism of formation and outflow of aqueous humor	Physiology	Fluid systems of the Eye
	Describe normal value of intraocular pressure and its regulation	Physiology	

	Describe the method for measuring the intraocular pressure	Integrate with Ophthalmology	
	Describe the causes and features and pathophysiology of glaucoma	Physiology	
HNSS-P-004	Discuss the clinical features of Open Angle and Angle Closure Glaucoma	Physiology	Glaucoma
HNSS-P-005	Describe the physiological anatomy and function of structural elements of retina	Physiology	Retina
	Enlist different layers of retina	Physiology	
	Explain the significance of melanin pigment in retina	Physiology	
	Describe macula and foveal region of retina and their significance	Physiology	
	Describe the structure of rods and cones	Physiology	
	Comment on the location of optic disc and its significance	Physiology	
	Describe the cause, features, and treatment of retinal detachment	Physiology	
	Enlist the current investigations for Retinal Diseases	Integrate with Ophthalmology	
HNSS-P-006	Describe the rhodopsin-retinal visual cycle	Physiology	Photochemistry of vision
	Describe the mechanism of excitation of rods/ rods receptor potential	Physiology	
	Describe the causes and treatment of night blindness	Physiology	
HNSS-P-007	Define and describe different mechanisms of light adaptation	Physiology	Adaptation
	Define and describe different mechanisms of dark adaptation	Physiology	
	Enumerate the diseases leading to Night Blindness and retinal detachment	Integrate with Ophthalmology	
HNSS-P-	Explain the tri color mechanism of color	Physiology	Color vision

008	determination		
	Define term protanopes, deuteranopes, tritanopes	Physiology	
	Enlist the types of color blindness and their causes	Physiology	
	Enlist clinical features of Color vision deficiencies	Integrate with Ophthalmology	
HNSS-P-009	Trace the visual pathway	Physiology	Visual Pathways
	Enlist and describe the abnormalities of visual pathway & visual field		
	Explain the effect of removal of primary visual cortex		
HNSS-P-010	Define the physiological blind spot and describe its location	Physiology	Field of vision
	Define scotoma/ pathological blind spot and enlist causes	Physiology	
HNSS-P-011	Illustrate the abnormalities of field of vision	Integrate with Ophthalmology	Visual fields
HNSS-P-012	Describe the muscular and neural control of eye movements	Physiology	Eye movements
HNSS-P-013	Define and enlist the types of Strabismus	Integrate with Ophthalmology	Strabismus
HNSS-P-014	Explain the mechanism of accommodation	Physiology	Accommodation
	Enlist the components of near response in accommodation	Physiology	
	Describe the neural pathway for accommodation reflex	Physiology	
	Describe the regulation of accommodation	Physiology	
	Enlist the clinical features of Presbyopia	Integrate with Ophthalmology	
HNSS-P-015	Trace the neural pathway for pupillary light reflex	Physiology	Pupillary light reflex
	Explain the pupillary light reflexes or reactions in CNS diseases	Physiology	
	Describe the cause and features of Horner syndrome	Physiology	
	Illustrate the differential diagnosis of Anisocoria	Integrate with	

		Ophthalmology	
HNSS-P-016	Describe the physiological anatomy of outer and middle ear	Physiology	Sense of hearing
	Enlist the functions of middle ear	Physiology	
	Discuss clinical features and treatment of impacted wax	Integrate Otorhinolaryngology	
	Define causes and clinical features of Otomycosis	Integrate Otorhinolaryngology	
	Describe the mechanism of impedance matching and its significance	Physiology	
	Describe the mechanism of attenuation reflex and its significance	Physiology	
HNSS-P-017	Describe the physiological anatomy of inner ear	Physiology	Inner Ear/ Cochlea
	Describe the mechanism of transmission of sound waves in cochlea	Physiology	
HNSS-P-018	Describe the physiological anatomy and function of organ of Corti	Physiology	Organ of Corti
	Describe the mechanism of generation of endo-cochlear potential and its significance	Physiology	
HNSS-P-019	Write down the normal range of frequency for hearing	Physiology	Determination of sound frequency
	Describe the role of place principle in determination of sound frequency	Physiology	
	Describe the role of volleys principle in determination of sound frequency	Physiology	
HNSS-P-020	Trace the normal auditory nervous pathway	Physiology	Auditory pathway
	Describe the types of deafness	Physiology	
	Discuss the clinical features and investigations of Congenital and Acquired hearing loss	Integrate with Otorhinolaryngology	
HNSS-P-021	Enlist the primary taste sensations	Physiology	Sense of Taste
	Define and explain the term taste blindness	Physiology	

	Describe the physiological anatomy and location of taste buds	Physiology	
HNSS-P-022	Describe the mechanism of stimulation of taste buds/ receptor potential	Physiology	Excitation of Taste buds
	Trace the pathway of taste sensation	Physiology	
HNSS-P-023	Define and explain the terms: Ageusia, Hypergeusia, Hypogeusia and dysgeusia	Physiology	Abnormalities of Taste sensations
	Describe the senile changes in taste buds		
HNSS-P-024	Explain the terms: Taste preference and taste aversion	Physiology	Taste preference and aversion
HNSS-P-025	Enlist the primary sensations of smell	Physiology	Sense of smell
	Describe the physiological anatomy and location of olfactory membrane	Physiology	
HNSS-P-026	Enlist the causes and clinical features of Rhinitis	Integrate with Otorhinolaryngology	Rhinitis
	Differentiate between viral and allergic Rhinitis	Integrate with Otorhinolaryngology	
CODE	**MEDICAL BIOCHEMISTRY**	**TOTAL HOURS = 7**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
HNSS-B-001	Discuss the metabolism of mono and disaccharides	Biochemistry	Metabolism of mono and disaccharides
	Interpret Hereditary fructose intolerance, fructosuria, galactosemia and lactose intolerance, in relevance to the clinical findings	Biochemistry	
	Explain the Polyol pathway and effect of hyperglycemia on sorbitol pathway	Biochemistry	
	Discuss the sources, metabolically active forms, biochemical role and clinical correlation of Vit-A with vision	Biochemistry	
HNSS-B-002	Discuss biochemical basis and clinical aspects of Riboflavin	Biochemistry	Vitamins

HNSS-B-003	Discuss the sources, absorption, regulation, biomedical functions and clinical aspect of Zn, Fl	Biochemistry	Eye

PRACTICAL

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 16+05=21	
		DISCIPLINE	TOPIC
HNSS-P-027	Examine the Second, Third, Fourth & Sixth Cranial Nerves	Physiology	Cranial Nerves
HNSS-P-028	Examination of Light Reflex		Light reflex
HNSS-P-029	Determine the Visual Acuity for Far and Near vision		vision
HNSS-P-030	Perform Ophthalmoscopy		ophthalmoscopy
HNSS-P-031	Examine Field of Vision and interpretation of visual field plotted	Physiology	Visual field
HNSS-P-032	Examine Color Vision		Color vision
HNSS-P-033	Perform Tuning fork test and audiometry, interpret the report		Ear
HNSS-B-004	Perform estimation of uric acid level in blood	Biochemistry	Uric acid level in blood
HNSS-B-005	Perform HbA1C by chromatographic method		HbA1C
HNSS-B-006	Detect abnormal constituents in urine by chemical methods		Abnormal constituents in urine

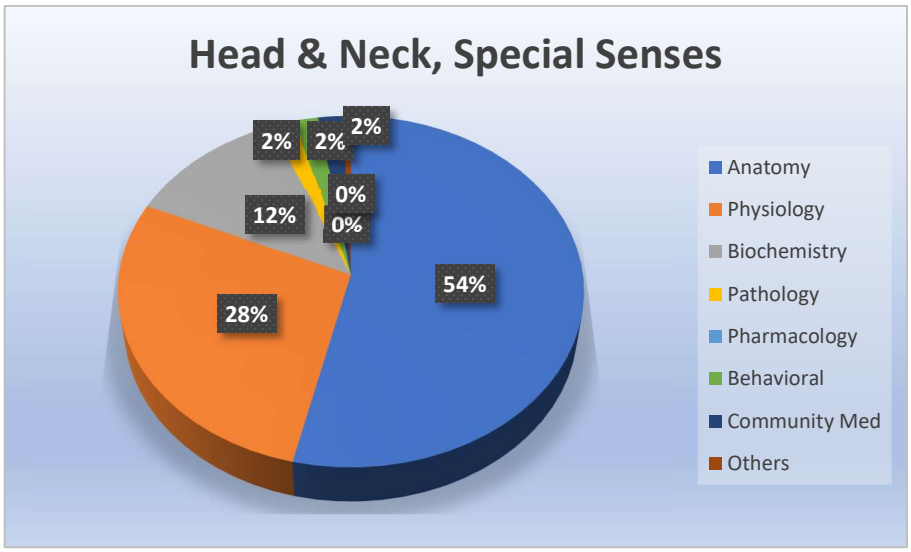
PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 09	
		DISCIPLINE	TOPIC
HNSS-Pa-001	Enlist the common causative agents of Eye, Ear infections	Pathology (Microbiology)	Eye/Ear infections
	Discuss the pathogenesis and clinical features of common pathogens	Pathology (Microbiology)	

HNSS-B-004	Correlate proto-oncogene and oncogene concept with relevance of tumors	Biochemistry	Oncogenes
HNSS-B-005	Discuss tumor markers and their significance		Tumor markers
HNSS-B-006	Discuss the concept of xenobiotics Explain and interpret pedigree of multifactorial mitochondrial disorder i.e. Libers hereditary optic neuropathy		Genetics

DISEASE PREVENTION AND IMPACT			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 07**	
		DISCIPLINE	**TOPIC**
HNSS-B-007	Explain the role of antioxidants (selenium (Se), Vit-E & C, Glutathione) in preventing oxidative stress	Biochemistry	Anti-oxidants
HNSS-CM-001	Identify factors leading to noise pollution	Community Medicine/ Otorhinolaryngology	Hearing loss
HNSS-CM-002	Describe the common causes of blindness in community	Community Medicine	Blindness
	Describe risk factors and preventive strategies for blindness at community level	Behavioral Sciences	
HNSS-BhS-001	At end of module the students will learn the psychosocial aspects of pain which will help in understanding the complex and multidimensional nature of pain.		Pain

AGING			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 03**	
		DISCIPLINE	**TOPIC**
HNSS-Ag-001	Identify the role of oxidative radicals and the process of lipid peroxidation that leads to aging	Biochemistry	Lipid oxidation
HNSS-Ag-002	Familiarize with the age-related hearing loss	Otorhinolaryngology	Deafness
HNSS-Ag-003	Discuss the age changes of mandible	Anatomy	Head & Neck

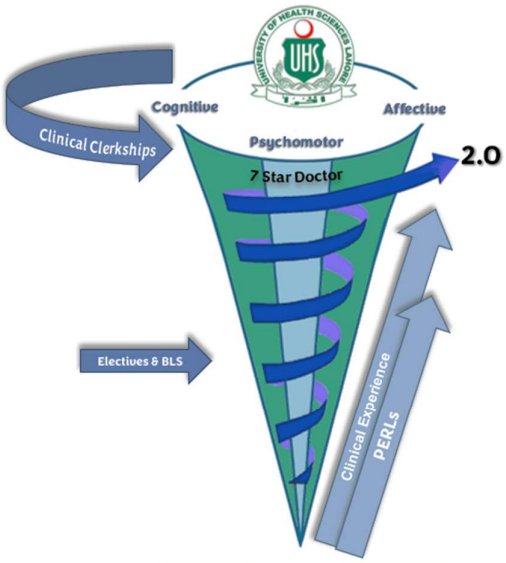


Module Weeks	Recommended Minimum Hours
05	164

MODULAR INTEGRATED CURRICULUM 2K23

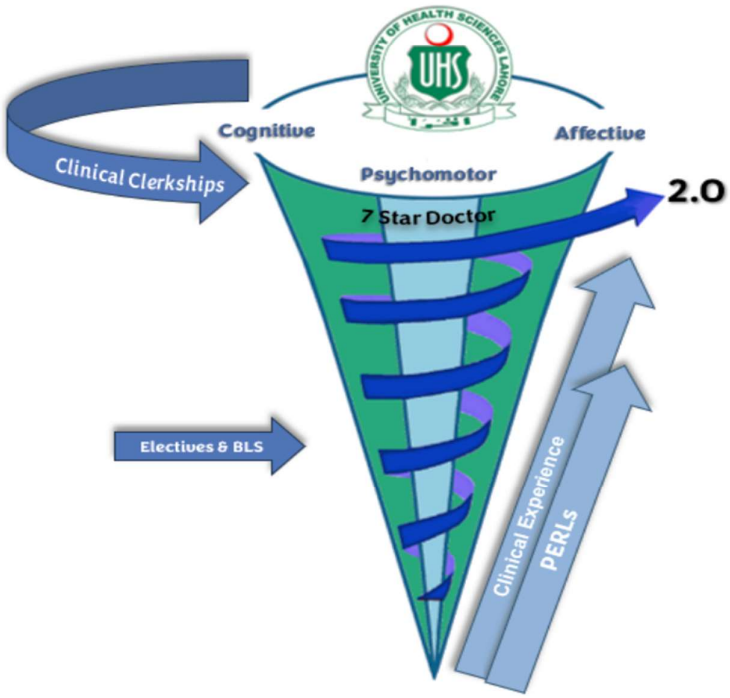
version 2.0

BLOCK-6



MODULE NO. 10:
NEUROSCIENCES-I

MODULAR INTEGTARTED CURRICULUM 2K23 *version 2.0*



MODULE RATIONALE

The neurosciences module is crucial as understanding the brain and nervous system is essential for diagnosing and treating a wide range of neurological and psychiatric conditions. This includes conditions such as Alzheimer's disease, Parkinson's disease, epilepsy, migraines, traumatic brain injuries, depression, schizophrenia, and autism. By studying neurosciences, medical students will gain the knowledge and skills necessary to accurately diagnose and effectively treat these conditions.

MODULE OUTCOMES

- Describe the neuroanatomy, histology and embryology of the central nervous system.
- Discuss the physiology of Autonomic Nervous System (ANS), motor and sensory system.
- Explain the pathophysiology of common diseases pertaining to the nervous system.
- Explain a basic management and prevention plan for common neurological disorders.
- Appreciate the burden of neuroscience disorders and their psychosocial impact.

THEMES

- Neurons/ nerve fibers and receptor
- Cerebrum
- Spinal cord and tracks
- Cerebellum and brainstem, basal ganglia
- Autonomic Nervous System (ANS)

CLINICAL RELEVANCE

- Neurons/ nerve fibers and receptor
- Cerebrum
- Spinal cord and tracks
- Cerebellum and brainstem, basal ganglia
- ANS

IMPLEMENTATION TORs
• The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1200. • The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. • However, the level of cognition can be kept at a higher level by the institution. • The Table of Specifications provided will be used for the three papers of the Second professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.

SYLLABUS OF NEUROSCIENCES-I MODULE

NORMAL STRUCTURE			
THEORY			
CODE	**GROSS ANATOMY**	**TOTAL HOURS = 46**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
NS-A-001	Describe the basic organization of nervous system	Human Anatomy	Nervous system
	Identify and describe the components of the Nervous system and their function	Human Anatomy	
NS-A-002	Trace the Origin, exit from vertebral canal, branches & Distribution of typical spinal nerve.	Human Anatomy	Spinal Nerves
NS-A-003	Identify the Location, Extent, Coverings and Blood supply of spinal cord Discuss & tabulate nuclear organization at different levels of Spinal cord. Describe, draw & label the transverse section of spinal cord at mid cervical level showing ascending & descending tracts Tabulate the sensory nerve endings, and anatomical sites of first, second, third order neurons of ascending tracts Tabulate first, second, third order neurons of descending tracts. Elaborate on the Cross-sectional details of white and gray matter of cervical, thoracic and lumbar segments of Spinal cord for localization of site of lesion.	Human Anatomy	Spinal cord Clinical correlates (Spinal cord)
NS-A-004	Differentiate clearly between upper and lower motor neuron lesions	Human Anatomy	Brainstem
	Location, Relations, Blood supply and external	Human Anatomy	

	features of medulla, pons midbrain. Cross sectional details of white and grey matter of Brain stem (mid brain, pons, medulla) Discuss clinical correlates of brain stem Medial and lateral medullary syndrome Weber syndrome, Benedikt syndrome		
NS-A-005	Location, Relations, Functional classification & Blood supply along with major connections of Cerebellum (Cerebellar Peduncles) Define important clinical correlates	Human Anatomy	Cerebellum
NS-A-006	Identify the Lobes, Sulci & Gyri, Cortical areas. Describe Venous drainage and arterial supply of each lobe	Human Anatomy	Cerebrum
	Describe Functional areas of cerebrum. Draw and Label Homunculus. Define important clinical correlates		
	Describe internal structure of cerebral hemisphere; 1. white matter 2. Basal ganglia 3. Lateral ventricle		
NS-A-007	Describe components & functions of Limbic system & Reticular formation		Limbic system. Reticular formation
NS-A-008	Explain the origin, exit from the brain and intracranial course of cranial nerves Describe the Functional Components and specific functions of each cranial nerve.	Human Anatomy	Cranial nerves
NS-A-009	Identify the Location and sub division of Diencephalon.	Human Anatomy	Diencephalon
NS-A-010	Discuss the Location, Relations, Blood supply, nuclei and major connections of Thalamus, Hypothalamus, Epithalamus, Subthalamus, Metathamalus	Human Anatomy	Thalamus and hypothalamus

	Describe and Illustrate the Hypothalamic and pituitary gland Nuclei with their functions, location afferents. Describe the Hypothalamo-Hypophyseal Portal System Describe the functions of Hypothalamus Explain the anatomical basis for the Thalamic Cauterization, Thalamic Pain, Thalamic Hand and Hypothalamic Disorders		
NS-A-011	Explain the Gross anatomy of Intracranial fossae with intracranial foramina	Human Anatomy	Intracranial fossa
NS-A-012	Explain the attachments, blood supply and nerve supply of the meninges of the brain	Human Anatomy	Meninges
NS-A-013	Discuss the Origin, tributaries & area of drainage, termination of Dural venous sinuses	Human Anatomy	Dural venous sinuses
NS-A-014	Explain the Formation, circulation and absorption into venous system of CSF (Cerebrospinal fluid) Describe ventricular system, Lateral, 3rd & 4th ventricles	Human Anatomy	CSF
NS-A-015	Discuss the Origin, course, branches and distribution of internal carotid artery, vertebral artery Formation, Location, branches and area of supply of Circle of Willis	Human Anatomy	Blood supply of brain & spinal cord
NS-A-016	Explain the Major subdivision of ANS into Sympathetic and parasympathetic nervous system with comparison of anatomical differences.	Human Anatomy	ANS
NS-A-017	Describe the Location, connections and functions of autonomic ganglion	Human Anatomy	Autonomic ganglia
NS-A-018	Explain the origin, termination and branches of the sympathetic chain Localize spinal cord lesions	Human Anatomy	Sympathetic chain
CODE	**EMBRYOLOGY & POST-NATAL DEVELOPMENT**	**TOTAL HOURS = 03**	

	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC
NS-A-019	Explain the Development of Neural tube and Brain vesicles. Discuss related clinical anomalies	Embryology	Neural tube development
NS-A-020	Describe the development of the spinal cord and related clinical anomalies	Embryology	Spinal cord development
NS-A-021	Describe development of Pituitary gland	Embryology	Pituitary gland
CODE	MICROSCOPIC ANATOMY (HISTOLOGY & PATHOLOGY)	TOTAL HOURS = 05	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
NS-A-022	Describe the histological structure of Nervous tissue, Neuron, Nerve fiber, Sensory & motor nerve endings, Neuroglia, Blood brain barrier, ganglia	Histology	Nervous tissue
NS-A-023	Describe the histological structure of the spinal cord	Histology	Spinal cord
NS-A-024	Describe the histological structure of Cerebrum, Cerebellum	Histology	Cerebrum, Cerebellum
PRACTICAL			
CODE	HISTOLOGY	TOTAL HOURS = 07	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
NS-A-025	Identify draw & label light microscopic structure of Peripheral nerve sensory ganglia, autonomic ganglia	Histology	CNS
NS-A-026	Identify Draw & label the light microscopic structure of the spinal cord	Histology	Cerebrum
NS-A-027	Identify Draw & label the light microscopic structure of the Cerebrum	Histology	Cerebellum
NS-A-028	Identify Draw & label the light m structure of the Cerebellum	Histology	Spinal Cord

NORMAL FUNCTION			
THEORY			
CODE	**MEDICAL PHYSIOLOGY**	**TOTAL HOURS = 60**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
NS-P-001	Describe the general organization of nervous system	Medical Physiology	Organization of Nervous System, Neurons and Synapses
	Classify synapses		
	Explain physiological anatomy of synapses		
	Describe the properties of synaptic transmission		
	Classify the substances that act as neurotransmitters		
	Classify all sensory receptors in the body		
	Enumerate the properties of receptors		
	Explain the mechanism of adaptation of receptors		
	Enlist the rapid adapting mechanism of receptors		
NS-P-002	Explain the properties of receptors		Nerve fibers
	Explain the general classification of nerve fibers		
	Explain the numerical classification of nerve fibers		
	Explain Gasser classification of nerve fibers		
	Explain summation and its types		
NS-P-003	Describe the sensory areas of brain		Sensory areas of the brain
	Enlist Brodmann number of sensory areas		
	Describe the effects produced by damage to each sensory area of brain		
	Describe the pathophysiology and features of personal neglect syndrome		
NS-P-004	Classify and explain somatic sensations	Medical Physiology	Somatic sensations
NS-P-005	Enumerate the ascending tracts/Pathways		Ascending Tracts/ pathways
NS-P-006	Name the sensations carried by Dorsal column	Medical	Anterolateral

	medial lemniscus system DCMLS	Physiology	system
	Trace the pathway of DCMLS		
NS-P-007	Classify pain		Pain
	Differentiate between slow pain and fast pain		
	Describe the analgesia system in brain and spinal cord		
	Describe the cause and features of Brown Sequard Syndrome		
NS-P-008	Describe the Physiological anatomy of spinal cord	Medical Physiology	Spinal cord
	Name the anterior motor neurons and their location		
	Explain the Renshaw cells feedback		
	Classify the spinal cord reflexes according to number of synapses		
NS-P-009	Describe the structure & functions of Muscle spindle		Muscle Spindle and stretch reflex
	Trace the reflex arc of stretch reflex		
	Discuss the clinical significance of stretch reflex		
NS-P-110	Define tone and how it is maintained		Tone
NS-P-011	Trace the reflex arc of Golgi Tendon Organ GTO, Golgi tendon reflex Explain the importance of Golgi tendon reflex		GTO
NS-P-012	Name the motor areas of brain		Motor areas of the brain
	Enlist Brodmann number of motor areas of brain Explain the features produced due to damage to the motor areas		
NS-P-013	Enlist the functions of brain stem	Medical Physiology	Brainstem
NS-P-014	Enumerate the descending tracts		Descending tracts
	Describe the functions of Pyramidal tract		
	Describe the effect of lesions in motor cortex of brain or pyramidal tract		

NS-P-015	Discuss the location of upper and lower motor neuron		Location of motor neurons
	Explain the features of upper motor neuron lesion		
	Explain the features of lower motor neuron lesions		
NS-P-016	Define spinal shock	Medical Physiology	Spinal shock and hemi section
	Enumerate and explain the stages of spinal shock		
	Describe the features of hemi section of spinal cord (at the level, above the level, below the level)		
NS-P-017	Name the functional parts of cerebellum		Cerebellum
	Explain the functions of spinocerebellum		
	Describe the functions of cerebro cerebellum		
	Discuss the functions of vestibule cerebellum		
	Explain the clinical features of cerebellar disease		
NS-P-018	Name the components of Basal ganglia		Basal Ganglia
	EXPLAIN the putamen and caudate circuits		
	Enlist the neurotransmitters in basal ganglia and enlist the functions of basal ganglia		
	Enumerate and explain the clinical abnormalities of putamen circuit		
	Explain the pathophysiology and features of Huntington's disease		
	Explain the types of rigidity		
	Differentiate spasticity and rigidity		
	Define decerebrate rigidity		
NS-P-019	Enumerate the components of vestibular Apparatus	Medical Physiology	Vestibular apparatus
	Name the sensory organs of vestibular apparatus		
	Describe the role of vestibular Apparatus in maintenance of linear and angular equilibrium		
NS-P-020	Enlist the components of limbic system		Limbic system
	Describe the functions of amygdala		

	Explain the effects of bilateral ablation of the amygdala—The Klüver-Bucy Syndrome		
	Explain the functions of hippocampus		
	Explain the functions of Hypothalamus		
	Explain Functions of Thalamus		
	Discuss the Thalamic syndrome		
NS-P-021	define brain stem reticular formation (BRF), name the neurotransmitters of BRF, enlist functions of BRF, differentiate between the functions of Pontine and medullary reticular Formation	Medical Physiology	Brain stem reticular formation
NS-P-022	Enumerate and discuss the physiological basis of Electroencephalogram EEG waves	Medical Physiology	EEG
NS-P-023	Explain the types of sleep		Sleep
	Discuss the stages of slow wave sleep		
	Explain the changes in EEG during sleep wake cycle		
	Enumerate the areas and hormones/ neurotransmitters involved in sleep		
	Describe sleep disorders (narcolepsy, cataplexy, insomnia, somnolence, somnambulism, bruxism, nocturnal enuresis and sleep apnea)		
NS-P-024	Enumerate different types of epilepsy		Epilepsy
	Explain the features and physiological basis and EEG waves in different types of epilepsy		
NS-P-025	Define memory		Memory
	Classify memory on the basis of duration and information stored		
	Explain the Molecular Mechanism of Intermediate Memory		
	Enumerate the structural changes of long-term memory		
	Explain the higher intellectual functions of prefrontal	Medical	

	association cortex	Physiology	
	Explain the mechanism of consolidation of memory		
	Explain retrograde and anterograde amnesia		
	Explain the physiological basis and features of Alzheimer's disease		
NS-P-026	Enlist the areas of speech		Speech
	Explain the functions of motor and sensory areas of speech		
	Trace and explain the pathway of written and heard speech		
	Enlist the abnormalities of speech		
	Explain the features of motor aphasia		
	Elaborate the features of sensory aphasia		
	Define dyslexia, alexia, agraphia		
NS-P-027	Discuss Components of Autonomic nervous system	Medical Physiology	ANS
	Explain the physiological anatomy of sympathetic and parasympathetic nervous system		
	Describe the types of adrenergic and cholinergic receptors		
	Explain the effects of sympathetic and parasympathetic on various organs/ system of body		
CODE	**MEDICAL BIOCHEMISTRY**	**TOTAL HOURS = 20**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
NS-B-001	Explain the digestion and absorption of lipids with enzymes involved in it. Discuss role of bile acids and salts in lipid digestion and absorption	Medical Biochemistry	Digestion and absorption of lipids
NS-B-002	Explain the concept of lipid transport and storage		Lipid transport and storage

NS-B-003	Discuss the reactions of beta-oxidation, alpha and omega oxidation of unsaturated and saturated fatty acids Calculate energy yield from palmitate in oxidation		Sphingolipidosis
NS-B-004	Discuss role of carnitine shuttle		Carnitine shuttle
NS-B-005	Discuss the role of citrate shuttle in fatty acid synthesis		Citrate shuttle
NS-B-006	Explain the pathway of fatty acid synthesis and its regulation Explain the steps of the reactions of hepatic ketogenesis and regulation		Fatty acid synthesis
NS-B-007	Describe utilization of ketone bodies by extrahepatic tissue. Describe the Synthesis and degradation of phospholipids and sphingolipids interpret the disorders related to enzyme deficiencies.		Metabolism of phosphor and sphingolipids
NS-B-008	Discuss the metabolism of glycolipids interpret the disorders related to enzyme deficiencies.		Glycolipid metabolism
NS-B-009	Explain fast feed cycle with reference to pathways activated and suppressed in each tissue in starved and fed state Discuss integration of metabolism	Medical Biochemistry	Fast feed cycle
NS-B-010	Explain fast. Discuss the structure, biochemical function and metabolism, dopamine, serotonin, histamine, GABA Correlate the biochemical functions of these neurotransmitters with their deficiency diseases		Neurotransmitters
NS-B-011	Explain proto-oncogene and oncogene concept.		Oncogene
NS-B-012	Discuss tumor markers and their significance.		Tumor markers

NS-B-013	Explain the role of genetics in cancers especially breast, ovary, lung and colon.		Cancer
NS-B-014	Discuss the concept of xenobiotics.		Xenobiotics

PRACTICAL

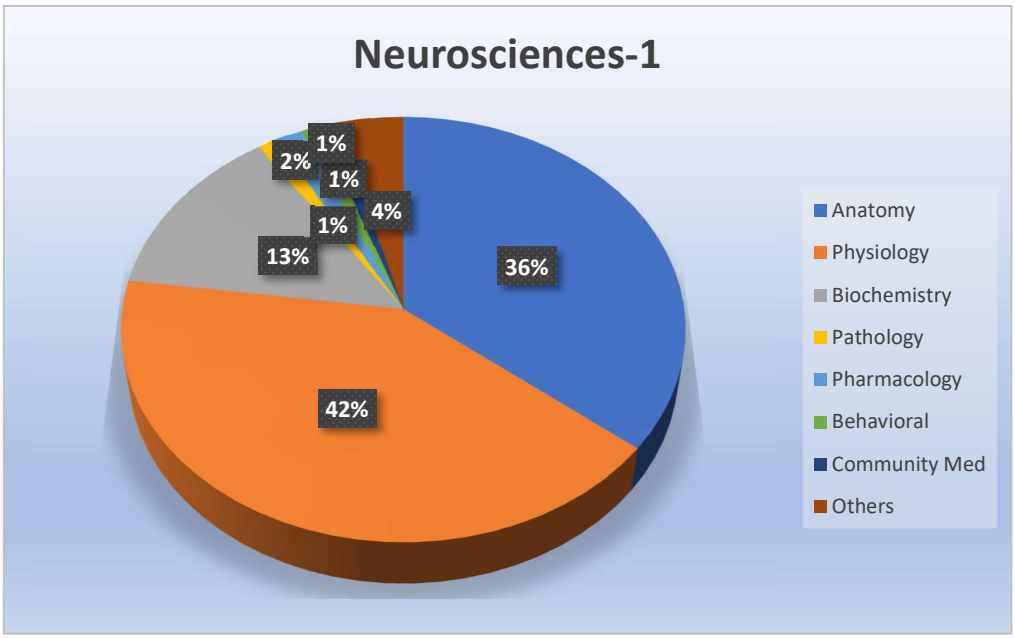
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 14	
		DISCIPLINE	TOPIC
NS-B-015	Interpret the lysosomal storage diseases on given data Neiman pick disease, Gaucher's disease etc.	Biochemistry Practical	Data Interpret
NS-B-016	Perform the estimation of triglycerides by kit method		Triglycerides estimation
NS-P-028	Examine the Sensory System	Physiology Practical	Sensory system
NS-P-029	Examine the Superficial Reflexes		Superficial Reflexes
NS-P-030	Examine the Deep Reflexes		Deep Reflexes
NS-P-031	Demonstrate Cerebellar Function Test		Cerebellar Tests
NS-P-032	Demonstrate the testing of Cranial Nerve (CN) VII		CN VII
NS-P-033	Demonstrate the Testing of Cranial Nerves (XI, XII)		CN X, XI, XII
NS-P-034	Examine the Motor system		Motor system

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 05	
		DISCIPLINE	TOPIC
NS-Ph-001	1.Classify various opioid receptors 2.Describe Mechanism of Action (MOA), pharmacological actions, clinical uses and adverse effects of opioid agonist, mixed agonist -antagonist and antagonist	Pharmacology	Opioids
NS-Ph-002	1.Classify various CNS stimulants and depressants 2.Describe MOA, pharmacological actions, clinical uses and adverse effects of CNS stimulant and		CNS stimulants & depressants

	depressants		
NS-Pa-001	Define cerebral vascular accident (CVA). Discuss the etiology and morphological changes of Cerebrovascular accidents	Pathology	CVA
NS-Pa-002	Define Meningitis Identify types of meningitis		Meningitis
DISEASE PREVENTION AND IMPACT			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 10**	
		DISCIPLINE	**TOPIC**
NS-CM-001	Students should be able to depict the depth of problem in context of mental illnesses	Community Medicine and Public Health	Epidemiology of Mental Disorders
NS-CM-002	Able to learn the general approach to prevent mental illnesses at community level		Community based interventions for Mental Illnesses
NS-BhS-001	Explain the theoretical basis of classic conditioning, operant conditioning and observational learning with examples in medical practice Incorporate learning principles to help prepare people for medical interventions	Behavioral Sciences	Learning and Behavior
NS-BhS-002	Outline the structure of memory and explain the distinction between short- and long-term memory. Describe memory improvement techniques and how the appropriate ones will help patients recall long and complex explanations		Memory
NS-M-001	Identify various types of CVA (cerebrovascular accident) Describe various symptoms and signs Outline management strategies	Medicine	Stroke/CVA
NS-S-001	Discuss the role of surgery in stroke	Surgery	Stroke/CVA
NS-M-002	Define Epilepsy Enlist various types of epilepsy Identify various symptoms and signs Outline management strategies	Medicine	Epilepsy

NS-M-003	Enlist various types of meningitis Describe symptoms and signs Outline management strategies	Medicine/ Neurology	Meningitis
NS-S-002	Describe triage in ER Emergency Room	Surgery	Head injury
NS-S-003	Identify the various types of hematomas	Neurosurgery	Hematoma/ CVA
NS-Pe-001	Describe the clinical features of Cerebral Palsy	Pediatrics	Cerebral Palsy
AGING			
CODE	**THEORY**	**TOTAL HOURS = 01**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
NS-Ag-001	Define dementia	Medicine	Dementia
	Discuss various causes for dementia		
	Discuss various risks for dementia		
	Outline management strategies		



Module Weeks	Recommended Minimum Hours
07	171

MODULE NO. 11:

INFLAMMATION

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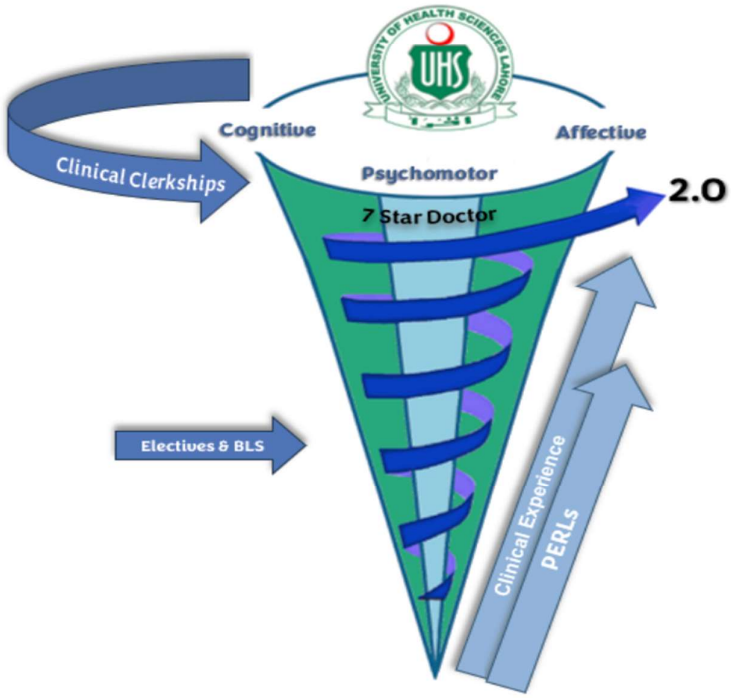


MODULE RATIONALE

The objective of teaching inflammation to undergraduate students is to impart knowledge about cellular and molecular mechanisms of cell injury, inflammation, and repair. This understanding serves as the foundation for comprehending most disease processes within the body. It equips students to apply this knowledge in the clinical field when working with real-life patients.

MODULE OUTCOMES

- Define inflammation and describe its fundamental characteristics.
- Explain the cellular and molecular mechanisms that underlie the inflammatory response.
- Differentiate between acute and chronic inflammation
- Discuss the physiological role of inflammation in tissue repair and host defense.
- Identify how dysregulated inflammation contributes to the pathogenesis of various diseases.
- Describe the key inflammatory mediators, including cytokines, chemokines, and prostaglandins.
- Illustrate the signaling pathways involved in the initiation and resolution of inflammation.
- Recognize the roles of different immune cells (e.g., neutrophils, macrophages, lymphocytes) in the inflammatory response.
- Discuss the pharmacological aspects of steroidal and non-steroidal anti- inflammatory drugs
- Discuss the clinical aspects of inflammation.

THEMES

- Role of inflammation in embryology
- Inflammatory response and role of leukocytes
- Eicosanoids
- Acute inflammation
- Chronic inflammation
- Cell repair
- Prostaglandin analogues
- Anti-inflammatory drugs
- Steroidal anti-inflammatory drugs

- Non-steroidal anti-inflammatory drugs
- COX- inhibitors
- Histamines and antihistamines
- Communicable diseases and their prevention
- Psychological stress and inflammation
- Aging

CLINICAL RELEVANCE

- Inflammation, in medical terminology, refers to a collection of classical signs and symptoms, such as edema, erythema, increased warmth, pain, and loss of function.
- It represents a complex and dynamic series of responses to tissue injury, primarily triggered by toxic chemicals, environmental factors, trauma, overuse, or infection.
- Diseases in which inflammation plays a predominant pathological role are typically denoted by the suffix 'itis,' examples of which include encephalitis and meningitis.

IMPLEMENTATION TORs
• The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1200. • The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. • However, the level of cognition can be kept at a higher level by the institution. • The Table of Specifications provided will be used for the three papers of the Second professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.

SYLLABUS OF INFLAMMATION MODULE

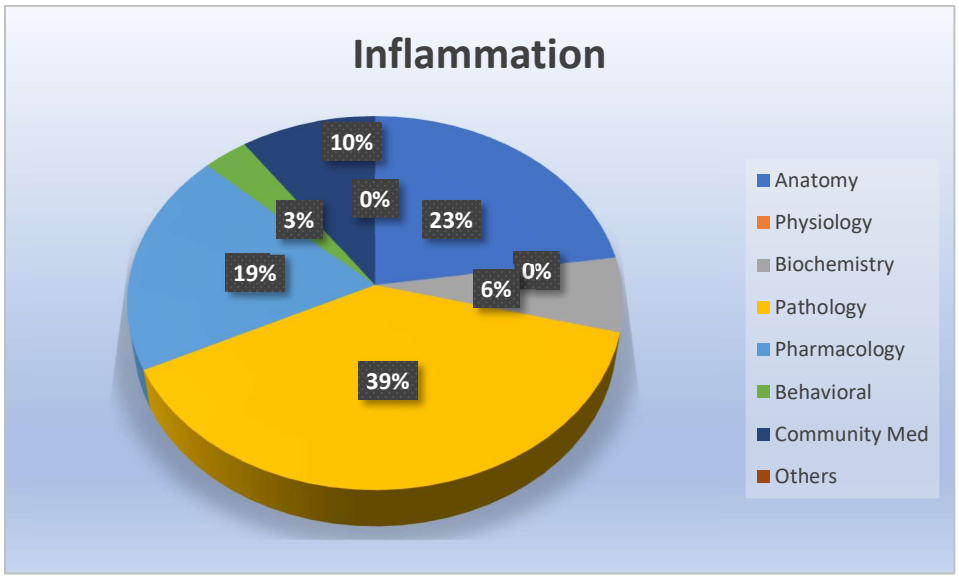
NORMAL STRUCTURE			
THEORY			
CODE	**EMBRYOLOGY & POST-NATAL DEVELOPMENT**	**TOTAL HOURS = 03**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
IN-A-001	Identify role of inflammation in implantation Development of cells involved in acute & chronic inflammation Development of integumentary system	Embryology	Role of inflammation in Implantation & Development of Integumentary System
CODE	**MICROSHOPIC STRUCTURE**	**TOTAL HOURS = 02**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
IN-A-002	Discuss the microscopic structure of components involved in inflammation (cells, capillaries) Discuss the histology of integumentary system	Histology	Integumentary system & Inflammatory Response at Cellular Level
PRACTICAL			
CODE	**HISTOLOGY**	**TOTAL HOURS = 02**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
IN-A-003	Draw and identify microscopic structure of integumentary system	Histology	Integumentary System
CODE	**MEDICAL BIOCHEMISTRY**	**TOTAL HOURS = 01**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
IN-B-001	Explain the biochemical and therapeutic roles of eicosanoids (prostaglandins, leukotrienes, thromboxane and prostacyclin	Medical Biochemistry	Eicosanoids

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS			
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 06+12	
		DISCIPLINE	TOPIC
IN-Ph-001	Enumerate prostaglandin analogues Discuss the clinical use and adverse effect of prostaglandin analogues	Pharmacology & Therapeutics	Prostaglandin analogues
IN-Ph-002	Enlist anti-inflammatory drugs Differentiate between steroidal and non-steroidal anti-inflammatory drugs		Anti-Inflammatory drugs
IN-Ph-003	Discuss mechanism of action, clinical usage, and adverse effects of steroidal anti-inflammatory drugs		Steroidal anti-Inflammatory drugs
IN-Ph-004	Discuss mechanism of action, pharmacological effects, clinical usage, and adverse effects of non-steroidal anti-inflammatory drugs		Non-steroidal anti-Inflammatory drugs (NSAIDs)
IN- Ph-005	Differentiate between selective and non-selective cyclooxygenase (COX) inhibitors Differentiate between Aspirin and paracetamol Classify antihistamines Discuss the role of histamines and antihistamines in inflammation and allergies, adverse effects and drug interactions		COX inhibitors
IN-Pa-001	Define acute inflammation Enlist stimuli for Acute Inflammation Recognize microbes, necrotic cells, and foreign substances causing acute inflammation Identify different components of inflammation Define necrosis and explain its type with example	Pathology	Acute inflammation
IN-Pa-002	Discuss the role of vascular and cellular events in acute inflammation Differentiate between transudate and exudate Classify chemical mediators Describe the different pathways of synthesis of chemical		Process of acute inflammation

	mediators and their role in clinical practice Discuss the role of different chemical mediators in acute inflammation Describe the different morphological patterns and outcomes of acute inflammation		
IN-Pa-003	Define chronic inflammation Discuss the role of chronic inflammatory cells and mediators in chronic inflammation Discuss the causes, pathophysiology and morphology of granulomatous inflammation Classify mycobacteria Explain the pathogenesis, clinical manifestations and lab diagnosis of typical mycobacteria Explain the pathogenesis, clinical manifestations and lab diagnosis of atypical mycobacteria		Chronic Inflammation
IN-Pa-004	Discuss the concept of Cell Proliferation, the Cell Cycle and Stem Cells in tissue repair Discuss the role of Growth Factors, receptors, signal transduction and extracellular matrix Involved in Regeneration and Repair Explain the types of healing along with the steps in scar formation Identify the factors that influence the tissue repair Discuss the complication of wound healing -keloid, Hypertrophy, Scarring		Cell Repair

DISEASE PREVENTION AND IMPACT			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 03+01**	
		DISCIPLINE	**TOPIC**
IN-CM-001	Discuss the mode of transmission of communicable diseases Explain the general concept of prevention of communicable diseases Discuss the primary, secondary and tertiary prevention of	Community Medicine and Public Health	Communicable Diseases

	acute and chronic diseases Discuss the role of immunoprophylaxis and chemoprophylaxis in prevention of communicable diseases		
IN-BhS-001	Understand the correlation between psychological stress and inflammation	Behavioral Sciences	Role of Psychological stress in Inflammation
AGING			
CODE	**THEORY**	**TOTAL HOURS = 01**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
IN-Ag-001	Explain inflammatory changes and role of leukotriene and cytokines in old age	Biochemistry	Inflammatory changes & signaling molecules in Aging

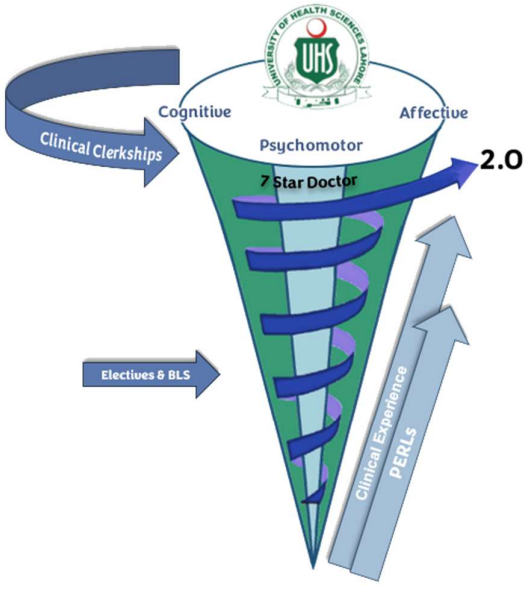


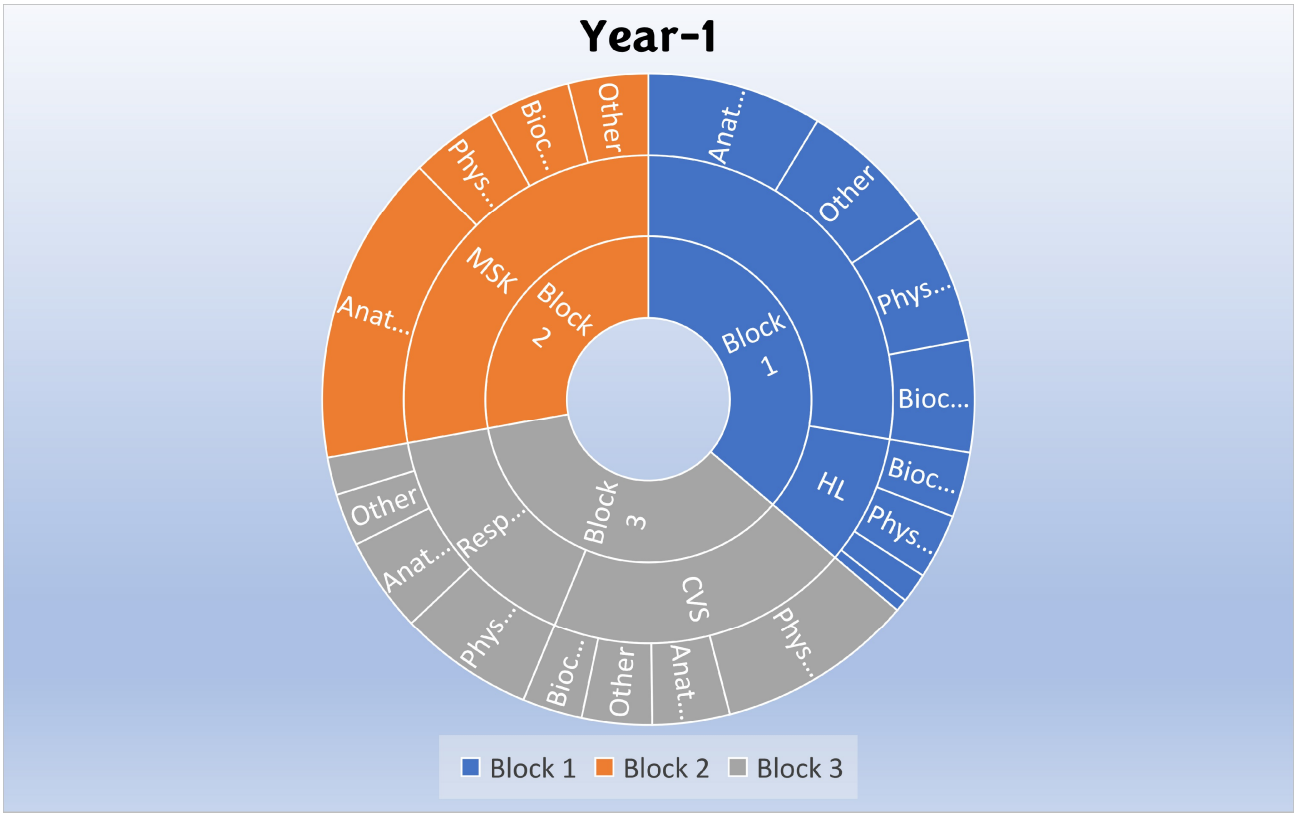
Module Weeks	Recommended Minimum Hours
01	31

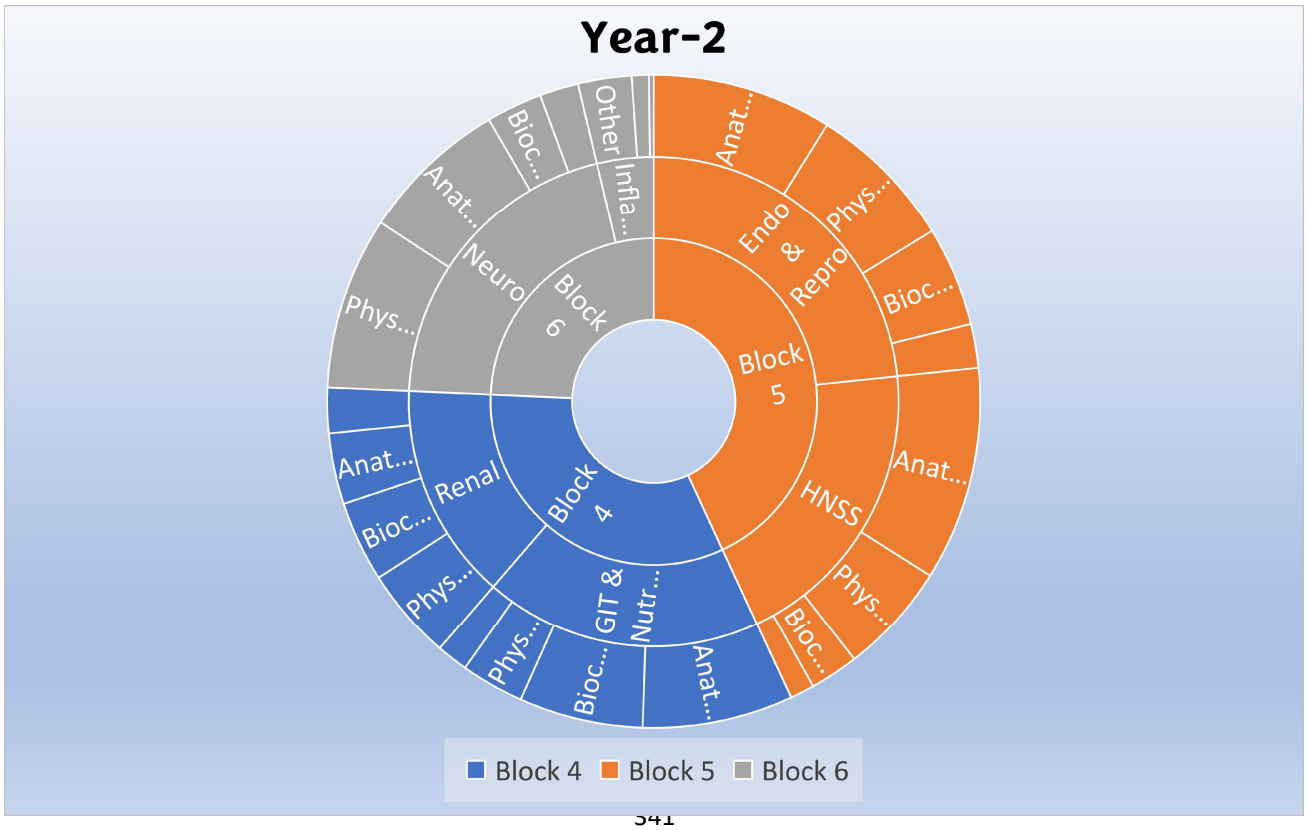
MODULAR LANDSCAPE

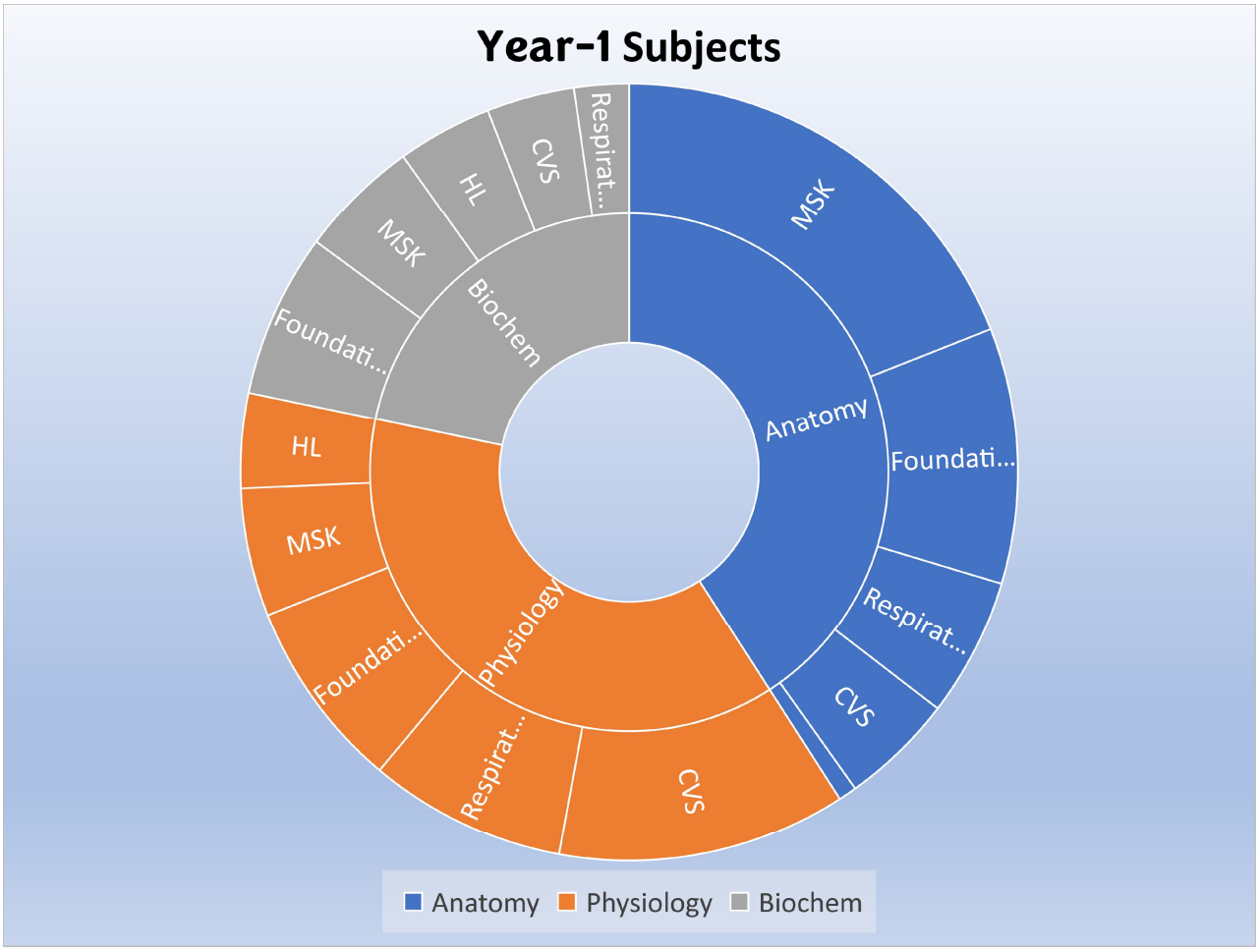
CURRICULUM 2K23

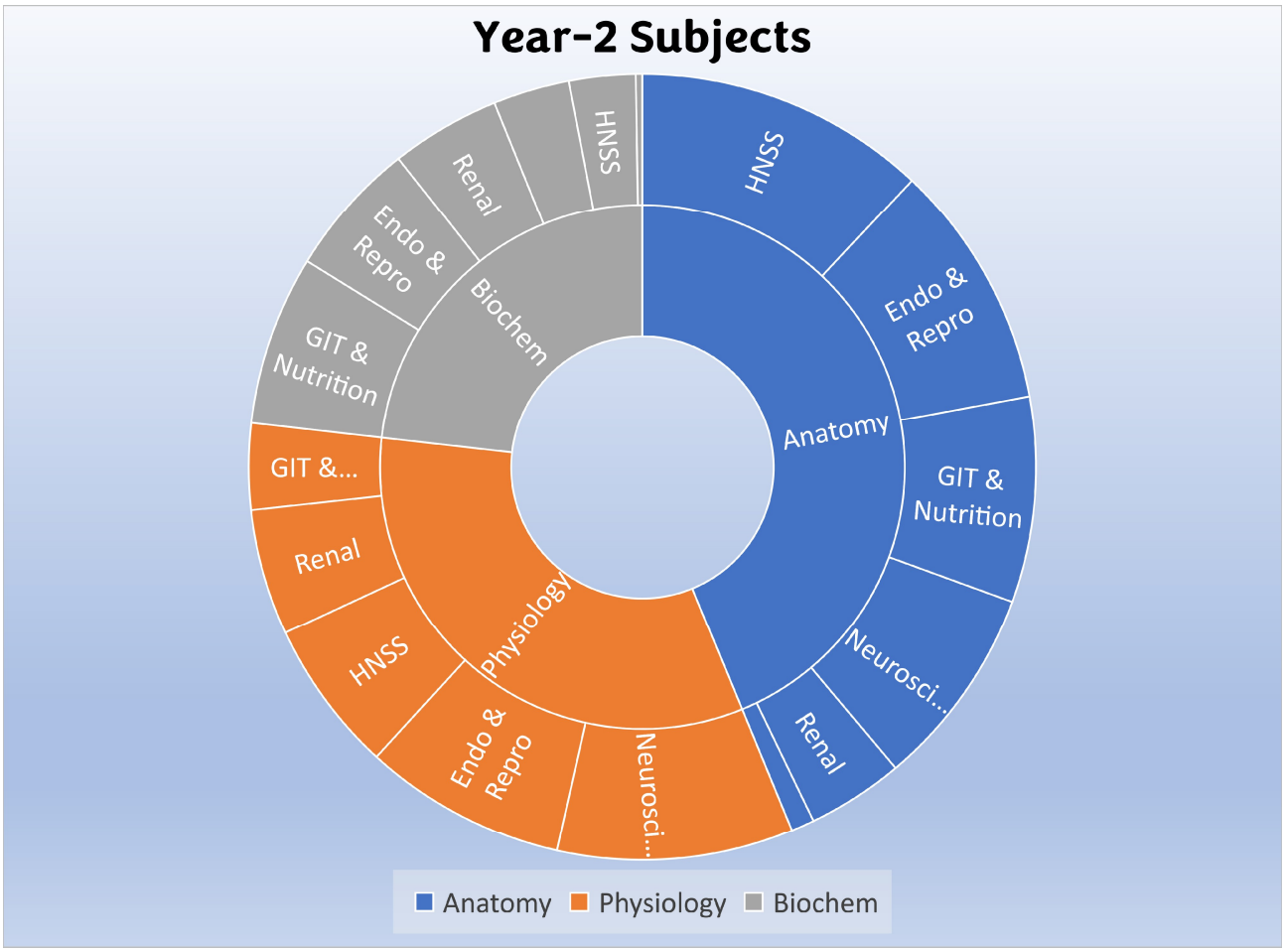
version 2.0

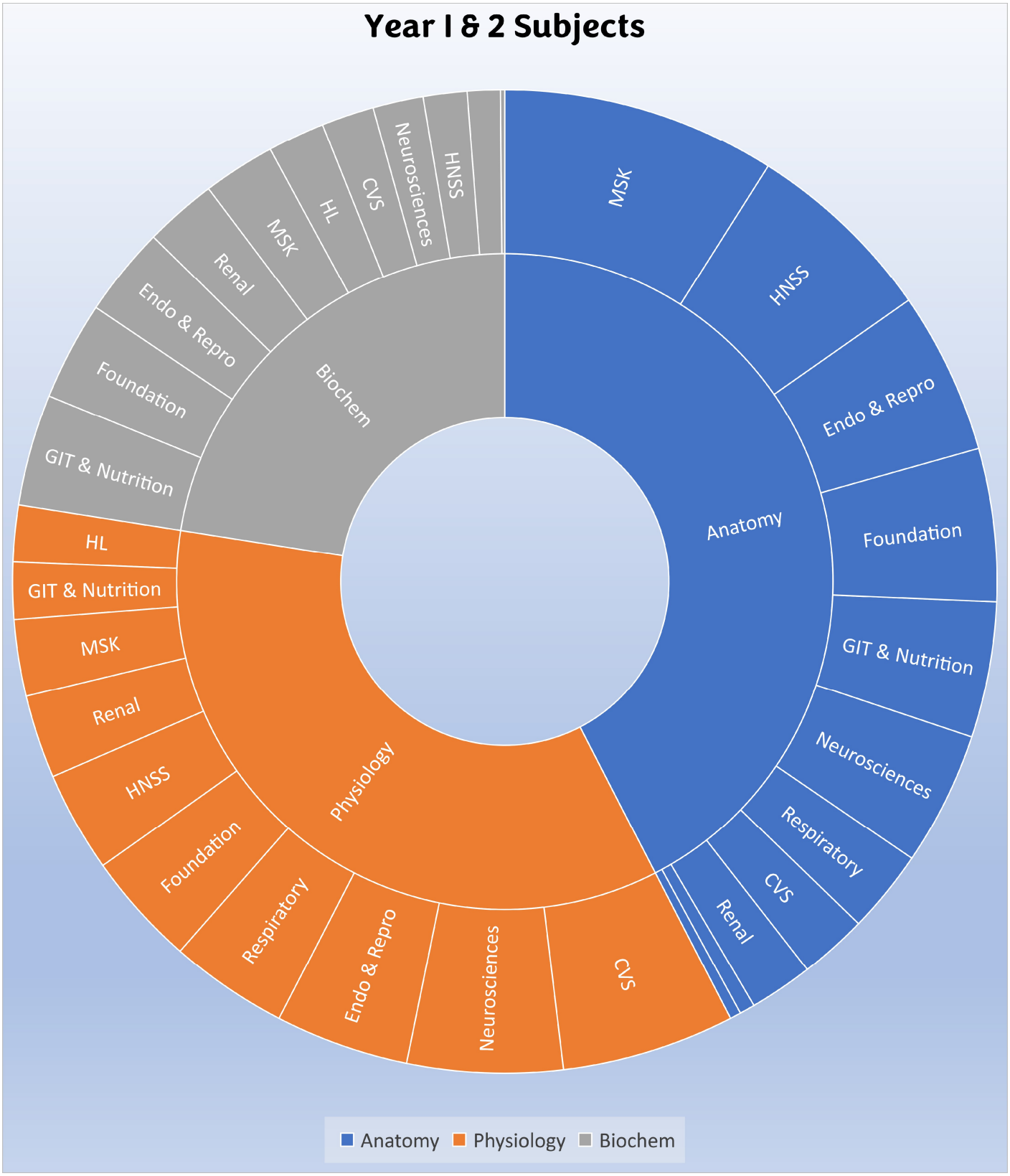



Year-1
Block 1
Block 2
Block 3
Anat...
Other
Phys...
Bioc...
HL
MSK
Resp...
CVS
Block 1 Block 2 Block 3


Year-2
Block 4
Block 5
Block 6
Endo & Repro
HNSS
Renal
GIT & Nutr...
Neuro
Infla...
Block 4 Block 5 Block 6


Year-1 Subjects
MSK
Foundati...
Respirat...
CVS
Anatomy
Respirat...
CVS
Foundati...
MSK
HL
Physiology
MSK
Foundati...
HL
CVS
Respirat...
Biochem
Anatomy
Physiology
Biochem


Year-2 Subjects
HNSS
Endo & Repro
GIT & Nutrition
Neurosci...
Renal
Anatomy
Neurosci...
Endo & Repro
HNSS
Renal
GIT &...
Physiology
GIT & Nutrition
Endo & Repro
Renal
HNSS
Biochem
Anatomy
Physiology
Biochem


Year I & 2 Subjects
MSK
HNSS
Endo & Repro
Foundation
GIT & Nutrition
Neurosciences
Respiratory
CVS
Renal
Anatomy
CVS
Neurosciences
Endo & Repro
Respiratory
Foundation
HNSS
Renal
MSK
GIT & Nutrition
HL
Physiology
HNSS
Neurosciences
CVS
HL
MSK
Renal
Endo & Repro
Foundation
GIT & Nutrition
Biochem
Anatomy
Physiology
Biochem

Section 8

MODULAR INTEGRATED CURRICULUM 2K23

version 2.0

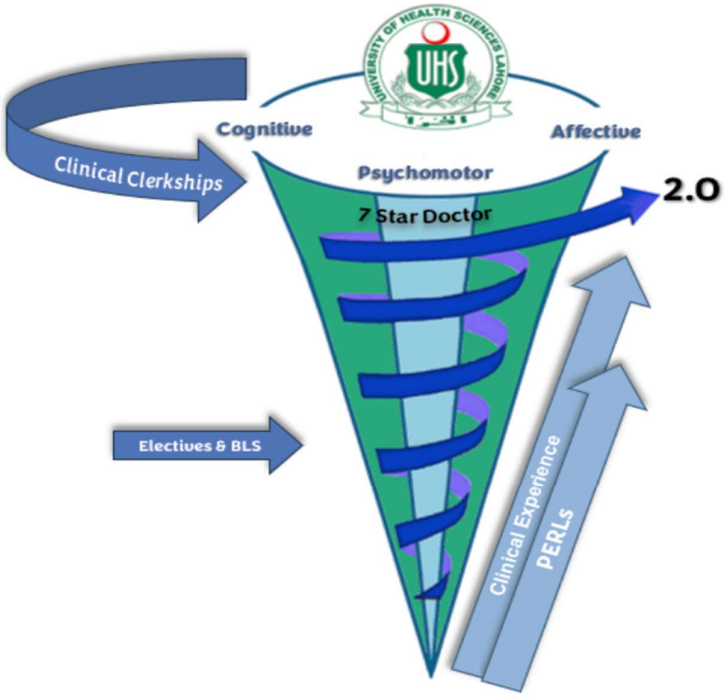
THE HOLY QURAN
PAKISTAN STUDIES
ISLAMIYAT
CIVICS

CURRICULUM

OF

The Holy Quran

MODULAR INTEGTARTED CURRICULUM 2K23 *version 2.0*



1. MODULE RATIONALE

The Holy Quran provides wisdom and knowledge to be followed in every applied component of modern civilization covering Ethical, Social, Legal, Financial and Healthcare Domains. The complete Quran encompasses the guidelines, all full of 'Hikmah' (wisdom) to deal with all practical scenarios encountering patients and health professionals. As the Holy Quran is the guiding light for humanity and a way of life for all the believers of one true Allah, therefore, understanding the message of this Holy Book is mandatory for realizing the duties which one has towards other human beings in general and the profession in particular. Holy Quran is a guide for the modern society and scientific development therefore, orbiting around Quranic doctrines and axioms of Hadith, all challenges faced by modern healthcare can be solved. Therefore, this longitudinal curriculum is developed so that all health professionals can get, as enunciated by the Holy Quran itself, "the best of this world as well as the best of the Hereafter".

2. VISION & MISSION

2.1: Vision: Building the personality and character of health professionals in light of teachings of the Holy Quran and Sunnah, to alleviate human sufferings.

2.2: Mission: Teaching Holy Quran and Sunnah to undergraduate students of Health Sciences, building their personality and character, enabling them to apply these principles in patient care and innovative research.

3. CURRICULUM DESIGN AND ORGANIZATION

3.1: Course Aim: The Holy Quran course aims to imbibe Health profession students with professionalism, general and medical, based on Divine teachings. The professionals thus groomed shall be able to correlate religion with healthcare delivery and modern science with an understanding that evidence-based practice itself originated from the system by which the "Hadith" was preserved after centuries.

3.2: Mode of Delivery: The module will be taught in the form of interactive lectures.

3.3: Learning Experience: Classroom environment will be used.

3.4: Attendance: Seventy five percent (75%) attendance is mandatory to be eligible to sit in the professional examination.

3.5: Course Modules for Year 1 and Year 2

The curriculum will be taught under three Major Sections

- Faith
- Worship
- Specific Quranic Commandments

3.6: Module Credit hours & Contact hours: This will be a three (03) credit hour course where each credit hour will be equivalent to eighteen (18) contact hours distributed over four years.

3.7: Assessment Portfolio

The assessment will be done through student portfolios based on four written assignments and two quizzes per year. The portfolio submission to the Quran teacher will be mandatory for sending admission to the university and sitting in the professional examination. The assignments will be based on the topics discussed during the year. One will be given after first half of the course will be completed for the year and second will be given at the completion of the Quran course.

3.8: Reference Material

- Translations of the Holy Quran approved by the Quran Board
- Six Authentic Books of Hadith

3.9. Module Faculty

At least one full time faculty member (Lecturer or above) will be hired for running the Holy Quran course throughout four years. The qualifications of the faculty member will be certified by the academic council of the college/institution to be declared as the teacher of Holy Quran course.


SYLLABUS OF
THE HOLY QURAN

Quran: Year-1

SECTION ONE: FAITH (AQAID)

LEARNING OUTCOMES

a. Oneness of Allah (SWT) (Tawheed)

i. Describe Unity of Allah in being
ii. Describe Unity of Allah in attributes
iii. Describe concept of Shirk
iv. Impact of Tawheed in human life

b. Prophethood (Risalat)

i. Explain Significance of Risalat
ii. Identify Prophets as role models
iii. Recognize finality of Prophethood - Prophet Muhammad (PBUH)

c. Belief in Hereafter (Aakhirat)

i. Appraise continuity of life beyond material world
ii. Concept of Doomsday and its various stages
iii. Concept of Day of Judgment and accountability in the Hereafter
iv. Concept of "Meezan"

d. Divine Revelations (Holy Books)

i. Explain the divine decree in sending the Holy Books
ii. Identify the Holy Quran as the only preserved & authenticated divine revelation to date
iii. Interpret Quran as Furqan

e. Angels

i. Discuss belief in angels and its significance
ii. Describe the universal role of angels (their specific duties)

f. Qadr

i. Identify Taqdeer as Knowledge of Allah
ii. Explain the concept of Faith in Good and Evil

CONTENTS

1. Oneness of Allah subhan wa taala (Tawheed)
2. Prophethood (Risalat)

3. Belief in Hereafter (Akhirat)
4. Devine revelations (Holy Books)

SECTION TWO: WORSHIP (IBADAAT)

LEARNING OUTCOMES

a. Prayer (Namaz)

i. Recognize the importance of physical purity (Taharah)
ii. Discuss the philosophy of prayer and its role in purification of soul
iii. Recognize the importance of prayer in building personal character - sense of duty, patience, perseverance, punctuality and self/social discipline
iv. Spiritual, moral and social impact of prayer in building of righteous community
v. Role in creating brotherhood, equality and unity in ummah
vi. Identify the conditions in which relaxation in prayer is allowed e.g. during operation, travelling etc.

b. Obligatory Charity (Zakat)

i. Identify obligatory importance of Zakat and other items as outlined under the title of 'Infaq-fee-sabilillah'
ii. Categorize the people who can be the beneficiaries of Zakat
iii. Role of zakat in eradication of greed and love of material world
iv. Effect of Zakat and sadaqat in circulation of wealth and alleviation of poverty
v. Explain the essence of zakat and sadaqat in building just communities
vi. Describe the role of state in collection and disbursement of zakat

c. Fasting (Roza)

i. Discuss the importance and significance of fasting
ii. Relate the Holy Quran and the month of Ramadan
iii. Role of fasting in building personal qualities like self-control, piety and soft corner for the poor and needy persons
iv. Identify the applications of "Taqwa" through fasting

d. Pilgrimage (Hajj)

i. Discuss the importance and significance of Hajj
ii. Identify the conditions in which Hajj becomes an obligation
iii. Role of manasik-e-Hajj in producing discipline and complete submission
iv. Recognize the importance of Hajj in uniting the ummah
v. Sacrifice for Allah subhan wa taala (essence of qurbani)

TOPIC AREAS
1. Prayer (Salah/Namaz) 2. Obligatory charity (Zakat) 3. Fasting (Saum/Roza) 4. Pilgrimage (Hajj)

Quran: Year-2

SECTION THREE: SPECIFIC QURANIC COMMANDMENTS

LEARNING OUTCOMES

a. Importance of the protection of Human life

i. Concept of the sanctity of human life in Quran and Sunnah
ii. Importance and significance of a single human being even during war
iii. Concept of punishment in regard to the killing of a human being, voluntarily or involuntarily

b. Jihad

i. Concept of Jihad and its significance (hikmat)
ii. Different forms of Jihad and their importance
iii. Principles and preparation of Jihad
iv. Devine reward of Jihad

c. Heirship/Inheritence (Virasat)

i. Heirship and division of wealth in accordance with divine teachings
ii. Heirs and their shares
iii. Legal aspect of virasat (Hud-e-Illahi)

d. Amar-bil-maroof-wa-Nahi-anil-munkar

i. Differentiation between Maroof and Munkar
ii. Importance and significance (effects of avoiding this principle)
iii. Necessary conditions of both amar-bil-maroof and nahi-anil-munkar
iv. The different stages and the necessary prerequisites

e. Hadood-e Illahee and taazeerat

i. Meaning and various types of hadood-e-Illahee
ii. Authority for fixation of limit (hudd)
iii. Criteria and permissible relaxation in fixing the limits
iv. Difference between 'Hadood', 'Qisas' and 'Tazeerat'. Punishments which are left to the court of law
v. Benefits for the good of community

f. Justice (Adal-o-insaf)

i. Justice of Allah subhan wa taala
ii. Importance of justice for the survival of community
iii. Need of justice to be prevailed irrespective of religion
iv. Devine reward for fair justice

g. Business (Bay-o-tijarat)

i. Importance of fair business and its necessary constituents
ii. Permissible and impermissible conditions of businesses
iii. Concept of loan in businesses

h. Interest (Riba or Sudi karobar)

i. Meaning of Riba or interest and its different forms
ii. Impact of Riba on a society in general
iii. Devine declaration and its punishment both in this world and Hereafter

i.Nikah-o-talaq

i. Basic rulings regarding marriage and divorce
ii. Importance of Nikah and its constituents
iii. Conditions of Nikah and various forms of prohibited/impermissible nikah
iv. Misconception of dowry
v. Talaq and its various forms
vi. Meaning of Khula and its conditions

CONTENTS

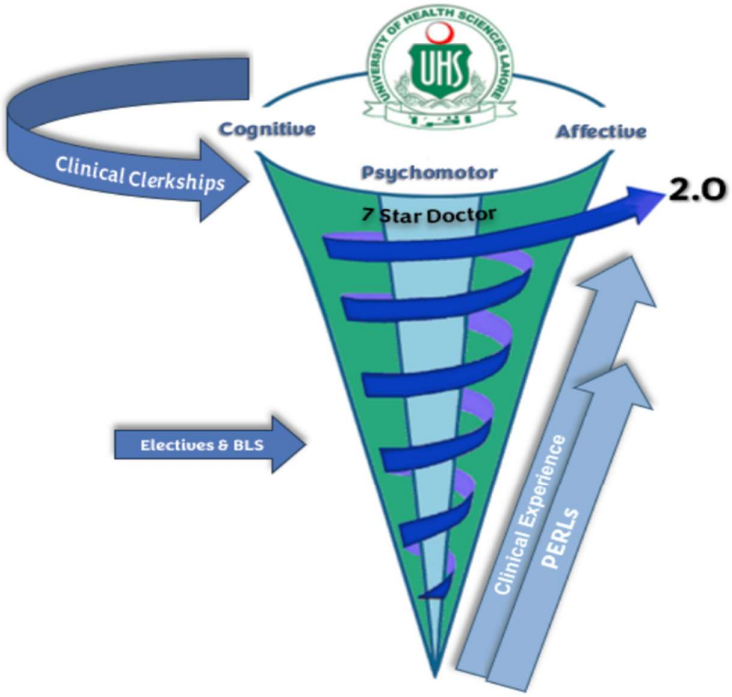
8. Interest (Riba or Sudi karobar)
9. Nikah-o-talaq

CURRICULUM

OF

Islamiyat & Pakistan Studies

MODULAR INTEGTARTED
CURRICULUM 2K23 *version 2.0*



MODULE RATIONALE

This module comprises of Islamiyat & Pakistan Studies. All the medical or other curricula relate to our core context and internal fiber. The study of religion and country endorses all relevancy and competency acquisition for the purpose of service to humanity and community orientation.

ISLAMIYAT

A short course on Islamic Studies will be completed in First and Second year with an exam at the end of second year.

Course Content:

1. Understand the basic principles of Islam.
2. Explain the concept of the Islamic state.
3. Explain the Quran as a guide for modern society and scientific development.
4. Describe the life of the Holy Prophet Peace be upon him as an example to follow.
5. Explain ethics in the Islamic prospective.
6. Describe the rights of the individual in Islam.
7. Describe the rights of women and children in Islam.
8. Explain the contribution of Islamic scholars to science and medicine.
9. Understand Islam in terms of modern scientific development.
10. Explain the concept of Rizk-e-Hilal.
11. Explain the concept of Hukook-ul-Ibad.

PAKISTAN STUDIES

A short course on Pakistan Studies will be completed in First and Second year with an exam at the end of second year.

Course Content:

1. Describe brief the salient features of the Pakistan movement.
2. Explain the basis for the creation of Pakistan.
3. Give a brief account of the history of Pakistan.
4. Explain the ethnic and cultural distribution of the population of Pakistan.
5. Describe the Provinces and resources available in Pakistan.
6. Explain current problems faced by Pakistan.

7. Describe the social, economic and health problems of the rural population of Pakistan.

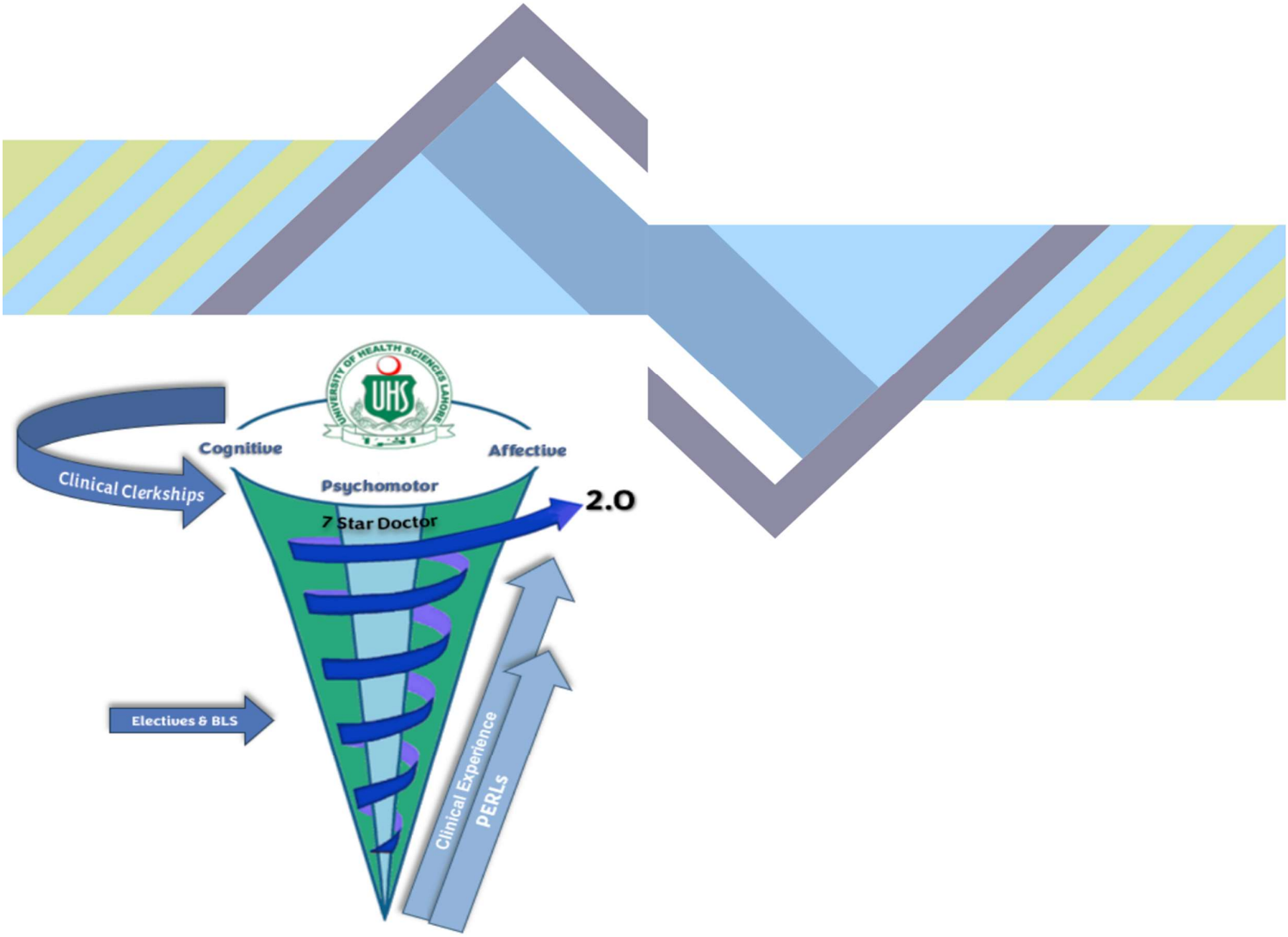
ISLAMIYAT AND PAKISTAN STUDIES BOOKS

- Standard Islamiyat (Compulsory) for B.A, B.Sc., M.A, M.Sc., MBBS by Prof. M.Sharif Islahi Ilmi Islamiyat (Compulsory) for B.A. B.Sc., & equivalent.
- Pakistan studies (Compulsory) for B.A. B.Sc., B.Com., Medical/Engineering by Prof. Shah Jahan Kahlun
- Pakistan studies (Compulsory) for B.A, B.Sc., B.Com., B.Ed., Medical/Engineering by Prof. Shah Jahan Kahlun

CURRICULUM

OF

Civics



MBBS YEAR 1 CURRICULUM

1. MODULE RATIONALE

Civics is part and parcel of life and the study of Civics has major thrust on improvement of the quality of life and welfare of human beings. This discipline enhances the approach towards rational behavior and daily life.

There is a need for us to know role of a citizen with specific reference to Global Village, the Citizen and Daily life issues, Citizenship, Rights and Responsibility, Role of Government and State, Implementation

Issues of Devolution plan, Social Welfare Institutions/ NGOs and their role at basic level, social interactions and the new discoveries in IT and mass media, relations with International Organizations and Pakistan and its neighbors. Civics goes beyond the cognitive level to deal with social values and attitudes. From the earliest stages of the course, it is important to respect students' opinions while helping them to develop a rationale for their opinions. This curriculum is adapted from Agha Khan University Examination Board curriculum for higher secondary examination.

2. VISION & MISSION

2.1: Vision: Building the personality and character of health professionals

2.2: Mission: Teaching Civics to undergraduate students of Health Sciences, building their personality and character, enabling them to apply these principles in patient care.

3. CURRICULUM DESIGN AND ORGANIZATION

3.1: Course Aim:

- To develop understanding of the social nature and significance of civics, its key concepts and civic life.
- To emphasize learning of related themes in a way that encourages creativity, curiosity, observation, exploration and questioning.
- To create awareness of the nature of civic life and the relationship between civics and other social sciences.
- To promote understanding about the ideology of Pakistan and the struggle of an independent state.

- To inculcate the behavior patterns of national character, and qualities of a good citizen,
- self-reliance, patriotism and leadership.
- To create a strong sense of national unity, integration and cohesion.
- To prepare students as future citizens, conscious of their positive role in a society and the world at large.

3.2: Mode of Delivery: The module will be taught in the form of interactive lectures.

3.3: Learning Experience: Classroom environment will be used.

3.4: Attendance: Seventy-five percent (75%) attendance is mandatory to be eligible to sit in the professional examination.

3.5: Assessment: The assessment will be done through two written assignments and two quizzes per year. The assignments will be based on the topics discussed during the year. One will be given after first half of the course will be completed for the year and second will be given at the completion of the course.

3.7: Module Faculty: At least one full time faculty member (Lecturer or above) will be hired to run the civics course throughout four years. The qualifications of the faculty member will be certified by the academic council of the college/institution to be declared as the teacher of civics.


SYLLABUS OF
CIVICS

LEARNING OUTCOMES	TOPICS
i. Define civics ii. Describe how civics can improve the citizenship iii. Illustrate the scope of civics iv. Discuss the nature of civics v. Give examples how civics can help in the national development	Civics-Meaning & Nature
i. Examine the significance of civics ii. Explain how civics is important to know the problems of daily life iii. Discuss how civics can help to bring improvements in the civics life of citizens iv. Evaluate how civics can improve the sense of love and respect for human relationship v. Discuss that studying civics can develop a sense of gratitude vi. Give examples how civics is important to develop the global unity	Significance and Utility
i. Compare civics with political science, history, economics, sociology and ethics	Relationship with Social Sciences
i. Describe the term harmonic relationship ii. Explain the harmonic relationship among different members of society. (Women, children and senior citizens) iii. Explain how harmonic relationship develop for respect of religion	Harmonic Relationship
i. Define the term individual in relation to civics ii. Define the term state iii. Explain the relation between an individual and a state iv. Describe the importance of an individual in a state v. Enlist the responsibilities of an individual in a state	Individual and state
i. Identify the basic unit of social institution Discuss and characterize the different types of family ii. Give the importance of basic unit of social institution in the development of a state Enlist the responsibilities of family in	Family

general iii. Analyze your role for the betterment of the family Compare and contrast the impact of the deterioration of family in the western society and give examples	
i. Define community ii. Explain the nature and significance of community iii. Discuss the role of a family in community iv. Analyze the role of an individual for the betterment of the community	Community
i. Define society ii. Elaborate the relation between an individual and society and society and state iii. Analyze the role of an individual for the betterment of society	Society
i. Define the term nation, nationality and ummah differentiate between nation and nationality distinguish between nation and ummah analyze the value, behavior and the pattern of society based on religions ii. Evaluate the characteristics of society developed by religions	Nation, Nationality
i. Trace the origin of state with reference to the theories of Divine Origin, Force and Social ii. Contract (Hobbs, Lock, Rousseau) iii. Describe the elements of a state (sovereignty, population, territory, Government) iv. Compare and distinguish the role of state, society and government	Origin and elements of State
i. Describe the functions of state ii. Describe the factors which are necessary for proper functioning of state iii. Analyze the situation when a state does not function properly iv. Describe the characteristics of a welfare state Analyze how a welfare state guarantees the equity and justice on the issues of gender, religion, and social classes	Functions of state. (Defense, law and order, welfare etc.)

i. Define the concept of sovereignty in west ii. Discuss different kinds of sovereignty iii. Explain Austin's concept of sovereignty iv. Analyze critically Austin's concept of sovereignty	Sovereignty

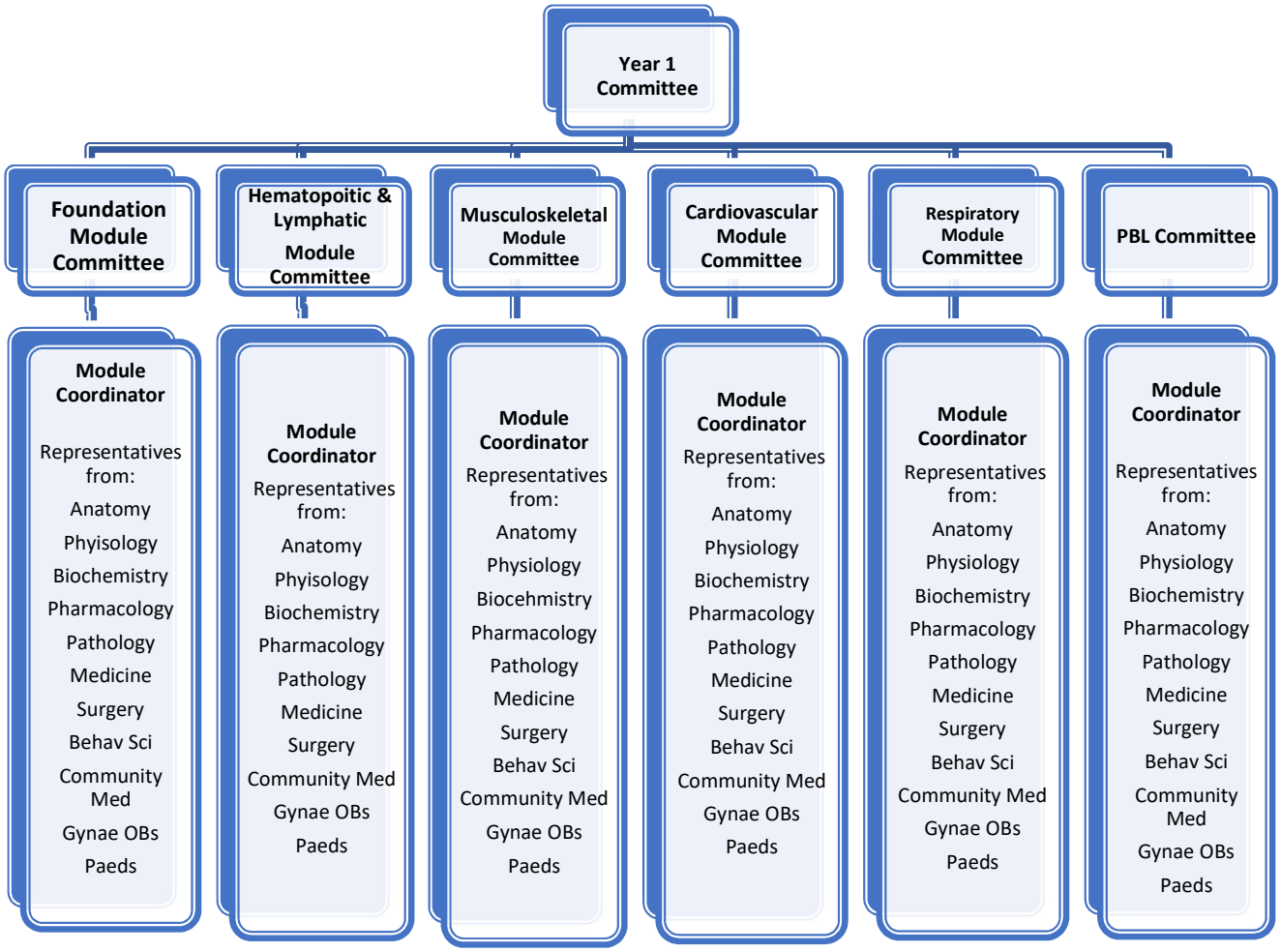
Section 9

Institutional Implementation Recommendations

RECOMMENDED IMPLEMENTATION SOPs

The implementation of the modular integrated approach requires to be categorical and methodical. It is recommended that the institutes should have an internal hierarchy for the smooth conduction of the educational process and for fine detailing the interpretation of the curricular guidelines.

A recommended organogram is given below:



A few recommended organizational titles and responsibilities are as follows:

YEAR COMMITTEE
• Identify the philosophy for implementing future Curriculum. • Ensures module requirements ahead of time. • Any adjustment of schedule if required. • Liaison with the chairperson of the mentoring program. • Quality assurance of teaching and learning. • Hold regular meetings. • Compliance to schedule and timetable. • Compliance to proposed internal assessment. • Oversee completion of Logbooks and Portfolio. • Oversee the foundation component of C-FRC. • Ensure student centeredness and feedback from students. • Develop timetables. • Analyze the implementation of current curriculum. • Strategize communication with both faculty and students.
MODULE COMMITEE
• Module committee should be headed by module coordinator. • The nomination of the 'Module Coordinator' will be based on the maximum content present in the respective module e.g., Musculoskeletal will have a module coordinator from Anatomy. • The coordinator will develop module team. • Collaboration and consultation with all the relevant departments. • Follow the curricular guidelines by the modules provided by UHS. • Coordinate with the Assessment Cell. • Arrange regular meetings. • Develop study guides in collaboration with the Department of Medical Education • Liaison with the PBL Committee.

PBL COMMITTEE

- PBL committee should be headed by PBL coordinator.
- Responsible for coordination of the PBL meetings
- Responsible for training of tutors by incorporating experiential learning, small group work and critical reflection.
- The tutors must possess both content expertise and group facilitation skills.
- Forwarding the PBL to coordinator year committee / DME for the purpose of Quality assurance
- Ensure the teaching resources available for delivery of PBL.
- Quality assurance visits to the PBL site.
- Coordination with year committee head as well as Director Medical Education.

MENTORING COMMITTEE

- Design a mentorship program by establishing the idea and need for program to increase professional competence of students and interest in research and post-graduation.
- A senior faculty member with a keen interest in medical education and student affairs can chair the committee.
- Members of the committee include faculty from basic as well as clinical side voluntarily.
- Training of volunteer mentors through a workshop
- Assigning of mentorship groups (10-12 mentees per mentor)
- Build up a professional network for the mentees and personal growth.
- Improve their level of performance and satisfaction.
- Build relationships with colleagues and feel part of the community.
- Manage the integration of job, career, and personal goals.
- Regular monitoring of program and providing support to mentorship groups
- Evaluation every 6 months based on feedback from the faculty and students and individual performance of students.

DEPARTMENT OF MEDICAL EDUCATION

- The department of medical education serves as a backbone to provide

effective and high-quality education to both undergraduate and post graduate medical and dental students.

- The Department of Medical Education needs to play the integral role in the implementation and adoption of **Curriculum 2K23** *version 2.0.*
- DME will be overall responsible for the spirals of PERLs & C-FRC.
- DME will be monitoring the portfolio development by the students and the completion of logbook.
- DME will be responsible for developing a mentoring platform.
- Faculty development trainings for mentoring, reflective writing and portfolio development will be undertaken.
- Planning the affective training competency acquisition framework with the academic council will be the most pivotal role.
- Collaboration with other disciplines for the training sessions for different aspects of Professionalism, Ethics, Research and Leadership skills.

GENERAL RESPONSIBILITIES OF DME

- Contribute and design, train the trainer activities which fulfil the need for undergraduate and post graduate training.
- Shape and develop medical education research activities of the college.
- Facilitating & organizing workshops, seminars, symposia & conferences
- Conducting CME activities to leverage culture of awareness, journal club.
- Networking by representing the college, when needed, in national /international meetings or conferences.
- Student counseling
- Supervising students' academic progress
- Academic Committees Development and Support
- Staff Support and Development
- Curriculum development and reform
- Collaborate with curriculum committee and faculty members to develop quality instructional material such as modules, lecture, or study guides.
- Standard Operating Procedures for DME development
- Skill lab management

- Assessment analysis which includes blue printing, pre-exam review, item analysis and standard setting and provide feedback to concerned faculty and students on the learning outcome achievement.
- Develop and conduct periodical review of process of the program, learning and teaching activities, and assessment process.
- Identify opportunities for use of IT in teaching and learning, assessment and faculty development activities.
- Exam Cell management
- Quality Assurance Cell management
- Record keeping of departmental data.
- Leadership and management
- Participation in overall planning and management of teaching in liaison with the departments

INSTRUCTIONAL STRATEGIES

Delivery of a curriculum also needs a diversity of educational vernacular for the different learning styles. Following are a few of the recommended instructional strategies. It is advised that at least **three different methods of instructions** should be adopted in the institutional planning. This will enable the diversity of learning patterns to be facilitated.

Large Group Interactive Session (LGIS)

Lecture format is the most widely used approach to teaching especially in a large class size with average attention span of 20-30 mins. Interactive lecturing involves a two-way interaction between the presenter and the participants. Interactive methods like brainstorming, buzz group, simulation, role play, and clinical cases can be used.

Significance of its usage

- Relaxed environment, diverse opinions, active involvement
- Increase attention and motivation.
- Independence and group skills.
- Cost effective.
- Suitable for taking advantage of available audiovisual technologies.

Team based learning (TBL)

TBL is a uniquely powerful form of small group learning. It provides a complete coherent framework for building a flipped course experience. There are four essential elements of TBL which include:

- Teams must be properly formed and managed (5-7 students)
- Getting students ready
- Applying course concepts
- Making students accountable

Significance of its usage

- Students are more engaged.
- Increased excitement in TBL classroom
- Teams outperforms best members.
- Students perform better in final and standardized exams.

Problem based learning (PBL)

It is an instructional student-centered approach in which students work in small groups on a health problem, identifying their own educational needs and being responsible for the acquisition of the knowledge required to understand the scenario.

Significance of its usage

- Teamwork
- Critical evaluation of literature
- Self-directed learning and use of resources
- Presentation skills
- Leadership
- Respect for colleagues' views

Case based learning (CBL)

It is an inquiry structured learning experience utilizing live or simulated patient cases to solve, or examine a clinical problem, with the guidance of a teacher and stated learning objectives.

Significance of its usage

- Induce a deeper level of learning by inculcating critical thinking skills.
- Flexibility on use of case
- Helps students acquire insightful information.
- Stay abreast with novel advancements in healthcare

Tutorials

Tutorial is a class or short series of classes, in which one or more instructors provides intensive instruction on some subject to a small group. Its purpose is to explore students' point of view, allowing time for discussion, and inculcating self-directed, reflective learning skills.

Significance of its usage

- Develop and assess the extent of background knowledge of students, which enables them to properly understand concepts which may not have been understood in lectures.
- Develop problem-solving skills.
- Develop practice of self-learning.
- Reduced time to understand the topic.

Reflective Writing

It is a metacognitive process that occurs before, during and after the situation with the purpose

of developing greater understanding of both the self and situation so that future encounters with the situation are informed from previous encounters.

Significance of its usage

- Questioning attitude and new perspectives.
- Areas for change and improvement.
- Respond effectively to new challenges.
- Critical thinking and coping skills

Bedside Teaching

Teaching and learning that occurs with actual patient as the focus. It occurs in wards, emergency departments, operating rooms, and high dependency units.

Significance of its usage

- Stimulus of clinical contact
- Psychomotor skills
- Communication skills
- Language skills
- Interpersonal skills
- Professional attitudes and empathy
- Role modelling

Simulation

Person, device or set of conditions, which attempts to present education and evaluation of problems authentically. The student or trainee is required to respond to the problems as s/he would under natural circumstances.

Significance of its usage

- Safety for patients
- Liberty to make mistakes.
- Manageable/variable complexity of tasks
- Opportunity to develop self-efficacy before real patient encounter.
- Repeatability of tasks
- Learning at different pace is permissible

Skill laboratories

It refers to specifically equipped practice rooms functioning as training facilities offering hands on training for the practice of clinical skills within non-threatening environment prior to their real-life application This applies to both basic clinical skills as well as complex surgical skills.

Significance of its usage

- Controlled, anxiety-free, and risk-free learning environment to students.
- A platform for repeated practice for mastery in relevant clinical skills
- Increase the preparedness of student learners before transitioning to the real hospital setting.
- Build strong communication skills.
- Enable learners to make critical decisions.

Clinical Case based Conference

Clinical Case based conferences allow clinicians and medical students to present difficult case material and include discussions of diagnostic, clinical formulation, and/or treatment issues.

Significance of its usage

- Provides detailed (rich qualitative) information.
- Provides insight for further research.
- Permitting investigation of otherwise impractical (or unethical) situations.

Laboratory Practical

Lab practical involve things like identifying a structure, a type of stain through a microscope, a problem with a preparation, reading biochemical test results and answering safety questions. These simulations allow students to attempt the experiments in the laboratory in a risk-free way that provides the opportunity to make mistakes and learn how to correct them using the immediate feedback generated.

Significance of its usage

- Enhance mastery of subject matter.
- Develop scientific reasoning.
- Develop practical skills.
- Develop teamwork abilities.

Ward Rounds

It is a composite clinical practice to review inpatients' management and progress, to make decisions about further investigations, treatment options and discharge from hospital. It is an opportunity for clinicians, students, and patients to participate in education and training at bedside.

Significance of its usage

- Patient management skills
- History taking
- Physical examination
- Time management skills
- Communication skills

Demonstrations

The demonstration method in teaching can be defined as giving a demo or performing a specific activity or concept. It is a teaching-learning process carried out in a very systematic manner.

Significance of its usage

- Promotes learning and correlates theory with practice.
- Sharpens the observation skills.
- Sustain interests in learning environment.
- Helps teacher to evaluate students' response

Case Presentations

It is a teaching method which provides descriptive information about a clinical patient scenario and to share this educational experience with the general medical and scientific community. It prepares students for clinical practice, using authentic clinical cases by linking theory to practice with the help of inquiry-based learning methods.

Significance of its usage

- Cultivate the capacity for critical analysis.
- Judgement and Decision making
- Facilitate creative problem solving.
- Allow students to develop realistic solutions to complex problems

Section 10

Assessment Policy

Statutes

1. The First Professional MBBS Examination shall be held at the end of the first year MBBS, whereas, the Second Professional MBBS Examination shall be held at the end of the second year.

2. Every candidate shall be required to study contents of Anatomy (including Histology), Physiology, Biochemistry, Behavioural Sciences, Community Medicine & Public Health, Pathology, Pharmacology & Therapeutics, Islamic Studies/ Civics and Pakistan Studies, Clinical skills and Professionalism, Ethics, Research and Leadership. The teaching and assessment shall be done in three modular blocks.

3. There will be three papers in the first professional examination, and four papers inthe second professional examination:

   First Professional Exam:
   a. Paper 1 will be based on contents of Block 1;
   b. Paper 2 will be based on contents of Block 2;
   c. Paper 3 will be based on contents of Block 3;

   Second Professional Exam:
   a. Paper 1 will be based on contents of Block 4;
   b. Paper 2 will be based on contents of Block 5;
   c. Paper 3 will be based on contents of Block 6;
   d. Paper 4 will be based on contents of Islamic studies/Civics and Pakistan Studies

4. Each paper will comprise of two components 'Written' and 'Oral/Practical/Clinical' examinations.

5. The Written and 'Oral/Practical/Clinical' examination in each paper will carry 150 marks each, making the total marks of 300 for each of the papers 1,2, and 3 (inclusive of Internal Assessment).

6. Total marks for the First and Second Professional Examinations shall be 900, each. Marks of Islamic Studies/Civics and Pakistan Studies shall not be counted towards total marks of any professional examination, and determination of position or merit of a candidate. However, the candidates shall have to take the examination in the subject in their Second Professional MBBS Examination. Those failing the subject in both annual & supplementary examinations, while passing all the other subjects of Second Professional Examination shall be promoted to the 3rd year MBBS, however they will be allowed two more attempts to clear the subject with Second professional Examination of the next session, failing which they shall be detained in the 3rd Professional MBBS.

7. Major content areas of the first two professional years shall be from:
   a. Anatomy including applied/clinical Anatomy;
   b. Physiology including applied/clinical Physiology;
   c. Biochemistry including applied/clinical Biochemistry.

8. The Applied/Clinical content for the Anatomy, Physiology and Biochemistry shall be basedon

clinical correlations.

9. Integrated clinical content areas of the both years include Behavioral Sciences, Community Medicine & Public Health, Pathology, Pharmacology & Therapeutics, Clinical Foundation- I & II and PERLs- I & II.

10. Written Examination

a. The written component of Papers 1, 2, and 3 will consist of 'One-best-type' Multiple Choice Questions (MCQ)and Structured Essay Questions (SEQ) in a ratio of 70:30 %.
b. Each MCQ will have five options (one best response and four distractors) andwill carry one (01) mark.
c. There will be no negative marking.
d. There will be no sections within an SEQ, and it will be a structured question with five (05) marks each.
e. SEQ's will only be based on the major content areas of the year.
f. There will be total of 85 MCQs and 07 SEQs in every written paper in Papers1,2, and 3.
g. The duration of each written paper will be 180 minutes (03 hours).
h. The MCQ section will be of 110 minutes duration and the SEQ section of 70 minutes.

11. Oral/Practical/Clinical Examination

a. The 'Oral/Practical/Clinical' component of each Papers 1, 2, and 3 will consist of a total of twelve (12) OSPE/OSCE/OSVE stations in each 'Oral/Practical/Clinical' examination.
b. There will be seven (07) Observed OSPE (Objective Structured Practical Examination) stations from major subject areas. Each OSPE station will have the practical component and an evaluation of the underlying principle relevant to that practical with a component of applied knowledge.
c. There will be two (02) Observed OSCE (Objective Structured Clinical Examination) stations, based on C-FRC1 and PERLs-1 in each 'Oral/Practical/Clinical' examination.
d. There will be three (03) Observed interactive OSVE (Objective Structured Viva Examination) from major subject areas. Each OSVE station will have a structured viva, to assess a practical component along with evaluation of the underlying principle relevant to that practical with a component of applied/practical knowledge and related clinical application.
e. Each OSPE/OSCE station will carry eight (08) marks.
f. Each OSVE station will carry sixteen (16) marks
g. The duration of each 'Oral/Practical/Clinical' examination will be 120 minutes (2 hours).
h. Time for each OSPE. OSCE and OSVE station will be eight (08) minutes.

12. Every candidate shall take the examination in the following Blocks (Modules) in First& Second Professional MBBS Examinations: -

Year 1

A.	Block 1 (Foundation-I + Hematopoietic & Lymphatic)	300 Marks
B.	Block 2 (Musculoskeletal & Locomotion-I)	300 Marks
C.	Block 3 (Cardiovascular-I+ Respiratory-I)	300 Marks

Year 2

I.	Block 4 (Gastrointestinal Tract & Nutrition-I + Renal-I)	300 Marks
II.	Block 5 (Endocrinology & Reproduction-I + Head & Neck, Special Senses)	300 Marks
III.	Block 6 (Neurosciences-I + Inflammation)	300 Marks
IV.	Islamic Studies/ Civics + Pakistan Studies	100 Marks

A. Block 1 (Foundation-I + Hematopoietic and Lymphatic)

The examination in Block 1 shall be as follows: -

I. One written paper of 120 marks having two parts:
   i. Part I shall have eighty-five Multiple Choice Questions (MCQs) of total 85 marks (01 mark for each MCQ) and the time allotted shall be 110 minutes. There will be no negative marking.
   ii. Part II shall have seven Structured Essay Questions (SEQs) of total 35 marks (05 marks for each SEQ) and the timeallotted shall be 70 minutes.

II. 'Oral/Practical/Clinical' examination shall have 120 marks in total.

III. The continuous internal assessment through 'Block Examination', conducted by the college of enrollment shall carry 60 marks, i.e., 20% of the total allocated marks (300) for the block. The score will be equally distributed to the Written and 'Oral/Practical/Clinical' Examinations.

B. Block 2 (Musculoskeletal & Locomotion-I)

The examination in Block 2 shall be as follows: -

I. One written paper of 120 marks having two parts:
   i. Part I shall have eighty-five Multiple Choice Questions (MCQs) of total 85 marks (01 mark for each MCQ) and the time allotted shall be 110 minutes. There will be no negative marking.
   ii. Part II shall have seven Structured Essay Questions (SEQs) of total 35 marks (05 marks for each SEQ) and the timeallotted shall be 70 minutes.

II. 'Oral/Practical/Clinical' examination shall have 120 marks in total.

III. The continuous internal assessment through 'Block Examination', conducted by the college of enrollment shall carry 60 marks, i.e., 20% of the total allocated marks (300) for the block. The score will be equally distributed to the Written and 'Oral/Practical/Clinical' Examinations.

C. Block 3 (Cardiovascular-I + Respiratory-I)

The examination in Block 3 shall be as follows: -

I. One written paper of 120 marks having two parts:
   i. Part I shall have eighty-five Multiple Choice Questions (MCQs) of total 85 marks (01 mark for each MCQ) and the time allotted shall be 110 minutes. There will be no negative marking.
   ii. Part II shall have seven Structured Essay Questions (SEQs) of total 35 marks (05 marks for each SEQ) and the timeallotted shall be 70 minutes.

II. 'Oral/Practical/Clinical' examination shall have 120 marks in total.

III. The continuous internal assessment through 'Block Examination', conducted by the college of enrollment shall carry 60 marks, i.e., 20% of the total allocated marks (300) for the block. The score will be equally distributed to the Written and 'Oral/Practical/Clinical' Examinations.

D. Block 4 (Gastrointestinal & Nutrition-I + Renal-I)

The examination in Block 2 shall be as follows: -

I. One written paper of 120 marks having two parts:
   i. Part I shall have eighty-five Multiple Choice Questions (MCQs) of total 85 marks (01 mark for each MCQ) and the time allotted shall be 110 minutes. There will be no negative marking.
   ii. Part II shall have seven Structured Essay Questions (SEQs) of total 35 marks (05 marks for each SEQ) and the timeallotted shall be 70 minutes.

II. 'Oral/Practical/Clinical' examination shall have 120 marks in total.

III. The continuous internal assessment through 'Block Examination', conducted by the college of enrollment shall carry 60 marks, i.e., 20% of the total allocated marks (300) for the block. The score will be equally distributed to the Written and 'Oral/Practical/Clinical' Examinations.

E. Block 5 (Endocrinology & Reproduction-I + Head & Neck, Special Senses)

The examination in Block 2 shall be as follows: -

I. One written paper of 120 marks having two parts:
   i. Part I shall have eighty-five Multiple Choice Questions (MCQs) of total 85 marks (01 mark for each MCQ) and the time allotted shall be 110 minutes. There will be no negative marking.
   ii. Part II shall have seven Structured Essay Questions (SEQs) of total 35 marks (05 marks for each SEQ) and the timeallotted shall be 70 minutes.

II. 'Oral/Practical/Clinical' examination shall have 120 marks in total.

III. The continuous internal assessment through 'Block Examination', conducted by the college of enrollment shall carry 60 marks, i.e., 20% of the total allocated marks (300) for the block. The score will be equally distributed to the Written and 'Oral/Practical/Clinical' Examinations.

F. Block 6 (Neurosciences-I + Inflammation)

The examination in Block 2 shall be as follows: -

I. One written paper of 120 marks having two parts:
   i. Part I shall have eighty-five Multiple Choice Questions (MCQs) of total 85

marks (01 mark for each MCQ) and the time allotted shall be 110 minutes. There will be no negative marking.

ii. Part II shall have seven Structured Essay Questions (SEQs) of total 35 marks (05 marks for each SEQ) and the timeallotted shall be 70 minutes.

II. 'Oral/Practical/Clinical' examination shall have 120 marks in total.

III. The continuous internal assessment through 'Block Examination', conducted by the college of enrollment shall carry 60 marks, i.e., 20% of the total allocated marks (300) for the block. The score will be equally distributed to the Written and 'Oral/Practical/Clinical' Examinations.

G. ISLAMIC STUDIES/CIVICS AND PAKISTAN STUDIES

The examination in Islamic Studies/Civics and Pakistan Studies shall be as follows: -

I. One written paper of 100 marks in Islamic Studies/ Civics and Pakistan Studies having two components:

i. Islamic Studies/Civics component having total 60 marks. There will be three (3) Long Essay Questions (LEQs) to be attempted out of five (5), having 20 marks each.

ii. Pakistan Studies component having total 40 marks. There will be two (2) Long Essay Questions (LEQs) to be attempted out of four (4), having 20 marks each.

Note: Islamic Studies for Muslims, and Civics for Non-Muslims candidates.

13. The marks distribution in each subject is given in Table 1:

Table 1

YEAR-1						
Subject	**Theory**		**Practical**			**Total**
Block 1 **Modules** (Foundation-I + Hematopoietic and Lymphatic)	Part I MCQs (85)	85 Marks	Practical / Clinical Examination	07 OSPE 02 OSCE 03 OSVE	Marks 56 16 48	**300**
	Part II SEQS (7)	35 Marks				
	Internal Assessment 10%	30 Marks	Internal Assessment 10%	30 Marks		
	Total	**150**	Total	**150**		
Block 2 **Modules** (Musculoskeletal & Locomotion-I)	Part I MCQs (85)	85 Marks	Practical / Clinical Examination	07 OSPE 02 OSCE 03 OSVE	Marks 56 16 48	**300**
	Part II SEQS (7)	35 Marks				
	Internal Assessment 10%	30 Marks	Internal Assessment 10%	30 Marks		
	Total	**150**	Total	**150**		
Block 3 **Modules** (Cardiovascular-I &	Part I MCQs (85)	85 Marks	Practical / Clinical Examination	07 OSPE 02 OSCE 03 OSVE	Marks 56 16 48	
	Part II SEQS (7)	35 Marks				

Respiratory-I)	Internal Assessment 10%	30 Marks	Internal Assessment 10%	30 Marks		300
	Total	150	Total	150		
				Total Marks:		900
YEAR-2						
Block 4 **Modules** (GIT & Nutrition-I + Renal-I)	Part I MCQs (85)	85 Marks	Practical / Clinical Examination	07 OSPE 02 OSCE 03 OSVE	Marks 56 16 48	300
	Part II SEQS (7)	35 Marks				
	Internal Assessment 10%	30 Marks	Internal Assessment 10%	30 Marks		
	Total	150	Total	150		
Block 5 **Modules** (Endocrinology & Reproduction-I + Head& Neck, Special Senses)	Part I MCQs (85)	85 Marks	Practical / Clinical Examination	07 OSPE 02 OSCE 03 OSVE	Marks 56 16 48	300
	Part II SEQS (7)	35 Marks				
	Internal Assessment 10%	30 Marks	Internal Assessment 10%	30 Marks		
	Total	150	Total	150		
Block 6 **Modules** (Neurosciences-I + Inflammation)	Part I MCQsPart II SEQS	85 Marks 35 Marks	Practical / Clinical Examination	120 Marks		300
	Internal Assessment	30 Marks	Internal Assessment	30 Marks		
	Total	150	Total	150		
	Total Marks					900
Islamic Studies/ Civics and PakistanStudies	**Islamic Studies/Civics** 3 LEQs of 20 marks each			60 Marks		100*
	Pakistan Studies 2 LEQs of 20 marks each			40 Marks		
	Total			100		

* Total marks for the First and Second Professional Examinations shall be 900, each. Marks of Islamic Studies/Civics and Pakistan Studies shall not be counted towards total marks of any professional examination, and determination of position or merit of a candidate. However, the candidates shall have to take the examination in the subject in their Second Professional MBBS Examination. Those failing the subject in both annual & supplementary examinations, while passing all the other subjects of Second Professional Examination shall be promoted to the 3rd year MBBS, however they will be allowed two more attempts to clear the subject with Second professional Examination of the next session, failing which they shall be detained in the 3rd Professional MBBS.

14. No grace marks shall be allowed in any examination or practical under any guise or name.

15. At least 25% MCQs & 25% SEQs shall be based on applied/clinical/case scenario to assess high order thinking in the papers set for the students of First and second Professional MBBS Examinations.

Regulations

1. Professional examination shall be open to any student who: -
   a. has been enrolled/registered and completed one academic year preceding the concerned professional examination in a constituent/affiliated College of the University.
   b. has his/her name submitted to the Controller of Examinations, for the purpose of examination, by the Principal of the College in which he / sheis enrolled & is eligible as per all prerequisites of the examination.
   c. has his/her marks of internal assessment in all the Blocks sent to the Controller of Examinations by the Principal of the College along with the admission form.
   d. produces the following certificates duly verified by the Principal of his / her College:
      (i) of good character;
      (ii) of having attended not less than 85% of the full course of lectures delivered and practical conducted in the particular academic session, in each block, as well as in the aggregate;
      (iii) Certificate of having appeared at the Block Examinations conducted by the college of enrolment with at least 50 % cumulative percentage in aggregate of blocks 1, 2 and 3 for the first year and blocks 4,5 and 6 for the second year;
      (iv) Candidates falling short of attendance requirement shall not be admitted to the annual examination but may be permitted to appear at the supplementary examination if they make up the deficiency up to the commencement of the next examination by remaining on the rolls of a College as regular student, subject to fulfillment of all other mandatory requirements to appear at the examination.

2. The minimum number of marks required to pass the professional examination for each paper shall be fifty percent (50%) in Written and fifty percent (50%) in the 'Oral/Practical/Clinical' examinations and fifty percent (50%) in aggregate, independently and concomitantly, at one and the same time.

3. Candidates who secure eighty five percent (85%) or above marks in any of the papers shall be declared to have passed "with distinction" in that Block, subject to having at least 80 % marks in the Written component of that paper, concomitantly. However, no candidate shall be declared to have passed "with distinction" in any paper, who does not pass in all the papers of the Professional Examination as a whole at one and the same time,

4. A candidate failing in one or more paper of the annual examination shall be provisionally allowed to join the next professional class till the commencement of supplementary examinations. Under no circumstances, a candidate shall be promoted to the next professional class till he / she has passed all the papers in the preceding Professional MBBS Examination.

5. If a student appears in the supplementary examination for the first time as he/she did not

appear in the annual examination because of any reason and fails in any paper in the Supplementary Examination, he/she will be detained in the same class and will not be promoted to the next class.

6. Any student who fails to clear the First or Second Professional MBBS Examination in four consecutive attempts, inclusive of both availed as well as un-availed, after becoming eligible for the examination, and has been expelled on that account shall not be eligible for continuation of studies and shall not be eligible for admission as a fresh candidate in either MBBS or BDS. (**Ref.** UHS Circulars/137-20/2750 dated 23-11-2020).

7. The colleges may arrange remedial classes and one re-sit for each block examination, either with the subsequent block examination or before completion of the subsequent block, and before or during preparatory leave in case of the terminal block of the professional year, before issuance of the date sheet for the concerned professional examination, subject to the following conditions:
   i. At the completion of each block, the principals of the colleges shall submit a detailed report to the university, including cases of students with short attendance, poor performance/absence in the block examination along with the reasons and evidence for the same, proposed schedule for remedial classes and re-sit examination.
   ii. Competent Authority UHS will have the cause and the submitted evidence evaluated and documented, before permitting the colleges to arrange remedial classes and re-sit examination at the concerned block. No college is allowed to conduct remedial classes or re-sit examination without prior approval of the competent authority.
   iii. The students can appear in re-sit of a block examination, along with the subsequent block, and before or during preparatory leave for the terminal block of the professional year, once the requirement of 'attendance' is met with. However, conduct of remedial classes shall be permitted only in the cases of students, who shall have attended at least 50 % of total attendance of the concerned block in the first instance.
   iv. The valid reasons for short attendance in a block or absence from a block examination may include major illness/accident/surgery of the student or death of an immediate relative/being afflicted by a natural calamity or disaster.

8. The application for admission of each candidate for examination shall be submitted to the Controller of Examination, through the Principal of the College, in a prescribed format, as per notified schedule, accompanied by the prescribed fee.

9. The marks of internal assessment and attendance shall be submitted to Controller of Examinations three times, within two weeks of completion of each block examination.

10. At the end of each block, the colleges are required to submit question papers and keys for the block examination, internal assessment marks and attendance record to the Department of Examinations UHS. Further, parent-teacher meetings shall be arranged by the colleges after every block examination to share feedback on the progress of students with their parents. Minutes of parent teacher meetings shall be submitted to the Department of Medical Education UHS.

11. It is emphasized that fresh internal assessment or a revision of assessment for supplementary examination shall not be permissible. However, a revised internal assessment for the detained students can be submitted. The internal assessment award in a particular year will not be decreased subsequently detrimental to the detainee

candidate. A proper record of the continuous internal assessment shall be maintained by the concerned department/s in the colleges.

12. The candidates shall pay their fee through the Principals of their respective Colleges who shall forward a bank draft / pay order / crossed cheque in favor of Treasurer, University of Health Sciences Lahore, along with their Admission Forms.

13. Only one annual and one supplementary of First and Second Professional MBBS Examinations shall be allowed in a particular academic session. In exceptional situations, i.e., national calamities, war or loss of solved answer books in case of accident, special examination may be arranged after having observed due process of law. This will require permission of relevantauthorities, i.e., Syndicate and Board of Governors.

MBBS 1st Professional

Block-1

Theme	Subject	Written Exam			Oral/Practical/Clinical Exam			
		MCQ (1 mark)	SEQ (5 mark each)	Marks	OSPE (8 marks each observed)	OSCE (8 marks each observed)	OSVE (16 marks each observed)	Marks
Normal Structure	Anatomy applied/clinical	20	03	35	03	-	01	40
Normal Function	Physiology applied/clinical	22	02	32	02	-	01	32
	Biochemistry applied/clinical	22	02	32	02	-	01	32
Disease Burden & Prevention	Community Medicine & Public Health	05	-	05	-	-	-	-
	Behavioral Sciences	05	-	05	-	-	-	-
Pathophysiology & pharmacotherapeutics	Pathology	06	-	06	-	-	-	-
	Pharmacology	05	-	05	-	-	-	-
CFRC	CF-1-2	-	-	-	-	01	-	08
PERLs	PERLs-1-2	-	-	-	-	01	-	08
Total		**85**	**7x5=35**	**120**	**07 stations x 08 = 56**	**02 stations x 08 = 16**	**03 stations x 16=48**	**120**

MBBS 1st Professional
Block-2

Theme	Subject	Written Exam			Oral/Practical/Clinical Exam			
		MCQ (1 mark)	SEQ (5 mark each)	Marks	OSPE (8 marks each observed)	OSCE (8 marks each observed)	OSVE (16 marks each observed)	Marks
Normal Structure	Anatomy applied/clinical	35	04	55	05	-	01	56
Normal Function	Physiology applied/clinical	17	02	27	01	-	01	24
	Biochemistry applied/clinical	11	01	16	01	-	01	24
Disease Burden & Prevention	Community Medicine & Public Health	06	-	06	-	-	-	-
	Behavioral Sciences	04	-	04	-	-	-	-
Pathophysiology & pharmacotherapeutics	Pathology	07	-	07	-	-	-	-
	Pharmacology	05	-	05	-	-	-	-
CFRC	CF-1-2	-	-	-	-	01	-	08
PERLs	PERLs-1-2	-	-	-	-	01	-	08
Total		**85**	**7x5=35**	**120**	**07 stations x 08 = 56**	**02 stations x 08 = 16**	**03 stations x 16=48**	**120**

MBBS 1st Professional
Block-3

Theme	Subject	Written Exam			Oral/Practical/Clinical Exam			
		MCQ (1 mark)	SEQ (5 mark each)	Marks	OSPE (8 marks each observed)	OSCE (8 marks each observed)	OSVE (16 marks each observed)	Marks
Normal Structure	Anatomy applied/clinical	16	02	26	01	-	01	24
Normal Function	Physiology applied/clinical	31	04	51	04	-	01	48
	Biochemistry applied/clinical	18	01	23	02	-	01	32
Disease Burden & Prevention	Community Medicine & Public Health	06	-	06	-	-	-	-
	Behavioral Sciences	02	-	02	-	-	-	-
Pathophysiology & pharmacotherapeutics	Pathology	07	-	07	-	-	-	-
	Pharmacology	05	-	05	-	-	-	-
CFRC	CF-1-3	-	-	-	-	01	-	08
PERLs	PERLs-1-3	-	-	-	-	01	-	08
Total		**85**	**7x5=35**	**120**	**07 stations x 08 = 56**	**02 stations x 08 = 16**	**03 stations x 16=48**	**120**

MBBS 2nd Professional

Block-4

Theme	Subject	Written Exam			Oral/Practical/Clinical Exam			
		MCQ (1 mark)	SEQ (5 mark each)	Marks	OSPE (8 marks each observed)	OSCE (8 marks each observed)	OSVE (16 marks each observed)	Marks
Normal Structure	Anatomy applied/clinical	23	03	38	03	-	01	40
Normal Function	Physiology applied/clinical	16	02	26	02	-	01	32
	Biochemistry applied/clinical	20	02	30	02	-	01	32
Disease Burden & Prevention	Community Medicine & Public Health	07	-	07	-	-	-	-
	Behavioral Sciences	06	-	06	-	-	-	-
Pathophysiology & pharmacotherapeutics	Pathology	09	-	09	-	-	-	-
	Pharmacology	04	-	04	-	-	-	-
CFRC	CF-2-1	-	-	-	-	01	-	08
PERLs	PERLs-2-1	-	-	-	-	01	-	08
Total		**85**	**7x5=35**	**120**	**07 stations x 08 = 56**	**02 stations x 08 = 16**	**03 stations x 16=48**	**120**

MBBS 2nd Professional

Block-5

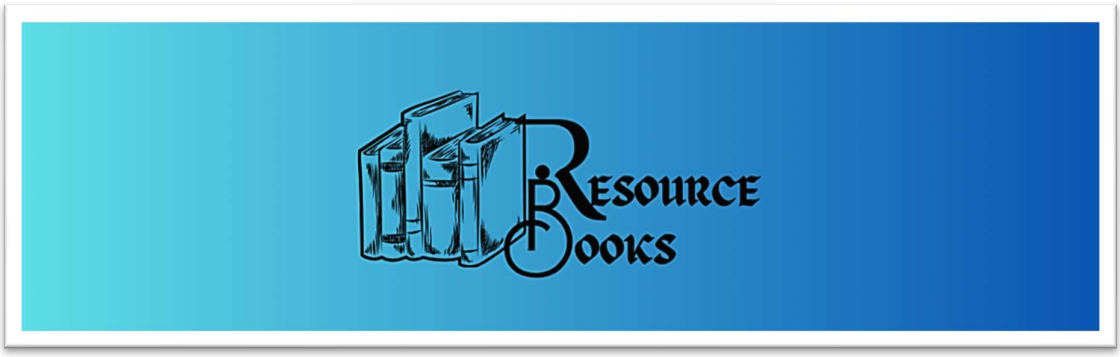
Theme	Subject	Written Exam			Oral/Practical/Clinical Exam			
		MCQ (1 mark)	SEQ (5 mark each)	Marks	OSPE (8 marks each observed)	OSCE (8 marks each observed)	OSVE (16 marks each observed)	Marks
Normal Structure	Anatomy applied/clinical	30	04	50	04	-	01	48
Normal Function	Physiology applied/clinical	18	02	28	02	-	01	32
	Biochemistry applied/clinical	11	01	16	01	-	01	24
Disease Burden & Prevention	Community Medicine & Public Health	08	-	08	-	-	-	-
	Behavioral Sciences	04	-	04	-	-	-	-
Pathophysiology & pharmacotherapeutics	Pathology	12	-	12	-	-	-	-
	Pharmacology	02	-	02	-	-	-	-
CFRC	CF-2-2	-	-	-	-	01	-	08
PERLs	PERLs-2-2	-	-	-	-	01	-	08
Total		**85**	**7x5=35**	**120**	**07 stations x 08 = 56**	**02 stations x 08 = 16**	**03 stations x 16=48**	**120**

MBBS 2nd Professional
Block-6

Theme	Subject	Written Exam			Oral/Practical/Clinical Exam			
		MCQ (1 mark)	SEQ (5 mark each)	Marks	OSPE (8 marks each observed)	OSCE (8 marks each observed)	OSVE (16 marks each observed)	Marks
Normal Structure	Anatomy applied/clinical	24	03	39	03	-	01	40
Normal Function	Physiology applied/clinical	26	03	41	03	-	01	40
	Biochemistry applied/clinical	09	01	14	01	-	01	24
Disease Burden & Prevention	Community Medicine & Public Health	04	-	04	-	-	-	-
	Behavioral Sciences	03	-	03	-	-	-	-
Pathophysiology & pharmacotherapeutics	Pathology	12	-	12	-	-	-	-
	Pharmacology	07	-	07	-	-	-	-
CFRC	CF-2-3	-	-	-	-	01	-	08
PERLs	PERLs-2-3	-	-	-	-	01	-	08
Total		**85**	**7x5=35**	**120**	**07 stations x 08 = 56**	**02 stations x 08 = 16**	**03 stations x 16=48**	**120**

Section 11

List of Resources



Anatomy

- Snell's Clinical Anatomy 10th ed.
- Langman's Medical Embryology 12th ed
- Medical Histology by Laiq Hussain Siddiqui 8th ed.
- General Anatomy by Laiq Hussain Siddiqui 6th ed.

Physiology

- Guyton AC and Hall JE. Textbook of Medical Physiology. W. B. Sunders & Co., Philadelphia 14th Edition.
- Essentials of Medical Physiology by Mushtaq Ahmed

Biochemistry

- Harpers illustrated Biochemistry 32nd edition. Rodwell.V.W MCGrawHill publishers.
- Lippincott illustrated Review 8th edition Kluwer.W.
- Essentials of Medical Biochemistry vol 1&2 by Mushtaq Ahmed.

Pathology

- Vinary Kumar, Abul K. Abbas and Nelson Fausto Robbins and Cotran, Pathologic basis of disease. WB Saunders.
- Richard Mitchall, Vinary Kumar, Abul K. Abbas and Nelson Fausto Robbins and
- Cotran, Pocket Companion to Pathologic basis of diseases. Saunder Harcourt.
- Walter and Israel. General Pathology.
- Churchill Livingstone.

Medicine

- Davidson's Principles and Practice of Medicine

Pharmacology

- Basic and Clinical Pharmacology by Katzung, McGraw-Hill.
- Pharmacology by Champe and Harvey, Lippincott Williams & Wilkins

Behavioural Sciences

- Handbook of Behavioural Sciences by Prof. Mowadat H.Rana, 3rd Edition
- Medical and Psychosocial aspects of chronic illness and disability SIXTH EDITION by Donna R.Falvo, PhD Beverely E.Holland, PhD, RN

Community medicine

- Parks Textbook of Preventive and Social Medicine. K. Park (Editor)
- Public Health and Community Medicine

- Ilyas, Ansari (Editors)

Surgery

- Bailey and Love's short practice of surgery

Islamiyat

- Standard Islamiyat (compulsory) for B.A, BSc, MA, MSc, MBBS by Prof M Sharif Islahi.
- Ilmi Islamiyat(compulsory) for BA, BSc & equivalent.

Guidelines for ‘Institutional Study Guides’

Guidelines for Development of Study Guide for the Faculty & Students

Institutions are advised to develop one study guide for each module of the curriculum.

The study guide should have:

1. **Title page** having the name of the module and the year it is being taught**.**
2. **Table of contents**
3. **List of abbreviation**
4. **Curriculum frame work** This is a comprehensive statement that provides an overview of how various subjects are integrated into different modules on a yearly basis, and it is applicable to all
5. **Introduction to the study guide** The introduction of the study guide should clearly state its purpose and outline the information it conveys, specifically addressing the following questions: What is the main objective of the study guide? What message does it aim to convey? Additionally, it should specify the intended audience for whom the guide was developed
6. **Introduction to module** In the introduction to the module, students are informed of the course name, year number, and the duration of the module. The module is focused on specific systems, such as the cardiovascular system or respiratory system. Students are informed of the relevance of these topics to real-life scenarios, emphasizing the importance of the knowledge they will gain and about end of module assessment.
7. **Module committee** the modular committee includes the coordinator, co-coordinator, and departmental representatives from areas such as internal medicine, surgery, pediatrics, and medical education. Together, they work to create an integrated and current curriculum that supports the educational objectives and prepares students for healthcare careers.
8. **Curriculum map of the module (optional)** to give a clear overview of the learning goals, progression, and connections between subjects in a module**.**
9. **Time table**
10. **Distribution and duration of teaching activities amongst different disciplines**

    Tabulate the total contact hour for each such subject and their further distribution for different teaching activities

11. **The modular outcomes** to help students understand what they will learn by the end of a module, it is important to provide a list of the specific outcomes that will be covered in a modular format.
12. **The learning objectives** of the module distributed according to subject and theme. The provision of learning objectives to students alongside modular outcomes serves to define the particular abilities or information that they are expected to gain, as well as to provide guidance on the goals and trajectory of their learning.
13. **Operational definitions** of the different teaching activities aligned with those published in the curriculum.
14. The assessment section needs to provide a clear description of the following.
    - Write the **assessment policy** regarding internal assessment and professional examination in terms of format and regulation.
    - Provide the **assessment schedule**
    - Mention the **assessment tools** that are going to be used for the formative and summative assessment. These assessment tools should be the recommended
    - Provide the operational definitions for the assessment instruments in alignment with those published in the curriculum.
    - **Sample questions from each category** of assessment tool (optional) so that student may understand the format of exam (optional)
15. **The books and reading resources** for every subject should be mentioned.

Innovating & Strategizing Healthcare Academia

University of Health Sciences Lahore

Department of Medical Education & International Linkages

Section 12

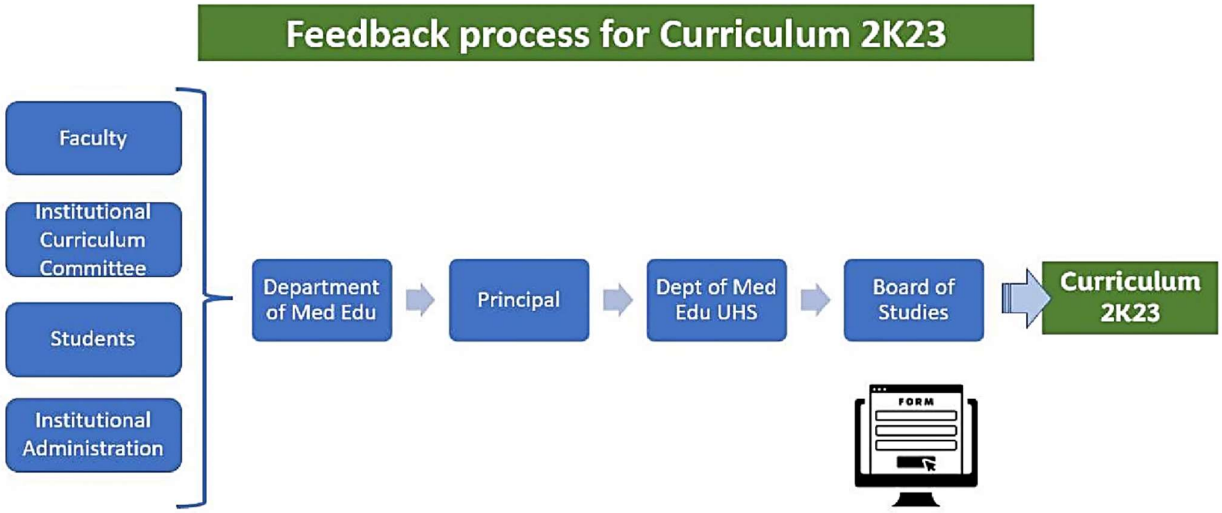
Feedback Proforma & Process

Program Evaluation & Feedback

In continuation to the contextualization and development process undertaken by all the subject experts and stakeholders, the process of implementation is also vital. DME University of Health Sciences Lahore, considers the implementation segment of the entire continuum as the most vital and significant step. A curriculum is a live document and its viability dependence on the collaborative ownership of all the stakeholders. These stakeholders are inclusive of curriculum designers, students, faculty members, institutional administration, institutional leads, examiners, paper setters, question bank developers, PBL architects and program evaluators. To address such broad-based evaluation response UHS aims to keep the channel of feedback patent so that any possible glitch, omission, overlap, adjustment, or nuance could be addressed in a methodical manner.

A feedback proforma has been annexed which will also be available on the website. This if filled and routed through the channel mentioned below will be assessed at DME University of Health Sciences Lahore and then processed by the subject expert committee. In addition to the educationists at UHS we have module in charge and subject expert committees who can further process any recommendation or define a solution.

After the processing the recommended solution will be put up for approval by the Board of Studies before being conveyed across the board to the affiliated colleges and being implemented.



Name of the respondent / applicant
Title of the respondent / applicant (student/faculty member/ Principal)
Registration Number (or any official identification number)
Name of Department (in case of students mention year of entry)
Name of Institution
Observation / Impediment to training identified
Area of observation / Impediment (content, theme, resources, instructional strategy, timetable, implementation, assessment, logbooks, clarity of instruction etc.)

Any recommended solution:
Signature: _____ Name: _____ Date: _____

FOR OFFICE USE

Remarks by Director Medical Education

Signature Director Medical Education: _____ Name & Stamp: _____ Date: _____

Remarks by Principal

Signature: _____

Name & Stamp: _____

Date: _____

List of Annexures

MODULAR INTEGRATED CIRRICULUM 2K23

version 2.0

LOGBOOK

CLINICAL-FOUNDATION ROTATION CLERKSHIP

C-FRC

C-FRC

LOGBOOK

C-FRC-1 (YEAR-1)

Table of Contents

LIST OF ABBREVIATIONS

Abbreviations	Subjects
A	Anatomy
Ag	Aging
B	Biochemistry
BhS	Behavioral sciences
C	Civics
CM	Community Medicine
C-FRC	Clinical-Foundation Rotation Clerkship
CV	Cardiovascular
EnR	Endocrinology & Reproduction
ENT	Ear Nose Throat
F	Foundation
FM	Forensic Medicine
GIT	Gastrointestinal tract
GO	Gynecology and Obstetrics
HL	Hematopoietic & Lymphatic
HNSS	Head & Neck and Special Senses
IN	Inflammation
M	Medicine
MS	Musculoskeletal
NS	Neurosciences
O	Ophthalmology
Or	Orientation
P	Physiology
Pa	Pathology
Pe	Pediatrics
PERLs	Professionalism, Ethics, Research, Leadership
Ph	Pharmacology

Psy	Psychiatry
QI	Quran and Islamiyat
R	Renal
Ra	Radiology
Re	Respiratory
S	Surgery

PREAMBLE

The Aim of Medical training is to deliver the best possible patient care. This is not possible until medical students are holistically trained to deliver standardized patient care, with management and counselling skills. The competencies given by PMDC for a graduating physician include:

1. Skillful
2. Knowledgeable
3. Community Health Promoter
4. Critical Thinker
5. Professional
6. Scholar
7. Leader and Role Model

All the above cannot be accomplished without a robust Clinical clerkship program.

The purpose of this document is to provide an outline to the UHS clinical clerkship program which will serve as a vertically integrated module throughout the five years of medical college, transitioning from Clinical Foundation (CF) in the first two years to Clinical Rotations (CR) in the third and fourth year and finally to a complete clinical clerkship (CC) in final year of MBBS.

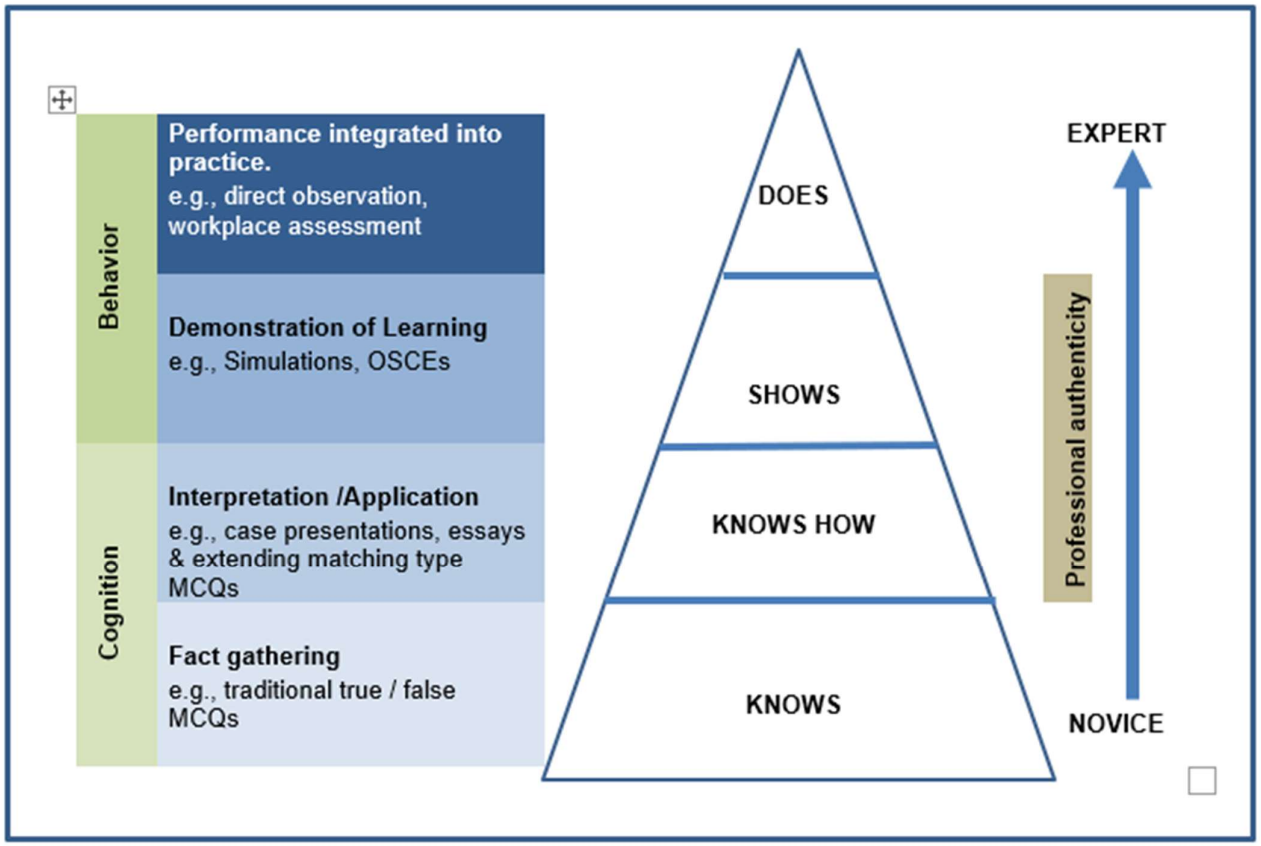
Keeping in view the 45 affiliated medical colleges under the umbrella of UHS, we have tried our best to devise a flexible program which colleges can tailor according to their capacities and resources. We are hopeful this innovative new step will lead to standardization of patient care for UHS lead colleges in the best possible way.

How to use this logbook:

- Each clinical skill has an entry in this logbook along with the checklist to be filled by the supervisor in the ward.
- Number of entries per skill is also mentioned in the modular study guides.
- The Clinical supervisor must tick all boxes deemed fulfilled and give feedback to the student regarding their performance.

MILLER'S PYRAMID

The basis to assess clinical skills is the Miller's pyramid. Different skills throughout the CFR-C module scale from Knows How (e.g., Interpretation of CXR) to does (administer IM injections etc.).



BLOCK-01

FOUNDATION MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Demonstrate steps of hand washing	Hand washing	Shows
Demonstrate the procedure of taking thepulse	Radial Pulse	Shows
Record the Respiratory Rate of patient	Respiratory Rate measurement	Shows
Demonstrate the procedure of taking theBlood Pressure	Blood Pressure	Shows
Demonstrate the process of wearing thegloves	Donning and Doffing	Shows

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR HANDWASHING **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES (Minimum 2 Entries)**	
STEP/TASK		
GETTING READY: 1. Has read the handwashing procedure and understands the 4 moments of hand hygiene. i. Before Contact with patient and/or their environment ii. Before performing a clean and/or aseptic procedure iii. After exposure to blood and/or body fluid iv. After contact with patient and/or their environment		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
THE PROCEDURE: 1. Wet hands with warm water		
2. Apply soap and lather thoroughly		
3. Rub palms, spaces between fingers, backs of hands and wrists, rubbing it vigorously.		
4. Able to identify how long handwashing procedure is		
5. Rinse under running water.		
6. Pat hands dry with paper towel.		

7. Turn off tap with paper towel		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
SIGNATURES OF SUPERVISOR		

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR HANDWASHING **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES (Minimum 2 Entries)**		
STEP/TASK			
GETTING READY: 1. Washed hands/sanitized hands			
2. Prepared equipment: watch with second hand.			
3. Explained procedure to the patient and take consent			
4. Determined if the patient is taking any medications that may affect the pulse rate.			
5. Assisted the patient to a comfortable position			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
THE PROCEDURE: 6. Located the radial artery. Use the tip of the index and third fingers of your other hand to feel the pulse in your radial artery between your wrist bone and the tendon on the thumb side of your wrist.			
7. Placed the tips of index and middle fingers over the vessel.			
8. Pushed lightly at first, adding pressure till feeling the pulsation			

SKILL/ACTIVITY PERFORMED SATISFACTORILY			
POST PROCEDURE: 9. Discussed the findings with the facilitator			
10. Washed hands.			
11. Recorded the results as beats / minute and comment on, rate and rhythm			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
SIGNATURES OF SUPERVISOR			

VITAL SIGNS REFERENCE RANGES

(Ref: EMT National Training - National Exams)

Ages	Heart Rae	Respiratory Rate	Systolic Blood Pressure	Temperature
Infancy (Birth to 1 Year)	100 to 160 (first 30 minutes) Settling around 120 bpm	40 to 60 initially 30-40 after first few minutes. 20-30 by one year	70 at Birth to 90 at 1 year	98-100
Toddler (12 to 36 Months) and Preschool Age (3 to 5 Years)	20 to 130 bpm 20 to 120 bpm	20 to 30 20 to 30	70 to 100 mmHg 80 to 110 mmHg	96.8 – 99.6
School-age Children (6 to 12 Years)	70 to 110 bpm	20 to 30	80 to 120 mmHg	98.6
Adolescence (13 to 18 Years)	55 to 105 bpm	12 to 20	100 to 120 mmHg	98.6
Early Adulthood (20 to 40 Years)	70 bpm average	16 to 20 (12-20 normal)	120/80 mmHg average	98.6
Middle Adulthood (41 to 60 Years	70 bpm average	16 to 20 (12-20 normal)	120/80 mmHg average	98.6

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

Note: Respiratory rate is not taken in isolation, usually it is performed while checking radial pulse.

CHECKLIST FOR HANDWASHING **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES (Minimum 3 Entries)**		
STEP/TASK			
GETTING READY:			
1. Introduce yourself to the patient.			
2. Explain the procedure of radial pulse measurement and reassure the patient.			
3. Get patient's consent.			
4. Wash hands/Sanitize hands			
5. Prepare the necessary material (clock/watch)			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
THE PROCEDURE:			
6. Check radial pulse (see pulse checklist for reference).			
7. Proceed with taking the Respiratory rate (RR) while your hand is still on the patient's radial artery (Do not inform your patient that you are taking the RR).			

8. Placed Observe the rise and fall of the patient's chest and count the number of respirations for another one full minute. (One respiration consists of one complete rise and fall of the chest, or the inhalation and exhalation of air).			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
SIGNATURES OF SUPERVISOR			

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR BLOOD PRESSURE **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
GETTING READY:			
1. Introduce yourself to the patient.			
2. Explain the procedure and reassure the patient. (blood pressure measurement)			
3. Get patient's consent.			
4. Wash hands/sanitize hands			
5. Prepare the necessary material (clock/watch)			
6. Position the patient in a sitting position and uncover one of his /her arms. (Make sure the patient is relaxed and comfortable).			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
THE PROCEDURE:			
6.Turn on the mercury valve (if it is mercury sphygmomanometer).			
7. Select an appropriately sized cuff and apply it to the upper arm ensuring that it fits securely. (The centre of the cuff bladder must be over brachial artery [the bladder should cover 80% of the circumference of the upper arm] and lower edge 2.5 cm above the ante-cubital fossa).			

8. Palpate the brachial or radial artery while inflating the cuff till the point where pulsation disappears and keep inflating the cuff 20-30 mmHg more.			
9. Slowly deflate the cuff, noting the pressure at which the pulse reappears. (This is the approximate level of the systolic blood pressure).			
10. Continue to deflate the cuff slowly at 2 mm Hg/second. Note the point at which Korotkoff sounds disappear completely as the diastolic pressure.			
11. Turn off the mercury valve (if it is mercury sphygmomanometer).			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
POST PROCEDURE:			
12. Wash hands.			
13. Document the findings			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR DONNING & DOFFING **(Some of the following steps/tasks should be performed simultaneously.)**	**Minimum 2 Entries**	
STEP/TASK		
GETTING READY: 1. Washed hands.		
2. Preparation: gloves, in place		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
THE PROCEDURE: (gloving) 3. Pick up one glove and place the palm away from you. Slide the fingers under the glove cuff and spread them so that a wide opening is created. Keep thumbs under the cuff.		
4. The doctor will thrust his or her hand into the glove. Do not release the glove yet		
5. Gently release the cuff (do not allow the cuff to snap sharply) while unrolling it over the wrist. Proceed with the other glove using the same technique.		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		

Signatures of Supervisor	

HEMATOPOEITC AND LYMPHATIC MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Detail the steps of drawing blood from a vein.	*Venipuncture and blood collection	Knows how
Check for pallor in the conjunctiva, tongue, and palm of hands	Pallor	Shows

- These skills are at the 'Knows how' level of the miller's pyramid, meaning thereby that students need not perform them themselves but may develop a perception regarding them by observing performance/working on simulated patients/facilitation with video.

COLLECTION

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR VENIPUNCTURE **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 2 Entries)**	
GETTING READY: 1. Identification of patient		
2. Washed hands/ sanitized hands		
3. Preparation: gloves, in place		
SKILL/ACTIVITY DESCRIBED SATISFACTORILY		
THE PROCEDURE: 4. Explain procedure to the patient and obtain consent		
6. Clean the site with an antiseptic solution and allow it to dry		
7. Select an appropriate site for venipuncture, such as the antecubital fossa or the back of the hand		
7. Apply a tourniquet above the site to enhance vein distention		
8. Ask the patient to make a fist to further enhance vein distention		
9. Insert the needle into the vein at a 15–30-degree angle with the bevel up		
10. Once the needle is in the vein, release the tourniquet and apply pressure to the site with gauze or a cotton ball		

11. Remove the needle and apply pressure to the site for a few minutes		
12. Dispose of the needle and syringe in a sharp's container		
13. Label the specimen with the patient's information and send it to the lab for analysis		
SKILL/ACTIVITY DESCRIBED SATISFACTORILY		
Signatures of Supervisor		

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR PALLOR **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 2 Entries)**	
GETTING READY: 1. Identification of patient		
2. Presence of natural light		
SKILL/ACTIVITY OBSERVED AND DESCRIBED SATISFACTORILY		
THE PROCEDURE: 3. Obtain informed consent from the patient		
4. Examine in natural light		
EXAMINATION OF THE CONJUNCTIVA: 5. Request the patient to look upwards and simultaneously pull the lower eyelid gently downward, thereby exposing the lower palpebral conjunctiva. The lower conjunctiva has a half-moon shape and has been divided into: *i.* posterior rim: the posterior portion of the half-moon shape attached to the sclera. *ii.* anterior rim: the anterior or front portion of the half-moon shape attached to the eyelid. Normally, the anterior rim is of bright red color, in sharp contrast to the posterior rim which has relatively palefleshy color.		
6. Report pallor (Pallor is said to be present if the anterior rim is not markedly redder as compared tothe posterior rim.) (Severe pallor is considered when both, anterior and posterior rims of the palpebral conjunctivae have the same very pale fleshy color.)		

EXAMINING THE TONGUE FOR PALLOR: 7. Ask the patient to protrude the tongue and observe the dorsal surface.		
8. Report pallor (pallor is said to be present if the tongue and oral mucosa are visibly pale)		
EXAMINING THE HANDS FOR PALLOR:		
9. Holds the patient's hand gently and checks the palm, compares the color of the palm with his/her own palm.		
10. Reports pallor (severe pallor-very pale or white, some pallor-pale)		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
Signatures of Supervisor		

BLOCK-02

MUSCULOSKELETAL AND LOCOMOTION MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Measure body temperature using a mercury/digital thermometer	Body temperature	Shows
Examine the wrist joint for functionality	Wrist joint examination	Shows
Examine strength of the upper limb	Upper limb strength and power examination	Shows
Examine strength of the lower limb	Lower limb strength and power examination	Shows
Examine the knee joint for functionality	Knee joint examination	Shows
Examine the shoulder joint for functionality	Shoulder joint examination	Shows
Examine the hip joint for functionality	Hip joint examination	Shows
*Identify common fractures showing in x rays of upper limb	X ray common fractures Upper limb	Knows how

- These skills are at the 'Knows how' level of the miller's pyramid, meaning thereby that students need not perform them themselves but may develop a perception regarding them by observing performance/working on simulated patients/facilitation with videos.

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR BODY TEMPERATURE **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 2 Entries)**		
STEP/TASK			
GETTING READY: Before proceeding further, check if the patient has recently taken cold or hot food/drink or smoked. Dip the thermometer in antiseptic (spirit) and wipe dry. If analogue thermometer, shake it until the normal temperature is pushed below 35ºC. If digital thermometer, switch it on and it will show the room temperature on the display.			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
THE PROCEDURE: 1. Explain the procedure to the patient and get a verbal consent to proceed.			
2. Keep the thermometer bulb/probe under the patient's tongue. Ask the patient to close the lips firmly around the thermometer but without biting it			
3. Keep it in place for at least 2 minutes.			

4. Read the temperature as soon as you pull out the instrument			
5. After use, clean the instrument with antiseptic and wipe it off			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR WRIST JOINT EXAMINATION (Some of the following steps/tasks should be performed simultaneously.)	**CASES (Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Explain the procedure to the patient and get a verbal consent to proceed.			
2. Adequately expose hands and wrists of the patient			
3. before starting with the examination, inquire about pain in any area.			
4. Observe both hands and wrists for any asymmetry, scars, and muscle wasting			
5. Palpate the wrists for evidence of any joint line irregularities or tenderness			
6. Ask patients to perform wrist extension "put the palms of your hands together and extend your wrists fully ". normal range of movement is 90 degrees			
7. Ask the patient to perform wrist flexion "put the backs of your hands together and flex your wrist fully", normal range of motion id 90 degrees			
8. Ask the patient to fully relax and allow you to move their hand and wrist for them. Warn them that in case any pain is felt they should report immediately.			
9. Repeat movements 6 and 7 passively.			

SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Date Observed: _____

CHECKLIST FOR EXAMINATION OF UPPER LIMB STRENGTH (Some of the following steps/tasks should be performed simultaneously.)	**CASES (Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Explain the procedure to the patient and get a verbal consent to proceed.			
2. Ensuring privacy, adequately expose the arms of the patient			
3. Before starting the testing for power and strength, for each muscle group check: a. appearance of the muscle (wasted, highly developed or normal) b. Feel tone of muscle (flaccid, normal, clinic)			
4. Observe both hands and wrists for any asymmetry, scars, and muscle wasting			
5. Starting with the deltoids, ask the patient to raise both their arms in front of them simultaneously as strongly as then can while the examiner provides resistance to this movement. Compare the strength of each arm.			
6. Ask the patient to extend and raise both arms in front of them as if they were carrying a pizza. Ask the patient to keep their arms in place while they close their eyes and count to 10. Normally their arms will remain in place.			
7. Test the biceps muscle flexion by holding the patient's wrist from above and instructing them to "flex their hand up to their shoulder". Provide resistance at the wrist. Repeat and compare to the opposite arm.			
8. Ask the patient to extend their forearm against the examiner's resistance. Make certain that the patient begins			

their extension from a fully flexed position because this part of the movement is most sensitive to a loss in strength. This tests the triceps. Note any asymmetry in the other arm			
9. Test the strength of wrist extension by asking the patient to extend their wrist while the examiner resists the movement. This tests the forearm extensors. Repeat with the other arm.			
10. Examine the patient's hands and test the patient's grip by having the patient hold the examiner's fingers in their fist tightly and instructing them not to let go while the examiner attempts to remove them. Normally the examiner cannot remove their fingers. This tests the forearm flexors and the intrinsic hand muscles. Compare the hands for strength asymmetry			
11. Test the intrinsic hand muscles once again by having the patient abduct or "fan out" all of their fingers. Instruct the patient to not allow the examiner to compress them back in. Normally, one can resist the examiner from replacing the fingers			
12. Test the strength of the thumb opposition by telling the patient to touch the tip of their thumb to the tip of their little finger. Apply resistance to the thumb with your index finger. Repeat with the other thumb and compare.			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Date Observed: _____

CHECKLIST FOR EXAMINATION OF LOWER LIMB STRENGTH (Some of the following steps/tasks should be performed simultaneously.)	**CASES (Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Explain the procedure to the patient and get a verbal consent to proceed.			
2. Ask the patient to lie down and raise each leg separately while the examiner resists. Repeat and compare with the other leg. This tests the iliopsoas muscles.			
3. Test the adduction of the legs by placing your hands on the inner thighs of the patient and asking them to bring both legs together. This test the adductors of the medial thigh.			
4. Test the abduction of the legs by placing your hands on the outer thighs and asking the patient to move their legs apart. This tests the gluteus maximus and gluteus minimums.			
5. Test the extension of the hip by instructing the patient to press down on the examiner's hand which is placed underneath the patient's thigh. Repeat and compare to the other leg. This tests the gluteus maximus			
6. Test extension at the knee by placing one hand under the knee and the other on top of the lower leg to provide resistance. Ask the patient to "kick out" or extend the lower leg at the knee. Repeat and compare to the other leg. This tests the quadriceps muscle.			
7. Test flexion at the knee by holding the knee from the side and applying resistance under the ankle and instructing the patient to pull the lower leg towards their buttock as hard as possible. Repeat with the other leg. This tests the hamstrings			
8. Test dorsiflexion of the ankle by holding the top of the ankle			

and have the patient pull their foot up towards their face as hard as possible. Repeat with the other foot. This tests the muscles in the anterior compartment of the lower leg. Holding the bottom of the foot, ask the patient to "press down on the gas pedal" as hard as possible. Repeat with the other foot and compare. This tests the gastrocnemius and soleus muscles in the posterior compartment of the lower leg			
9. Ask the patient to move the large toe against the examiner's resistance "up towards the patient's face. This tests the extensor halluces longus muscle.			
POST PROCEDURE: 1. 'Wash your hands, thank the patient'			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Date Observed: _____

CHECKLIST FOR EXAMINATION OF HIP JOINT EXAMINATION (Some of the following steps/tasks should be performed simultaneously.)	**CASES (Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Explain the procedure to the patient and get a verbal consent to proceed.			
2. Ensure adequate exposure of the legs while maintaining patient privacy. Provide a covering sheet for the patient. (Students examining patients of an opposite gender must be with a chaperone.)			
3. Ask the patient if they have any pain before proceeding			
4. Inspect the joint and legs for any deformity, scarring or swelling			
5. Ask the patient to walk to the end of the examination room and then turn and walk back whilst you observe their gait			
6. Ask patient to lie down for next part pf the examination.			
7. With the patient still positioned supine on the clinical examination couch simultaneously assess and compare hip joint temperature using the back of your hands.			

8. Palpate the greater trochanter of each leg for evidence of tenderness			
9. To assess apparent leg length, measure and compare the distance between the umbilicus and the tip of the medial malleolus of each limb.			
10. To assess true leg length, measure from the anterior superior iliac spine to the tip of the medial malleolus of each limb.			
11. For active hip flexion Place your hand under the lumbar spine to detect masking of restricted hip joint movement by the pelvis and lumbar spine and ask the patient to *"bring your leg to your chest as much as you can"*			
12. For active hip extension ask the patient to extend their leg so that it lies flat on the bed.			
13. Perform passive hip flexion, Whilst supporting the patient's leg, flex the hip as far as you are able, making sure to observe for signs of discomfort.			
14. For passive hip internal rotation, Flex the patient's hip and knee joint to 90° and then rotate their foot laterally.			
15. For passive hip external rotation, flex the patients hip and knee joint to 90° and rotate the foot medially			
16. To perform passive hip abduction: a. With the patient's legs straight and flat on the bed, use one of your hands to hold the ankle of the hip being assessed and place your other hand over the contralateral iliac crest to stabilize the pelvis. b. Move the patient's ankle laterally to abduct the hip until the pelvis begins to tilt.			
17. To perform passive hip adduction: a. With the patient's legs straight and flat on the bed, use one of your hands to hold the ankle of the hip being assessed and place your other hand over the contralateral iliac crest to stabilize the pelvis. b. Move the patient's ankle medially to adduct the hip until the pelvis begins to tilt.			
18. To perform passive hip extension, ask the patient to lie in a prone position, use one hand to hold the ankle and the other should be placed on the pelvis.			
19. Thank and reassure the patient			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			

Signatures of Supervisor	

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Date Observed: _____

CHECKLIST FOR EXAMINATION OF SHOULDER JOINT EXAMINATION (Some of the following steps/tasks should be performed simultaneously.)	**CASES (Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Explain the procedure to the patient and get a verbal consent to proceed.			
2. Ensure adequate exposure of the shoulder and arm and provide blanket to patient for the time when they are not being examined.			
3. Position the patient standing for initial inspection and ask the patient if they have any pain before proceeding for examination.			
4. Perform a brief general inspection looking for scars, alignment, and muscle wasting			
5. Assess and compare shoulder joint temperature using the back of your hands.			
6. Palpate the various components of the shoulder girdle, noting any swelling, bony irregularities, and tenderness.			
7. To check for external rotation and abduction, ask the patient to put their hands behind their head and point their elbows out to the side			
8. To check internal rotation and adduction, ask the patient to place each hand behind their back and reach as far up their spine as they are able to			
9. For active shoulder flexion instruct the patient to raise their arms forward until they're pointing up towards the ceiling.			
10. For active shoulder extension, ask the patient to stretch their arms behind them.			
11. For active shoulder abduction, ask the patient to raise their arms out to the sides in an arc like mono until their hands touch above their head			

12. For active shoulder adduction, ask the patients to keep their arms straight and move them across the front of their body to the opposite side.			
13. For active internal rotation, ask the patient to place each hand behind their back and reach as far up the spine as they can.			
14. To check scapular movement, ask patient to abduct their shoulder while you simultaneously palpate inferior pole of the scapula.			
15. To judge passive movements, ask the patient to fully relax and allow you to move their arms for them. Go through steps 7-14 by moving the patients arm through those movements.			
16. Thank and reassure the patient			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Date Observed: _____

CHECKLIST FOR UPPER LIMB X-RAY (Some of the following steps/tasks should be performed simultaneously.)	**CASES (Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Observe the ABC's: a. Alignment and joint space b. Bone texture c. Cortices			
2. Changes in alignment will suggest a fracture/ complete or partial dislocation			
3. Describe the position of the fragment distal to the fracture site			
4. Look around the outline of each bone to see any step in the cortex as it may indicate a fracture			
5. Once a fracture is identified, describe which bone is involved and where the fracture is located (proximal/middle distal)/			
6. Recognize a fracture extending all the way through the bone as a complete fracture.			
7. Identify type of complete fracture accordingly: a. Transverse: fracture at right angles to the shaft b. Oblique: fracture at an angle to the shaft c. Spiral: caused by twisting injury d. Comminuted: 2 or more bone fragments e. Impacted: fractured bone forced together			

8. Recognize an incomplete fracture as one not involving the whole cortex.			
9. Types of incomplete fractures include: a. Torus/Buckle: a bulge in the cortex b. Bowing: associated bend in the bone shaft c. Greenstick: bending of the shaft with a fracture on the convex surface Salter-Harris: involving the growth plate			
10. Identify an open fracture as having a puncture of the skin or an open wound identify closed fractures as not having any skin opening.			
11. Identify closed fractures as not having any skin opening.			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

BLOCK-03

CARDIOVASCULAR-1 MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Auscultation of heart sounds	Heart sounds	Shows
Detection of ankle swelling/edema – pitting /non-pitting	Edema	Shows
Abdominal jugular reflex	JVP	Shows
Perform detection of pedal and carotid pulses	Pedal and carotid pulse	Shows
Perform cervical and axillary lymph node examination	Lymph node Examination	Shows

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR HEART SOUNDS **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Begin by introducing yourself to the patient and explaining the auscultation process to them.			
2. Take consent of the patient			
3. Position the patient in a comfortable position and expose their chest.			
4. Place the stethoscope on the patient's chest over the four auscultation points - aortic, pulmonary, tricuspid and mitral.			
5. Listen to the heart sounds in each area, first with the diaphragm and then with the bell			
6. Identify the S1 and S2 sounds. S1 is the first sound heard, which is produced by the closure of the atrioventricular valves. S2 is the second sound heard, which is produced by the closure of the semilunar valves			
7. Determine the heart rate and rhythm			
8. Assess the intensity of the heart sounds - S1 and S2. S1 should be louder than S2 at the mitral area and vice versa at the aortic area.			
9. Assess the splitting of the heart sounds - S2 may split physiologically during inspiration and be heard as two distinct sounds			

10. Listen for any additional heart sounds such as S3 or S4 which may indicate pathological conditions.			
11. Thank the patient			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR EXAMINATION OF EDEMA **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Begin by introducing yourself to the patient and explaining the procedure			
2. Take consent.			
3. Ask patient to remove shoes and socks			
4. Observe the patient's ankles for any visible swelling or changes in skin colour			
5. Release the pressure and observe the area for any indentation or "pit".			
6. If a pit Is observed that is known as pitting edema			
7. If no pit is observed that is known as non-pitting edema			
8. Assess the extent of the edema by measuring the circumference of the ankle with a tape measure.			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR EXAMINATION OF PEDAL AND CAROTID PULSE **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE: (Pedal pulse)			
1. Begin by introducing yourself to the patient and explaining the procedure			
2. Take consent.			
3. Ask the patient to lie down flat on their back or sit up with their legs dangling over the edge of the examination table			
4. Identify the pedal pulse by locating the dorsalis pedis artery on the top of the foot, just lateral to the extensor hallucis longus tendon. Alternatively, locate the posterior tibial artery by palpating the groove between the medial malleolus and Achilles tendon.			
5. Place your index and middle fingers over the identified artery and apply gentle pressure until you feel the pulse.			
6. Assess the strength and regularity of the pulse.			
THE PROCEDURE: (Carotid pulse)			
1. Identify the carotid pulse by locating the carotid artery on the side of the neck, just below the angle of the jaw			
2. Assess the strength and regularity of the pulse			

3. Record your findings accurately and thank the patient **Remember, it's important to be gentle when performing this examination and to explain the procedure to the patient beforehand. Also, it's important to avoid excessive pressure on the carotid artery to prevent potential complications, especially in elderly or hypertensive patients. DO NOT COMPRESS CAROTID SIMULTANEOUSLY ON BOTH SIDES*			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR EXAMINATION OF JVP **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Introduce yourself to the patient and explain the procedure			
2. Ask the patient to lie down flat on their back			
3. Place your right hand on the patient's upper abdomen, just below the ribcage. 4. Apply firm pressure for about 10 seconds			
5. Observe the neck veins for any visible distension			
6. If the jugular veins in the neck become more visible or distended, this is a positive abdomin-jugular reflex and indicates an elevated JVP			
7. If there is no change in the neck veins, this is a negative abdomin-jugular reflex and indicates a normal JVP			
8. Thank the patient			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

CERVICAL AND AXILLARY LYMPH NODES

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines

Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR EXAMINATION OF LYMPH NODES **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Introduce yourself to the patient and explain the procedure			
2. Inspect the neck and axilla for any visible swelling or abnormality			
3. Palpate the cervical lymph nodes. Start by checking the pre-auricular nodes, then move on to the post-auricular, occipital, submental, submandibular, tonsillar, superficial cervical, deep cervical, supraclavicular nodes			
4. Palpate the cervical lymph nodes. Start by checking the pre-auricular nodes, then move on to the post-auricular, occipital, submental, submandibular, tonsillar, superficial cervical, deep cervical, supraclavicular nodes			
5. Note the size, shape, and consistency of the lymph nodes. Normal lymph nodes are usually small, soft, and movable. Enlarged lymph nodes may be hard, tender, or fixed			
6. Check for pain or tenderness			
7. Thank the patient			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

RESPIRATORY-1 MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Performance of chest compressions	CPR/Chest compressions	Shows
Detection of clubbing	Clubbing	Shows
Identify main organs of the thorax on CXR	CXR	Shows
Identification of pneumonic patch on chest x ray	Pneumonia CXR	Shows
Administering inhaler to a patient	Inhaler use	Shows

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

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CHECKLIST FOR IDENTIFICATION OF ORGANS ON CXR **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Orient yourself to the image by identifying the left and right sides of the chest			
2. Look for the bony structures of the chest, including the ribs, sternum, and clavicles			
3. Identify the lungs, which will appear as dark areas on the X-ray film			
4. Look for the diaphragm, which is a thin, curved line separating the chest cavity from the abdominal cavity			
5. Identify the heart, which will appear as a slightly enlarged area in the middle of the chest			
6. Look for the aorta, which is the largest artery in the body and runs down the center of the chest			
7. Identify the trachea, which is a tube that runs down the center of the chest and divides into the left and right main bronchi			
8. Look for any abnormalities such as nodules, masses, or areas of consolidation in the lungs			
9. Report your findings			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			

Signatures of Supervisor	

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR PERFORMANCE OF CHEST COMPRESSIONS **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 2 Entries)**		
STEP/TASK			
THE PROCEDURE: 1. Position the person on their back: Place the person on their back on a hard, flat surface			
2. Kneel beside the person: Kneel beside the person's chest			
3. Place your hands: Place the heel of one hand on the center of the person's chest between the nipples. Place the other hand on top of the first hand			
4. Interlock your fingers: Interlock your fingers, making sure that pressure is not applied to the person's ribs			
5. Compress the chest: With your arms straight, press down on the person's chest using your upper body weight. Compress the chest at least two inches deep, but no more than 2.4 inches, at a rate of 100-120 compressions per minute.			
6. Allow the chest to return to its normal position: After each compression, release the pressure on the chest, but do not remove your hands.			
7. Repeat: Continue the cycle of compressions and releases until medical help arrives or the person starts breathing on their own.			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Date Observed: _____

CHECKLIST FOR CHECKING CLUBBING OF FINGERS **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 2 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Explain the procedure: Introduce yourself to the patient, explain what you will be doing and obtain their consent.			
2. Inspect the nails: Look at the shape of the nails. Clubbed fingers have an increased curvature of the nail bed, causing the nails to appear rounded and wider than normal			
3. Check the nail base: Look at the base of the nails. Clubbed fingers have a bulbous enlargement of the soft tissues at the base of the nails			
4. Check for other signs: Look for other signs of underlying medical conditions that can cause clubbing, such as cyanosis (blue discoloration of the skin), coughing, difficulty breathing, or chest pain			
5. Ask about symptoms: Ask the patient about any symptoms they may be experiencing, such as shortness of breath, chest pain, or chronic cough			
6. Thank the patient			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

IDENTIFICATION OF PNEUMONIC PATCH ON X-RAY

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines

Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR IDENTFICATION OF PNEUMONIC PATCH **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 2 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Identify the location of the patch: Look for an area of increased opacity or whiteness on the chest x-ray. The patch is usually located in one or more of the lung fields			
2. Assess the shape and size of the patch: Observe the shape of the patch. It may be round, oval, or irregular in shape. Note the size of the patch and whether it is increasing or decreasing in size			
3. Determine the density of the patch: Evaluate the density of the patch. It may appear dense or fluffy, and may be surrounded by a hazy or fuzzy border			
4. Look for air bronchograms: Identify air bronchograms, which are visible air-filled bronchi within the patch. These indicate that the surrounding lung tissue is consolidated			
5. Check for pleural effusion: Assess the presence of a pleural effusion, which is a buildup of fluid in the pleural space around the lungs. This can be seen as a dark area at the bottom of the lung field			
6. Consider the patient's clinical presentation: Review the patient's symptoms, such as cough, fever, and shortness of breath, which are commonly associated with pneumonia			
7. Report your findings			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			

Signatures of Supervisor	

INHALER USAGE

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

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Date Observed: _____

CHECKLIST FOR INHALER USAGE **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(minimum 2 entries)**		
STEP/TASK			
THE PROCEDURE: 1. Explain what you are about to demonstrate to the patient			
2. Take off the cap of the inhaler			
3. Shake the inhaler well before using it to ensure proper mixing of the medication			
4. Hold the inhaler in your hand with your thumb on the bottom and your index and middle fingers on top			
5. Position the mouthpiece between your teeth and close your lips around it to form a tight seal (explain to the patient, do not insert in your mouth while doing demonstration)			
6. Begin to inhale slowly and deeply through your mouth as you press down on the canister to release the medication			
7. Wait for at least 30 seconds before repeating the above steps if another dose is required			
8. Recap the inhaler			
9. Instruct the patient, that incase a steroid inhaler is used, rinse mouth to prevent oral thrush			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			

Signatures of Supervisor	

C-FRC

LOGBOOK

C-FRC-2 (YEAR-2)

Table of Contents

LIST OF ABBREVIATIONS

Abbreviations	Subjects
A	Anatomy
Ag	Aging
B	Biochemistry
BhS	Behavioral sciences
C	Civics
CM	Community Medicine
C-FRC	Clinical-Foundation Rotation Clerkship
CV	Cardiovascular
EnR	Endocrinology & Reproduction
ENT	Ear Nose Throat
F	Foundation
FM	Forensic Medicine
GIT	Gastrointestinal tract
GO	Gynecology and Obstetrics
HL	Hematopoietic & Lymphatic
HNSS	Head & Neck and Special Senses
IN	Inflammation
M	Medicine
MS	Musculoskeletal
NS	Neurosciences
O	Ophthalmology
Or	Orientation
P	Physiology
Pa	Pathology
Pe	Pediatrics
PERLs	Professionalism, Ethics, Research, Leadership
Ph	Pharmacology

Psy	Psychiatry
QI	Quran and Islamiyat
R	Renal
Ra	Radiology
Re	Respiratory
S	Surgery

PREAMBLE

The Aim of Medical training is to deliver the best possible patient care. This is not possible until medical students are holistically trained to deliver standardized patient care, with management and counselling skills. The competencies given by PMDC for a graduating physician include:

1. Skillful
2. Knowledgeable
3. Community Health Promoter
4. Critical Thinker
5. Professional
6. Scholar
7. Leader and Role Model

All the above cannot be accomplished without a robust Clinical clerkship program.

The purpose of this document is to provide an outline to the UHS clinical clerkship program which will serve as a vertically integrated module throughout the five years of medical college, transitioning from Clinical Foundation (CF) in the first two years to Clinical Rotations (CR) in the third and fourth year and finally to a complete clinical clerkship (CC) in final year of MBBS.

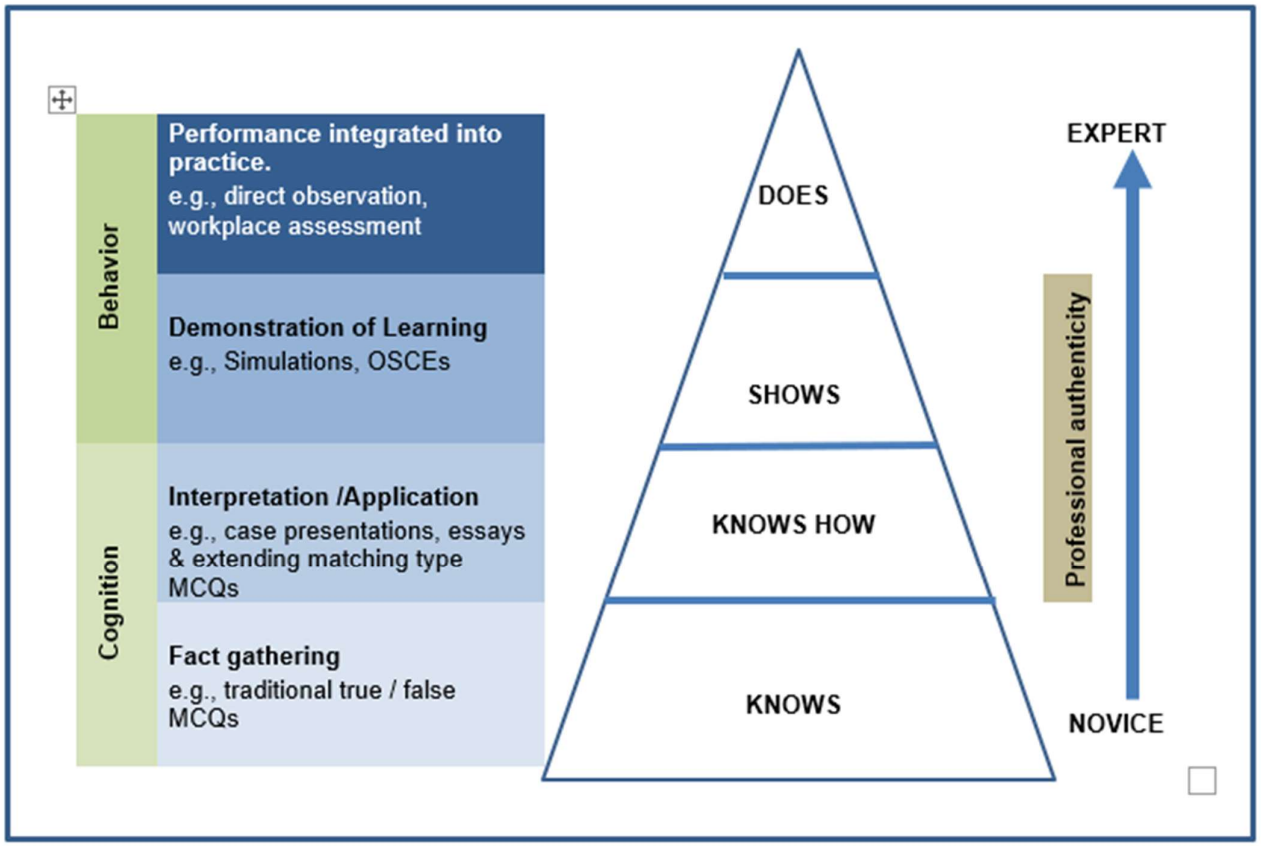
Keeping in view the 45 affiliated medical colleges under the umbrella of UHS, we have tried our best to devise a flexible program which colleges can tailor according to their capacities and resources. We are hopeful this innovative new step will lead to standardization of patient care for UHS lead colleges in the best possible way.

How to use this logbook:

- Each clinical skill has an entry in this logbook along with the checklist to be filled by the supervisor in the ward.
- Number of entries per skill is also mentioned in the modular study guides.
- The Clinical supervisor must tick all boxes deemed fulfilled and give feedback to the student regarding their performance.

MILLER'S PYRAMID

The basis to assess clinical skills is the Miller's pyramid. Different skills throughout the CFR-C module scale from Knows How (e.g., Interpretation of CXR) to does (administer IM injections etc.).



BLOCK-04

GIT AND NUTRITION-1 MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Demonstrate steps of abdominal examination	Abdominal Examination	Shows
Demonstrate the procedure of shifting dullness	shifting dullness	Shows
Identify organs on X-ray abdomen	X-ray Abdomen	Shows
Assess dehydration in infant/young child and explain procedure of making home made ORS	Dehydration	Does

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CHECKLIST FOR ABDOMINAL EXAMINATION **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES (Minimum 3 Entries)**		
STEP/TASK			
GETTING READY: 1. Has performed hand washing			
2. Introduces himself/herself to patient			
3. Explains Procedure and Asks for consent			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
THE PROCEDURE: **GENERAL EXAMINATION:** Examine the following features to check for any pathology related to the GIT: i. Facies ii. Body build iii. Posture iv. Color of skin v. Vital signs vi. Head vii. Neck viii. Upper limbs ix. Lower limbs x. Chest and heart xi. Spine			

INSPECTION OF THE ABDOMEN: 1. Position the patient in the supine position and drape the patient, exposing only the areas needed for assessment. 2. Inspect the abdomen for shape/contour, symmetry, pigmentation/colour, lesions/scars, pulsation, and visible peristalsis 3. Examination was carried out in good light, looking from either end of the bed from the side, and finally tangentially 4. Looked for: i. shape (contour) ii. sub costal angle iii. epigastric pulsation iv. divarication of recti v. position of the umbilicus vi. hair distribution vii. skin(pigmentation, scars) viii. dilated veins ix. hernia orifices (ask pt to cough) x. visible movements xi. genitalia xii. back (all back exam at the end) 5. Type of breathing (ask the patient to take deep breath)			
PALPATION: 1. Stand by the right side of the patient 2. Relax the abdominal wall by asking the patient to flex his hip and knees, and ask him to open the mouth and breathe quietly in and out. 3. Make sure that his/her hand is warm 4. If a painful area or mass is present, palpate that area at the end. 5. Started by light palpation (superficial palpation): i. Tenderness: Ask the patient to locate the site of tenderness. If he/she is not able to; ask them to take a deep breath or to cough. Elicit Rebound tenderness ii. Differentiate rigidity from guarding: rigidity is generally a sign of peritoneal irritation, it is present throughout the abdominal wall, the wall feels stiff and board like to touch.			

Guarding is a protective mechanism usually triggered by touch or patient's anticipation to pain. iii. (Swelling: If there is a swelling; - Ask the patient to contract his/her abdominal wall muscles by raising his/her head (to determine if it is intra or extra abdominal swelling) Notice the swelling mobility with respiration iv. Hernia orifices: Examine the anatomical sites of hernia for swelling and any expansile impulse with cough. Elicit deep palpation: i. Start Palpation of normal solid viscera (the liver, the spleen and the kidneys): **A. <u>Palpation of the liver:</u>** i. Place hand in the right iliac fossa, (hand may either rest transversely and flat at right angle to the linea semilunaris and parallel to the costal margin, or placed with fingers pointing towards the head of the patient). The other hand is placed in the loin. ii. Ask the patient to take a deep breath. iii. Keep hand still during inspiration and during expiration slide the hand a little nearer to the right costal margin. <u>When examining a hepatic swelling record:</u> i. The degree of enlargement in a fingerbreadth below the costal margin. ii. The character of the edge (sharp or rounded). iii. The surface (smooth or nodular) iv. The consistency (soft, firm, hard or heterogeneous) v. The presence of tenderness vi. The degree of movement on respiration. **B. <u>Palpation of the spleen</u>** There are several clinical methods for the detection of an enlarged spleen: a) <u>The standard method or bimanual examination:</u> Start palpation from the right iliac fossa with the tips of the examining hand directed towards the left axilla. The left hand is placed over the lateral aspect of the left costal margin, exerting a certain amount of compression. Followed the rules of palpation moving toward the left hypochondrium until feeling the spleen.(If the spleen is not felt, lift the rib cage forwards as the patient inspired).			

b) <u>The hooking method:</u> If the spleen is not felt by the bimanual method, ask the patient to place the fist of the left hand under the lower ribs in order to push the spleen forward. Then stand on the left side of the patients head and place the fingers of both hands over the costal margin. The patient is instructed to take deep breath. c)<u>The right lateral position</u>: If the spleen is not felt by the ordinary method ask the patient to turn to his right side and palpate the spleen by insinuating hand below the costal margin and ask the patient to take deep breath till feeling the lower edge of the spleen . d)<u>Dipping method:</u> In the presence of tense ascites. Place hand in the left hypochondrium and push the abdominal wall downwards and wait for the return impulse to hand **C). <u>The kidneys:</u>** a) The right kidney is examined by the left hand behind the patient's right loin (between the last rib and the iliac crest) lift the loin and the kidney forward. Put the right hand on the right lumbar region just above the anterior superior iliac spine and as the patient to take deep breath. During expiration push the right hand deeply but gently and keep it still during inspiration and repeat as patient takes his breath. b) The left kidney is examined by the same procedure on the left side by either standing on the patient's left side or by leaning across the patient, putting the right hand in the left loin and feeling the kidney with the left hand. **D). <u>Palpation for other abdominal swellings</u>:** Parietal swellings: Swellings of the anterior abdominal wall are differentiated from the intra-abdominal swellings by three signs: i. Relation to the costal margin. ii. Behavior on contraction of the abdomen. iii. Movement with respiration. ❖ If abdomen was tense, started percussion before palpation			

PERCUSSION:

i. Percuss over the whole abdomen and particularly over any masses.
ii. light percussion is necessary.
iii. Start from resonant to dull in the midline

A) Percussion of the liver (span of the liver):

i. Determine the upper border of the liver by heavy percussion. (started from the 2nd intercostal space, opposite the sternocostal junction)
ii. Percuss down along each interspace and when reaching the liver dullness of the upper border ask the patient to take a deep breath and hold it. Percuss again, and then asked him/her to exhale and re-percuss (tidal percussion). Percuss onto the abdomen until the liver dullness disappeared.
iii. Mark the lower border of the liver.
iv. Measure the distance between the upper and lower border in the right mid- clavicular line.

B) Percussion of the spleen:

The three methods for percussion of the spleen

(a) Percussion in the right lateral position.

Start at the lower border of pulmonary resonance in the posterior axillary line and carry down obliquely towards the lowest mid-anterior costal margin.

(b) Percussion in the supine position: start from the right iliac fossa towards the left costal margin then continue to the mid axillary line.

(c) Percussion of the Traube`s space:

Area defined by the left sixth rib superiorly, the left midaxillary line laterally, and the left costal margin inferiorly.

C)Percussion of the kidney:

Percuss the renal angle.

AUSCULTATION:

i. Intestinal sounds
ii. Bruits
iii. Venous hum
iv. Succussion splash

Examination of the back:

i. Ask the patient to sit ii. Inspect for any swellings, deformities or scars iii. Palpate for edema over the sacrum iv. Palpate for the tenderness in the renal angles, palpate for tenderness over vertebrae v. Auscultate the renal angles for bruit			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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CHECKLIST FOR FLUID THRILL/SHIFTING DULLNESS **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES (Minimum 3 Entries)**		
STEP/TASK			
GETTING READY: 1. Washed hands/sanitized hands			
2. Explained procedure to the patient and take consent			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
The Procedure: *1.* Percuss from the umbilical region to the patient's left flank. If dullness is noted, this may suggest the presence of ascitic fluid in the flank. 2. Whilst keeping your fingers over the area at which the percussion note became dull, ask the patient to roll onto their right side (towards you for stability). 3. Keep the patient on their right side for 30 seconds and then repeat percussion over the same area. 4. If ascites is present, the area that was previously dull should now be resonant (i.e. the dullness has shifted).			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			

Signatures of Supervisor	

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CHECKLIST FOR X-RAY ABDOMEN **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES (Minimum 2 Entries)**	
STEP/TASK		
Patient Information 1. Verify patient identification (name, date of birth).		
2. Confirm the date and time of the X-ray.		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
Technical Factors 1. Check the X-ray for proper exposure, focus, and positioning.		
2. Assess the image for any artifacts or technical errors.		
3. Ensure the correct orientation of the X-ray (anterior-posterior or posteroanterior view).		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
Procedure: 1. Identify and evaluate the integrity of the bony structures, including the spine, ribs, and pelvic bones.		
2. Assess the soft tissues, looking for any masses, swellings, or abnormalities.		
3. Identify the presence and distribution of gas throughout the abdomen and bowel loops.		

4. Examine the diaphragm for any abnormalities, such as elevation or flattening.		
5. Evaluate the cardiac silhouette for size and shape.		
6. Identify abdominal organs: i. Liver: assess Assess the size, shape, and density of the liver ii. Spleen: Evaluate the size and contours of the spleen iii. Stomach: identify the gastric air bubble and its location iv. Pancreas: look for pancreatic shadow v. Kidneys: identify both kidneys, assess their size, shape and density vi. Bladder: check for presence of urine in bladder		
7. Small Bowel: Evaluate for normal loops and check for any signs of obstruction. 8. *Colon: Assess* the size and contour of the colon.		
9. Vascular structures: Aorta: evaluate the size and course of the abdominal aorta Inferior Vena cava: check the patency and size		
10. Muscles: examine abdominal wall muscles for symmetry and abnormalities. Fat: assess the distribution and amount of intraabdominal fat.		
11. Abnormalities: identify any abnormalities such as calcification, masses, abnormal densities.		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
Signatures of Supervisor		

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CHECKLIST FOR ORS FORMULATION AND DEHYDRATION ASSESSMENT **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES (Minimum 2 Entries)**	
STEP/TASK		
Introduction 1. Gain consent from parent / child for examination after explaining procedure		
2. Make sure hands are washed and warm		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
Procedure: 3. Ask about diarrhea/vomiting and any reduction in urine output		
4. Inquire about color of urine (darker indicates dehydration)		
5. Look for dry cracked lips, dry mouth		
6. Inspect eyes if they appear sunken (sign of dehydration)		
7. Notice if child is generally irritable/has an altered mental status		
8. Examine for absence of tears		
9. Check pulse (dehydration results in tachycardia)		
10. Skin pinch is assessed by pinching the skin of the abdomen between the thumb and forefinger without twisting. If the skin goes back in <1 second it is normal, if it takes more than that,		

dehydration is likely		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
Formulation of ORS at home 1. Counsel patient regarding rehydration		
2. Explain the procedure of adding 6 teaspoons levelled of sugar, ½ teaspoon of salt and exact 1 liter of water (Approx. 5 cups of 200 ml)		
3. Mix the ingredients well and make sure the salt and sugar amount are exact		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
Signatures of Supervisor		

RENAL MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Detail the steps of urinary catheterization in females	*Catheterization	Knows how
Detail the steps of urinary catheterization in males	*Catheterization	Knows how

- These skills are at the 'Knows how' level of the miller's pyramid, meaning thereby that students need not perform them themselves but may develop a perception regarding them by observing performance/working on simulated patients/facilitation with video.

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Date Observed: _____

CHECKLIST FOR FEMALE CATHETERIZATION (Some of the following steps/tasks should be performed simultaneously.)	**(Minimum 1 Entry)**
1. Identification of patient	
2. Washed hands/ sanitized hands	
3. Preparation: gloves, in place, Foley catheter kit, extra pair of sterile gloves, Velcro™ catheter securement device to secure Foley catheter to leg, wastebasket, and light source	
SKILL/ACTIVITY DESCRIBED SATISFACTORILY	
4. Explain procedure to the patient and obtain consent, and explain the need of a chaperone (for male students)	
5. Assess for latex/iodine allergies, GYN surgeries, joint limitations for positioning, and any history of previous difficulties with catheterization.	
6. Position the female patient in a dorsal recumbent position. Uncover the patient, exposing the patient's groin, legs, and feet for positioning and sterile field (female = dorsal recumbent; may need assistance to position patient and help support legs). Drape the patient with a bath blanket, exposing only the necessary area for patient privacy.	
7. Create a sterile field on the over-the-bed table.	
8. Open the outer package wrapping. Remove the sterile wrapped box with the paper label facing upward to avoid spilling contents and place it on the bedside table or, if possible, between the patient's legs. Place the plastic package wrapping at the end of the bed or on the side of the bed near you, with the opening facing you or facing upwards for waste.	

9. Open the kit to create and position a sterile field: a. Open the first flap away from you. b. Open the second flap toward you. c. Open side flaps. d. Only touch within the outer 1" edge to position the sterile field on the table.	
10. Carefully remove the sterile drape from the kit. Touching only the outermost edges of the drape, unfold and place the touched side of drape closest to linen, under the patient. Vertically position the drape between the patient's legs to allow space for the sterile box and sterile tray.	
11. Wash your hands and apply sterile gloves.	
12. Empty the lubricant syringe or package into the plastic tray. Place the empty syringe/package on the sterile outer package.	
Simulate application of iodine/antimicrobial cleanser to cotton balls.	
13. Carefully remove the plastic catheter covering, while keeping the catheter in the sterile box. Attach the syringe filled with sterile water to the balloon port of the catheter; keep the catheter sterile.	
14. Lubricate the tip of the catheter by dipping it in lubricant and place it in the box while maintaining sterility.	
15. Tell the patient that you are going to clean the catheterization area and they will feel a cold sensation.	
16. With your nondominant hand, gently spread the labia minora and visualize the urinary meatus. Your nondominant hand will now be nonsterile. This hand must remain in place throughout the procedure.	
17. With your dominant hand, use an antiseptic swab or pick up a sterile antiseptic soaked cotton ball with plastic forceps to clean the labia minora farthest from you using a downward stroke, then discard the swab or cotton ball. Repeat for the labia minora closest to you. Use another antiseptic swab or antiseptic soaked cotton ball to clean the area between the labia minora. Discard the cotton ball after use into the plastic bag, not crossing the sterile field. Repeat for a total of three times using a new cotton ball each time. Discard the forceps in the plastic bag without touching the sterile gloved hand to the bag	
18. Pick up the catheter with your sterile dominant hand. Instruct the	

patient to take a deep breath and exhale or “bear down” as if to void, as you steadily insert the catheter maintaining sterility of the catheter until urine is noted.	
19. Once urine is noted, continue inserting the catheter 2-3″ farther.” Do not force the catheter.	
20. With your dominant hand, inflate the retention balloon with the water-filled syringe to the level indicated on the balloon port of the catheter. With the plunger still pressed, remove the syringe and set it aside. Pull back on the catheter until resistance is met, confirming the balloon is in place.	
21. Remove your gloves and perform hand hygiene.	
22. Apply new gloves. Secure the catheter with securement device, allowing room as to not pull on the catheter.	
23. Place the drainage bag below the level of the bladder, attaching it to the bed frame.	
24. Remove your gloves and perform hand hygiene. Assist patient to a comfortable position.	
SKILL/ACTIVITY DESCRIBED SATISFACTORILY	
Signatures of Supervisor	

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Satisfactory: Performs the step or task according to the standard procedure or guidelines

Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR MALE CATHETHERIZATION **(Some of the following steps/tasks should be performed simultaneously.)**	**(Minimum 1 Entry)**
1. Identification of patient	
2. Collect the equipment required for the procedure and place it within reach on the clean trolley. Check the expiry date on the catheter, sterile water, normal saline and lidocaine gel. Ensure a clinical waste bin is placed nearby	
SKILL/ACTIVITY OBSERVED AND DESCRIBED SATISFACTORILY	
1. Wash hands	
2. Introduce yourself to the patient, explain the procedure and take consent	
3. Explain the need for a chaperone (for female students)	
4. Setup up the sterile field by first removing the outer packaging from the catheter pack and then opening the catheter pack from the corners without touching the inner surface of the field.	
5. Using aseptic non-touch technique (ANTT) empty the catheter, lidocaine gel syringe, sterile water syringe and sterile gloves onto the field.	
6. Pour the 0.9% sodium chloride solution over the cotton balls which should already be located within the gallipot of the catheter pack	
7. With the patient lying supine, ensure the bed is at an appropriate height for you to comfortably carry out the procedure	
8. Wash your hands again and don a pair of sterile gloves	
9. Ask your chaperone to remove the sheet covering the patient's genitals to allow you to maintain sterility	
10. Place a sterile absorbent pad underneath the patient's genital region, ensuring you maintain sterility	
11. With your dominant hand pick up a cotton ball and use a single stroke moving away from the urethral meatus to clean an area of the glans. Dispose of the first cotton ball into the clinical waste bin and continue to repeat this process with a new cotton ball each time until all areas of the glans have been cleaned	

12. Discard your used gloves, wash your hands again and don a new pair of sterile gloves	
13. Place the sterile drape over the patient's penis, positioned such that the penis remains visible through the central aperture of the drape. Some drapes come with a hole already present for this purpose, whereas others will require you to create one	
14. Place the sterile urine collection bowl below the penis but on top of the sterile drape	
15. Warn the patient that the anesthetic gel might initially sting, but then should quickly cause things to become numb with your dominant hand place the nozzle of the syringe of anaesthetic gel into the urethral meatus. Empty the entire 10mls of anaesthetic gel into the urethra at a slow but steady pace . Continue to hold to the penis in the vertical position to ensure the gel remains within the urethra and allow 3 to 5 minutes for the lidocaine gel to reach its maximum effect	
16. Pick up the catheter which should be on your sterile field in its wrapper. Remove the tear-away portion of the wrapper near the catheter tip, making sure not to touch the catheter. Clean away any urine spillage or excess lubricating gel and cover the patient with the sheet. Dispose of your equipment into a clinical waste bin 46 Provide the patient with privacy to get dressed	
17. Hold the penis again using sterile gauze with your non-dominant hand	
18. Warn the patient you are about to insert the catheter. Insert the exposed catheter tip into the urethral meatus using your dominant 'clean hand'	
19. Advance the catheter slowly whilst gradually removing more of the wrapper to expose more of the catheter. You should continue to advance the catheter until it is fully inserted into the penis	
20. Once the catheter is fully inserted, inflate the catheter balloon with the 10ml syringe of sterile water to secure it within the bladder	
21. Once the balloon is fully inflated, remove the syringe and gently withdraw the catheter until resistance is noted, confirming the catheter is held securely within the bladder	
22. Attach the catheter bag tubing to the end of the catheter securely. Position the catheter bag below the level of the patient to facilitate effective drainage of urine	
23. Clean away any urine spillage or excess lubricating gel and cover the patient with the sheet Dispose of your equipment into a clinical waste bin. Provide the patient with privacy to get dressed	
24. Dispose of your equipment into a clinical waste bin.	
25. Provide the patient with privacy to get dressed	
SKILL/ACTIVITY PERFORMED SATISFACTORILY	
Signatures of Supervisor	

BLOCK-05

ENDOCRINOLOGY & REPRODUCTION-1 MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Examination of the thyroid gland	Thyroid examination	Shows
Examination for Acromegaly	Examination for acromegaly	Shows
Measurement of blood glucose levels	Blood sugar measurement	Shows
Suturing	Suturing	*Knows how

- These skills are at the 'Knows how' level of the miller's pyramid, meaning thereby that students need not perform them themselves but may develop a perception regarding them by observing performance/working on simulated patients/facilitation with videos.

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR THYROID EXAMINATION **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
GETTING READY:			
1. Wash your hands and don PPE if appropriate			
2. Introduce yourself to the patient including your name and role			
3. Gain consent to proceed with the examination			
4. Ask the patient to sit on a chair for the assessment			
5. Adequately expose the patient's neck and upper sternum			
6. Ask if the patient has any pain before proceeding			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
THE PROCEDURE:			
7. Inspect the patient whilst at rest, looking for clinical signs suggestive of underlying pathology			
8. Inspect the patient's face for clinical signs suggestive of thyroid pathology (dry skin, excessive sweating, eyebrow loss)			
9. Inspect the patient's eyes for evidence of lid retraction, inflammation and exophthalmos			
10. Assess for eye movement abnormalities			
11. Assess for lid lag			
12. Inspect the midline of the neck for evidence of thyroid enlargement, lumps or scars			

13. Ask the patient to protrude their tongue and repeat inspection			
14. Palpate the patient's thyroid gland assessing size, symmetry and consistency. Also note any masses present in the thyroid tissue.			
15. Ask the patient to protrude their tongue whilst you palpate			
16. Palpate local lymph nodes to assess for lymphadenopathy			
17. Inspect for tracheal deviation			
18. Percuss downwards from the sternal notch for evidence of retrosternal dullness			
19. Auscultate each lobe of the thyroid for a bruit			
20. Thank the patient			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR ACROMEGALY **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Wash your hands and gain consent from the patient			
2. Ask the patient if he/she has any pain in any region			
3. Perform a brief general inspection of the patient, looking for clinical signs suggestive of acromegaly such as: a. Facial features: coarse features, such as prominent supraorbital ridges and prognathism, may be indicative of acromegaly.			
4. Hands and feet: may be enlarged.			
5. Skin: may display thickening in the hands and face and excess sweating or oiliness in acromegaly.			
6. Posture: patients with acromegaly can present with signs of osteoarthritis, especially in the weight-bearing joints (knees and hips).			
7. Hair growth: hirsutism in women and hypertrichosis may occur.			
8. Skin tags: acromegaly can cause an increase in the number of skin tags.			

9. Gait: acromegaly can cause a rolling gait or varus deformity. 10. Clothes: clothes or jewellery may appear tight if significant weight gain has occurred.			
11. Hands: Inspect for: a. Enlargement: grossly increased size of the hands may be assessed by comparing your hands to the patient are, accounting for natural size differences. b. Wasting: thenar wasting can indicate untreated carpal tunnel syndrome. c. Scars: carpal tunnel release scar may indicate previous median nerve compression. d. Skin changes: skin thickening and excess sweating can occur in acromegaly. e. Finger pricks: finger prick marks on the tips of the fingers may indicate diabetes, which is linked to acromegaly f. Palpation g. Assess for thickening of the patient's skin by pinching the skin overlaying the third metacarpophalangeal joint. This can be compared with your own hand's skin to detect any differences.			
12. Axillae: Whilst supporting the patient's arm, inspect each axilla for the following: a. Acanthosis nigricans: darkening (hyperpigmentation) and thickening (hyperkeratosis) of the axillary skin which can be benign (most commonly in dark-skinned individuals) or associated with insulin resistance (e.g., type 2 diabetes mellitus) as a complication of acromegaly. b. Hypertrichosis: increased hair growth can occur as a result of the effects of growth hormone.			
13. Palpate for thyroid gland			
14. Look for raised JVP			
15. Face: a. General features: b. Inspect the general appearance face for coarse features associated with acromegaly: c. Frontal bossing: a prominent or protruding brow can occur with excess GH. d. Large nose, ears, and lower lip: aspects of soft-tissue overgrowth. e. Prognathism: overgrowth of the jaw can lead to a			

mandibular protrusion			
16. Mouth: Inspect the inside of the mouth for the following: a. Macroglossia: tongue enlargement may cause the tongue to appear large for the mouth or even cause visible partial airway obstruction in extreme cases. b. Wide spaced teeth: growth of the soft palate may cause interdental separation of the lower jaw. c. Prognathism: overgrowth of the jaw may only be discernible on closer inspection.			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Date Observed: _____

CHECKLIST FOR EXAMINATION OF BLOOD GLUCOSE LEVELS **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Explain the procedure to the patient and get a verbal consent to proceed.			
2. Gather the relevant equipment and place in a clean tray: i. Non-sterile gloves ii. Blood glucose reader (a.k.a. glucometer): calibrate using calibration fluid if required. iii. Spring-loaded lancet: to obtain the blood sample. iv. Testing strips: make sure the expiry date is valid. v. Gauze vi. Tape			
3. Ensure the patient's finger is cleaned prior to measuring capillary blood glucose: i. It's important that the skin over the site being tested has been cleaned, as substances on the skin can affect the accuracy of capillary blood glucose results (e.g. substances containing sugar). ii. Ask the patient to wash their own hands or alternatively you can clean the site with an alcohol swab (70% isopropyl). iii. Make sure the skin over the testing site has dried completely before performing capillary blood glucose measurement.			
4. Turn on the capillary blood glucose monitor and ensure it is calibrated.			

5. Load a test strip into the glucose monitor.			
6. Don a pair of non-sterile gloves.			
7. Pick up the lancet and carefully remove the protective cap.			
8. Prick the side of the patient's finger with the lancet and gently squeeze the finger from proximal to distal to produce a droplet of blood. Some guides advise cleaning away the first drop of blood, however, there is no evidence that this significantly impacts the reliability of blood glucose results.			
9. Gently touch the tip of the test strip against the droplet of blood to allow it to be absorbed into the strip.			
10. Apply gauze or cotton wool to the puncture site to stop the bleeding and ask the patient to maintain pressure over the site			
11. Safely dispose of the lancet into a sharps bin.			
12. Dispose of the test strip and the cotton wool/gauze into a clinical waste bin. If the patient's finger is still bleeding, keep the cotton wool or gauze in place and secure with some tape.			
POST PROCEDURE: 1. 'Wash your hands, thank the patient'			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Date Observed: _____

CHECKLIST FOR SIMPLE INTERRUPTED SUTURE (Some of the following steps/tasks should be performed simultaneously.)	**CASES (Minimum 2 Entries)**		
STEP/TASK			
EQUIPMENT: Collect a procedure trolley, and clean the top surface using an alcohol surface disinfectant wipe. Next obtain a plastic tray, and clean it in a similar manner. You will then need to collect a number of items. For cleaning: i. A pair of non-sterile gloves. ii. Five 10mL sachets of 0.9% sodium chloride (saline) solution. iii. Gauze. For anaesthesia: i. A pair of sterile gloves. ii. Alcohol wipe (2% chlorhexidine in 70% alcohol). iii. 20mL 1% lidocaine solution (with or without adrenaline. iv. Drawing up needle (≤18 gauge). v. Subcutaneous needle (25-27 gauge) and syringe (20mL). vi. Sharps bin. For suturing: i. Suture pack (containing needle holder, scissors, toothed forceps, non-toothed forceps). ii. A pair of sterile gloves. iii. Suture material. iv. Sterile drape. v. Sharps bin.			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
THE PROCEDURE: i. Explain the procedure to the patient and take consent			

Inspection: ii. Assess the size and depth of the wound as well as the state of its border. Inspect for any pus inside which may suggest infection. Ensure that there are no foreign bodies present, such as glass. Finally, check the surrounding skin for any bruising or erythema which may suggest a cellulitis infection.			
Cleaning iii. To clean the wound, take the gauze and soak it in saline solution. Carefully wipe the area starting from the centre of the wound and continuing outwards.			
Anaesthesia iv. Before injecting the anaesthetic, confirm with the patient that they have had no previous reactions to local anaesthetic. Once this has been confirmed, clean the surrounding area using an alcohol wipe. Whilst waiting for the skin to dry, draw up the lidocaine solution into the syringe. a) Once ready to inject, switch the needle on the syringe and don some sterile gloves. Using proper technique, inject 2mL of lidocaine solution subcutaneously into the surrounding skin. After doing so, manoeuvre the needle and continue to inject small amounts of anaesthetic such that all of the surrounding skin is anaesthetised. For medium to large wounds, you will need to withdraw the needle and reinject at another area.			
v. Wash and dry both your hands and the distal third of your forearms and then put the sterile gloves on using correct sterile technique. Allow the anaesthesia at least 5 minutes to work.			
vi. Carefully position the part of the body with the wound and apply the sterile drape over it. At this point, explain to the patient that it is very important for them to keep still and not touch anything on the sterile field to avoid contamination.			
a) Using the toothed forceps, pinch the sides of the wound to test for numbness, and ask the patient whether they can feel any pain. Be sure to warn the patient before you do this. The patient may be able to feel a sense of pressure but should not feel any pain.			
vii. Use the forceps to position the needle in the needle holder so that the needle holder is two-thirds of the way up from the tip of the needle.			
viii. Hold the needle holder in your dominant hand and the toothed forceps in the other. Starting from the middle of the wound, use the forceps to pull the skin up on the wound side closest to your dominant hand. Insert the needle into the skin on the same side at a 90° angle, at least 5mm from the wound edge.			
ix. Push the needle through the skin, supinating your forearm to			

	follow the curvature of the needle as you do so. Remove the needle from the needle holder and pull the needle through that side of the wound using the forceps. a) Position the needle back into the needle holder and insert it into the dermis of the other side of the wound, around 5mm below the skin surface. Again, supinate your wrist such that the needle emerges to the skin surface. Pull the needle through such that only 15cm of thread remains on the other side.			
x. xi. xii. xiii.	To secure the suture in place, you will need to tie a surgical knot. This is achieved by tying three smaller "throw" knots. 1st throw: Hold the needle holder directly above and parallel to the wound. Wrap the longer end of the thread around the needle holder twice in a clockwise direction and then use the tip of the needle holder to grasp the shorter end of the thread and pull in opposite directions, tying the first throw. 2nd throw: Once again wrap the longer end of the thread around the needle holder, however this time, do so only once and in an anticlockwise direction. Then, as before, use the tip of the needle holder to grasp the shorter end of the thread. Pull the suture material through, tying another throw. 3rd throw: Tie this throw in a clockwise direction in a similar manner to the 1st. However, only wrap the thread once around the needle holder.			
xiv. xv.	Once you have completed the three throws, you should have a strong surgical knot. Try to position the knot on one side of the wound. Next, cut both ends of the suture such that there is 5mm of thread on either side. This is so that it is easy to identify the suture. Insert more sutures as required about 5-10mm apart. Once you are finished, dispose of the needle in the sharps bin.			
xvi.	Press lightly on the sides of the wound to stop any bleeding. Once satisfied, remove the drape and your gloves. Arrange for the wound to be dressed using a non-adherent dressing.			
SKILL/ACTIVITY PERFORMED SATISFACTORILY				
Signatures of Supervisor				

HEAD AND NECK, SPECIAL SENSES MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Examination of the nose	Nasal examination	Shows
Examination of neck lumps	Neck lump examination	Shows

- These skills are at the 'Knows how' level of the miller's pyramid, meaning thereby that students need not perform them themselves but may develop a perception regarding them by observing performance/working on simulated patients/facilitation with videos.

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Date Observed: _____

CHECKLIST FOR EXAMINATION OF THE NOSE **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE: 1. Explain the procedure to the patient and get a verbal consent to proceed.			
Inspection: 2. Inspect the external surface of the nose from the front, side and behind the patient to identify any abnormalities.			
3. Skin changes: I. Inspect for skin lesions: i. Basal cell carcinoma: pearly lesions with telangiectasia and rolled edges. ii. Squamous cell carcinoma: scaly lesions, sometimes with associated ulceration and hyperpigmentation.			
iii. Keratoacanthoma: raised lesions with a core of scaly keratin. II. Deformity i. Inspect for any deviation in the nasal bones or cartilage suggestive of a fracture. This is best performed by standing behind the patient with their head tilted slightly backwards.			
III. Palpation: i. Warn the patient that you will be applying some pressure to their nose and ask them to let you know if they experience any pain.			

4. Palpate the nasal bones assessing: i. Alignment ii. Tenderness iii. Irregularity (suggestive of fracture)			
5. Palpate the nasal cartilage assessing: i. Alignment ii. Tenderness			
6. Palpate the infraorbital ridges and assess eye movement if there is a history of trauma to screen for an orbital blowout fracture**.**			
*An orbital blowout fracture is a fracture of the orbital floor or medial wall resulting from blunt trauma to the eye socket (e.g., tennis ball). Typical findings on clinical examination include infraorbital tenderness, epistaxis and restricted eye movement (usually on vertical gaze).			
7. The correct method for using a nasal speculum is slightly counter-intuitive, however, it does allow the best visualization of the nasal mucosa: i. Insert your index finger into the bend of the speculum and support it above with the thumb. ii. The middle and ring fingers are used to manipulate the prongs of the speculum. iii. You will be aiming to look at the gap between these two fingers. iv. Press the prongs of the speculum together to allow them to be placed within the nostril and then reduce your grip on the speculum to widen the prongs until an optimal view of the nasal cavity is achieved.			
a) Nasal vestibule: inspect for inflammation, ulceration or oedema affecting the nasal mucosa. b) Nasal septum: note any polyps, deviation, perforation, haematoma, superficial vessels or areas of cautery. c) Inferior turbinates: note any asymmetry, inflammation or polyps.			
8. Place a cold shiny surface, such as a metal tongue depressor under the nose.			
9. Observe for misting of the metal surface as the patient			

breathes and compare the misting pattern of the two nostrils.			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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CHECKLIST FOR EXAMINATION OF NECK LUMPS **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(minimum 2 entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Explain the procedure to the patient and get a verbal consent to proceed.			
2. Inspect the patient, looking for clinical signs suggestive of underlying pathology: i. Scars: may indicate previous neck surgery (e.g. thyroidectomy, lymph node biopsy/excision, radiotherapy related scarring). ii. Cachexia: ongoing muscle loss that is not entirely reversed with nutritional supplementation. Cachexia is commonly associated with underlying malignancy. iii. Hoarse voice: caused by compression of the larynx due to thyroid gland enlargement (e.g. thyroid malignancy). iv. Dyspnoea or stridor: may indicate compression of the upper respiratory tract by a neck mass. v. Behaviour: anxiety and hyperactivity are associated with hyperthyroidism (due to sympathetic overactivity). Hypothyroidism is more likely to be associated with low mood. vi. Clothing: may be inappropriate for the current temperature. Patients with hyperthyroidism suffer from heat intolerance whilst patients with hypothyroidism experience cold intolerance. vii. Exophthalmos: bulging of the eye anteriorly out of the orbit associated with Graves' disease.			
3. Ask the patient to point out the neck lump's location if relevant. i. Inspect the neck lump from the front and side, noting			

its location (e.g. anterior triangle, posterior triangle, midline).

4. If a midline mass is identified during the initial inspection, perform some further assessments to try and further narrow the differential diagnosis.

<u>Swallowing</u>

Ask the patient to swallow some water and observe the movement of the mass:

i. Thyroid gland masses (e.g. a goitre) and thyroglossal cysts typically move upwards with swallowing.
ii. Lymph nodes will typically move very little with swallowing.
iii. An invasive thyroid malignancy may not move with swallowing if tethered to surrounding tissue.

<u>Tongue protrusion</u>

Ask the patient to protrude their tongue:

i. Thyroglossal cysts will move upwards noticeably during tongue protrusion.
ii. Thyroid gland masses and lymph nodes will not move during tongue protrusion.

<u>Further Assessment</u>

i. If you identify a midline neck lump or systemic signs indicative of thyroid disease, ask the examiner if a full thyroid status examination should be performed.

5. Palpate the neck lump assessing the following:

i. Site: assess the lump's location in relation to other anatomical structures (e.g. anterior triangle, posterior triangle, midline).
ii. Size: assess the size of the lump.
iii. Shape: assess the lump's borders to determine if they feel regular or irregular.
iv. Consistency: determine if the lump feels soft (e.g. cyst), hard (e.g. malignancy) or rubbery (e.g. lymph node).
v. Mobility: assess if the lump feels mobile or is tethered to other local structures. Asking the patient to turn their head as you palpate, the mass can reveal if it is tethered to the underlying muscle (e.g. malignant tumour).
vi. Fluctuance: hold the lump by its sides and then apply pressure to the centre of the mass with another finger. If the mass is fluid-filled (e.g. cyst) then you should feel the sides

bulging outwards. vii. Temperature: increased warmth may suggest an inflammatory or infective cause (e.g. infected epidermoid cyst). viii. Overlying skin changes: note any overlying skin changes such as erythema (e.g. inflammatory/infective aetiology) or a punctum (a pore in the epidermis indicative of an underlying epidermoid cyst). ix. Pulsatility: suggests vascular origin (e.g. carotid body tumour, aneurysm). x. Tenderness: may indicate infective and/or inflammatory aetiology (e.g. ruptured epidermoid cyst, infected cyst). Other characteristics of the lump may include: i. Transillumination: apply a light source to the lump, if it is illuminated it suggests the lump is fluid-filled (e.g. cystic hygroma). ii. Vascular bruit: auscultate the lump to listen for a bruit suggestive of vascular aetiology (e.g. carotid artery aneurysm).			
6. Assess cervical lymph nodes and thyroid gland as explained in previous checklists			
7. Assess the submandibular gland if a swelling is found in that area. Each submandibular gland can be palpated inferior and posterior to the body of the mandible. Move inwards from the inferior border of the mandible near its angle with the patient's head tilted forward. To assess the gland thoroughly, you should perform bimanual palpation with one gloved finger palpating the floor of the mouth whilst the other palpates externally underneath the mandible. ❖ Submandibular gland swellings are usually singular, whereas lymphadenopathy typically involves multiple nodes). Salivary duct calculi are relatively common and may be felt as a firm mass within the gland.			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

BLOCK-06

NEUROSCIENCES-1 MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Assess Glasgow Coma Scale	GCS	Shows
Interpretation of Normal CT brain	CT scan interpretation	Knows how

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

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Date Observed: _____

CHECKLIST FOR GLASGOW COMA SCALE **(Some of the following steps/tasks should be performed simultaneously)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE: The Glasgow Coma Scale (GCS) allows healthcare professionals to consistently evaluate the level of consciousness of a patient. It is commonly used in the context of head trauma, but it is also useful in a wide variety of other non-trauma related settings. Regular assessment of a patient's GCS can identify early signs of deterioration. There are three aspects of behaviour that are independently measured as part of an assessment of a patient's GCS **–** motor responsiveness**,** verbal performance and eye-opening**.** The highest response from each category elicited by the healthcare professional is scored on the chart. The highest possible score is 15 (fully conscious) and the lowest possible score is 3 (coma or dead).			
1. Eye Opening: To assess eye response, initially observe if the patient is opening their eyes spontaneously. i. If the patient is opening their eyes spontaneously, your assessment of this behaviour is complete, with the patient scoring 4 points. You would then move on to assessing verbal response, as shown in the next section. If, however, the patient is not opening their eyes spontaneously, you need to work through the following steps until a response is obtained.			
ii. If the patient doesn't open their eyes spontaneously, you need to speak to the patient *"Hey Mrs Smith, are you ok?"* iii. If the patient's eyes open in response to the sound of your voice, they score 3 points.			

iv. If the patient doesn't open their eyes in response to sound, you need to move on to assessing eye-opening to pain.
v. There are different ways of assessing response to pain, but the most common are:

   a. Applying pressure to one of the patient's fingertips
   b. Squeezing one of the patient's trapezius muscles (known as a trapezius squeeze)
   c. Applying pressure to the patient's supraorbital notch
   d. If the patient's eyes open in response to a painful stimulus, they score 2 points.

   e. If the patient does not open their eyes to a painful stimulus, they score 1 point.

   f. If the patient cannot open their eyes for some reason (e.g., oedema, trauma, dressings), you should document that eye response could not be assessed (NT).

2. Verbal responses:

i. If the patient is able to answer your questions appropriately, the assessment of verbal response is complete, with the patient scoring 5 points.

ii. If the patient is able to reply, but their responses don't seem quite right (e.g. they don't know where they are, or what the date is), this would be classed as confused conversation and they would score 4 points.

iii. Sometimes confusion can be quite subtle, so pay close attention to their responses.

iv. If the patient responds with seemingly random words that are completely unrelated to the question you asked, this would be classed as inappropriate words and they would score 3 points.

v. If the patient is making sounds, rather than speaking words (e.g., groans) then this would be classed as incomprehensible sounds, with the patient scoring 2 points.

vi. If the patient has no response to your questions, they would score 1 point.

vii. If the patient is intubated or has other factors interfering with their ability to communicate verbally, their response cannot be tested, and for this, you would write NT (not testable).

3. Motor Response:

i. The final part of the GCS assessment involves assessing a patient's motor response.

ii. You should score the patient based on the highest scoring response you were able to elicit in any single limb (e.g., if they were unable to move their right arm, but able to obey commands with their left arm, they'd receive a score of 6 points).

iii. Ask the patient to perform a two-part request (e.g. "Lift your right arm off the bed and make a fist.").

    a. If they are able to follow this command correctly, they would score 6 points and the assessment would be over.

iv. This assessment involves applying a painful stimulus and observing the patient for a response.

There are different ways of assessing response to pain, but the most common are:

a. Squeezing one of the patient's trapezius muscles (known as a trapezius squeeze)
b. Applying pressure to the patient's supraorbital notch

If the patient makes attempts to reach towards the site at which you are applying a painful stimulus (e.g. head, neck) and brings their hand above their clavicle, this would be classed as localising to pain, with the patient scoring 5 points.

This is another possible response to a painful stimulus, which involves the patient trying to withdraw from the pain (e.g. the patient tries to pull their arm away from you when applying a painful stimulus to their fingertip).

This response is also referred to as a "normal flexion response" as the patient typically flexes their arm rapidly at their elbow to move away from the painful stimulus.

It differs from the "abnormal flexion response to pain" shown below due to the absence of the other features mentioned (e.g., internal rotation of the shoulder, pronation of the forearm, wrist flexion).

Withdrawal to pain scores 4 points on the Glasgow Coma Scale.

Abnormal flexion to a painful stimulus typically involves adduction of the arm, internal rotation of the shoulder, flexion of the elbow, pronation of the forearm and wrist flexion (known as decorticate posturing).

Decorticate posturing indicates that there may be significant damage to areas including the cerebral hemispheres, the internal capsule, and the thalamus.

Abnormal extension to a painful stimulus is also known as decerebrate posturing. In decerebrate posturing, the head is extended, with the arms and legs also extended and internally rotated. The patient appears rigid with their teeth clenched. The signs can be on just one side of the body or on both sides (the signs may only be present in the upper limbs). Decerebrate posturing indicates brain stem damage. It is exhibited by people with lesions or compression in the midbrain and lesions in the cerebellum. Progression from decorticate posturing to decerebrate posturing is often indicative of uncal (transtentorial) or tonsilar brain herniation (often referred to as coning).			
The complete absence of a motor response to a painful stimulus scores 1 point**.**			
If the patient is unable to provide a motor response (e.g., paralysis), this should be documented as not testable (NT).			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR INTERPRETATION OF CT BRAIN **(Some of the following steps/tasks should be performed simultaneously)**	**CASES** **(Minimum 2 Entries)**	
STEP/TASK		
THE PROCEDURE: 1. Orientation and Windowing: a. Check the patient's information, including name, age, and date. b. Confirm that the images are properly oriented (anterior is at the top, and the left side corresponds to the patient's right side). c. Adjust window settings to optimize visualization of soft tissues and bone.		
2. Overall Assessment: a. Begin by observing the overall appearance of the brain for symmetry and any obvious abnormalities. b. Look for signs of mass effect, midline shift, or other gross abnormalities.		
3. Ventricles: a. Assess the size and symmetry of the lateral ventricles. b. Look for any signs of ventricular enlargement or obstruction.		
4. Sulci and Gyri: a. Evaluate the sulci and gyri for normal patterns and symmetry. b. Ensure there are no signs of cortical atrophy or abnormal folding.		
5. Cisterns and Cisternal Spaces: a. Examine the major cisterns (e.g., suprasellar cistern, ambient cistern) for appearance. b. normal Check for any compression or effacement of cisternal spaces.		
6. Basal Ganglia and Thalamus:		

a. Evaluate the basal ganglia (caudate nucleus, putamen, and globus pallidus) and thalamus for symmetry and density. b. Look for any signs of calcification or hemorrhage		
7. Brainstem: a. Assess the midbrain, pons, and medulla for normal anatomy. b. Look for any signs of midline shift or compression.		
8. Pineal Gland: a. Check the size and symmetry of the pineal gland. b. Assess for calcification, which is a common finding.		
9. Fourth Ventricle: a. Evaluate the size and symmetry of the fourth ventricle. b. Look for any signs of obstruction or enlargement.		
10. Subarachnoid Spaces: a. Assess the subarachnoid spaces for normal distribution and density of cerebrospinal fluid (CSF). b. Check for signs of subarachnoid hemorrhage.		
11. Skull and Scalp: a. Inspect the skull for fractures, abnormalities, or signs of trauma b. Assess the scalp for any soft tissue swelling or abnormalities.		
12. Sinuses and Mastoids: a. Check the paranasal sinuses and mastoid air cells for normal aeration. b. Look for signs of sinusitis or mastoiditis.		
13. Blood Vessels: a. Evaluate major intracranial blood vessels for patency and any signs of vascular abnormalities. b. Look for signs of intracranial hemorrhage. 14. Soft Tissue Structures: a. Soft tissue structures, including the eyes and extraocular muscles, for any abnormalities.		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
Signatures of Supervisor		

INFLAMMATION MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Learn how to do history taking	History Taking	Shows

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines

Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR HISTORY TAKING **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
INTRODUCTION (WIIPP) 1. Wash your hands 2. **I**ntroduce yourself: give your name and your job (e.g. Dr. Louise Gooch, ward doctor) 3. Identity: confirm you're speaking to the correct patient (name and date of birth) 4. Permission: confirm the reason for seeing the patient ("I'm going to ask you some questions about your cough, is that OK?") **P**ositioning: patient sitting in chair approximately a metre away from you. Ensure you are sitting at the same level as them and ideally not behind a desk.			
PRESENTING COMPLAINT 1. Ask the patient to describe their problem using open questions (e.g. "What's brought you into hospital today?") 2. The presenting complaint should be expressed in the patient's own words (e.g. "I have a tightness in my chest.") 3. Do not interrupt the patient's first few sentences if possible 4. Try to elicit the patient's ideas, concerns and expectations (ICE) e.g. "I'm worried I might have cancer." or "I think I need some antibiotics."			

HISTORY OF PRESENTING COMPLAINT			
1. Ask the patient further questions about the presenting complaint 2. A useful mnemonic for pain is “SOCRATES“ i. Site ii. Onset iii. Character iv. Radiation v. Alleviating factors vi. Timing vii. Exacerbating factors viii. Severity (1-10)			

PAST MEDICAL HISTORY

1. Ask the patient about all previous medical problems.
2. They may know these medical problems very well or they may forget some. Top ensure none are missed ask about these important conditions specifically (mnemonic: “MJTHREADS Ca”)

    i. Myocardiac infarction
    ii. Jaundice
    iii. Tuberculosis
    iv. Hypertension
    v. Rheumatic fever
    vi. Epilepsy
    vii. Asthma
    viii. Diabetes
    ix. Stroke
    x. Cancer (and treatment if so)

3. If the patient is unsure of their medical problems, ask them further clarifying questions, for example “What do you usually visit your doctor for?”. Remember you can add to past medical history if any of the medication later mentioned don’t match the medical problems listed.
4. Risk factors

    i. As part of medical history ask about specific risk factors related to their presenting complaint.
    ii. For example, if the patient presents with what maybe a myocardial infarction, you should ask about associated risk factors such as:

        a. Smoking, cholesterol, diabetes, hypertension, family history of ischemic heart disease.

5. Clarification of past medical history

    i. Some medical conditions require clarification of the severity. For example:

        a. COPD

    i. Ask about when the patient was diagnosed, their current and previous treatments, whether they have ever required noninvasive ventilation (“a tight-fitting face mask”), whether they have been to intensive care

        b. Myocardial infarction

    ii. Ask about angina, previous heart attacks, any previous angiograms (“a wire put into your heart from your leg or from your arm”), previous stenting

        c. Diabetes

    iii. Duration of diagnosis, current management including insulin

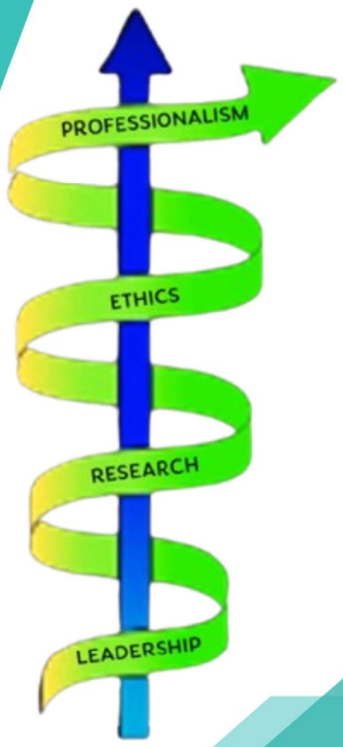
and usual control of diabetes i.e. well- or poorly-controlled			

DRUG HISTORY 1. All medications that they take for each medication ask them to specify: i. Dose, frequency, route and compliance (i.e whether they regularly take these medication). ii. If they take medication weekly ask what day of the week they take it. iii. If they take a medication with a variable dosing (e.g. Warfarin) ask what their current dosing regimen is 2. Recreational drugs 3. Intravenous drug use (current or previous) 4. Over the counter (OTC) medications			
ALLERGIES 1. Does the patient have any allergies? i. If allergic to medications, clarify the type of medication and the exact reaction to that medication. ii. Specifically ask about whether there's been a history of anaphylaxis e.g. "throat swelling, trouble breathing or puffy face"			
FAMILY HISTORY 1. Ask the patient about any family diseases relevant to the presenting complaints (e.g. if the patient has presented with chest pain, ask about family history of heart attacks). 2. Enquire about the patient's parents and sibling and, if they were deceased below 65, the cause of death i. If relevant and a pattern has emerged from previous history sketch a short family tree			
SOCIAL HISTORY 3. Alcohol intake 4. Tobacco use i. Quantify the number of pack years (number of packs of 20 cigarettes smoked per day multiplied by the number of years smoking) 5. Employment history i. Particularly relevant with exposure to certain pathogens e.g. asbestos, where you need to ask whether they have *ever* been exposed to any dusts 6. Home situation			

i. House or bungalow ii. Any carers iii. Activities of daily living (ability to wash, dress and cook) iv. Mobility, and immobility aids v. Social/family support vi. Do they think they're managing? 7. Travel history 8. Further social history maybe required depending on the type of presenting complaint for example: vii. Respiratory presenting complaint a. Ask about pets, dust exposure, asbestos, exposure to the farms, exposure to birds or if there are any hobbies viii. Infectious to disease related b. Ask for a full travel history including all occasions exposure to water, exposure to foreign food, tuberculosis risk factors, HIV risk factors, recent immunisations			
SYSTEMS REVIEW 1. Run through a full list of symptoms from major systems: 2. Cardiovascular: chest pain, palpitations, peripheral oedema, paroxysmal nocturnal dyspnoea (PND), orthopnoea 3. Respiratory: Cough, shortness of breath (and exercise tolerance), haemoptysis, sputum production, wheeze 4. Gastrointestinal: Abdominal pain, dysphagia, heartburn, vomiting, haematemesis, diarrhea, constipation, rectal bleeding 5. Genitourinary: Dysuria, discharge, lower urinary tract symptoms 6. Neurological: Numbness, weakness, tingling, blackouts, visual change 7. Psychiatric: Depression, anxiety 8. General review: Weight loss, appetite change, lumps or bumps (nodes), rashes, joint pain			
SUMMARY 1. Provide a short summary of the history including: a. Name and age of the patient, presenting complaint, relevant medical history 2. Give a differential diagnosis 3. Explain a brief investigation and management plan			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			

Signatures of Supervisor	

Develop & Design by:
- Dr. Komal Ata



MODULAR INTEGRATED CURRICULUM 2K23

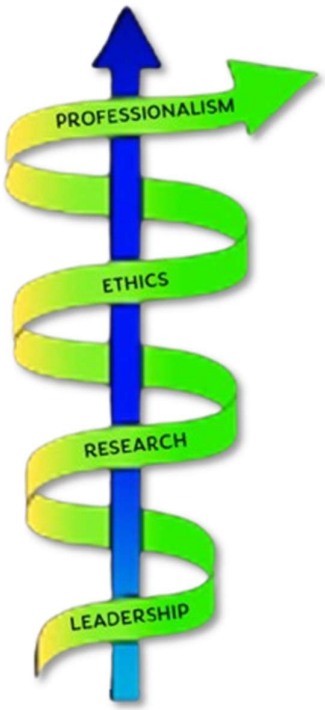
Version 2.0

PERLs

PROFESSIONALISM, ETHICS RESEARCH, LEADERSHIP SKILLS

PERLs-1

YEAR-1



DOMAIN	ATTRIBUTES	COMPETENCIES
Professionalism	Communicator	Demonstrate non-verbal, verbal, written and electronic communication skills with peers and teachers
		Develop an argument
	Caring & Empathic	Demonstrate respect of diversity in gender, age, culture, race, religion, disabilities, and sexual orientation for peers
	Responsible & Accountable	Follow the dress code and rules and regulation of the institution
		Demonstrate punctuality
		Discuss professional code of conduct
		Take responsibility of one's actions and be accountable to oneself
		Engage in orientation, co-curricular and extracurricular activities
	Team Player	Work respectfully and effectively with their peers and participate in different team roles
	Self-Aware	Identify personal strengths and areas of improvement
Ethics	Digital Citizen	Keep Personal & Professional data and information safe
		Understand cyberbullying, harassing, sexting.
		Design a professional digital footprint and use appropriate online etiquette and follow rules for every Internet resource
Research	Evidence Based Practitioner	Locate credible scientific data
Leadership	Resilient & Adaptable	Demonstrate healthy coping mechanisms to respond to stress
		Demonstrate patience and tolerance
	Self-directed Learner	Manage time effectively
		Identify the gap in own learning
		Set and track learning and improvement goals
		Identify and seek help as and when required to achieve the set goals

BLOCK-1

Code	Domain	Attribute	Specific Learning Outcome	Topic	Portfolio Entry
PERLs-1-01	PERLs	PERLs	Describe a Portfolio Describe types of portfolios Identify Portfolio entries Write reflection based on Gibbs reflective cycle	Reflective Writing	Reflective writing on portfolio outline development
PERLs-1-02	Professionalism	Communicator	Demonstrate non-verbal and verbal communication skills. Describe principles of Communication. Discuss types of Communication at professional level. Identify different Communication Styles. Explain the importance of nonverbal communication. Demonstrate active Listening. Describe assertive Communication techniques. Describe barriers to Effective	Verbal and nonverbal Communication Skills	Communication encounter with a peer or teacher

			Communication.		
PERLs-1-03		Responsible & Accountable	Follow the dress code and rules and regulations of the institution. Demonstrate punctuality	Responsibility towards institution and the profession	Quiz on rules and regulations of the institution
PERLs-1-04		Team player	Describe characteristics of a team Describe types of teams Discuss stages of team development Identify various team roles Discuss barriers to effective teamwork	Teamwork	Self- evaluation through reflective writing
PERLs-1-05	Ethics	Digital Citizen	Maintain personal privacy while sharing information Identify cyberbullying, harassing, and sexting Describe cybersecurity laws Discuss digital rights and responsibilities	Digital Identity & footprint	Case discussion of cyberbullying
PERLs-1-06	Research	Evidence based practitioner	Discuss Science and scientific evidence	Difference between science, philosophy, art and Scientific method	Assignment on application of scientific method to a problem

PERLs-1-07	Leadership	Self-directed Learner	Identify gaps in learning through reflection	Strategic planning Personal development plans Goal Setting	Written gaps in being a learner with goals

BLOCK-2

Code	Domain	Attribute	Specific Learning Outcome	Topic	Portfolio Entry
PERLs-1-08	Professionalism	Responsible & Accountable	Demonstrate punctuality	Responsibility towards self and the profession Attendance record Reflective Writing	Reflective writing on portfolio outline development
PERLs-1-09		Caring & Empathic	Demonstrate respect of diversity in gender, age, culture, race, religion, abilities, and sexual orientation for peers	Diversity Equity Inclusion	An encounter with a specially abled person
PERLs-1-10		Responsible & accountable	Describe responsibility to oneself Discuss responsibilities of being a learner	Learning styles Learning Domains Motivation	Written assignment
PERLs-1-11			Discuss professional code of conduct	Responsibilities of a doctor	Case analysis of nonprofessional practice
PERLs-1-12	Ethics	Digital Citizen	Design a professional digital footprint and use appropriate online etiquette and follow rules for every Internet resource	Design a professional digital footprint and use appropriate online etiquette and follow rules for every Internet resource	Professional Profile on LinkedIn

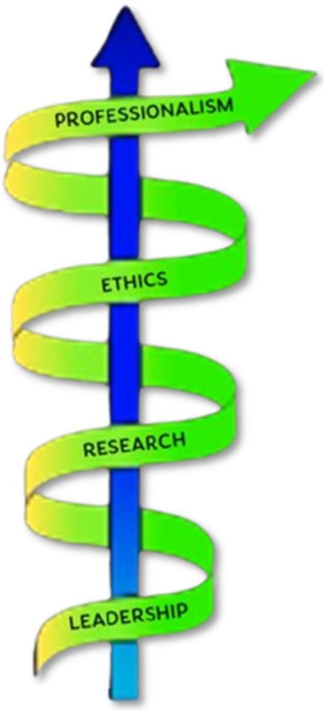
PERLs-1-13	Research	Evidence based practitioner	Locate credible scientific evidence	Sources of scientific data Database search engines Grey literature	Assignment on building a literature search
PERLs-1-14	Leadership	Self-Directed Learner	Manage time effectively	Time Management	Self and/or teacher feedback
PERLs-1-15			Set Learning Goals	Value identification Goal setting	List of goals
PERLs-1-16		Team Player	Work respectfully and effectively with their peers	Effective teamwork Building Rapport	Peer feedback

BLOCK-3

Code	Domain	Attribute	Specific Learning Outcome	Topic	Portfolio Entry
PERLs-1-17	Professionalism	communicator	Developing an argument	Structure of an argument Validity of an argument	Write an argument
PERLs-1-18	Leadership	Resilient and Adaptable	Demonstrate patience and tolerance	Tolerance Patience Role of emotional regulation effective Giving feedback	Teacher Feedback
PERLs-1-19			Demonstrate healthy coping mechanisms to respond to stress	Stress Coping mechanisms	Self or Peer Evaluation
PERLs-1-20		Self-Directed Learner	Identify and seek help as and when required to achieve the set goals	Seeking help Right way to ask Right way to give gratitude Receiving feedback	A narrative of seeking help from a knowledgeable other in personal or professional life

PERLs-II

YEAR-2



DOMAIN	ATTRIBUTES	COMPETENCIES
Professionalism	Communicator	Demonstrate non-verbal, verbal communication skills with stable patients
		Write a dialogue between a senior doctor and a patient
	Caring & Empathic	Demonstrate respect of diversity in children with disabilities
	Responsible & Accountable	Develop a dress code for your class
		Demonstrate punctuality in attending classes
		Write an anonymous report on a cheating incident in class during last year
		Actively demonstrate engagement in co-curricular and extracurricular activities
	Team Player	Develop a code of conduct for students in the small group discussions in teams
	Self-Aware	Demonstrate improvement in one area of weakness identified in the previous year
		Build a rapport with a stable patient
Ethics	Digital Citizen	Write a blog or a wiki
		Upgrade the portfolio with at least two academic and personal achievements in last one year
	Ethical Practitioner	Obtain Informed Consent from a stable patient
Research	Evidence Based Practitioner	Conduct a literature search and write a narrative review on an area of clinical interest
		Make a scientific poster related to the topic
Leadership	Resilient & Adaptable	Write a report on different coping mechanisms used by you during year 1
		Demonstrate patience and tolerance with patients' relatives
	Self-directed Learner	Seek active feedback from peers and teachers
		Set and track learning and improvement goals
		Seek membership in one of the student clubs or societies within or outside the institution.

BLOCK-4

Code	Domain	Attribute	Specific Learning Outcome	Topic	Portfolio Entry
PERLs-2-01	Professionalism	Responsible & Accountable	Develop a dress code for your class	Importance of codes, rules, and regulations in civilized societies Dress codes followed by international medical societies and institutions	Dress Code
PERLs-2-02			Demonstrate punctuality in attending classes	Importance of time	Attendance record
PERLs-2-03		Self-Aware	Demonstrate improvement in one area of weakness identified in the previous year	Setting and tracking milestones in strategic planning	Letter or certificate of accomplishment of a self-reflection
PERLs-2-04		Team Player	Develop a code of conduct for students in the small group discussions in teams	Group discussion Techniques of focus group discussion Democratic vs consensus-based decision making	Code of Conduct
PERLs-2-05	Ethics	Digital Citizen	Upgrade the portfolio with at least two academic and personal achievements in last one year	e-Portfolio Personal websites	Updated entries
PERLs-2-06			Write a blog or a wiki	Different form of digital content Engagement strategies with digital content Structure of a wiki	Published wiki or blog

				and blogpost	
PERLs-2-07	Research	Evidence Based Practitioner	Identify a topic for literature review	What is research What is the scientific method Developing a Literature search strategy	Research topic finalization process record
PERLs-2-08	Leadership	Resilient & Adaptable	Write a report on different coping mechanisms used by you during year 1	Comparison between coping strategies Choosing the right coping strategy for academic and personal issues Report writing	Report

BLOCK-5

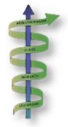
Code	Domain	Attribute	Specific Learning Outcome	Topic	Portfolio Entry
PERLs-2-09	Professionalism	Responsible & Accountable	Write an anonymous report on a cheating incident in class during last year	Anonymity Misconduct	Report
PERLs-2-10			Actively demonstrate engagement in co-curricular and extracurricular activities	Advantages of co-curricular and extra-curricular activities in development of personality and social skills	Participating or organizing certificate in any of the activities
PERLs-2-11		Communicator	Write a dialogue between a senior doctor and a patient	Structure of a dialogue Formatting of a dialogue Role of a dialogue in creative writing	Dialogue
PERLs-2-12		Caring & Empathic	Demonstrate respect of diversity in children with disabilities	Special needs of children with disabilities Laws and regulations for supporting persons with disabilities The government facilities for children with disabilities Daily routine of the deaf and dumb children	Visit to an institution of deaf and dumb children and reflecting on the experience in terms of interacting with them
PERLs-2-13	Ethics	Ethical Practitioner	Obtain Informed Consent from a stable patient	Informed consent Designing an informed consent form	Teacher marked proforma of informed consent for taking blood pressure, temperature or pulse rate from a stable patient
PERLs-2-14	Research	Evidence Based	Develop the summary table of all the studies	Research designs Study types	Summary table of at least seven

		Researcher	identified after literature review on the topic	Hierarchy of evidence Critical appraisal	articles relevant to the problem
PERLs-2-15	Leadership	Self-Directed Learner	Set and track learning and improvement goals	Goal setting and Action planning in areas of research and biomedical ethics	Written Goals and action plan with milestones

BLOCK-6

Code	Domain	Attribute	Specific Learning Outcome	Topic	Portfolio Entry
PERLs- 2-16	Professionalism	Self-Aware	Build a rapport with a stable patient	Rapport building Basics of Negotiation	Written report on patient encounter
PERLs- 2-17		Communicator	Demonstrate non-verbal, verbal communication skills with stable patients	Communication skills with the patients Appropriate verbal communication and appropriate non-verbal communication grounded in culture and context	Communication skills checklist filled by the observer
PERLs- 2-18	Leadership	Resilient & Adaptable	Demonstrate patience and tolerance with patients' relatives	Explaining decisions to relatives in terms that they understand Cultural and language sensitivity Art and science of listening	Reflection on encounter with patient attendants in a ward setting
PERLs- 2-19		Self-Directed Learner	Seek active feedback from peers and teachers	Difference between reflection and Feedback Techniques of receiving feedback	Feedback request generated by the student in specific areas and the reflection on the response received
PERLs- 2-20			Seek membership in one of the student clubs or societies within or outside the institution.	Medical Societies and clubs that provide membership to the student Bylaws, formation and registration of societies and clubs	Membership proof of any one club or society
PERLs- 2-	Research	Writer &	Write a literature	Structuring of a	Literature review

21		Presenter	review	literature review Academic writing essentials Plagiarism and its types	of at least 2000 words
PERLs- 2-22			Make a poster of the literature review	Anatomy of an academic poster Presenting a poster in academia	Poster



Develop & Design by:

- Lt. Col. (R) Dr. Khalid Rahim Khan

- Dr. Saima Chaudry

MODULAR INTEGRATED CIRRICULUM 2K23

version 2.0

UNIVERSITY OF HEALTH SCIENCES LAHORE

UHS

PLANNER

YEAR 1 & 2

Dates	Week	BLOCKS	Year 1 (Graduating Class of 2027) Modules	Spirals			Year 2 (Graduating Class of 2028) Modules	Spirals		BLOCKS
12-Feb-24	1	Block 1	*Module 1 :* **Foundation-1**	PERLs	C FRC	Quran , Islamiyat & Pak Studies	*Module 6:* **GIT & Nutrition-1**	PERLs	C FRC	Block 4
19-Feb-24	2						*Module 7:* **Renal-1**			
26-Feb-24	3									
04-Mar-24	4									
11-Mar-24	5									
18-Mar-24	6									
25-Mar-24	7									
01-Apr-24	8									
08-Apr-24	9		Ramazan & Eid							
15-Apr-24	10									
22-Apr-24	11		*Module 2:* **Haematopoeitic & Lymphatic**	PERLs	C FRC	Quran , Islam & Pak Stud	*Module 7 (continiues):* **Renal-1**	PERLs	C FRC	
29-Apr-24	12						*Space for Spirals & CIA*			
06-May-24	13						**Block Exam 4**			
13-May-24	14		*Space for Spirals & CIA*							
20-May-24	15		**Block Exam 1**							
27-May-24	16	Block 2	*Module 3:* **Musculoskeletal & Locomotion-1**	PERLs	C FRC	Quran , Islam & Pak Studies	*Module 8:* **Endocrinology & Reproduction-1**	PERLs	C FRC	Block 5
03-Jun-24	17									
10-Jun-24	18									
17-Jun-24	19									
24-Jun-24	20		Summer Break							
01-Jul-24	21									
08-Jul-24	22									
15-Jul-24	23		*Module 3 (continues):* **Musculoskeletal & Locomotion-1**	PERLs	C FRC	Quran , Islamiyat & Pak Studies	*(Continues)* **Endocrinology & Reproduction-1**	PERLs	C FRC	
22-Jul-24	24						*Module 9:* **Head & Neck, Special Senses**			
29-Jul-24	25									
05-Aug-24	26									
12-Aug-24	27		*Space for Spirals & CIA*				*Space for Spirals & CIA*			
19-Aug-24	28		**Block Exam 2**				**Block Exam 5**			
26-Aug-24	29	Block 3	*Module 4:* **Cardiovascular-1**	PERLs	C FRC	Quran , Islamiyat & Pak Studies	*Module 10:* **Neurosciences-1**	PERLs	C FRC	Block 6
02-Sep-24	30									
09-Sep-24	31									
16-Sep-24	32									
23-Sep-24	33									
30-Sep-24	34									
07-Oct-24	35									
14-Oct-24	36									
21-Oct-24	37		*Module 5:* **Respiratory-1**				*Module 11:* **Inflammation**			
28-Oct-24	38									
04-Nov-24	39									
11-Nov-24	40		*Space for Spirals & CIA*				*Space for Spirals & CIA*			
18-Nov-24	41		**Block Exam 3**				**Block Exam 6**			
25-Nov-24	42		Prep Leave							
02-Dec-24	43									
09-Dec-24	44									
16-Dec-24	45									
23-Dec-24	46		**Professional Exam**							
30-Dec-24	47									
06-Jan-25	48									
13-Jan-25	49									
20-Jan-25	50									
27-Jan-25	51									

*The institutions are authorized to adjust the planner in accordance to their academic calendars approved by their academic council as long as the stipulated framework requirements of module and session completion are fulfilled.

Department of Medical Education & International Linkages

University of Health Sciences
Lahore

Innovating & Strategizing Healthcare Academia