UNIVERSITY OF HEALTH SCIENCES, LAHORE

NOTIFICATION

The Syndicate in its 72nd meeting, held on 9th March 2023, on the recommendations of Board of Studies (Medicine) and Academic Council approved Modular Integrated MBBS Curriculum 2023, with effect from academic session 2022-2023.

Duly approved Curricular Framework for 5-years of Studies, Modular & Blocks based Organization of Course Contents for the First Year, PERLs Portfolio, Clinical Skills Foundation Log Book -Year 1, and Assessment Policy have been made available at the UHS website.

REGISTRAR

No. UHS/REG-23/1829 Dated: 27-04-2023.

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ii. Director Medical Education
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Nadia Nasreen

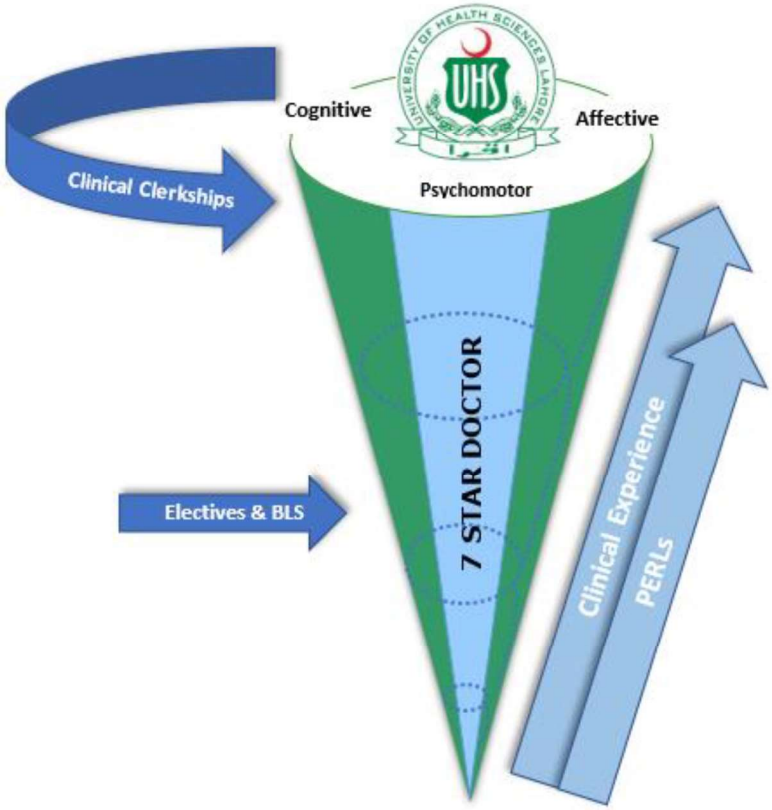
REGISTRAR

CURRICULUM 2K23

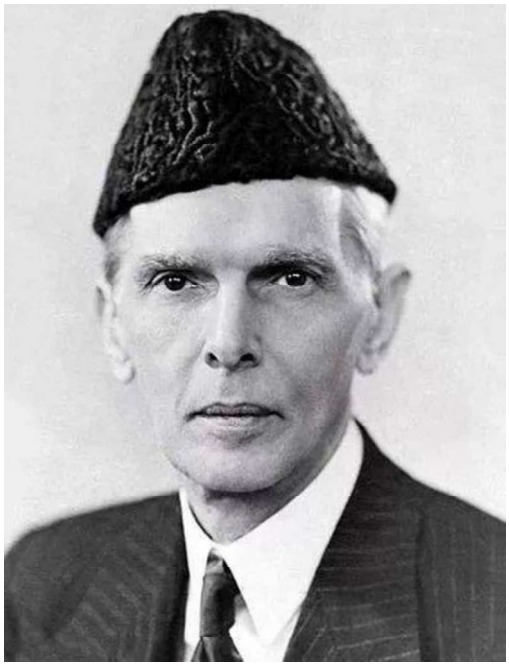
MODULAR INTEGRATED

Curriculum 2K23

Modular Integrated MBBS Curriculum



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

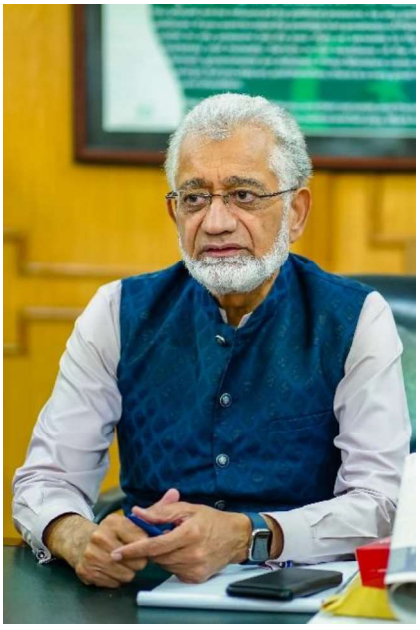
The progressive step taken by the University of Health Sciences Lahore (UHS) to bring forth an integrated undergraduate curriculum for medical students is a much-needed and futuristic move. Curriculum 2K23 by UHS will prove to be a historical milestone for the healthcare academia, faculty of the medical 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

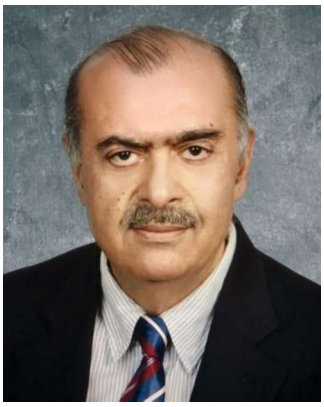


University of Health Sciences Lahore has a history to constantly reinvent and evolve for the benefit of its affiliated learners, upkeep of its standards and to lead the institutional strides as an internationally ranked university. The currently introduced '**Curriculum 2K23'** is yet another landmark 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 find the newly introduced Modular Integrated Curriculum 2K23, a concise and elaborate document, especially with all the implementation protocols mentioned. It is a matter of satisfaction to see that all aspects of adopting a newer paradigm have not only been covered by the guidelines but were also developed via detailed stakeholder input. SH&ME Department encourages futuristic and innovative educational efforts to enhance the quality of medical education. Curriculum 2K23 covers these dynamics and will prove to be a positive change for our learners, if implemented in true letter and spirit. The section of the institutional feedback channel ensures the viability of the document and the possibility of continuous improvement by the main stakeholders. I wish University of Health Sciences Lahore and its affiliated institutes the best of luck in their educational stride for excellence.

Dr. Ahmad Javed Qazi
Secretary
Specialized Health Care & Medical Education Department
Government of Punjab, Lahore.



Vice Chancellor

UNIVERSITY OF HEALTH SCIENCES LAHORE
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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. Curriculum 2K23 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
Registrar
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's** 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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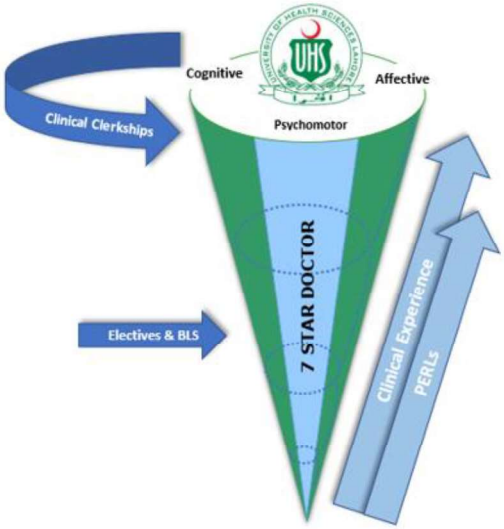
Lt. Col. (R) Dr. Khalid Rahim Khan TI (M)
Prof Saima Chaudhry

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
ENT	Ear Nose Throat
F	Foundation
FM	Forensic Medicine
GO	Gynecology and Obstetrics
HL	Hematopoietic & Lymphatic
M	Medicine
MS	Musculoskeletal
O	Ophthalmology
P	Physiology
Pa	Pathology
Pe	Pediatrics
PERLs	Professionalism, Ethics, Research, Leadership
Ph	Pharmacology
Psy	Psychiatry
QI	Quran and Islamiyat
R	Radiology
Re	Respiratory
S	Surgery

Section 2



Curriculum 2K23

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.

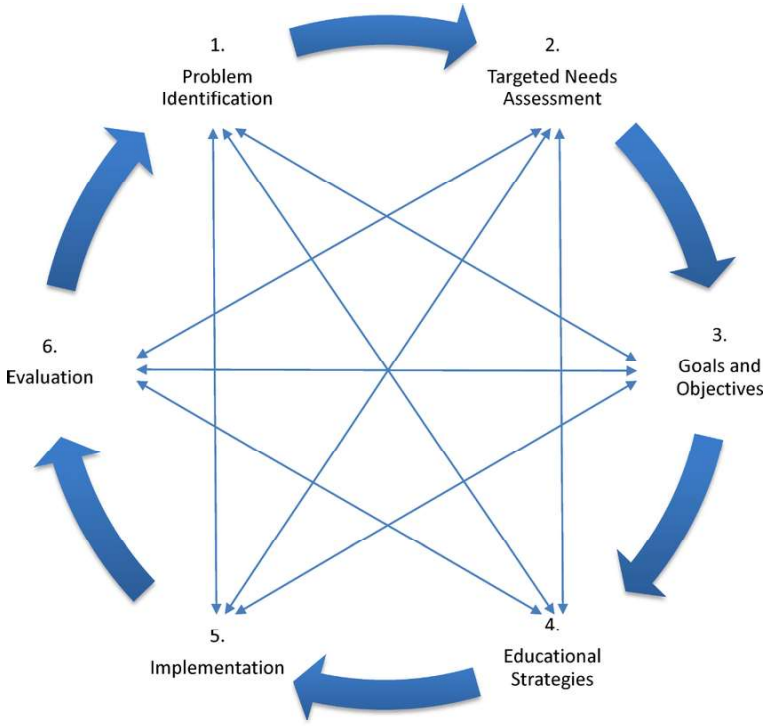


Figure. 1

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 106916 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.

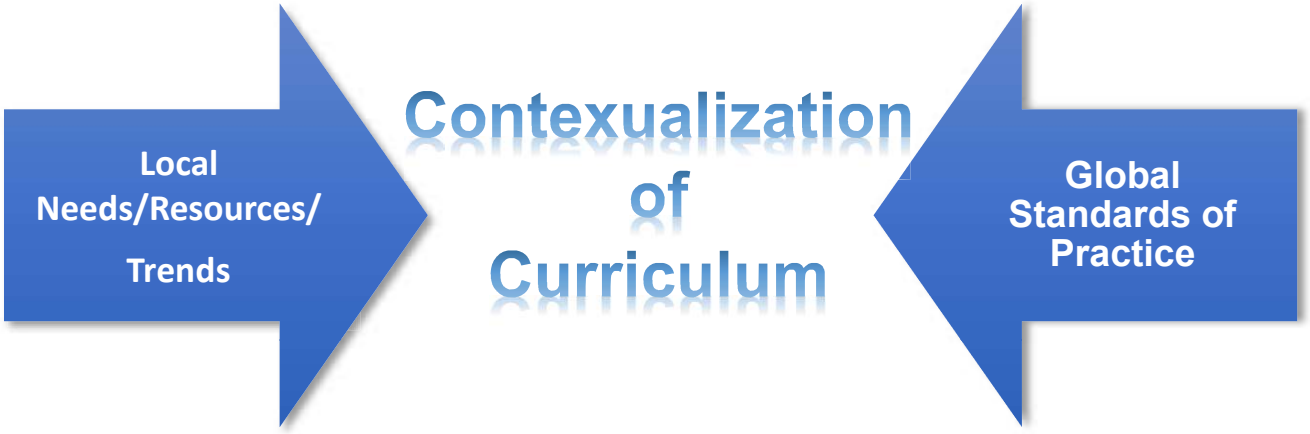
The University is focused on delivering high-quality instruction in Basic Medical Sciences, revitalizing the essential fields of Nursing and Allied Health Sciences, pioneering courses in Medical Education, Human Genetics, Behavioral Sciences, and fostering indigenous research activities through its state-of-the-art 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

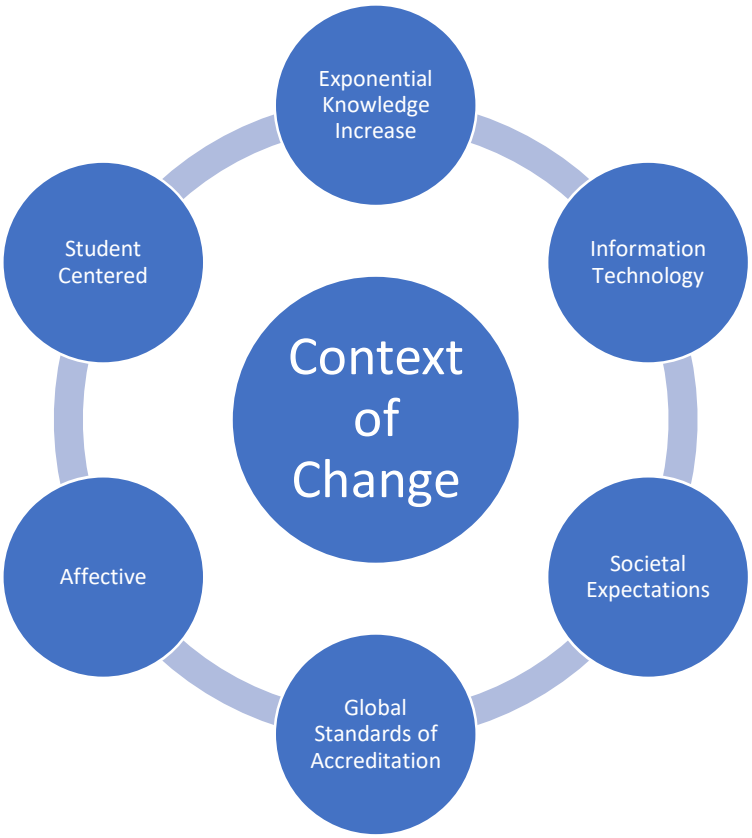
University of Health Sciences Lahore believes in the globally accepted best practices for any formal undertaking of development. All the processes of syllabi identification, thematic structure, content validation and contextualization of curricula a structured process was designed by the Department of 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 needs to shelter the possibility, to blend methodologies for the 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.



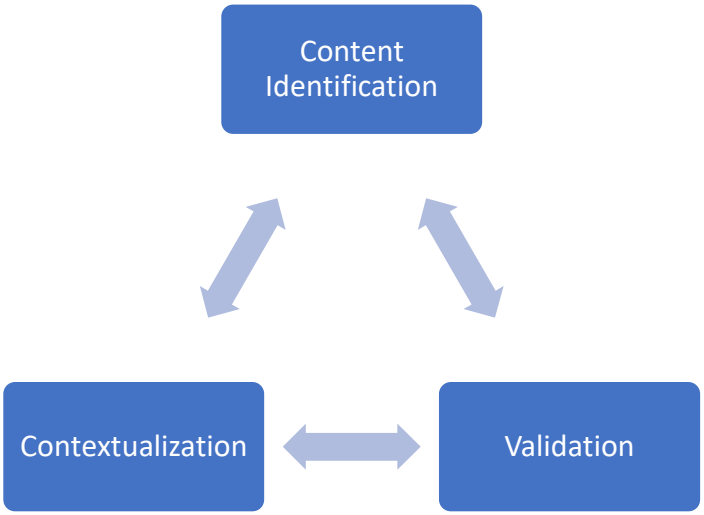
- Previously the curriculum was always expanded for the knowledge base and skill acquisition. However now the societal expectations, social awareness, legal bindings, increasing accountability and community interactions required a categorical structured training of the 'affective' domain of the young 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

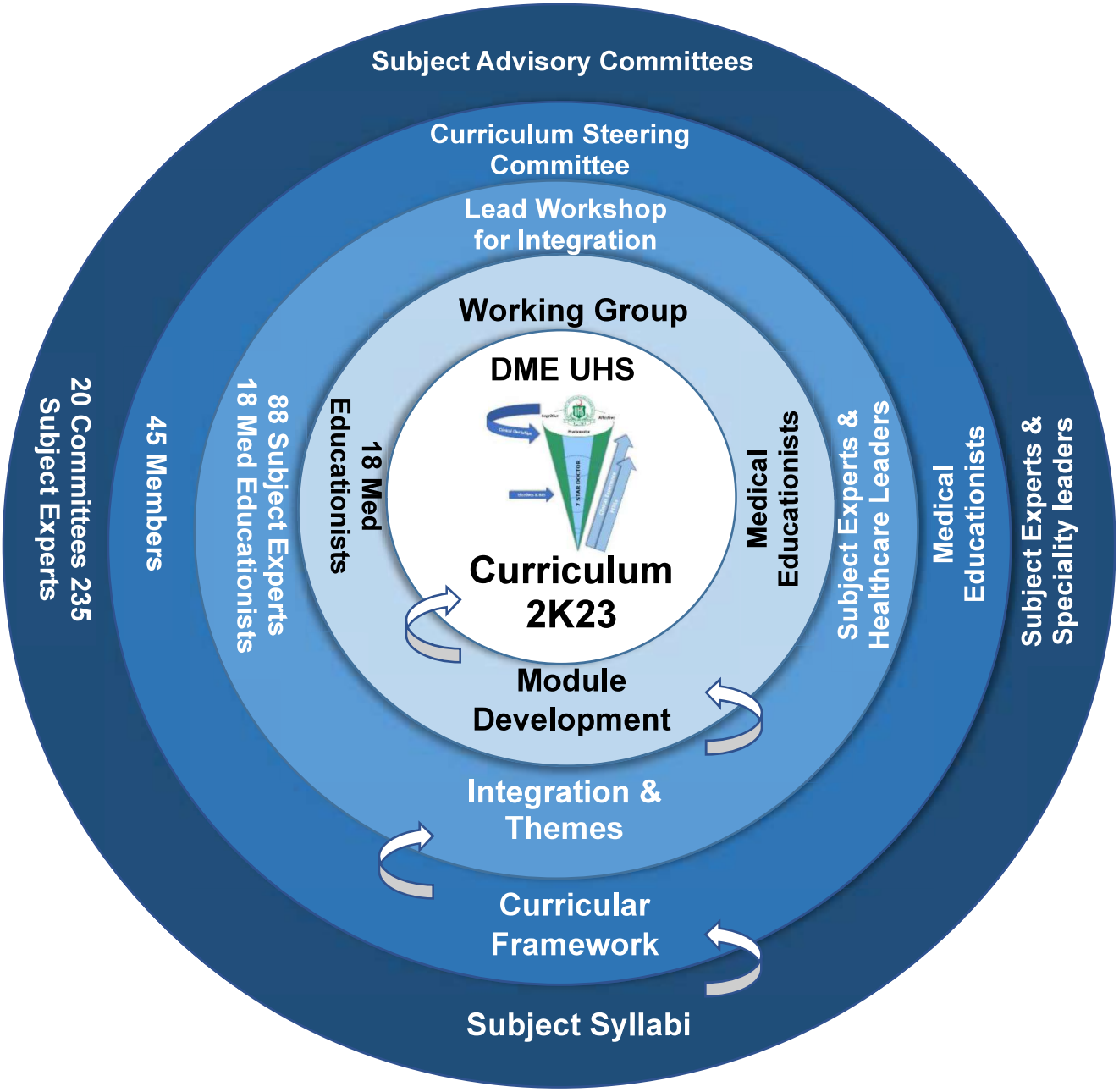
With a backdrop for contextualization of curricular elements and a need for developing a newer curriculum while maintaining a connect with the previously established educational and professional practices a clearly demarcated process was designed to have a standardized input by the subject experts. **University 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



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

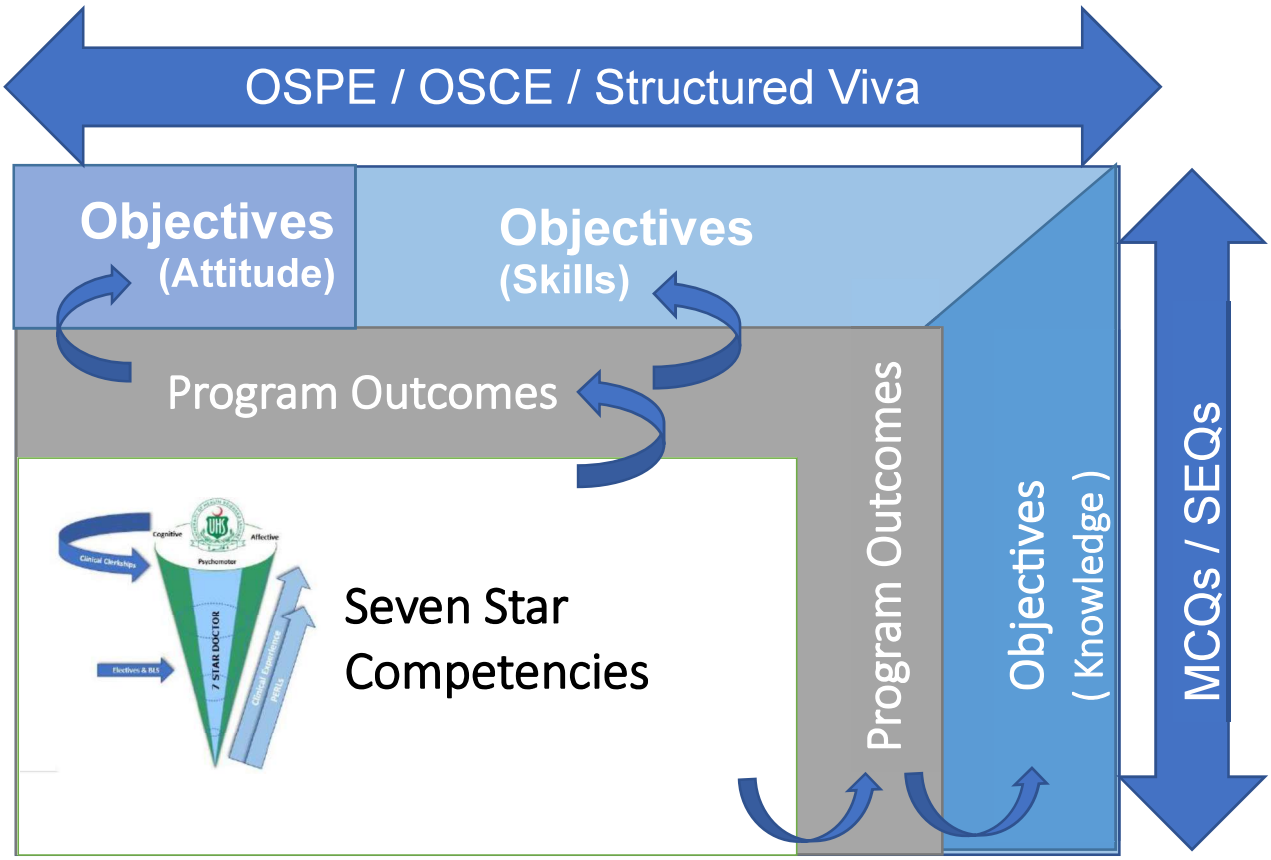
The curricular reforms and program evaluations are a dynamic need for the upkeep of learning, to implement innovations, contextualize educational processes with the societal needs and to keep pace with the advancements in the healthcare systems and technology. **University of Health Sciences Lahore** 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.



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

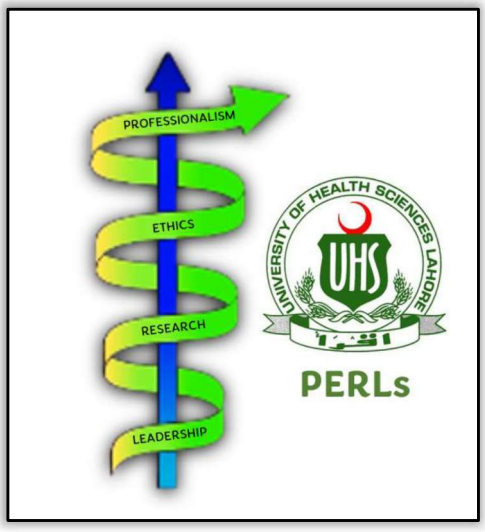
commenced in yesteryears. The year 3 and year 4 which have the rotations will also have the second visit of the modules which would now be more clinically inclined with a stronger base of Pharmacology and Pathology. Community oriented practices and family medicine will also be broadening the element 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

COMPETENCIES AND OUTCOMES

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 even 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 inprotecting, 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.
h. 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 the profession.

i. **<u>Life-long Self-directed Learner</u>**

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**.

<u>ii 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. Ethical

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

a. Without discrimination on the basis of age, gender, religion or beliefs, color, race, ethnic ornational 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, legal and 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. <u>Communicator</u>

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, creativityand 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 toanswer 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 leadersh potential in:

a. Advancing healthcare.

b. Enhancing medical education.

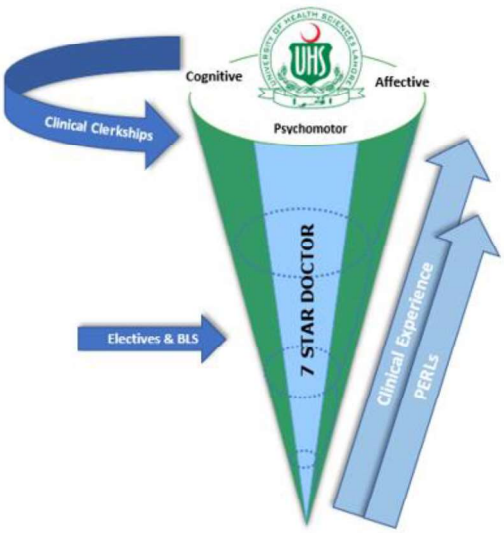
c. Initiating, participating in and adapting to change, using scientific evidence a approaches.

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.

Section 3



Curriculum 2K23

Curricular Framework

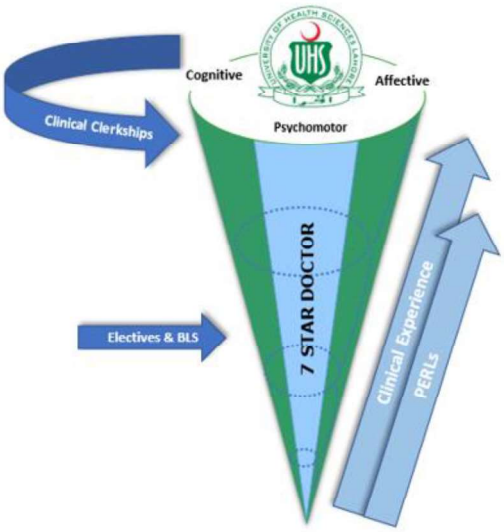
Curriculum 2K23 framework

The University of Health Sciences Lahore has designed a five-year modular framework for integrated curriculum based on specific systems, clinical clerkships, Quran, and Professionalism.

YEAR	MODULES	
YEAR 1	• Foundation-1 • Hematopoietic & Lymphatic	**Block 1**
	• Musculoskeletal & Locomotion-1	**Block 2**
	• Cardiovascular-1 • Respiratory-1	**Block 3**
	• PERLs 1 • Quran-1 • Islamiyat & Pak Studies	**Will be taught throughout the year**
	• Clinical Skills Foundation C-FRC **1** (Clinical – Foundation, Rotation, Clerkships)	
YEAR 2	• GIT & Nutrition • Renal • Endocrinology & Reproduction • Neurosciences • Head & Neck, Special Senses • Inflammation • PERLs - 2 • Quran-2 • Islamiyat & Pak Studies	
	• Clinical Skills Foundation C-FRC **2** (Clinical – Foundation, Rotation, Clerkships)	
YEAR 3	• Foundation-2 • Infectious Diseases • Neoplasia • Musculoskeletal & Locomotion-2 • Hematopoietic, Immunity & Transplant-2	

	• Cardiovascular-2 • Respiratory-2 • Forensic medicine • Community Medicine & family Health-1 • PERLs - 3 • Quran-3
	• Clinical Rotations C-FRC **3** (Clinical **–** Foundation, Rotation, Clerkships)
YEAR 4	• Renal-2 • Endocrine & Reproduction-2 • GIT & Nutrition-2 • Neourosciences-2 • Maternal & Child Health • Ophthalmology • Otorhinolaryngology • Community Medicine & family Health-2 • Psychiatry & Behavioral Sciences • PERLs - 4 • Quran-4 • **Electives** • **BLS workshop**
	• Clinical Rotations C-FRC **4** (Clinical **–** Foundation, Rotation, Clerkships)
YEAR 5 (Clerkships)	• Gynecology & Obstetrics • Pediatrics • Medicine • Surgery **Clinical Clerkships** C-FRC **5** (Clinical **–** Foundation, Rotation, Clerkships)

Section 4

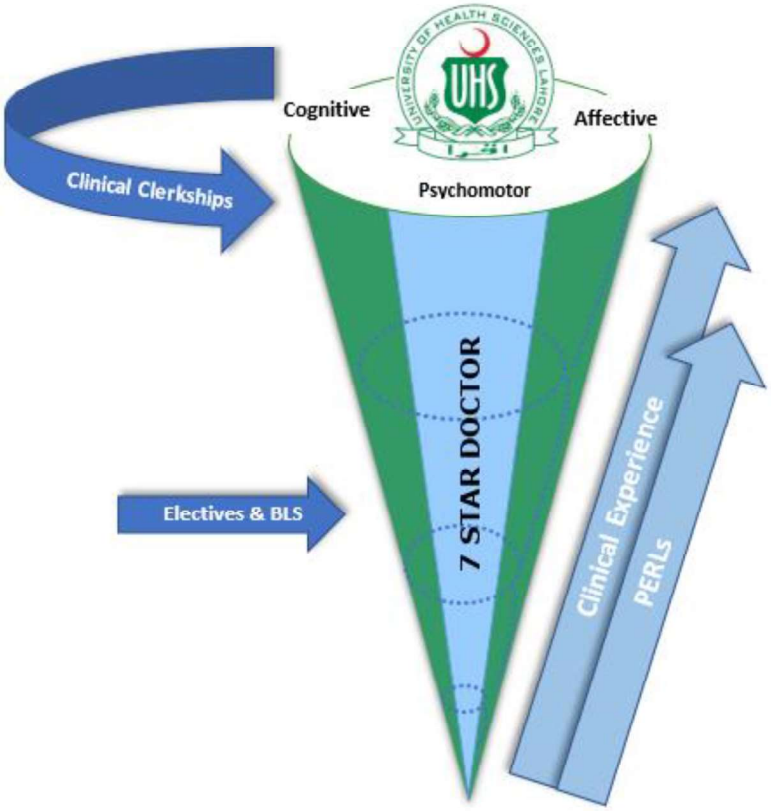


Curriculum 2K23

Block 1 Modules

Foundation Module 1
Curriculum 2K23

Modular Integrated
Undergraduate Curriculum



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

1. Describe the microscopic features of nerve cells, muscle cells, general features of epithelia of the body.
2. Appraise the functional characteristics of various components of cell membrane and organelles of cell.
3. Differentiate between the dynamics of various transport mechanisms along the cell membrane.
4. Compare the functional differences between RBCs, WBCs and blood groups.
5. Explain the significance of homeostatic mechanisms in keeping body's internal environment nearly constant.
6. Appraise the formation and functions of autonomic nervous system.
7. Correlate the structural design of each organ to its function.
8. Acquire information about the different fascial planes in the different regions of the body & their surgical importance.
9. Use descriptive anatomical terms of position to describe the different body structures in relation to each other.
10. Describe the movements of body using proper anatomical terms of movement.
11. Describe and demonstrate the various bony landmarks.
12. Describe the types of joints and correlate them to the mechanisms of movement.

13. Classify the bone, joints and muscles based on the structure, function, phylogenetic origin.
14. Describe the structures associated with muscles and explain their functional correlations.
15. Classify and describe the cardiovascular system and correlate it functionally.
16. Amplify the anatomical basis for radiological, cross-sectional, and surface anatomy.
17. Correlate clinicopathologically the apoptosis in health & diseases.

Proposed Themes

1. Cell structure
2. Cell transport and signaling
3. Cell chemistry
4. Homeostasis and blood
5. Autonomic nervous system
6. Body movement
7. Muscles
8. Growth and development

CURRICULUM OF INDIVIDUAL SUBJECTS

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.

NORMAL STRUCTURE			
Theory			
CODE	**SPECIFIC LEARNING OUTCOMES**	**DISCIPLINE**	**TOPIC**
	GROSS ANATOMY	**TOTAL HOURS = 12**	
FA-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
FA-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 structural classification of bones. Describe the morphological classification of bones. Describe and exemplify Sesamoid, Pneumatic, Wormian and Heterotopic bones. Describe the classification of bones on the basis of osteogenesis. Describe the relationship of growing end of bones with the direction of nutrient foramen Describe the blood supply, innervation and lymphatic drainage of various types of bones Describe the use of bone tissue for bone marrow biopsy and bone grafting Describe the salient features of common types of fractures	General Anatomy	Bones (Osteology)
FA-003	Describe the general features of cartilage and its importance in gross anatomy.	General Anatomy	Cartilage (Chondrology)

	Describe the subtypes and gross features of Hyaline Cartilage Describe the gross features of Elastic Cartilage Describe the gross features of Fibrocartilage. Differentiate the three types of cartilages		
FA-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 Joint Describe the blood supply, innervation and lymphatic drainage of Synovial Joints, cartilaginous joints, and fibrous joints. List the factors stabilizing a synovial joint. Describe the mechanism of movements	General Anatomy	Joints (Arthrology)
FA-005	Describe the structure and function of Skin on the basis of its two layers; Epidermis and Dermis Describe the surface irregularities of the skin. 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 and classify the burns and anatomical basis of manifestations of integumentary system	General Anatomy	Integumentary System
FA-006	Define Muscle 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)

	Describe Type A, B and C of Skeletal Muscles Classify and describe the skeletal muscles based on architecture. Classify skeletal muscle based on action. Describe the parts of a skeletal muscle. Describe the methods of studying skeletal muscle activity. Describe and differentiate the basic organization of innervation to skeletal, smooth, and cardiac muscle. Describe the structure of Tendons. Describe the structure of Synovial Bursae Describe the structure of Raphe. Comprehend the meaning of Paralysis, Spasm, Atrophy, Hypertrophy, Hyperplasia and Regeneration in relation to muscle tissue. Define Myasthenia Gravis and Polymyositis Define Angina pectoris and Fibrillation of Cardiac Muscle		
FA-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 Define the terms: Arteriosclerosis, Atherosclerosis and Varicose Veins 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, Lymphadenopathy and Lymphography	General Anatomy	Vascular System (Angiology)
FA-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. Describe the structure and functions of the neuroglia of the peripheral nervous system. Describe the gross and/or microscopic anatomy of the following structures: Nerve, Nerve fiber, Ganglion, Tract, Fasciculus, Funiculus and Lemniscus 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. Define and explain Dermatome (s) Define and 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 and differentiate between sympathetic and parasympathetic nervous system		
FA-009	Identify displacement of fracture segments of the bone Identify dislocation of joints	Integrate with Radiology	Imaging in Anatomy

	Describe the basic concept behind taking a biopsy of a tissue.		
	EMBRYOLOGY & POST-NATAL DEVELOPMENT	**TOTAL HOURS = 20**	
FA-010	Describe the cell cycle 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 and justify them Embryologically Describe the clinical presentation of structural chromosomal abnormalities and justify them Embryologically list the structural chromosomal anomalies Describe the anatomical basis for structural chromosomal abnormalities Describe the anatomical basis for the structural and numerical chromosomal anomalies Describe the embryological basis for mosaicism Describe the embryological basis for teratoma Describe the clinical presentation of common numerical chromosomal abnormalities	Embryology	Cell cycle and Gametogenesis
FA-011	Describe the Process of spermatogenesis and spermiogenesis Describe the embryological basis for Abnormal gametes Discuss the embryological basis of male infertility	Embryology	Spermatogenesis
FA-012	Describe the Prenatal and postnatal maturation of oocyte	Integrate with Gynecology	Oogenesis
FA-013	Describe the significance of arrested development of oocyte	Embryology	Oogenesis

	Describe the hormonal control of oocyte maturation Discuss the embryological basis of female infertility		
FA-014	Compare and contrast oogenesis and spermatogenesis		Gametogenesis
FA-015	Enlist and briefly describe the female reproductive organs		Female Reproductive organs
FA-016	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 Describe the anatomical and physiological basis of the following: Mittelschmerz, Anovulation, Menopause Define menstrual cycle Describe the phases of menstrual cycle Describe the anatomical and physiological basis of an-ovulatory menstrual cycle	Integrate with Gynecology	Female Reproductive Cycle
FA-017	Describe the transportation of male and female gametes Describe viability of gametes Explain the anatomical basis of diaspermy, triploidy		Transportation of gametes
FA-018	Define fertilization Describe the phases of fertilization Draw and label a diagram illustrating the phases of fertilization Enumerate and describe the results of fertilization Describe the anatomical and physiological basis of sex determination of the embryo	Embryology	Fertilization
FA-019	Define contraception Explain the mechanisms of following contraceptive techniques: 1. Barrier methods 2. Hormonal methods	Integrate with physiology	Contraception

	3. Intrauterine device (IUD) 4. Emergency contraceptive pills (ECPs) 5. Male and female sterilization		
FA-020	Describe the anatomical and physiological basis of male and female infertility Describe the role of clomiphine citrate in inducing ovulation Define assisted reproductive techniques Describe the mechanisms of following reproductive techniques: 1. In vitro fertilization (IVF) and embryo transfer 2. Cryopreservation of embryo 3. Intra-cytoplasmic sperm injection (ICSI) 4. Assisted in vivo fertilization 5. Surrogacy Explain the correlation of multiple births with assisted reproductive techniques	Integrate with Gynecology	Infertility & assisted reproductive techniques
FA-021	Describe the process of cleavage of embryo and blastocyst formation Describe the differentiation of embryo blast into epiblast and hypoblast Describe the establishment of cranial-caudal embryonic axis Describe pre-implantation genetic diagnosis 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 Describe the events and factors influencing the cleavage of zygote	Embryology	Cleavage, blastocyst formation
	Describe the sequence of events pertaining to formation of blastocyst 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	

	Describe the anatomical basis for the preimplantation genetic diagnosis Describe the formation of amniotic cavity, embryonic disc, and umbilical vesicle Describe the formation of chorionic sac		
FA-022	Describe the Uterus at the time of implantation (decidua reaction) Illustrate the concept of Implantation Describe the differentiation of inner and outer cell mass Describe the Abnormal implantation/ extra uterine implantations Enumerate the factors responsible for inhibition of implantation	Embryology	Implantation
FA-023	Describe the Molar pregnancy		Molar pregnancy
FA-024	Describe the Establishment of utero-placental circulation		Utero-placental circulation
FA-025	Describe the embryological basis of abortions and its types	Integrate with Gynaecology	Abortion
FA-026	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
FA-027	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		
FA-028	Describe the Formation of neural tube from neural plate. Justify embryologically the clinical picture seen in 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	Embryology	Derivatives of ectoderm
FA-029	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
FA-030	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
FA-031	Enlist the derivatives of germ layers	Embryology	Germ layer derivatives
FA-032	Describe the formation and functions of chorionic villi		Chorionic Villi
FA-033	Describe the Cephalo-caudal folding Describe the Lateral folding	Integrate with Gynaecology	Folding of embryo
FA-034	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	

FA-035	Describe the factors influencing the embryonic development	Embryology	Control of the embryonic development
FA-036	Enlist the characteristic features of the embryo during 4th – 8th weeks. Describe the criteria for estimating the developmental staging in human embryos Explain the estimation of gestational & embryonic age		Folding of Embryo Embryonic period
FA-037	Explain the trimesters of Pregnancy. Explain the estimation of fetal age Explain the measurement and characteristics of fetus. Describe the Overview of the monthly changes in External appearance of fetus (9th-38th weeks) 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 and post maturity		Fetal period
FA-037a	Tabulate the criteria for estimating fertilization age during the fetal period Describe the post maturity syndrome Describe the procedures for assessing fetal status Describe the clinical picture of IUGR & factors resulting in IUGR	Integrate with Gynaecology	
	Correlate the levels of alpha fetoprotein essay and fetal anomalies	Integrate with Gynaecology/ Radiology	
FA-038	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 Describe the functions of placenta Describe Placenta as an allograft & as an invasive tumor-like structure Describe the placental anomalies and their clinical picture (placenta previa, placenta ecreta, placenta percreta, battledore placenta, membranous placenta, pre-eclampsia) Describe the role of placenta as an allograft Describe the stages of labor		
FA-039	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 Enlist the components 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 characteristic signs and symptoms of oligohydramnios and polyhydramnios and justify embryologically Explain the clinical picture of umbilical band syndrome and justify it embryologically Explain the formation and fate of umbilical vesicle (yolk sac) Explain the formation and fate of Allantois	Integrate with Gynecology	Fetal membranes

	Describe the clinical picture of allantoic cyst & sinus and justify it Embryologically		
FA-040	Describe the development of Dizygotic twins Describe the development of Monozygotic twins Describe the fetal membranes in twin pregnancy Describe the twin transfusion syndrome Explain the zygosity of the twins Describe the characteristics of various types of conjoined monozygotic twins	Embryology	Multiple pregnancies
FA-041	Describe the Various methods of pre-natal diagnosis Describe the Fetal therapy		Prenatal diagnosis and fetal therapy
FA-042	Define morphogens, protein kinases, notch delta pathway, transcription factors, epigenetics Define stem cells and pluripotency Define the human disorders associated with genetic mutations		Molecular regulations and signaling pathways
FA-043	Define teratology: classification and causes of birth defects Define genomic imprinting 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: Drugs Environmental agents Chemicals & heavy metals Infectious agents Radiation Hormones Maternal diseases Describe the basis for male-mediated teratogens		Teratogenicity
	Microscopic Anatomy (Histology and Pathology)	**Total Hours = 08**	

FA-044	Describe different types of microscopies Describe Staining methods and their significance Describe the basis of enzyme histochemistry	Basic techniques in histology	Introduction to microscopy & staining techniques
FA-045	Describe the electron microscopic structure and fluid mosaic model of plasma membrane Draw the fluid mosaic model of plasma membrane Draw and label the structure and function of glycocalyx coat and lipid raft Describe the structure of glycocalyx coat and lipid raft and correlate it with function Describe different types of membrane proteins and their functions	Basic Histology	Cell membrane
	Explain different modes of transport across the cell membrane Describe the signal reception and transduction through different routes Tabulate the mechanisms of transport across the cell membrane Explain the following disorders related to cell membrane: Pseudohypoparathyroidism and Dwarfism	Integrate with pathology	
FA-046	List the membranous and non-membranous cellular organelles Draw and label the light and electron microscopic structure and functions of the cellular organelles Describe the structure of the following cellular organelles and correlate with their function: • Ribosomes • Endoplasmic reticulum (rough & smooth) • Golgi apparatus • Lysosomes • Proteasomes • Mitochondria • Peroxisomes		Cell organelles

	Describe the clinical presentation of lysosomal storage diseases and correlate with their histological basis Describe the structural components of cytoskeleton, and correlate them with their functions Explain the histological basis of immotile cilia syndrome		
FA-46a	Describe the histological features of cytoplasmic inclusions	Integrate with pathology	
FA-46b	Describe the structure of nuclear envelope and nuclear pores	Integrate with Physiology	Cell nucleus
FA-047	Describe the structure of chromatin Describe the structure of chromosome Draw and label the structure of nucleolus Describe the structure of nucleolus Describe the structure and types of DNA and RNA Describe the histological basis for apoptosis and necrosis	Histology	
	Describe the clinical presentation of the following diseases and correlate with its histology. • Laminopathies • Malignancy	Integrate with pathology	
	Describe the correlation of cell cycle with the following diseases. • Retinoblastoma • Malignancy		
	Describe the histological structure and function of basement membrane (light and electron) Describe the mechanism of ciliary movements		Epithelium
FA-048	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	

	Describe the Biochemical composition of the basolateral modifications Explain the correlation of intercellular junctions with the following diseases: 1. Gastric ulcer 2. Food poisoning 3. Pemphigus vulgaris		
FA-048a	Describe the electron microscopic structure of the following apical cell surface specializations: 1. Microvilli 2. Sterocilia 3. Cilia	Integrate with biochemistry	
FA-48b	Explain the correlation between the structure of microvilli and celiac disease Classify and exemplify the epithelia with their histological structure, locations and functions	Integrate with pathology	
FA-48c	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	
	Explain the histological basis of acne vulgaris	Integrate with pathology	
FA-049	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 Describe the composition, distribution, and function of glycosaminoglycans in connective tissue Explain the role of GAGs in formation of barrier against bacteria and the role of hyaluronidase in the breakdown of this barrier	Histology	Connective tissue

	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		
	Describe the types of adipose tissue (white & brown), their histogenesis, locations and function	Histology	
	Explain the etiology of Marfan's syndrome	Integrate with pathology	
	Describe lipid storage and mobilization in and from adipocytes and compare the brown and white adipose tissue		
	Explain the histological basis and clinical presentation of the following diseases in relation to adipocytes: 1. Lipoma 2. Obesity (with special emphasis of the role of leptin)		

Practical

CODE	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
	General Anatomy	**Total Hours = 05**	
FA-050	Demonstrate the anatomical terms of position and movement, in particular on limbs. 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.	Anatomy	Osteology Imaging and cross-sectional anatomy Arthrology
	Embryology	**Total Hours = 05**	
	Calculate fertilization age, gestational age, embryonic/fetal age and expected date of delivery.	Anatomy	Embryology
FA-051	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 & implantational variations, umbilical cord and it's contents • fetal features during fetal period. Determine age of fetus based on these features.		
FA-052	Describe the USG report for the: • fetal features, fetal age estimation, placental attachment with it's variations and fetal membranes. multiple pregnancies	Integrated with Radiology	
FA-053	On gross examination of human placenta and umbilical cord, identify: • normal complete placenta and cord • placental structural variations • umbilical cord and anomalies of its attachment to placenta • contents of umbilical cord (umbilical vessels anomalies)	Integrated with Gynaecology	
FA-054	Identify the features of haemolytic disease of newborn, dizygotic and monozygotic twins and correlate them embryologically	Integrated with Paediatrics	
FA-055	Identify the protocols and procedural steps for amniocentesis and chorionic villus sampling (CVS) and correlate their significance in developmental defects. Correlate the role of alpha feto-protein assays in neural tube defects.	Integrated with Gynaecology	
	Histology	**Total Hours = 22**	
FA-056	Describe different types of staining techniques and their significance with special emphasis on H&E staining	Microscopic Anatomy	Staining techniques
FA-057	Identify and draw different parts of light microscope		Microscope
FA-058	Identify and demonstrate different cell shapes under the microscope		Cell shape
FA-059	Identify and demonstrate under light microscope the following types of epithelia: 1. Simple squamous 2. Simple cuboidal		Epithelium

	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		
FA-060	Identify and demonstrate serous & mucous secreting glands under light microscope		Epithelium
FA-061	Identify and demonstrate the various types of connective tissue		Connective tissue

MEDICAL PHYSIOLOGY

Theory

CODE	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
	PHYSIOLOGY	**Total Hours = 40**	
FP-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, K and Cl 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.		
FP-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		
FP-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
FP-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 Enlist the abnormal types of hemoglobin	Medical Physiology	Hemoglobin
FP-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 leukemia Explain the effects of leukemia on body Define leukopenia 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.		
FP-006	Enumerate different blood group types. Explain the basis of ABO and Rh blood system Explain the Landsteiner law	Medical Physiology	Blood Types
FP-007	Discuss Components of 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	Autonomic nervous system

Practical

CODE	PHYSIOLOGY PRACTICAL	Total Hours = 10	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
FP-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

FP-009	Determine Erythrocyte Sedimentation Rate and packed cell volume		RBCs
FP-010	Determination of blood group		Blood Group
FP-011	interpret Total Leucocyte Count, Differential Leucocyte Count (normal & abnormal) in a CBC report generated by Automated Cell Counter.		WBCs

MEDICAL BIOCHEMISTRY

Theory

		Total Hours = 40	
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DISCIPLINE**	**TOPIC**
FB-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.	Cell Biology	Structure of cell
FB-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 (i) Lipids (ii) Carbohydrates (iii) Proteins Explain why the cell membrane is called fluid mosaic model		Cell Membrane
FB-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) Describe cell to cell adhesion.		Signal transduction
FB-004	Explain the biochemical markers and importance of subcellular organelles and their inherited disorders especially:		Subcellular organelles

	a. I- cell disease b. Refsum disease c. Parkinsonism d. Progeria		
FB-005	Describe the chemistry of purines and pyrimidines and their linkage in nucleic acid synthesis and their metabolism		Chemistry of purine and pyrimidines
FB-006	Discuss the organization of DNA with special reference to Watson and crick model, composition, structure, role of proteins, Chargaff's rule of base pairing and genetic coding Describe the structural forms of DNA		DNA
FB-007	Discuss the structure of different types of RNAs with special reference to composition, linkage, functions hn RNA, micro RNA Illustrate the structure and functions of various types of RNAs Describe the functions of various small RNAs present in cell		RNA
FB-008	Explain the structure and nomenclature of nucleotides, biomedical importance of natural and synthetic analogues Interpret the role of synthetic analogues of nucleotides in medicine based on sign/symptoms and data e.g Methotrexate, 5 Flurouracil and Allupurinol.		Nucleotides
FB-009	Explain the higher organization of DNA. Difference between DNA, chromatid and chromosome		Chromosome
FB-010	Illustrate de Novo and salvage pathways of purines and pyrimidines Describe the degradation of purine and pyramidine nucleotides		Nucleotide Metabolism

	Interpret Lesch-Nyhan syndrome, gout and adenosine deaminase deficiency on given data		
FB-011	Describe in detail all the steps in prokaryotic DNA replication with emphasis on: Different proteins required, Primers, DNA polymerase; their different components and functions, Initiation, elongation and termination of replication, Topoisomerases Describe in detail all the steps in Eukaryotic DNA replication with emphasis on differences between Pro- and Eukaryotes	Cell Biology	Replication
FB-012	Describe DNA repair especially Xeroderma pigmentosa		DNA repair
FB-013	Explain the transcription in prokaryotes focusing on the following key points; RNA polymerase, its components and functions, Initiation, elongation, and termination of transcription Illustrate the transcription in eukaryotes focusing on the differences between pro- and eukaryotic transcription and post transcriptional modifications Wobble hypothesis		Transcription
FB-014	Interpret the translation focusing on the following key points: Initiation, elongation and termination and inhibition by drugs Describe Post-translational modification of proteins		Translation

Practical			
CODE	**BIOCHEMISTRY PRACTICAL**	**Total Hours = 10**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
FB-015	Demonstrate the step taken to prevent or rectify the Laboratory Hazards	Biochemistry	Lab hazards
FB-016	Identify the structure of cells under microscope		cell

FB-017	Identify the methods of isolation of cell organelles'		Cell organelles
FB-018	Identify the different parts of equipment i.e., centrifuge, Microlab, Electrophoresis		Equipment
FB-019	Demonstrate the basic principles, uses and working of centrifuge, chromatography, electrophoresis & spectrophotometer		Demonstration of techniques

PATHOLOGY			
CODE	**Pathology theory**	**Total Hours = 12**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
FPa-001	Discuss the significance of pathology. 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	General Pathology	Cell Injury
FPa-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		
FPa-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			
CODE	**Theory**	**Total Hours = 04**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
FPh-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
FPh-002	Definitions of receptor, agonist, partial agonist, inverse agonist, antagonist and types of receptors and second messengers; Diagrammatic concept of signaling mechanisms		Basic terminologies of Pharmacology
FPh-003	Pharmacological aspects of Autonomic Receptors (types of autonomic receptors, important sites and actions)		Autonomic System

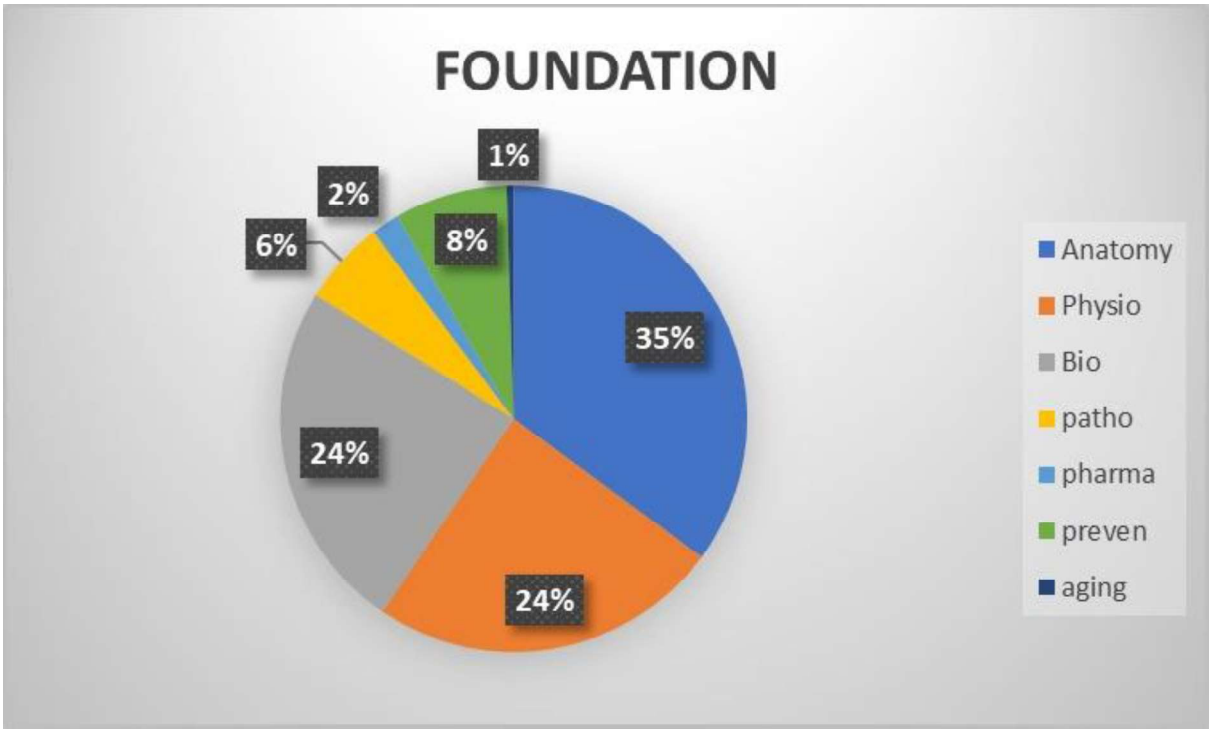
COMMUNITY MEDICINE & PUBLIC HEALTH			
CODE	Theory	Total Hours = 08	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
FCM-001	Describe the changing concepts and new philosophy of health Explain responsibility for health	Community medicine and public Health	Concept of health
FCM-002	Explain dimensions and 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
FCM-003	Describe the importance of health indicators Classify health indicators Calculate Morbidity and Mortality Describe Disability indicators Compare indicators among countries		Health indicators
FCM-004	Conceptualize disease causation and natural history of disease Explain Germ theory & multifactorial causation Describe Epidemiological Triad Discuss Web of disease causation Describe Gradient of infection	Community medicine and public Health	Disease causation
FCM-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		Disease Prevention

AGING			
CODE	**Theory**	**Total Hours = 01**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
FAg-001	Discuss telomeres and telomerase and their clinical significance in aging.	Geriatrics Integrate with Biochemistry	Process of Aging

IMPACT (EPIDEMIOLOGY, SOCIOLOGY/SOCIETY, COMMUNITY MEDICINE & PUBLIC HEALTH)			
CODE	**Theory**	**Total Hours = 08**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
FBhS-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 integrated with healthcare	Biological Basis of behavior
FBhS-002	Identify the burden of mental illness on the person, family and society Describe Intellectual disability, Mental Disorders and Personality Disorders		Psychological Disorders
FBhS-003	Identify the role of psychosocial factors in various illnesses Describe psychosocial aspects of various system diseases such as CVS, CNS, GIT, Respiration, renal, endocrine and Cancer		Psychology and Disease
FBhS-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 and pharmacological treatment
FBhS-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-		Palliative care

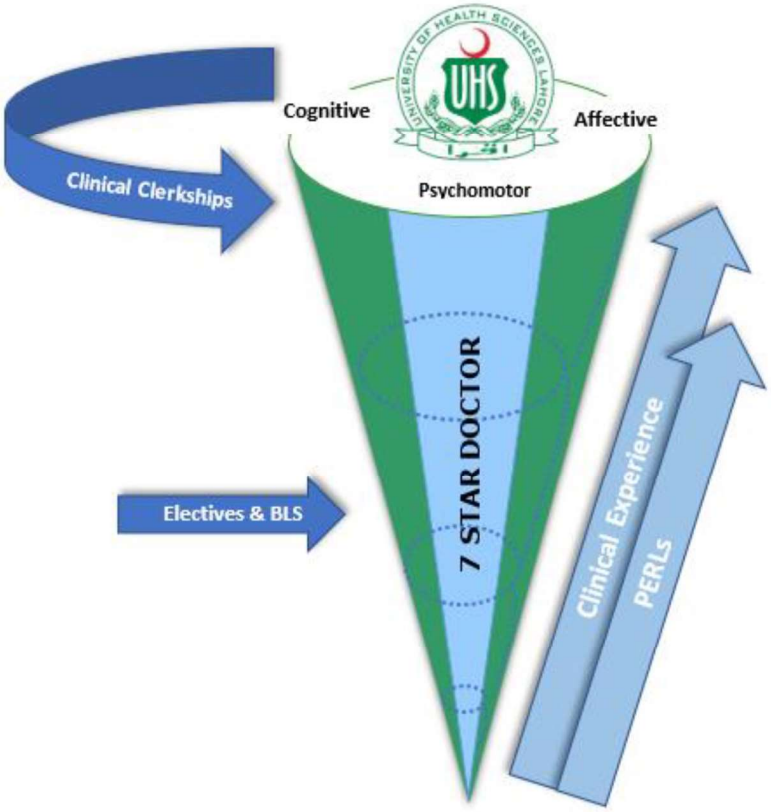
	infarcts Dementia, chronic renal disease, limb amputation		
FBhS-006	Identify the various physiological effects of stress Explain ANS response to stress, Describe behavioural manifestations of stress Stress related multiple sclerosis and autoimmune diseases		Stress

Module Weeks	8
Recommended Minimum Hours	205



Hematopoietic & Lymphatic Module

Modular Integrated Undergraduate Curriculum



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

1. 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
2. Explain the etiology and pathogenesis of common blood & lymphatic diseases, particularly those of importance in Pakistan.
3. Explain the rationale for the use of common therapeutic agents for the diseases related to Blood and immunity.
4. Describe the role of immunity in the body
5. Discuss the working & uses of laboratory instruments in diagnostic lab visit
6. Relate red cell indices with health and disease
7. Recognize ABO/RH blood grouping system
8. Describe the role of Reticuloendothelial system in the body
9. Describe the events of hemostasis
10. Extrapolate the biochemical aspects of plasma proteins
11. Discuss the pharmacological treatment of iron deficiency anemia
12. Discuss Blood composition and function
13. Discuss the role of liver in hemolytic anemia
14. Practice history taking of a patient presented with blood disorders

Themes

1. Red blood cell
2. Platelets
3. White blood cell

Clinical Relevance

1. Aplastic anemia
2. Hemolytic anemia
3. Blood loss anemia
4. Nutritional anemia
5. Polycythemia
6. Hemoglobinopathies
7. Jaundice
8. Acute and chronic lymphocytic and myelogenous Leukemia
9. Allergy (Type I, Type II & Type III)

CURRICULUM OF INDIVIDUAL SUBJECTS

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.

NORMAL STRUCTURE

Theory

CODE	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC
	GROSS ANATOMY	**TOTAL HOURS = 2**	
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		
	EMBRYOLOGY & POST-NATAL DEVELOPMENT	**TOTAL HOURS = 1**	
HL-A-002	Intrauterine Development of spleen	Embryology	Developmental Anatomy of Spleen

Practical

CODE	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
	Histology	**Total Hours = 2**	
HL-A-003	Light microscopic structure of Spleen, Thymus, Lymph nodes, tonsils and MALT including Appendix.	Histology	Histological features of lymph node, spleen & thymus

NORMAL FUNCTION			
Theory			
	MEDICAL PHYSIOLOGY	**Total Hours = 20**	
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DISCIPLINE**	**TOPIC**
HL-P-001	Define anemia	Medical Physiology	Anemia
	Classify anemia on the basis of morphology and cause		
	Discuss the effects of anemia on the body		
HL-P-002	Define polycythemia		Poly-cythemia
	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, INR, and its clinical significance.		
HL-P-006	Enlist and explain the conditions that cause excessive bleeding	Medical Physiology	Coagulation disorders

	Define thrombocytopenia	integrate 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		
	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	Medical Physiology	Blood group In-

		Integrate with Pathology	Scompatibility
HL-P-011	Discuss the features and complications of mismatched blood transfusion reaction Elaborate the Transplantation of Tissues and Organs		Blood mismatch Transfusion reactions
HL-P-012	Explain the process of tissue typing Explain prevention of Graft Rejection by suppressing immune system	Medical Physiology Integrate with Nephrology	Transplantation of tissues
MEDICAL BIOCHEMISTRY		**Total Hours = 21**	
HL-B-001	Discuss the biochemical role and types of hemoglobin a) Differentiate Hemoglobin and myoglobin b) Explain oxygen dissociation curve of hemoglobin and myoglobin and factors regulating them c) Interpret CO toxicity on basis of sign and symptoms d) Explain the role of 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: a) Hypochromic microcytic b) Normochromic microcytic c) Normochromic normocytic d) Macrocytic (megaloblastic)	Medical Biochemistry integrate with Pathology	Hemoglobinopathies/ RBCs/ Homeostasis
HL-B-003	Explain the iron metabolism with mechanism of absorption and factors affecting it.	Medical Biochemistry integrate	Iron Metabolism/ RBCs

	a) Interpret Iron deficiency anemia on basis of given data and microscopic findings b) Interpret folic acid and cobalamin in relation to anemias on given data and microscopic findings c) Discuss biochemical role of pyridoxine and vitamin C in microcytic anemia	with Medicine	
HL-B-004	Discuss the degradation of heme in macrophages of reticuloendothelial system a) Describe the formation of bile pigments, their types and transport b) Discuss the fate of bilirubin	Medical Biochemistry	Heme Degradation/ RBCs
HL-B-005	Discuss hyperbilirubinemias and their biochemical basis a) Differentiate types of jaundice on basis of sign/symptoms and data b) 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 b) Describe the production, structure and functions of B cells, plasma cells, and antibodies (IgA, IgD, IgE, IgG, and IgM). c) Discuss the functions of the cytokines (ILs, TNFs, IFs, PDGF, and PAF). d) 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	**PRACTICAL**	**Total Hours = 6+6=12**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
HL-P-013	Interpret the Red Blood Cell Count, Hemoglobin concentration, Hematocrit and RBC Indices by Automated Cell Counter	Medical Physiology	Blood Cells
	Interpret the Total Leucocyte Count, Differential Leucocyte Count Platelet Count by Automated Cell Counter.		
HL-P-014	Determine Bleeding Time. Determine Clotting Time.		Bleeding/Clotting time
HL-B-009	Interpret jaundice on the basis of estimation of bilirubin	Medical Biochemistry	Jaundice & Anemias/ RBCs/ Homeostasis
	Perform estimation of ALT and interpret the findings		
	Perform estimation of AST and interpret the findings		
	Perform estimation of ALP and interpret the findings		
	Interpret graph based on oxy HB curve and 23 BPG Interpret different types of anemias & porphyrias on basis of s/s and data		

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS

		Total Hours = 2+5=7	
CODE	**SPECIFIC LEARNING OBJECTIVES**	**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		

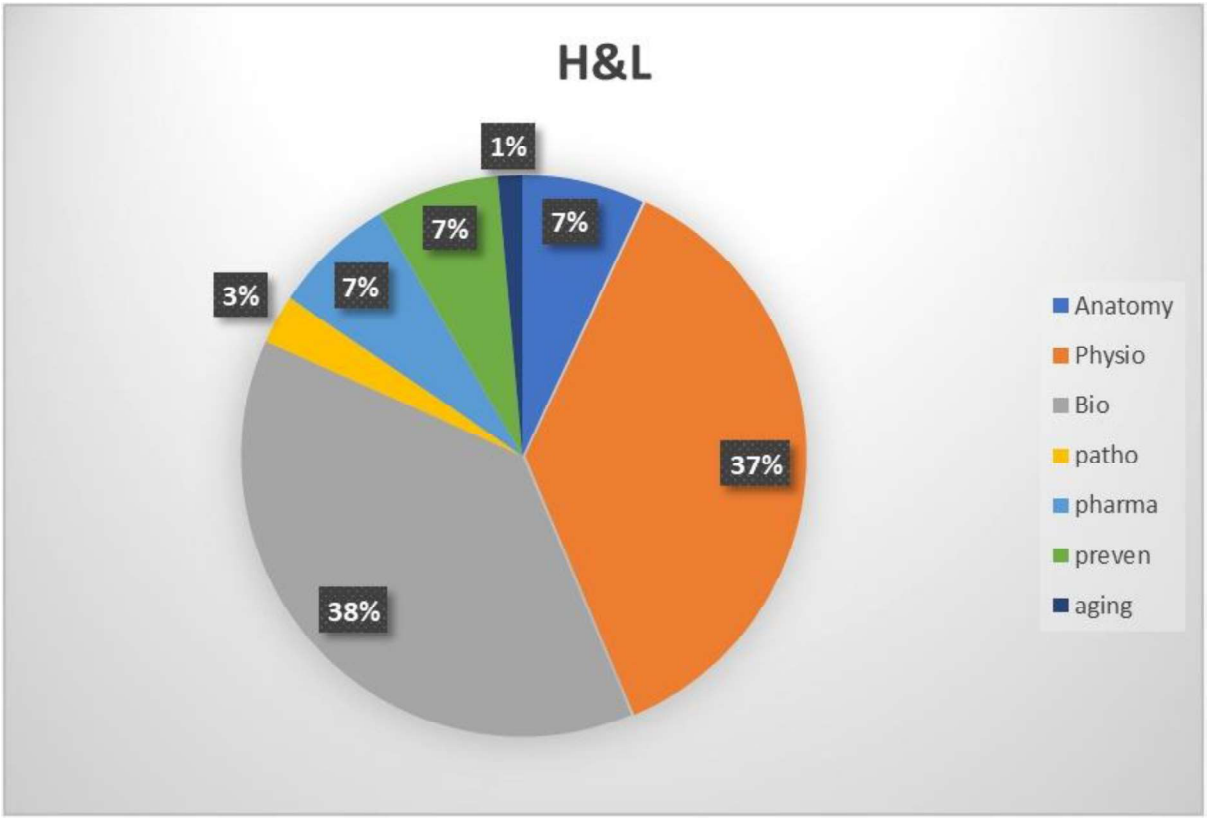
	Should know the terms: Hematopoietic growth factors, their name, mechanism of actions , uses and adverse effects		
HL-Pa-001	Define and classify anemias according to underlying mechanism and MCV/MCH	Pathology	Blood Cells, Platelets and Blood Group
	Discuss the causes and investigations of iron deficiency 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			
CODE		**Total Hours = 5**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
HL-CM-001	Describe the nutritional aspects of iron deficiency anemia and psychological aspects of diseases	Community Medicine and Public Health	Anemia
HL-CM-002	Enlist most common blood borne diseases in Pakistan Describe the routes of spread of blood borne diseases		communicable diseases
HL-CM-003	Genetic counseling of parents		Genetic diseases

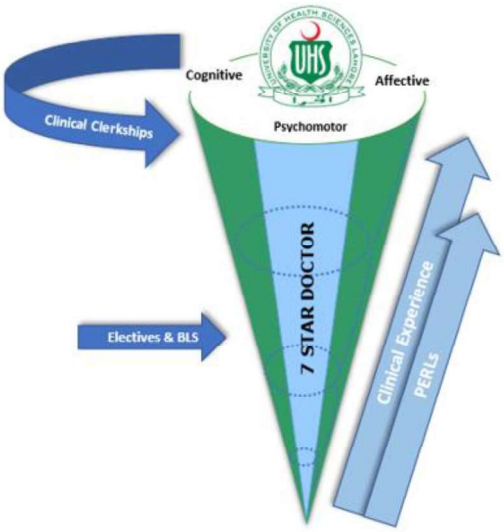
HL-BhS-001	Psychological Counselling of patients and their families	Behavioral Sciences	Counselling, informational care
HL-BhS-002	Identify and deal with the various psychosocial aspects of Hematopoietic System disorders (such as Sickle Cell Disease, Hemophilia, and Conditions of the Blood) on Individual, Family and Society.		Personal, Psychosocial and vocational issues

AGING			
CODE	**Theory**	**Total Hours = 1**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
HL-Ag-001	Discuss the role of platelets in PRP treatment in old age (for skin, hairs and joints)	Biochemistry /Dermatology	Platelet Rich Plasma Therapy
HL-Ag-002	Explain the role of glutathione in skin whitening		Glutathione

Module Weeks	**03**
Recommended Minimum Hours	**071**



Section 5

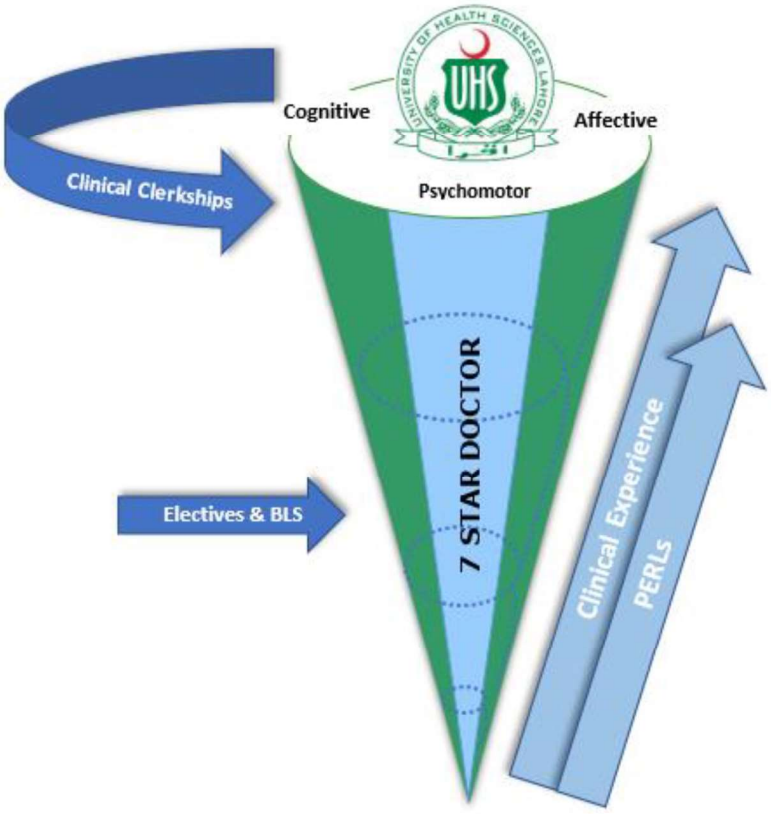


Curriculum 2K23

Block 2
Module

Musculoskeletal & Locomotion Module

Modular Integrated Undergraduate Curriculum



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

1. Develop an understanding of the fundamental components of the musculoskeletal system.
2. Explain the development of the structure & function of the musculoskeletal (MSK) components of limbs, back & correlate it with organization and gross congenital anomalies of the limbs.
3. Identify the anatomical features of bones, muscles & neurovascular components of the limbs with clinical correlation.
4. Describe how injury and disease alter the MSK structure & function.
5. Integrate concepts relating to various metabolic processes, their disorders and relevant lab investigations in the study of human MSK system.
6. Describe the role of the limbs (upper/lower) in musculoskeletal support, stability, and movements.
7. Describe the types, formation, stability, function & clinical significance of joints of the upper and lower limb.
8. 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 (in relation to muscle, bone and joint diseases**)**

- Congenital anomalies of limb
- Joint Dislocation
- Fracture
- Metabolic bone diseases (osteoporosis, osteomalacia, rickets)
- Myasthenia Gravis
- Multiple Sclerosis

CURRICULUM OF INDIVIDUAL SUBJECTS

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.
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- 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.

NORMAL STRUCTURE

Theory

CODE	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC
	GROSS ANATOMY	**TOTAL HOURS = 116**	
	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 fasciae, cutaneous nerves. and blood vessels of the Upper Limb.	Human Anatomy	Fascia & Myotomes of upper limb

	Describe the extent, attachments, and structures passing through Clavipectoral Fascia		
MS-A-003	Describe the extent, structure, neurovascular supply, lymphatic drainage of Breast (Mammary Glands)	Human Anatomy	Pectoral region & Back + Mammary Glands
	Define the boundaries of Triangle 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 muscles of pectoral girdle. Describe the attachments of muscle of pectoral girdle, nerve supply and actions (Pectoralis Major and minor, Subclavius, Trapezius, Latissimus Dorsi, Rhomboid major and minor, Levator Scapulae and Serratus anterior) Explain the role of muscles of pectoral region in stabilizing the pectoral girdle. Describe the triangle of auscultation. Mention the neurovascular supply of pectoral region and Correlate with important clinical conditions. Describe muscles of the back with their origin, insertion, nerve supply and actions.	Human Anatomy	

MS-A-004	Describe the Osteology of Clavicle (morphological features, side determination, attachments, ossification)	Human Anatomy	Bones of Upper Limb: Clavicle & Scapula
	Describe the functions of Clavicle in terms of weight transmission of upper limb		
	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 movements of scapula with muscles acting on it		
	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, blood supply, axes and planes of movements and stability factors.	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	Axilla
	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	Human Anatomy	

	Describe the formation, tributaries, and drainage of Axillary Vein		
	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 cutaneous nerves		
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.	Human Anatomy	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 Axio-appendicular Muscles on Skeleton/Model		
	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
	Describe Frozen Shoulder in relation to anatomical features.	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		
	Develop clear concepts of the topographical anatomy of Scapular Region		
	Tabulate the attachments, innervation, and actions of muscles of Scapular Region		
	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	Human Anatomy	Muscles of Arm
	Demonstrate surface marking of superficial veins of arm and forearm for IV injections		
	Determine the side and identify the landmarks of radius and ulna		

MS-A-013	Describe the Osteology of Radius (Side Determination, morphological features, attachments, ossification)	Human Anatomy	Bones of Forearm
	Describe the Osteology of Ulna (Side Determination, morphological features, attachments, ossification)		
MS-A-014	Describe in detail, the features of each flexor muscle of forearm, proximal & distal attachments, relations, and actions. 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	Human Anatomy	Muscle of Posterior/Extensor Compartment of Forearm
	Describe in detail, the features of each muscle of extensor compartment of forearm, proximal & distal attachments, relations, and actions with nerve supply.		
MS-A-016	Identify the muscles and neurovasculature of flexor and extensor compartments of forearm	Human Anatomy	Forearm: Neurovascular supply & topographical anatomy
	Develop clear concepts of the topographical anatomy of Forearm		
	Describe and illustrate the cutaneous innervation of the Forearm		
	Compartmentalize the forearm and give its anatomical basis.		
	Tabulate the attachments, innervation, and actions of Flexor & Pronator Muscles of the Forearm		
MS-A-017	Identify the Extensor & Flexor Retinacula and describe their attachments and relations	Human Anatomy	Retinacula of Forearm
MS-A-018	Demonstrate the formation of carpal tunnel and identify the contents	Human Anatomy	Carpel Tunnel
	Describe Carpel Tunnel Syndrome	Integrate with Surgery	

	Describe the features, attachments, relations and structures passing under Flexor Retinaculum	Human Anatomy	
MS-A-019	Describe the Origin, Course, Relations, and branches of Ulnar Artery in Forearm	Human Anatomy	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		
MS-A-020	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
	Describe Carrying Angle and justify its importance in limb movement	Integrate with Surgery	
MS-A-021	Describe the Radioulnar Joints in terms of articular surfaces, type, variety, ligaments, muscles producing movements, blood supply, nerve supply and radiological imaging.	Human Anatomy	Joints of Upper Limbs: Radioulnar Joint
	Demonstrate mechanisms of movements of Pronation & Supination		
MS-A-022	Describe the features of Interosseous Membrane with structures that pierce through it	Human Anatomy	Interosseous membrane
MS-A-023	Describe the features and explain the importance of Fibrous Flexor Sheaths, synovial flexor sheaths and extensor expansion	Human Anatomy	Fascia & Muscles of Hand
MS-A-024	Demonstrate the attachments and actions of the muscles of hand		Hand

	Identify the muscles and neurovasculature of the palm	Human Anatomy	
	Explain the morphology and tabulate the attachments, innervation, and actions of Intrinsic Muscles of the Hand		
MS-A-025	Demonstrate the various grips. Explain the mechanism of writing		Actions of Muscles of Upper Limb as a functional Unit
MS-A-026	Describe the Radial Artery's course, relations and termination in hand with its clinical significance in the region	Human Anatomy	Blood Vessels of Forearm& Hand
	Describe the Ulnar Artery's course, relations, 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& 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/ MRI		
	Mark the anatomical landmarks on a subject/ simulated model	Human Anatomy	
LOWER LIMB			
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, and ossification 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, sex differences, and important relations		
MS-A-031	Describe the parts, attachments, ossification, side determination, and Sex differences of femur	Human Anatomy	Femur
	Identify the parts and bony features of the femur, with its attachments, important relations.		
	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	Describe the Muscles of anterior compartment of thigh with their proximal and distal attachments, actions, and innervation	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, and significance 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	Human Anatomy	
	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	Describe the subcutaneous tissue of gluteal region	Human Anatomy Human Anatomy	Gluteal Region
	List the structures passing through the greater and lesser sciatic foramen.		
	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		

	Draw and label the cruciate and trochanteric anastomosis		
	Explain the anatomical basis of the consequences of wrongly placed gluteal intramuscular injections and injury to superior and inferior gluteal nerves	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 Piriformis syndrome	Integrate with Surgery	
MS-A-042	Describe the origin, course, relations, branches, distribution, and termination of Profunda femoris artery	Human Anatomy	Blood supply of thigh
	Describe the formation and distribution of chain anastomoses of thigh (and its clinical significance)		
MS-A-043	Describe the origin, course, relations, branches, distribution, and termination of sciatic nerve	Human Anatomy	Sciatic Nerve
	Describe the anatomical basis of 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.		
MS-A-045	Describe the Boundaries, relations, and contents of popliteal fossa	Human Anatomy	Popliteal Fossa
	Draw and label boundaries, relations, 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	Enlist the bones in the knee joint	Human Anatomy	Knee Joint
	Describe parts of tibia and fibula, with their attachments, important relations, ossifications, and side determination		
	Identify the parts and bony features of the tibia & fibula, their bony features, attachments, important relations.		
	Describe the anatomical basis for using fibula as graft	Integrate with Surgery	
	Describe the attachments and role of popliteus in locking and unlocking of the knee joint	Human Anatomy	
	Draw and label Parts of patella with its attachments		
	Describe features and ossification of patella,		
	Enlist the factors responsible for stabilizing the 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 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		
MS-A-048	Describe the origin, course, relations, branches/tributaries and termination of nerves and vessels of anterior, lateral, and posterior compartments of leg	Human Anatomy	Neurovascular supply of Leg
	Describe the cutaneous nerves and vessels of leg.		
	Draw and label the cutaneous nerve supply and dermatomes of leg		
MS-A-049	Identify the extensor, flexor, and peroneal retinacula and demonstrate the structures related to them	Human Anatomy	Flexor, 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 neurovasculature and movements at Tibio-fibular joints	Human Anatomy	Tibio-fibular Joint
MS-A-051	Describe the ankle joint with its type, articulations, ligaments, movements, and neuro-vascular 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 joints with their types, articulation, ligaments, stabilizing factors, movements, and neurovascular supply	Human Anatomy	Small joints of foot

MS-A-055	Describe the formation, components, stabilizing and maintaining factors of the arches of foot		Arches of foot
	Describe the clinical significance of arches of foot with respect to flat foot, claw foot.	Integrate with Orthopedics	
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 and vessels 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 and deep veins of the lower limb	Human Anatomy	Venous drainage of lower limb
	Draw a concept map of the superficial and deep veins of lower limb		
	List the factors favoring venous return of the lower limb		
	Explain the anatomical basis of the formation, and signs and symptoms of deep venous thrombosis	Integrate with Surgery	
	Describe the anatomical basis of knee jerk, ankle jerk, and plantar reflex	Integrate with Medicine	

MS-A-059	Describe the mechanism of walking	Human Anatomy	Human Gait
	Describe the phases of gait cycle with muscles involved in each phase	Integrate with Orthopedics	
	Describe the propulsive and shock-absorbing mechanisms of foot		
	Describe the weight bearing/ line of weight transmission in lower limb	Human Anatomy	
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	Human Anatomy	Cutaneous dermatomes 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: Clavicle Humerus Radius Ulna Small bones of hand Hip bone. Femur Tibia Fibula	Orthopedics and trauma	Bone Fracture

	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 Elbow joint Interphalangeal joint of hand Hip joint Knee joint Ankle joint	Orthopedics and trauma	Joint Dislocation
	EMBRYOLOGY & POST-NATAL DEVELOPMENT	**TOTAL HOURS = 06**	
CODE	**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		
	List the derivatives of epaxial and hypaxial musculature of limb		
	Briefly discuss the development of cardiac and smooth muscle (Detail to be covered in respective modules later).		
	Describe the developmental basis of myotome		
	Draw a concept map highlighting the sequence of events pertaining to smooth/ cardiac/ skeletal muscles		
MS-A-066	List the factors contributing to the development of limb	Human Embryology	Development of Limb
	Describe the role of AER and Zone of polarizing activity in development of limb		
	Describe the process of limb development and limb growth		
	Draw a concept map pertaining to development of limb		

	Compare and contrast the development of upper limb with the development of lower limb		
MS-A-067	Describe the embryological basis of cutaneous innervation of limb	Human Embryology	Development of Neurovascular 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 1. Amelia 2. Meromelia 3. Phocomelia 4. Split-Hand/Foot Malformations 5. Polydactyly, Brachydactyly, Syndactyly 6. 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	Describe the developmental process of intramembranous and endochondral ossification	Human Embryology	Process of Ossification
MS-A-071	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		
	MICROSCOPIC ANATOMY	**Total Hours = 06**	
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DISCIPLINE**	**TOPIC**
MS-A-072	Describe the microscopic structure and ultra-microscopic structure of skeletal muscle	Histology	

	Explain the basis of myasthenia gravis and Duchenne muscular dystrophy	Integrate with Medicine	Histology of Muscles
	Describe the microscopic and ultramicroscopic structure of cardiac muscle	Histology	
	Describe the microscopic and ultramicroscopic of smooth muscle		
	Compare and contrast the histological features of three types of muscle tissue		
MS-A-073	Describe the regeneration of muscle, hyperplasia, and hypertrophy of muscle fiber	Integrate with Pathology	Functional Histology
	Explain the histopathological basis of leiomyoma	Histopathology	
	Describe the histological basis of Duchenne Muscular Dystrophy	Integrate with Pathology	
MS-A-074	Describe the light and electron microscopic structure of bone cells	Histology	Histology of Osseous tissue
	Describe the histological justification for osteoporosis, osteopenia.	Integrate with Pathology	
	Describe the histological basis for bone repair after fractures.		
MS-A-075	Describe the light and electron microscopic structure of compact and spongy bone	Histology	Histology of Bone
	Compare and contrast the microscopic features of compact and spongy bone		
	Draw a concept map to explain the characteristic features of ossification		
	Draw and label the zones seen in an epiphyseal growth plate		
MS-A-076	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-077	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-078	Describe the histological basis for bone & Cartilage growth and repair	Histology	Mechanism of Bone growth

PRACTICAL			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DISCIPLINE**	**TOPIC**
	Histology	**Total Hours = 10**	
MS-A-079	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-080	Draw and label the histological picture of compact bone	Histology	Histology of Bones
	Draw and label the histological picture of spongy bone		
MS-A-081	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 ORGAN FUNCTION

Theory

	MEDICAL PHYSIOLOGY	**Total Hours = 34**	
CODE	**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		

	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-002	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 RMP.		
MS-P-003	Describe the Physiological basis of generation of RMP.		Resting Membrane Potential in Neurons
	Explain the effects of hyperkalemia and Hypokalemia on the RMP		
	Name the membrane stabilizers		
	Explain the physiological basis of action of Local Anesthetics.	Medical Physiology integrate with Anesthesiology	
MS-P-004	Describe the Physiological anatomy of Neurons	Medical Physiology	Neurons
	Discuss the axonal transport		
	Enlist & give functions of Neuroglial cells		
	Explain process of myelination in CNS & PNS		
MS-P-005	Classify neurons functionally.		Classification of Neurons & Fibers
	Classify nerve fibers according to Erlanger & Gasser Classification		
MS-P-006	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-007	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-008	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-009	Classify and explain Physiological basis of different types of synapses		Synapse
	Elaborate how signal transmission takes place across chemical synapse		
MS-P-010	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-011	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-012	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-013	Differentiate between isometric and isotonic contraction by giving examples.		Characteristics of whole muscle contraction
	Compare the fast and slow muscle fibers.		
MS-P-014	Explain the mechanism of summation and Tetanization.		Mechanics of muscle contraction
	Describe staircase effect/Treppe phenomena		
	Discuss the mechanism of skeletal muscle fatigue.		
	Explain the physiological basis of rigor mortis	Medical Physiology integrate with Forensic medicine	
MS-P-015	Describe the physiological anatomy of 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	
	Discuss the steps/ events of excitation contraction coupling in skeletal muscle.	Medical Physiology	
MS-P-016	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 types of action potential in smooth muscles.		
	Explain the LATCH mechanism		
	Describe the significance of LATCH mechanism.		
	Explain the nervous and hormonal control of Smooth Muscle Contraction.		

MS-P-017	Enlist various types of muscle disorders Describe the pathophysiology & features of muscular dystrophy.	Medicine	Muscular Disorders
MS-P-018	Define Myopathy Enlist various causes of myopathy Outline management of myopathy	Medicine	Myopathy
MS-P-019	Define osteoporosis Identify risk factors for osteoporosis Outline management strategies	Geriatrics/ Medicine	Metabolic bone diseases: Osteoporosis
MS-P-020	Define osteomalacia Identify risk factors for osteomalacia Outline management strategies	Medicine/ Rheumatology	Metabolic bone diseases: Osteomalacia
MS-P-021	Define rickets Identify risk factors for rickets Outline management strategies	Pediatrics	Metabolic bone diseases: Rickets
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DISCIPLINE**	**TOPIC**
	MEDICAL BIOCHEMISTRY	**Total Hours = 24**	
MS-B-001	Classify amino acids based on polarity, nutritional importance, and glucogenic/Ketogenic properties	Biochemistry	Classification of Amino acids
MS-B-002	Explain the structure, physical, chemical properties of amino acids and their biomedical importance		Amino Acids
MS-B-003	Classify proteins based on functions and physicochemical properties. Explain its biomedical importance. Distinguish between class A and B proteins. Discuss structure and functions of Fibrous proteins (collagen and Elastin)		Classification of Proteins
	Interpret diseases associated with them on basis of sign/symptoms and data	Integrate with Medicine	
MS-B-004	Explain the structural levels of proteins		

	Differentiate between alpha helix and beta pleated protein structures	Biochemistry	Structure of proteins
	Identify bondings at different levels of proteins		
MS-B-005	Describe the role of chaperons in protein folding.	Biochemistry	Protein misfolding
	Interpret disorders related to protein misfolding on basis of given data.	Integrate with pathology & Medicine	
	Describe the biochemical basis of Alzheimer's disease/ prion disease.		
MS-B-006	Describe biomedical importance of Mono-, Oligo and Polysaccharides.	Biochemistry	Carbohydrates Chemistry
	Discuss isomerization of carbohydrates		
	Explain physical and chemical properties of carbohydrates		
	Differentiate proteoglycan and glycoprotein and explain their functions		
MS-B-007	Describe the components of extracellular matrix.		ECM and collagen synthesis
	Describe the sources, metabolism, and biochemical functions of vitamin C		
	Describe structure, functions, and clinical significance of glycosaminoglycans.		
	Interpret the importance of vitamin C in collagen synthesis.		
MS-B-008	Identify the defects in collagen synthesis based on given data. (Osteogenesis Imperfecta)	Integrate with Medicine	Vitamin D metabolism
	Explain dietary sources, metabolism and biochemical functions of vitamin D	Biochemistry	
	Interpret Rickets and osteomalacia on basis of sign. Symptoms and clinical data	Integrate with Medicine/Orthopedics	

MS-B-009	Explain dietary sources, metabolism and biochemical functions of calcium and phosphate	Biochemistry	Calcium and Phosphate metabolism
	Discuss regulation of calcium metabolism in bone metabolism and role of parathyroid and calcitriol in it		
	Interpret hyper and hypocalcemic conditions on basis of sign/symptoms and clinical data	Integrate with Medicine	
MS-B-010	Interpret genetic basis of Duchene muscular dystrophy	Integrate with Pathology	Genetic basis of disease

PRACTICAL			
CODE		**Total Hours = 6**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
MS-B-011	Detection of amino acids by paper chromatography.	Bio-chemistry	Chromatography
MS-B-012	Estimation of total proteins by kit method/dipstick methods.		Total proteins
MS-B-013	Estimation of albumin and globulin		Albumin/ globulin
MS-B-014	Detection of calcium by micro lab.		Calcium
MS-B-015	Prepare different types of solution Molar, Molal, Normal and percentages.		Solutions

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS			
		Total Hours = 4+7=11	
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DISCIPLINE**	**TOPIC**
MS-Ph-001	Explain the mechanism by which drugs can stimulate NMJ.	Pharmacology & Therapeutics	Drugs acting on Neuromuscular Junction (NMJ)
	Explain the mechanism by which drugs can block NMJ.		
MS-Ph-002	Outline the pharmacological concepts of drugs used in Myasthenia gravis		Drugs in Myasthenia Gravis
MS-Ph-003	Outline the pharmacological concepts of drugs used as local anesthetics.		Local Anesthetics

MS-Pa-001	Describe the hyperplasia, hypertrophy, and atrophy of muscle fiber	Pathology	Muscle remodeling
	Explain the histopathological basis of leiomyoma		
MS-Pa-002	Describe the histological basis of Duchenne Muscular Dystrophy		Diseases of Muscle
	Describe the histopathological basis and clinical presentation of Alzheimer`s Disease, Multiple Sclerosis and Astrocytoma		
MS-Pa-003	Describe the clinical presentation and histological justification for osteoporosis, osteopetrosis		Diseases of Bone
	Describe the histological basis for bone repair after fractures		
MS-Pa-004	Describe the histological basis for cartilage growth and repair		Disease of Cartilage

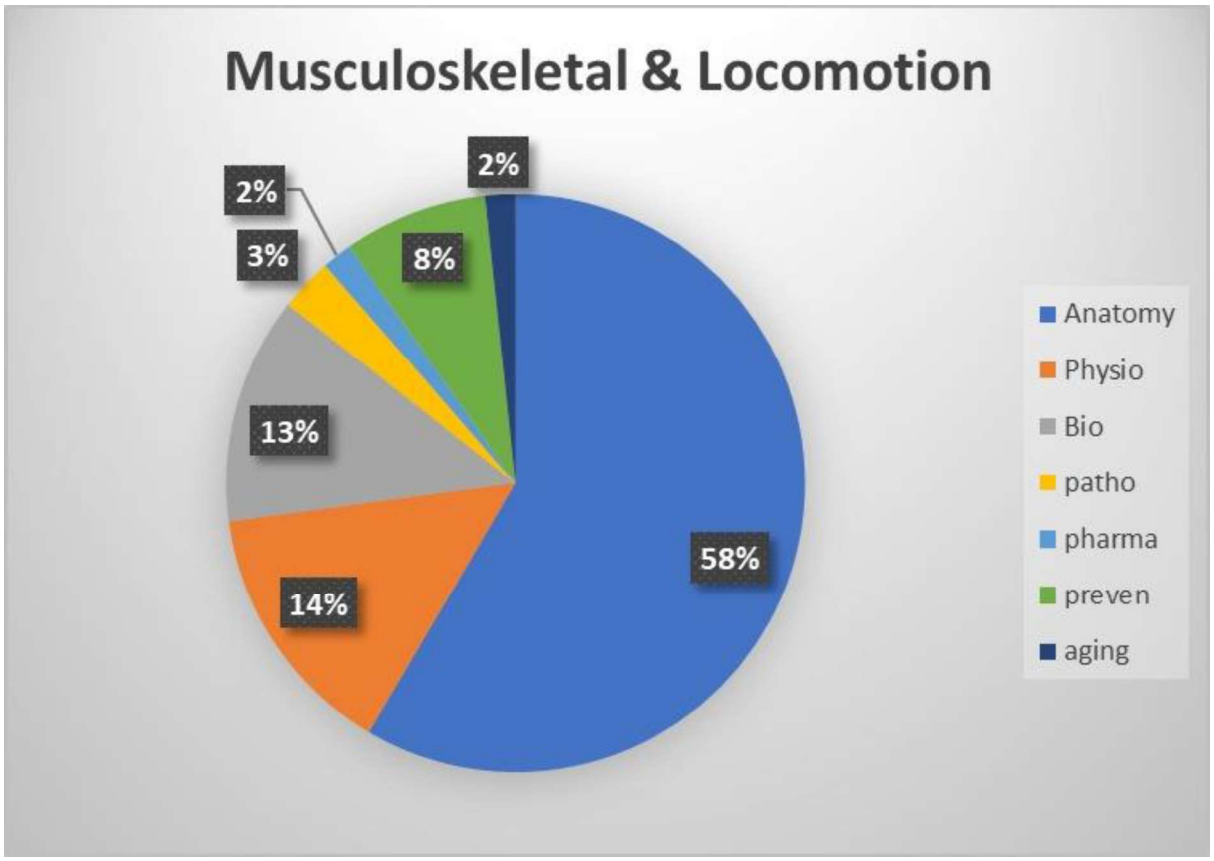
AGING			
CODE	**Theory**	**Total Hours = 4**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
MS-Ag-001	Discuss the effect of age on bone fragility and its implications with management.	Geriatrics/ Medicine/ Biochemistry	Bone
MS-Ag-002	Discuss the effect of age on loss of cartilage resilience and its implications and management		Cartilage
MS-Ag-003	Discuss the effect of age on Muscular strength and its implications and management		Muscle
MS-Ag-004	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			
CODE		**Total Hours = 16+3=19**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**

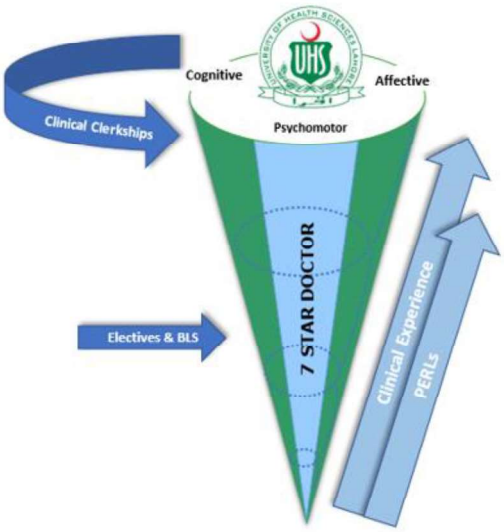
MS-CM-001	Explain causes of low back pain	Community Medicine and Public Health	Back Pain
	Describe prevention of low back pain		
MS-CM-002	Describe causes and prevention of musculoskeletal disorders (MSD)related to child labour		MSD related to child labour
MS-CM-003	Describe work related musculoskeletal disorders addition with its burden/epidemiology		Work related Musculoskeletal disorders
	Identify risk factors of MSD at workplace		
	Describe prevention of exposure to risk factors related to workplace		
MS-CM-004	Describe MSD related to mobile addition with its burden/epidemiology	Community Medicine and Public Health	MSD related to mobile usage
	Identify risk factors relates to MSD due to excessive mobile usage.		
	Describe the preventive strategies for mobile addiction related MSD.		
MS-CM-005	Describe application of ergonomics in MSD related to above disorders.	Community Medicine and Public Health	Ergonomics
MS-CM-006	Describe the concept of non-communicable diseases		Non-communicable disease
MS-CM-007	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 community.		
MS-BhS-001	Identify and deal with the various psychosocial aspects of Musculoskeletal conditions (such as Osteoarthritis, Osteomyelitis, Rheumatoid arthritis, Gout, chronic back pain, psycho-somatic complaints) and Neuromuscular conditions (Muscular dystrophy, Myasthenia	Behavioral Sciences	Psychosocial factors influencing chronic illnesses

	Gravis, Sclerosis) on Individual, Family and Society.		
MS-BhS-002	Identify the psychosocial risk factors as mediating factors between illness and its effect.		Psychosocial Impact of Disease and its management
	Discuss the role of psychological variables like coping, social support, and other health cognitions in mediating between illness and its effect.		

Module Weeks	**8**
Recommended Minimum Hours	**236**



Section 6

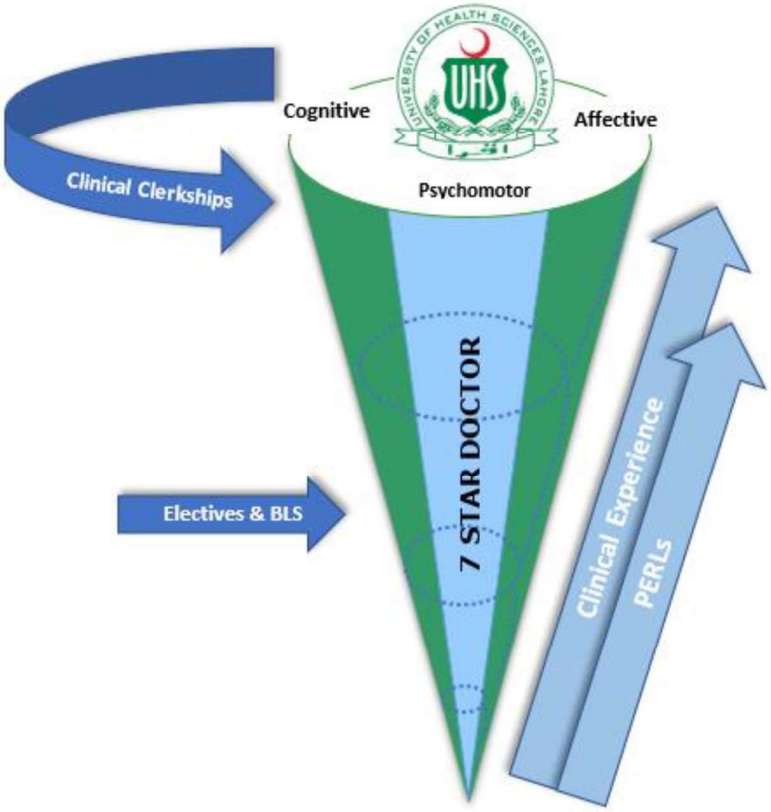


Curriculum 2K23

Block 3 Modules

Cardiovascular-I Module

Modular Integrated Undergraduate Curriculum



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 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 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

CURRICULUM OF INDIVIDUAL SUBJECTS

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.

NORMAL STRUCTURE			
Theory			
CODE	**SPECIFIC LEARNING OUTCOMES**	**DISCIPLINE**	**TOPIC**
	GROSS ANATOMY	**TOTAL HOURS = 14**	
CV-A-001	Define mediastinum giving its boundaries and compartments. List the contents of its various compartments.	Human Anatomy	Mediastinum
	Justify the clinical picture of superior mediastinum syndrome anatomically	Integrate with Surgery	
	Describe the formation, tributaries, and termination of superior vena cava	Human Anatomy	
	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 neurovascular supply and lymphatic drainage	Human Anatomy	Pericardium
	Describe the pericardial cavity mentioning transverse and oblique sinuses. Discuss their clinical significance		
	Describe the surgical significance of pericardial sinus	Integrate with Surgery	

	Describe the anatomical correlates of pericardial rub, pericardial pain, pericarditis, pericardial effusion, and cardiac tamponade.	Integrate with Medicine	
	Describe the anatomical basis for pericardiocentesis.		
CV-A-003	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 basis for cardiac catheterization		
	Describe the anatomical correlates of electrocardiography, heart block, atrial fibrillation, artificial cardiac pacemaker, cardiac referred pain	Integrate with Medicine	
	Describe the anatomical basis for echocardiography, coronary angiography, angioplasty, and coronary grafts	Integrate with Cardiology/ Medicine	Heart
	Describe the features of angina pectoris and myocardial infarction and correlate them anatomically		
	Describe the venous drainage of heart.	Human Anatomy	
	Describe the alternative venous routes to the heart		
	Identify the vessels supplying the heart with their origins/terminations		
	Describe the Lymphatics of heart		

	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 on CT/ MRI	Integrate with Radiology	
CV-A-004	Describe the surgical importance of pericardial sinus	Surgery	Pericardial sinus
CV-A-005	Discuss the anatomical principles of Varicose Veins	Surgery	Varicose Veins
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DISCIPLINE**	**TOPIC**
	EMBRYOLOGY & POST-NATAL DEVELOPMENT	**TOTAL HOURS = 14**	
CV-A-006	Describe the early development of heart and blood vessels	Human Embryology	Introduction
CV-A-007	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)		
CV-A-7a	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		
CV-A-008	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-009	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-010	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-011	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-012	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		
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DISCIPLINE**	TOPIC
	MICROSCOPIC ANATOMY (HISTOLOGY & PATHOLOGY)	Total Hours = 4	
CV-A-013	Describe the microscopic and ultramicroscopic structure of cardiac muscle emphasizing on T-tubules, sarcoplasmic reticulum and intercalated discs.	Histology	Cardiac Muscle
	Identify, draw and label histological structure of cardiac muscle		
CV-A-014	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-015	Describe histological features of arteries: Muscular arteries, elastic arteries, Arterioles	Histology	Arteries

CV-A-016	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-017	Describe the histopathological basis of thrombus and embolus formation.	Integrate with Pathology	Thrombus/ Embolus formation
CV-A-018	Explain the histological basis of arteriosclerosis and atherosclerosis	Histology	Arteriosclerosis atherosclerosis
CV-A-019	Describe role of arterioles in hypertension		Hypertension

PRACTICAL			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DISCIPLINE**	**TOPIC**
	Histology	**Total Hours = 3**	
CV-A-020	Identify, draw and label histological structure of cardiac muscle	Histology	Histological features of Cardiac Muscle
CV-A-021	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 = 75	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
CV-P-001	Explain the physiological anatomy of 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.	Physiology	Cardiac Muscle
	Define and give the duration of the Absolute and relative refractory period in cardiac muscle.		
	Draw & explain pressure & volume changes of left ventricle during cardiac cycle.		
	Explain & draw relationship of ECG with cardiac cycle.		
	Explain & draw the relationship of heart sounds with cardiac cycle.		
	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.		

	Explain the ectopic pacemaker.	Integrate with Cardiology/ Medicine	
CV-P-004	Enlist, draw, and explain the physiological basis & give durations of waves, intervals, and segments of normal ECG.	Physiology	Fundamentals of ECG
	Describe the standard limb leads, Augmented limb leads & precordial leads.		
	Define Einthoven's Triangle & Einthoven's law.		
	Explain the physiological basis of upright T wave in normal ECG.		
	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	
	Define bradycardia and enlist its causes.		

	Classify arrhythmias	Physiology	Cardiac arrhythmia
	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 1st, 2nd & 3rd degree heart block.		
	Explain the cause, physiological basis & ECG changes in Stokes Adam syndrome/ventricular escape.	Physiology	
	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 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 ventricular fibrillation.		
	Explain the causes, physiological basis, features & ECG changes of atrial 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	Discuss acute local control of local blood flow.	Physiology	Local & Humoral Control of Blood flow
	Discuss acute humoral control of local blood flow.		
	Explain long term control of local blood flow.		
	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 angiotensin system for long term control of blood pressure.	Physiology	Role of 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 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
	Explain the pathological causes of high & low 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	
	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	Circulatory shock
	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.	Physiology	
	Explain the mechanisms that maintain the cardiac output & arterial blood pressure in non-progressive shock.		
	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	
CV-P-018	Classify different types of heart failure	General Medicine/ Cardiology	Heart Failure
	Discuss the signs and symptoms of Heart failure.		
	Discuss the management of Heart failure.		
CV-P-019	Discuss the signs and symptoms of: Arrhythmias.		Arrhythmias
	Discuss the management of Arrhythmias.		
CV-P-020	Enlist various categories of ischemic heart diseases		Ischemic Heart Disease (IHD)
	Discuss the signs and symptoms of ischemic heart diseases		
	Discuss the management of ischemic heart diseases.		
	Discuss the signs and symptoms of: Hypertension.		

CV-P-021	Discuss the management of Hypertension.		Hypertension
CV-P-022	Enlist various valvular heart diseases Identify presentations and signs and symptoms of valvular heart diseases Outline management strategies		Valvular Heart Diseases
CV-P-023	Identify various pericardial diseases Identify presentations and signs and symptoms Outline management strategies	General Medicine/ Cardiology	Pericardial Diseases
CV-P-024	Identify various endocardial and myocardial diseases Identify presentations and signs and symptoms Outline management strategies	General Medicine/ Cardiology	Endocardial and myocardial diseases
CV-P-025	Define Peripheral arterial diseases Identify symptoms and signs of PAD Outline management strategies	General Medicine	Peripheral Arterial Diseases (PAD)
CV-P-026	Enlist various sites of venous thromboembolism Identify various symptoms and signs of DVT Identify various symptoms and signs of pulmonary embolism Outline management strategies	General Medicine, Surgery	Venous thrombo-embolism
CV-P-027	Identify the salient features of heart and great vessels on CT/ MRI Discuss the principles of cardiac catheterization	Radiology	Imaging in CVS disorders
CV-P-028	Justify the clinical picture of superior mediastinum syndrome anatomically	Surgery	Superior mediastinum Syndrome
CV-P-029	Describe Fetal and neonatal circulation mentioning transitional neonatal circulation with it clinical implication	Pediatrics, Obgyn	Fetal circulation at Birth

CV-P-030	Psychological basis of emotional fainting and its impact	Behavioral Sciences	Emotional fainting
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DISCIPLINE**	**TOPIC**
	MEDICAL BIOCHEMISTRY	**Total Hours = 30**	
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. Discuss lipid peroxidation and its significance	Biochemistry	Classification of fatty acids
CV-B-004	Explain the biochemical and therapeutic roles of eicosanoids (prostaglandins, leukotrienes, thromboxane, and prostacyclin)	Biochemistry	Eicosanoids
CV-B-005	Describe the types, structure, biomedical importance of Lipoproteins Discuss the synthesis, transport and fate of Lipoproteins	Biochemistry	Circulation Lipoproteins
CV-B-006	Interpret the disorders associated with impairment of lipoprotein metabolism especially atherosclerosis and LDL oxidized	Biochemistry	Hyperlipidemias
CV-B-007	Explain the sources, properties, and biomedical role of cholesterol Describe the reactions of cholesterol biosynthesis and its regulation & fate. Discuss Genetic basis of the Hypercholesterolemia	Biochemistry	Cholesterol

CV-B-008	Describe enzymes with reference to: • Active sites • Specificity • Catalytic efficiency •Cofactor • Coenzyme • Holoenzyme • Apoenzyme • Prosthetic group • Zymogens • Location	Biochemistry	Hypercholesterolemia
CV-B-009	Classify enzymes according to the reaction they catalyze.	Biochemistry	Enzymes
	Explain the mechanism of enzyme action from reactants to products (catalysis). a) Illustrate enzyme kinetics in relation to MM Equation & Lineweaver- Burke plot		
	Discuss the effect of various factors (with special reference to Km/V max) on enzymatic activity. • Substrate concentration • Temperature • PH • Enzyme concentration		
	Explain the regulation of enzymatic activity. a) Compare allosteric regulation with regulation by covalent modification. b) Discuss the effect of inhibitors on enzymatic activity which includes: • Competitive inhibition • Uncompetitive inhibition c) Interpret the effect of organophosphorus poisoning on enzyme activity on basis of given data		

	Explain the application of enzyme in clinical diagnosis and therapeutic use	Integrate with Medicine/ Cardiology	
CV-B-010	Discuss the signs and symptoms of hyperlipidemia	Biochemistry / Medicine	Type I to V hyperlipidemias
	Interpret data related to hyperlipidemia		

PRACTICAL			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**Total Hours = 10+08=18**	
		DISCIPLINE	**TOPIC**
CV-P-031	Record an electrocardiogram by correct lead placement and connections.	Physiology	ECG
CV-P-032	Perform auscultation of chest to recognize normal heart sounds.		Heart Sounds
CV-P-033	Examine neck veins to determine Jugular Venous Pulse.		JVP
CV-P-034	Examine arterial pulse to recognize normal characteristics of pulse.		Arterial Pulse
CV-B-011	Perform estimation of Cholesterol by kit method	Biochemistry	Cholesterol Estimation
CV-B-012	Perform estimation of HDL, LDL		HDL, LDL Estimation
CV-B-013	Estimation of cardiac markers		Cardiac Marker Estimation
CV-B-014	Interpret lab reports based on enzymes for diseases like cardiac disorders and hyperlipidemias		Interpretation of Lab report

AGING			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**Total Hours = 5**	
		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

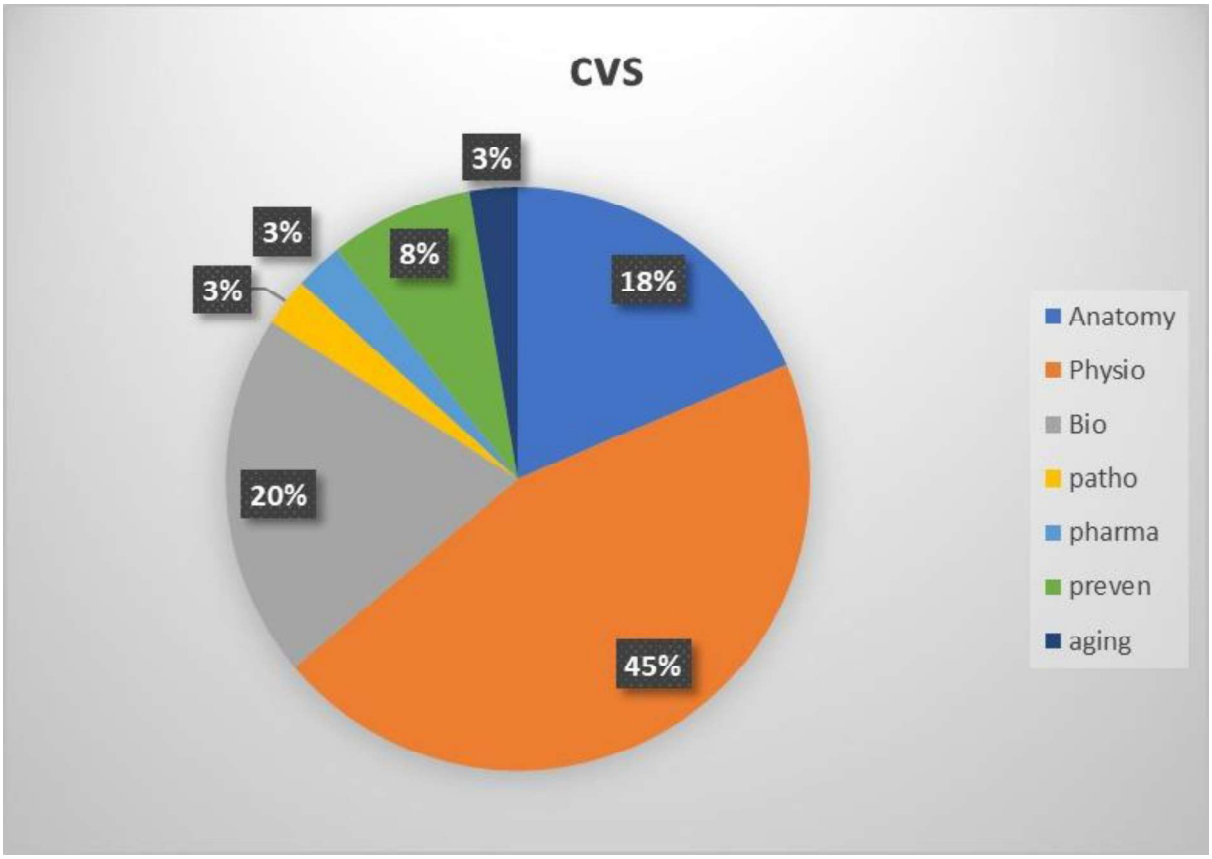
PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS			
		Total Hours = 5+5= 10	
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DISCIPLINE**	**TOPIC**
CV-Pa-001	Classify types of thrombosis, embolism, and infarction	Pathology	Hemodynamics and CVS
CV-Pa-002	Discuss the pathophysiology of thrombosis, embolism, and infarction		Atherosclerosis
CV-Pa-003	Identify the types and causes of hypertension		Hypertension
CV-Pa-004	Discuss the pathophysiology of atherosclerosis, hypertension, and shock		Shock
CV-Pa-005	Discuss the clinical consequences of hypertension and atherosclerosis		Cardiac Failure
	Classify the types of heart failure		
	Identify the causes leading to heart failure		

CV-Pa-006	Identify the types of ischemic heart disease Discuss the pathophysiology of different types of ischemic heart disease		Ischemic Heart Disease
CV-Ph-001	Outline the pharmacological concepts of drugs used in hypertension.	Pharmacology	Antihypertensive drugs
CV-Ph-002	Outline the pharmacological concepts of drugs used in angina.		Antianginal drugs
CV-Ph-003	Outline the pharmacological concepts of drugs used in arrythmias.		Antiarrhythmics drugs
CV-Ph-004	Outline the pharmacological concepts of drugs used in cardiac failure.		Drugs for cardiac failure
CV-Ph-005	Outline the pharmacological concepts of drugs used in peripheral vascular diseases.		Drugs for peripheral vascular diseases

DISEASE PREVENTION & IMPACT			
CODE		**Total Hours = 15**	
	SPECIFIC LEARNING OBJECTIVES	**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 behavioral change interventions at community level.		Behavioral Change Intervention
CV-CM-005	To apply secondary and tertiary preventions on CVS diseases (coronary heart disease, ischemic heart disease, hypertension)		Secondary & Tertiary Prevention

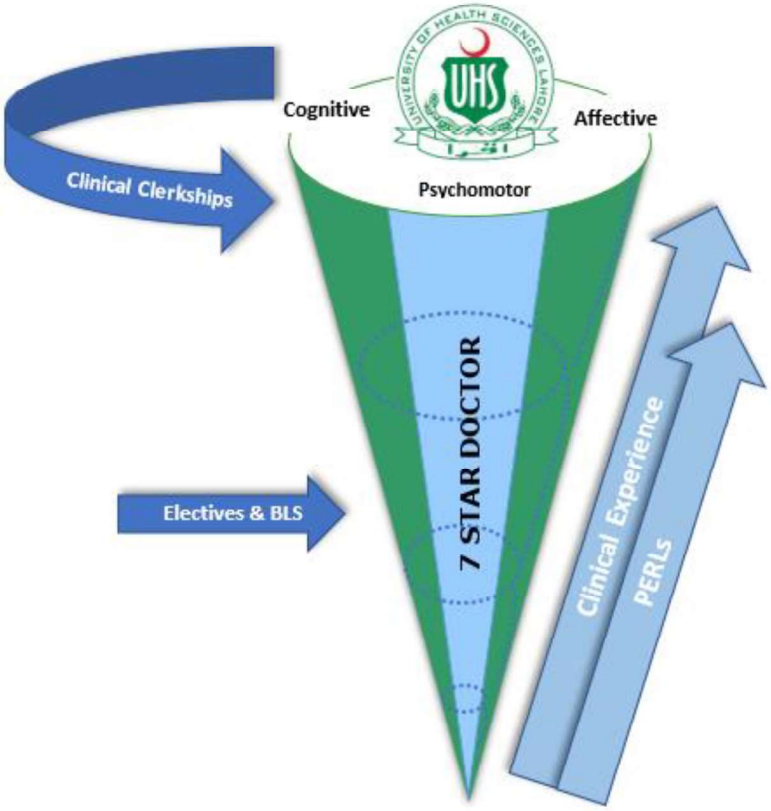
CV-CM-006	Describe the concept of cardiovascular diseases as non-communicable diseases		Non-communicable disease
CV-CM-007	Identify the risk factors in the community for CVS diseases.		Risk factor assessment of CVS diseases
	Learn and apply interventions to prevent the risk factors in community.		
CV-BhS-001	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

Module Weeks	7
Recommended Minimum Hours	188



Respiratory-1 Module

Modular Integrated Undergraduate Curriculum



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

At the end of this module the students will be able to: • 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

CURRICULUM OF INDIVIDUAL SUBJECTS

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.

NORMAL STRUCTURE

Theory

CODE	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC
	GROSS ANATOMY	**TOTAL HOURS =30**	
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 inlet syndrome & 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 and give their attachments.		
	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		
	Describe the anatomical correlates of intercostal incisions	Integrate with Surgery	

Re-A-006	Describe the anatomical features and attachments on typical & atypical thoracic vertebrae.	Human Anatomy	Thoracic Vertebrae
	Differentiate between typical and atypical vertebrae		
	Explain the thoracic part of vertebral column (normal curvature, intervertebral joints, muscles & fascia of the back, blood supply, lymphatic drainage, nerve supply of back) Associated Clinical conditions -Kyphosis, Scoliosis		
Re-A-007	Describe the bony features and attachments on the sternum	Human Anatomy	Sternum
	Describe the anatomical correlates of median sternotomy.	Integrate with Surgery	
	Describe the anatomical correlates of sternal biopsy.		
	Describe the presentation of sternal fractures and correlate it anatomically	Integrate with Orthopedics	
Re-A-008	Describe the endo thoracic fascia with its attachments.	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.	Human Anatomy	Joints of thorax
	Describe the mechanism of thorax: pump handle and bucket handle movements.		
Re-A-010	Describe the origin, course, relations and distribution of intercostal nerves and vessels	Human Anatomy	Neurovascular supply of thorax
	Describe the course and relations of Internal thoracic vessels.		

	Describe the alternate routes of venous drainage in blockage of superior/ inferior vena cava	Integrate with medicine	
Re-A-011	Describe the cutaneous nerve supply and dermatomes of thorax.	Human Anatomy	Cutaneous nerve supply of thorax
	Give anatomical justification of the manifestations of herpes zoster infection on thoracic wall.	Integrate with medicine	
	Discuss anatomical correlates of intercostal nerve block	Integrate with Anesthesia	
Re-A-012	Name the parts of diaphragm mentioning their attachments and neurovascular supply	Human Anatomy	Diaphragm
	Explain the role of diaphragm in respiration		
	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	Human Anatomy	Pleural cavity
	Describe the pleural cavity giving its recesses and the lines of pleural reflection		
	Describe the anatomical correlates of pleural pain pleurisy, pneumothorax, pleural effusion	Integrate with Medicine	
	Describe the anatomical features, relations of lungs	Human Anatomy	Lungs
Re-A-014	Describe the neurovascular supply and lymphatic drainage of 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		
	Explain the pathophysiology of Atelectasis.	Integrate with pulmonology	
	Describe the anatomical correlates of bronchoscopy	Integrate with pulmonology	
	Describe the anatomical basis for medico-legal 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	
	EMBRYOLOGY & POST-NATAL DEVELOPMENT	**TOTAL HOURS = 6**	
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
	Describe the embryological basis of congenital anomalies of the diaphragm: diaphragmatic hernias, eventuation of diaphragm, epigastric hernia, hiatal hernia, retrosternal hernia	Integrate with Pediatrics	
Re-A-017	Describe the development of upper respiratory tract: larynx and trachea	Human Embryology	

	Describe congenital anomalies of larynx and trachea: laryngeal web, laryngeal atresia, tracheal stenosis and atresia.	Integrate with Pediatrics	Upper respiratory tract
	List the types of tracheo-esophageal fistulas. Describe their embryological basis and clinical presentation	Integrated with Surgery	
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 and clinical presentation of respiratory distress syndrome/Hyaline membrane disease.	Integrate with Pediatrics	
	MICROSCOPIC STRUCTURE	**Total Hours = 4**	
Re-A-019	Give the general histological organization of respiratory system.	Histology	Organization of respiratory system
Re-A-020	Describe the microscopic and ultra-microscopic structure of respiratory epithelium	Histology	Respiratory epithelium
Re-A-021	Describe the histology of blood-air barrier	Histology	blood-air barrier
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	histology	trachea and lungs
Re-A-024	Explain the histological basis of: Coughing Atelectasis Infant respiratory distress syndrome Diffuse alveolar damage Lung carcinoma	Integrate with pathology	Clinical correlates

Practical			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DISCIPLINE**	**TOPIC**
	Histology	**Total Hours = 5**	
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 ORGAN FUNCTION			
Theory			
	MEDICAL PHYSIOLOGY	**Total Hours = 45**	
CODE	**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 lung compliance		Lung Compliance
	Enlist the factors that affect lung compliance		

	Draw the compliance diagram of air filled and saline filled lungs	Medical Physiology	
	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 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 FEV1/FVC ratio in relation to pulmonary embolism	Integrate with medicine	
Re-P-004	Define alveolar ventilation.	Medical Physiology	Alveolar ventilation
	Define minute respiratory volume		
Re-P-005	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-006	Explain the different forms of transport of oxygen in the blood	Medical Physiology	Transport of oxygen in the blood

	Draw and explain oxyhemoglobin dissociation curve		
	Enlist the factors that cause rightward shift of oxyhemoglobin dissociation curve.		
	Enlist the factors that cause leftward shift of oxyhemoglobin dissociation curve		
	Explain the Bohr's effect		
	Define; enlist the types, and causes of cyanosis	Integrate with Medicine	
Re-P-007	Enlist different forms in which CO2 is transported in the blood.	Medical Physiology	Transport of CO2 in blood
	Explain the Carboxyhemoglobin dissociation curve.		
	Explain the Haldane effect.		
	Explain the chloride shift/Hamburger phenomenon.		
	Define the respiratory exchange ratio (RER)		
Re-P-008	Explain the alveolar oxygen and carbon dioxide pressure when VA/Q = infinity, zero and normal	Medical Physiology	VA/Q (Ventilation Perfusion Ratio)
	Explain the concept of physiological shunt when VA/Q ratio is less than normal		
	Explain the concept of physiological dead space when VA/Q ratio is above normal		
Re-P-009	Enlist the respiratory & non-respiratory functions of lungs.	Medical Physiology	Protective Reflexes
	Explain the nervous control of bronchiolar musculature		
	Trace the reflex arc of cough reflex and sneeze reflex		
Re-P-010	Explain the principal 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-011	Explain the pathophysiology, features, prevention and treatment of decompression sickness.	Medical Physiology	Deep sea diving
Re-P-012	Draw and explain the effect of CO poisoning on oxyhemoglobin dissociation curve	Medical Physiology	CO poisoning
	Explain the pathophysiology, features, and treatment of CO poisoning.	Integrate with medicine	
Re-P-013	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-014	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-015	Explain the regulation of Respiration during Exercise	Medical Physiology	Exercise and respiration
Re-P-016	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-017	Explain the pathophysiology of Tuberculosis.	Integrate with pathology	Tuberculosis
Re-P-018	Describe the pathophysiology of Pneumonia	Integrate with pathology	Pneumonia
Re-P-019	Define Dyspnea	General Medicine	Dyspnea
	Enlist different causes of dyspnea		
	Differentiate between cardiac and respiratory dyspnea		

	Outline management strategies for dyspnea		
Re-P-020	Enlist the causes of Pneumothorax	Surgery	Pneumothorax
	Describe the signs and symptoms of Pneumothorax		
Re-P-021	Enlist the causes of Pleuritis		Pleuritis
	Describe the signs and symptoms of Pleuritis		
	Discuss the management of Pleuritis		
Re-P-022	Enlist the causes of Bronchitis	General Medicine	Bronchitis
	Discuss the signs and symptoms of Bronchitis		
	Discuss the management of Bronchitis		
Re-P-023	Classify different types of pneumonia		Pneumonia
	Discuss the sign symptoms of pneumonia		
	Discuss the management of pneumonia		
Re-P-024	Classify different types of asthma		Asthma
	Discuss the signs and symptoms of asthma		
	Discuss the management of asthma		
Re-P-025	Classify different types of Tuberculosis		Tuberculosis
	Discuss the signs and symptoms of tuberculosis		
	Discuss the management of Tuberculosis		
Re-P-026	Classify different types of acute respiratory distress syndrome	General Medicine	Acute respiratory distress syndrome
	Discuss the signs and symptoms of acute respiratory distress syndrome		
	Discuss the management of acute respiratory distress syndrome		
Re-P-027	Define respiratory failure	General Medicine	Respiratory Failure
	Describe various types of respiratory failure		
	Enlist various causes of respiratory failure		
	Outline management strategies of respiratory failure		
Re-P-028	Describe ABC in a trauma patient	Surgery	First Aid in Surgical Patients

MEDICAL BIOCHEMISTRY		Total Hours = 15	
Re-B-001	Explain and interpret the pedigree of single gene defect i.e., Emphysema and cystic fibrosis (autosomal recessive)	Medical Biochemistry	Genetic defects
Re-B-002	Explain the biochemical significance of phospholipids	Medical Biochemistry	Phospholipids
	Interpret Respiratory Distress syndrome on the basis of given data	Integrate with Physiology	
Re-B-003	Describe the structure, synthesis, degradation and functions of Elastin	Medical Biochemistry	Elastin
	Discuss the pathophysiology of Emphysema.	Integrate with Pathology	
Re-B-004	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	**PRACTICAL**	**Total Hours = 10**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
Re-P-029	Perform the clinical examination of chest for the respiratory system (inspection, palpation, percussion, Auscultation)	Medical Physiology	Clinical Examination of Chest
Re-P-030	Determine Peak Expiratory Flow rate with Peak Flow Meter		Peak Expiratory Flow rate measurement
Re-P-031	Determine Blood Oxygen Saturation with finger Pulse Oximeter		Oxygen Saturation

Re-P-032	Determine Respiratory Volumes & Capacities with Spirometer/ Spiro lab. (FEV1/FVC ratio)		Spirometry
Re-P-033	Student should be able to Record the movements of chest by stethograph		Chest movements
Re-B-005	Determine the pH of the solution by pH meter	Medical Biochemistry	Determination of pH

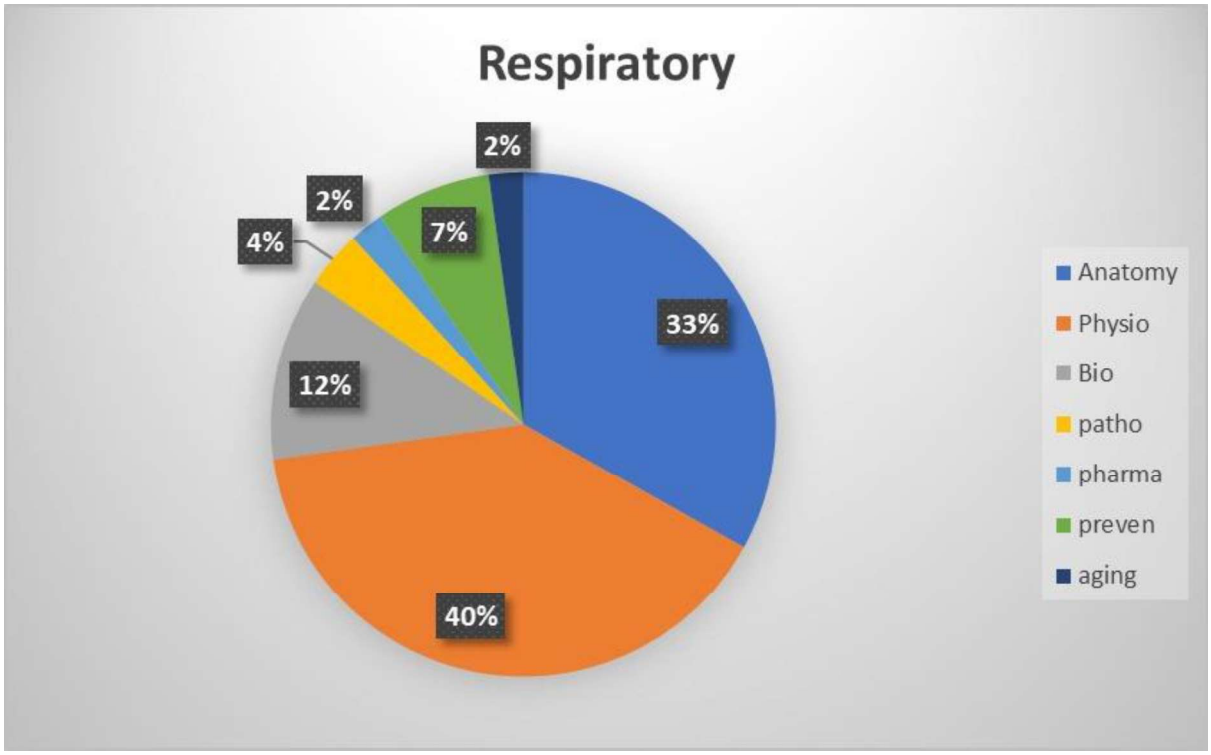
PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS			
		Total Hours = 5+3	
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DISCIPLINE**	**TOPIC**
Re-Ph-001	Identify the drugs for cough suppression & expectoration	Pharmacology & Therapeutics	Cough Suppressants
	Explain the mechanism of action and adverse effects of cough suppressants		
Re-Ph-002	Explain the mechanism of action and adverse effects of anti-histamines		Anti-histamines
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

AGING			
CODE	**Aging theory**	**Total Hours = 3**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
Re-Ag-001	Discuss the effect of age on decreased lung compliance	Pathology	Age-induced lung fibrosis
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

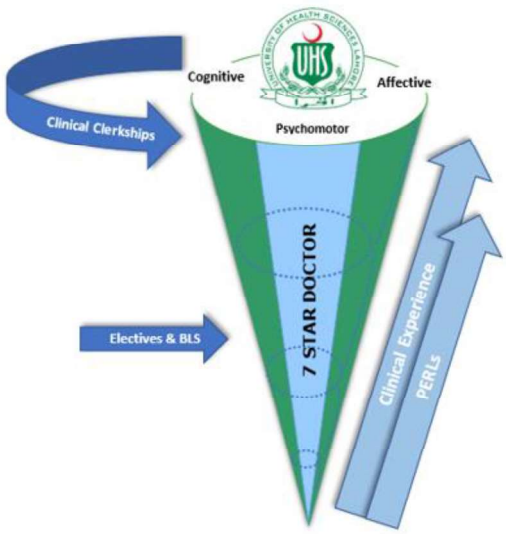
DISEASE PREVENTION & IMPACT			
CODE		**Total Hours = 10**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
Re-CM-001	Identify the common risk factors of acute respiratory infections with emphasis on smoking	Community Medicine and Public Health	Prevention of acute respiratory infections (ARI)
	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 infections	Integrate with Biochemistry	
Re-CM-002	Explain the effect of air pollutants on the respiratory system		Interaction of environment &

		Community Medicine and Public Health	Respiratory system
Re-CM-003	Describe the burden of respiratory diseases		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

Module Weeks	4
Recommended Minimum Hours	136



Section 7



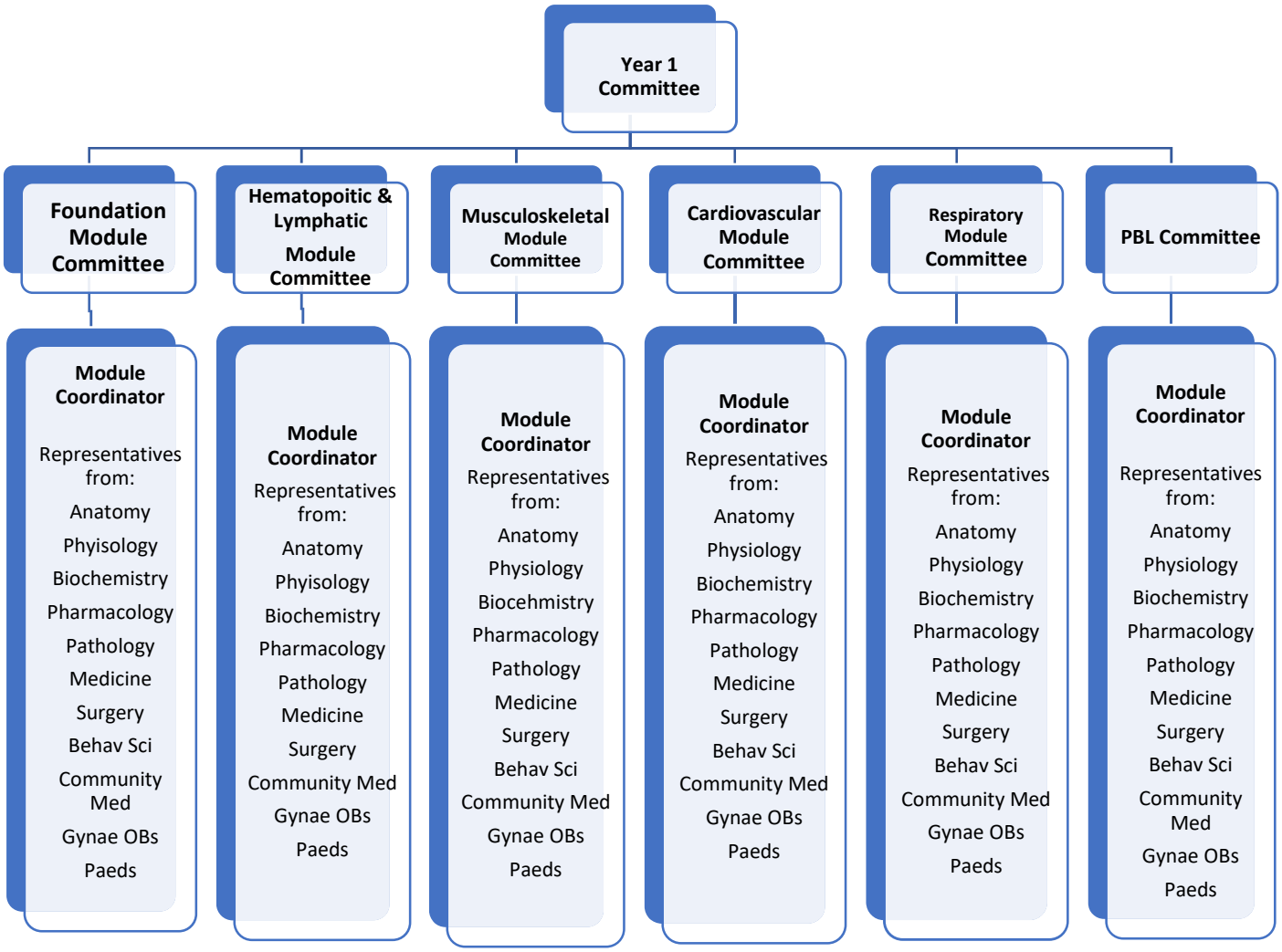
Curriculum 2K23

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.**
- 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

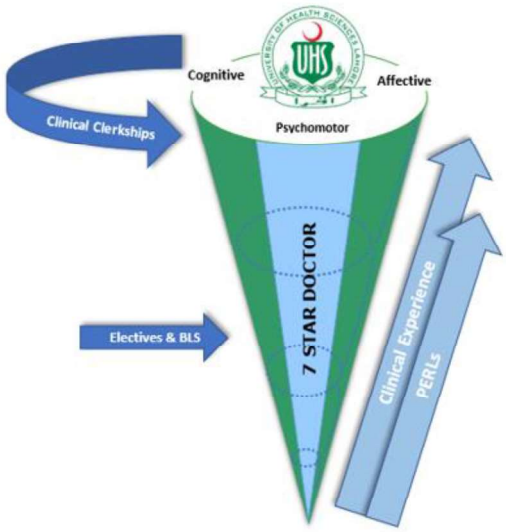
Case Presentations

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 8



Curriculum 2K23

Assessment Policy

Statutes

1. The First Professional MBBS Examination shall be held at the end of first year MBBS class.
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/Ethics 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 four papers in the professional examination. Three papers shall be based on contents of three Blocks and the fourth paper on contents of Islamic Studies/Ethics and Pakistan Studies:
    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;
    d. Paper 4 will be based on contents of Islamic Studies/Ethics and Pakistan Studies.
4. Each paper will comprise of 'Written' and 'Oral/Practical/Clinical' examinations except the paper of Islamic Studies/Ethics and Pakistan Studies, which shall comprise of written component alone.
5. The Written and Oral/Practical/Clinical examinations in each paper will carry 150 marks each, making the total marks of 300 for each paper of papers 1,2, and 3.
6. Total marks of the First Professional Examination will be 1000, however marks of Islamic Studies/Ethics and Pakistan Studies shall not be counted towards merit determination and determination of positions in the examination.
7. Major content areas of the year are 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 based on clinical correlations.
9. Minor content areas of the year are from Behavioral Sciences, Community Medicine & Public Health, Pathology, Pharmacology & Therapeutics, Clinical Foundation I and PERLs I.

10. Written Examination

    a. There will be one written paper in each of the Papers 1, 2, and 3.
    b. Each written paper will consist of 'One-best-type' Multiple Choice Questions (MCQ) and Structured Essay Questions (SEQ) in a ratio of 70:30 %.
    c. Each MCQ will have five options (one best response and four distractors) and will carry one (01) mark.
    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 Papers 1,2, and 3.
g. The duration of each written paper will be 180 minutes (03 hours).
h. The MCQ section will be 110 minutes duration and the SEQ section 70 minutes.

11. Oral/Practical/Clinical Examination

a. There will be an Oral/Practical/Clinical examination in each of Papers 1, 2, and 3.
b. There will be a total of twelve (12) OSPE/OSCE/Viva stations in each Oral/Practical/Clinical examination.
c. There will be seven (07) Observed OSPE stations from major subject areas.
d. There will be two (02) Observed OSCE stations, 01 from C-FRC1 and 01 from PERLs-1 in each Oral/Practical/Clinical examination.
e. There will be three (03) structured viva stations in each Oral/Practical/Clinical examination.
f. Each OSPE/ OSCE will carry eight (08) marks.
g. Each structured viva station will carry 16 marks (8 marks each for internal and external examiner)
h. The duration of each Oral/Practical/Clinical examination will be 150 minutes (2.5 hours).
i. Time for each OSPE and OSCE station will be eight (08) minutes.
j. Time for each structured viva station will be 20 min (10 min for each examiner)

12. Every candidate shall take the examination in the following Blocks/subjects in First Professional MBBS Examination: -

A.	Block 1 (Foundation + Hematopoietic & Lymphatic Modules)	300 Marks
B.	Block 2 (Musculoskeletal & Locomotion Module)	300 Marks
C.	Block 3 (Cardiovascular System + Respiratory Modules)	300 Marks
D.	Islamic Studies/Ethics and Pakistan Studies	100 Marks

A. Block 1 (Foundation + Hematopoietic and Lymphatic Modules)

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 85 marks and the time allotted shall be 110 minutes.
   ii. Part II shall have seven Structured Essay Questions (SEQs) of 35 marks and the time allotted shall be 70 minutes.

II. Oral/Practical/Clinical examination shall have 120 marks.

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 for the block. The score will be

equally distributed to the Written and Oral/Practical/Clinical Examinations.

B. Block 2 (Musculoskeletal & Locomotion Module)

The examination in Block 2 shall be as follows:-

I. One written paper of 120 marks having two parts:
   iii. Part I shall have eighty five Multiple Choice Questions (MCQs) of 85 marks and the time allotted shall be 110 minutes.
   iv. Part II shall have seven Structured Essay Questions (SEQs) of 35 marks and the time allotted shall be 70 minutes.

II. Oral/Practical/Clinical examination shall have 120 marks.

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 for the block. The score will be equally distributed to the Written and Oral/Practical/Clinical Examinations.

C. Block 3 (Cardiovascular System + Respiratory Modules)

The examination in Block 3 shall be as follows:-

I. One written paper of 120 marks having two parts:
   v. Part I shall have eighty five Multiple Choice Questions (MCQs) of 85 marks and the time allotted shall be 110 minutes.
   vi. Part II shall have seven Structured Essay Questions (SEQs) of 35 marks and the time allotted shall be 70 minutes.

II. Oral/Practical/Clinical examination shall have 120 marks.

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 for the block. The score will be equally distributed to the Written and Oral/Practical/Clinical Examinations.

D. <u>ISLAMIC STUDIES/ETHICS AND PAKISTAN STUDIES</u>

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

I. One written paper of 100 marks in Islamic Studies/Ethics and Pakistan Studies having two components:
   i. Islamic Studies/Ethics component having 60 marks, three (3) Long Essay Questions (LEQs) to be attempted out of five (5) Long Essay Questions (LEQs), having 20 marks each.

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

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

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

Table 1

Subject	**Theory**		**Practical**		**Total**
Block 1 (Foundation + Hematopoietic and Lymphatic Modules)	Part I MCQs Part II SEQS	85 Marks 35Marks	Oral and Practical / Clinical Examination	120 Marks	**300**
	Internal Assessment	30 Marks	Internal Assessment	30 Marks	
		150		**150**	
Block 2 (Musculoskeletal & Locomotion Module)	Part I MCQs Part II SEQS	85 Marks 35Marks	Oral and Practical / Clinical Examination	120 Marks	**300**
	Internal Assessment	30 Marks	Internal Assessment	30 Marks	
		150		**150**	
Block 3 (CVS & Respiratory)	Part I MCQs Part II SEQS	85 Marks 35Marks	Oral and Practical / Clinical Examination	120 Marks	**300**
	Internal Assessment	30 Marks	Internal Assessment	30 Marks	
		150		**150**	
				Total	**900**
***Islamic Studies/ Ethics and Pakistan Studies**	**Islamic Studies/Ethics** 3 LEQs to be attempted out of 5 LEQs			60 Marks	

	Pakistan Studies 2 LEQs to be attempted out of 4 LEQs	40 Marks	
		100	

14. The medium of instruction and assessment shall be English with option to attempt questions for Islamic Studies/Ethics and Pakistan Studies in Urdu.

15. No grace marks should be allowed in any examination or practical under any guise or name.

16. At least 25% MCQs & 25% SEQs should be based on applied/clinical/ case scenario to assess high order thinking in the papers set for the students of First Professional MBBS Examination.

Regulations

1. This examination shall be open to any student who:-
   a. has been enrolled/registered and completed one academic year preceding the first 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 / she is 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 alongwith the admission forms.
   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 three-fourth (75%) of the full course of lectures delivered and practical conducted in the particular academic session.
      (iii) Certificate of having passed the Block Examinations conducted by the college of enrolment with at least 50 % cumulative percentage in aggregate of blocks 1, 2 and 3.

   Candidates falling short of lectures or practical shall not be admitted to the examination but may be permitted to appear at the next examination if they attend 75% of the lectures delivered and practical conducted up to the commencement of the next examination by remaining on the rolls of a College as regular student.

2. The minimum number of marks required to pass this 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.
   However, the minimum number of marks required to pass the examination for Islamic Studies/Ethics and Pakistan Studies shall be thirty three percent (33%) in aggregate.

   ***Note:**

   i. Islamic Studies/Ethics and Pakistan Studies can be cleared any time before passing the Final Professional Examination.
   ii. The marks of Islamic Studies/Ethics and Pakistan Studies shall not contribute towards the total marks of the Professional Examination and determination of position.

3. If there is a discrimination of > 50 % marks awarded by the Internal and External Examiners in any segment then the University holds the right to review and or re-examine the individual case.
4. Candidates who secure eighty five percent (85%) or above marks in any of the papers in Blocks 1, 2 and 3 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 who does not pass in all the papers of the First Professional Examination as a whole at one and the same time, shall be declared to have passed "with distinction" in any paper.

5. A candidate failing in one or more paper of the annual examination shall be provisionally allowed to join second professional class till the commencement of supplementary examinations. The candidate, however, shall have to pass the failed paper in this supplementary examination, within 04 weeks, failing which he / she shall be detained in the first professional. Under no circumstances, a candidate shall be promoted to the second professional class till he / she has previously passed all the papers in the First Professional MBBS Examination.

   If a student appears in the supplementary examination for the first time as he/she did not appear in the annual examination and failed 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 First Professional 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 medical/dental studies for MBBS or BDS and shall not be eligible for fresh admission as a fresh candidate in either MBBS or BDS.

7. Every candidate shall forward his / her application for admission to the examination to the Controller of Examination, through the Principal of the College as per notified schedule, before the commencement of the examination accompanied by the prescribed fee.

8. The marks of internal assessment and the attendance , shall be submitted to Controller of Examinations three times, within two weeks of completion of each of Blocks 1, 2 and 3 examinations. Internal assessment received after commencement of the examination shall not be accepted.

9. A parent-teacher meeting should be scheduled by all institutes to inform the parents and subsequently the university about the attendance and internal assessment, after every block exam.

10. 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 respective departments of Medical Colleges.

11. Whenever completed admission form or the fee is received after the last date prescribed above, the candidate shall pay double the normal fee, as per schedule notified by the controller of examination before the commencement of the examination. A fine of Rs. 50000/- will also have to be deposited by the respective college.

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 favour of Treasurer, University of Health Sciences Lahore, along with Admission Forms.

MBBS 1st Professional

Paper 1

Theme	Subject	Written Exam			Oral/Practical/Clinical Exam			
					OSPE/OSCE/Viva Stations			
		MCQ (1 mark)	SEQ (5 mark each)	Marks	OSPE (08 marks each) Observed	OSCE (08 marks each) Observed	Structured Viva (16 marks each)	Marks
Normal Structure	Anatomy & applied/clinical	20	3	35	3	-	1	40
Normal Function	Physiology & applied/clinical	22	2	32	2	-	1	32
	Biochemistry & applied/clinical	22	2	32	2	-	1	32
Disease Burden & Prevention	Community Medicine & Public Health	05	-	05	-	-	-	-
	Behavioral Sciences	05	-	05	-	-	-	-
Pathophysiology and Pharmacotherapeutics	Pathology	06	-	06	-	-	-	-
	Pharmacology	05	-	05	-	-	-	-
CFRC	CF 1-1	-	-	-		1	-	8
PERLs	PERLs 1-1	-	-	-		1	-	8
		85	7x5=35	**120**	7 Stations x 08 = 56	2 Stations x 08 = 16	3 Vivas x 16 = 48	**120**

MBBS 1st Professional

Paper 2

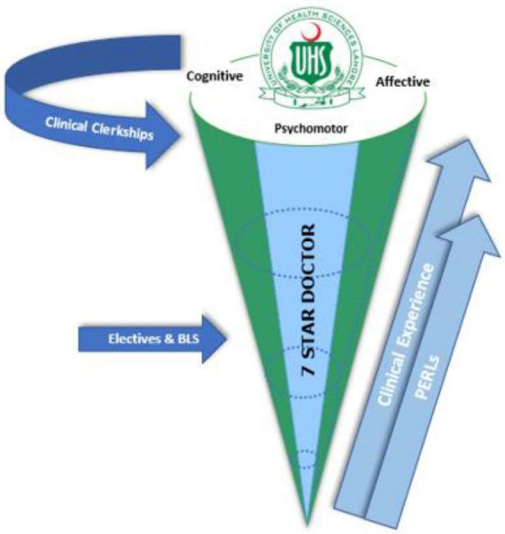
Theme	Subject	Written Exam			Oral/Practical/Clinical Exam			
					OSPE/OSCE/Viva Stations			
		MCQ (1 mark)	SEQ (5 mark each)	Marks	OSPE (08 marks each) Observed	OSCE (08 marks each) Observed	Structured Viva (16 marks each)	Marks
Normal Structure	Anatomy & applied/clinical	35	4	55	5	-	1	56
Normal Function	Physiology & applied/clinical	17	2	27	1	-	1	24
	Biochemistry & applied/clinical	11	1	16	1	-	1	24
Disease Burden & Prevention	Community Medicine & Public Health	06	-	06	-	-	-	-
	Behavioral Sciences	04	-	04	-	-	-	-
Pathophysiology and Pharmacotherapeutics	Pathology	07	-	07	-	-	-	-
	Pharmacology	05	-	05	-	-	-	-
CFRC	CFRC-1-2	-	-	-		1	-	08
PERLs	PERLs-1-2	-	-	-		1	-	08
		85	7x5=35	**120**	7 Stations x 08 = 56	2 Stations x 08 = 16	3 Vivas x 16 = 48	**120**

MBBS 1st Professional

Paper 3

Theme	Subject	Written Exam			Oral/Practical/Clinical Exam			
		MCQ (1 mark)	SEQ (5 mark each)	Marks	OSPE/OSCE/Viva Stations			Marks
					OSPE (08 marks each) Observed	OSCE (08 marks each) Observed	Structured Viva (16 marks each)	
Normal Structure	Anatomy & applied/clinical	16	2	26	1	-	1	24
Normal Function	Physiology & applied/clinical	31	4	51	4	-	1	48
	Biochemistry & applied/clinical	18	1	23	2	-	1	32
Disease Burden & Prevention	Community Medicine & Public Health	06		06	-	-	-	-
	Behavioral Sciences	02	-	02	-	-	-	-
Pathophysiology and Pharmacotherapeutics	Pathology	07	-	07	-	-	-	-
	Pharmacology	05	-	05	-	-	-	-
CFRC	CFRC-1-3	-	-	-	-	1	-	08
PERLs	PERLs-1-3	-	-	-	-	1	-	08
		85	7x5=35	**120**	7 Stations x 08 = 56	2 Stations x 08 = 16	3 Vivas x 16 = 48	**120**

Section 9



Curriculum 2K23

Study Guide Guidelines & Resource Books

RESOURCE BOOKS

Anatomy

- Langman's Medical Embryology
- Snell's Clinical Anatomy
- Snell's Clinical Neuroanatomy. Walter Kluwer
- Laiq H.S. Medical Histology. Paramount Books.
- Laiq H.S. General Anatomy. Paramount Books.

Physiology

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

Biochemistry

- Harper's Biochemistry by Robert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwell. McGraw-Hill latest ed.
- Lippincott's Illustrated Reviews Biochemistry Champe, P.C. & Harvey, E.A latest ed. Published by Lippincott Williams and Wilkins.
- ABC of clinical genetics by H.M.Kingston

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.

Pharmacology

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

Behavioral Sciences

- Handbook of Behavioural Sciences by Prof. Mowadat H.Rana, 3rd Edition .
- Medical and Psychosocial Aspects of Chronic Illness and Disability SIXTH EDITION Donna R. Falvo, PhD Beverley 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 & Love' Short practice of Surgery

Medicine

- Davidson's Principles and Practice of Medicine

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 Development of Study Guide for the faculty & students

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

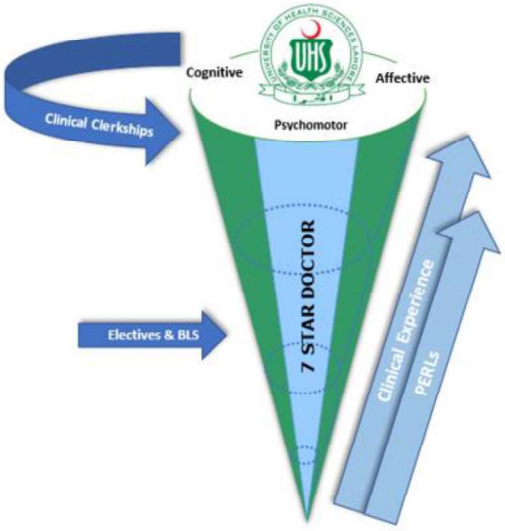
- **The study guide should have:**

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 modules**.**
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.

Section 10



Curriculum 2K23

Quran

CURRICULUM

of

THE HOLY QURAN

For

Students of Health Professions

UNIVERSITY OF HEALTH SCIENCES LAHORE
PAKISTAN

1. 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 Holy 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. 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 the 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 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 : 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 Quran course.

3.6 : 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.

MBBS YEAR 1 CURRICULUM

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

Topic Areas:

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)

CURRICULUM

of

CIVICS

For

Health Professions Students

UNIVERSITY OF HEALTH SCIENCES LAHORE
PAKISTAN

1. Rationale

Civics is part and parcel of life and the study of Civics has its 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

2.3 : Vision: Building personality and character of health professionals

2.4 : 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.

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

3.8 : Learning Experience: Classroom environment will be used.

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

3.10 : 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 Quran course.

3.11 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.

MBBS YEAR 1 CURRICULUM

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

Family	Identify the basic unit of social institution Discuss and characterize the different types of family Give the importance of basic unit of social institution in the development of a state Enlist the responsibilities of family in general 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
Community	Define community Explain the nature and significance of community Discuss the role of a family in community Analyze the role of an individual for the betterment of the community
Society	Define society Elaborate the relation between an individual and society and society and state Analyze the role of an individual for the betterment of society
Nation, Nationality	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 evaluate the characteristics of society developed by religions
Origin and elements of State	Trace the origin of state with reference to the theories of Divine Origin, Force and Social Contract (Hobbs, Lock, Rousseau) Describe the elements of a state (sovereignty, population, territory, Government) Compare and distinguish the role of state, society and government
Functions of state. (Defense, law and order, welfare etc.)	Describe the functions of state Describe the factors which are necessary for proper functioning of state Analyze the situation when a state does not function properly 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
Sovereignty	Define the concept of sovereignty in west Discuss different kinds of sovereignty Explain Austin's concept of sovereignty Analyze critically Austin's concept of sovereignty

Islamiyat & Pakistan studies

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

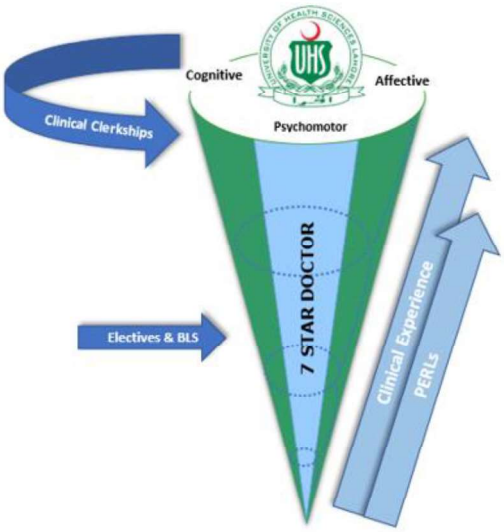
1. Describe brief the salient features of the Pakistan movement.
2. Explain the basis for the creation of Pakistan.
3. Give a brief account of the history of Pakistan.

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/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

Section 11



Curriculum 2K23

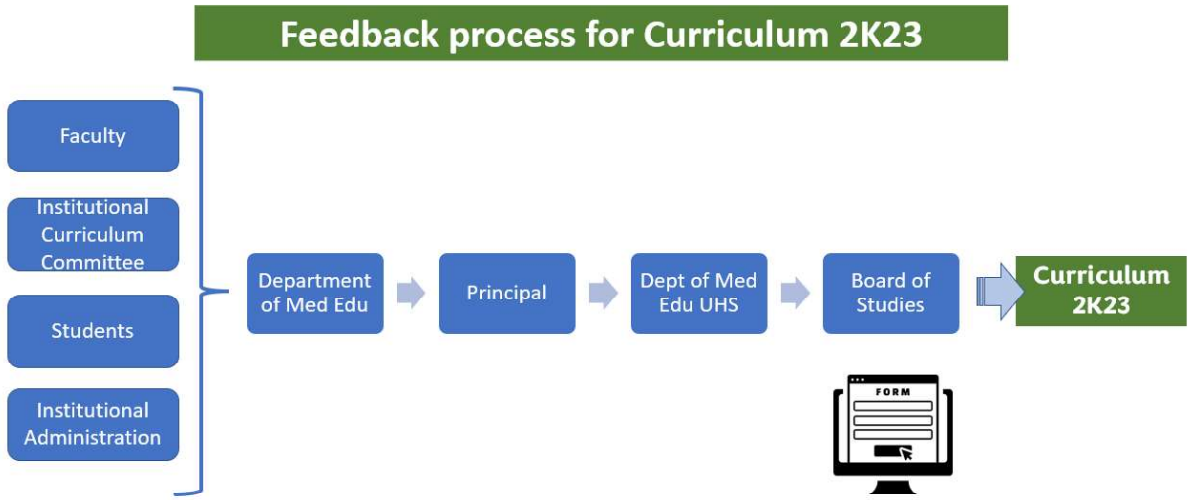
Program Evaluation & Feedback
List of Annexures

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.



Curriculum Feedback/Suggestion Proforma

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

- Annexure A Logbook Year 1
- Annexure B PERLs Portfolio

Innovating & Strategizing Healthcare Education

Department of Medical Education

& International Linkages

University of Health Sciences Lahore

CURRICULUM 2K23

MODULAR INTEGRATED

CLINICAL SKILLS FOUNDATION (CSF)

LOGBOOK - **YEAR 1**


UHS
Clerkships
Rotation
Foundation
Clinical Skills -FRC

Block 1, 2 and 3
Modular Integrated Undergraduate Curriculum

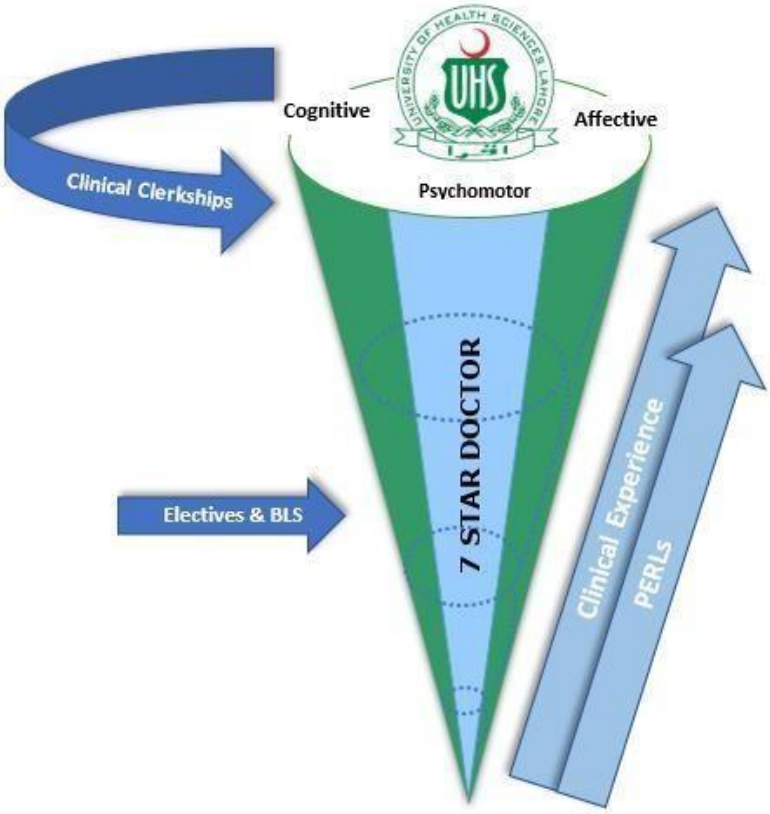


TABLE OF CONTENTS

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LIST OF ABBREVIATIONS

ABBREVIATIONS	SUBJECTS
A	Anatomy
P	Physiology
B	Biochemistry
Ph	Pharmacology
Pa	Pathology
BS	Behavioral sciences
FM	Forensic Medicine
CM	Community Medicine
ENT	Ear Nose Throat
O	Ophthalmology
Psy	Psychiatry
M	Medicine
S	Surgery
Pe	Pediatrics
GO	Gynecology and Obstetrics
QI	Quran and Islamiyat
PERLs	Professionalism, Ethics, Research, Leadership
Ag	Aging
CSF	Clinical Skills Foundation
C	Civics

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:

- Care giver
- Decision Maker
- Communicator
- Community Leader

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 Skills Foundation (CSF) in the first two years to Clinical Skills Rotations (CSR) in the third and fourth year and finally to a complete clinical clerkship (CC) in final year of MBBS.

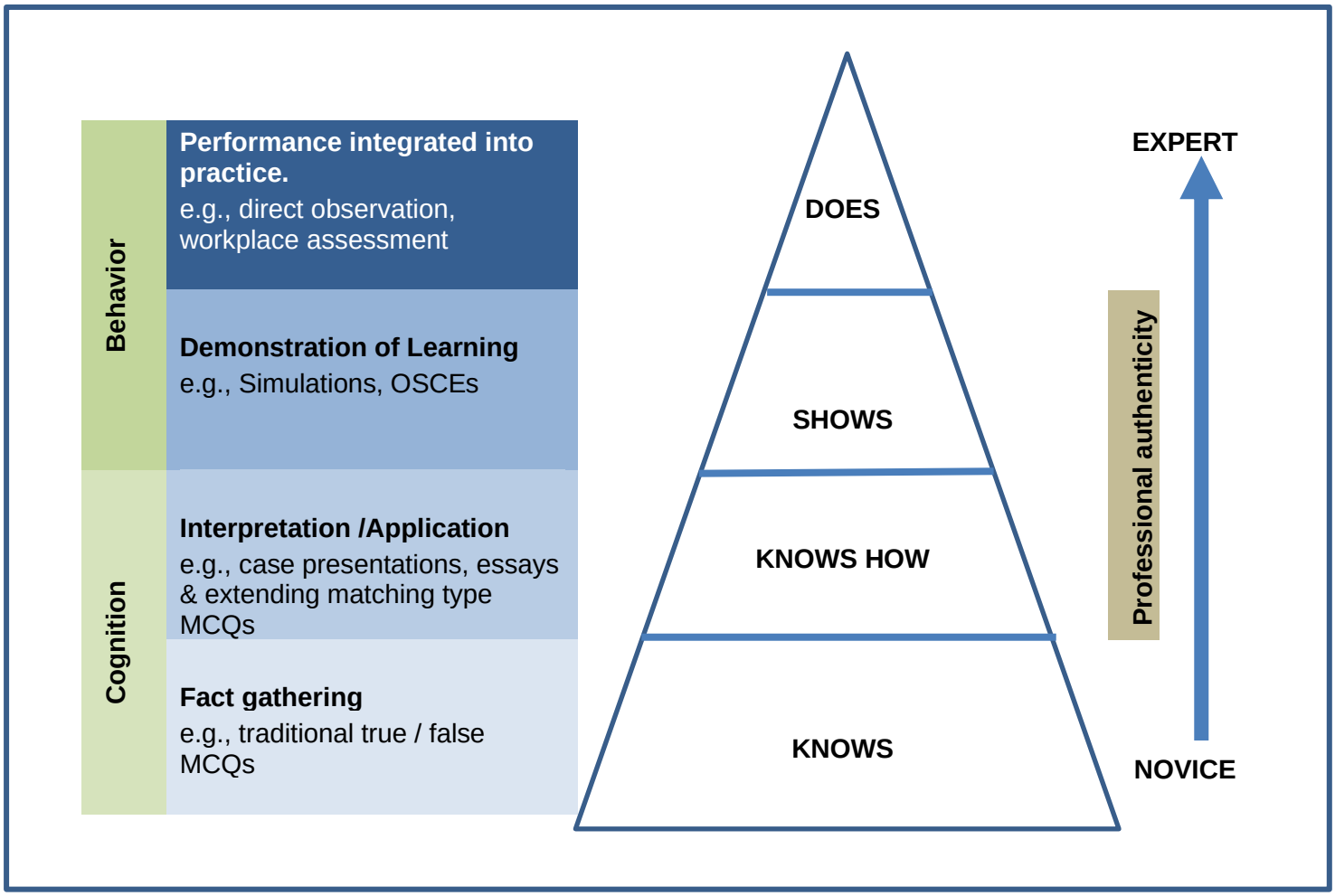
Keeping in view the 48 medical colleges under the umbrella of UHS, we have tried our best to devise a flexible program which colleges can tailor according to their capacities and resources. We are hopeful this innovative new step will lead to standardization of patient care for UHS lead colleges in the 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 CSF module scale
from Knows How (e.g., Interpretation of CXR) to does (administer IM injections etc.).



BLOCK 1

FOUNDATION MODULE

Objectives	Skill	Miller's Pyramid Level reflected
Demonstrate steps of hand washing	Hand washing	Shows
Demonstrate the procedure of taking the pulse	Radial Pulse	Shows
Record the Respiratory Rate of patient	Respirator Rate measurement	Shows
Demonstrate the procedure of taking the Blood Pressure	Blood Pressure	Shows
Demonstrate the process of wearing the gloves	Gloving	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 orguidelines

Unsatisfactory: Unable to perform the step or task according to the standardprocedure 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 Handhygiene. • Before Contact with patient and/or their environment • Before performing a clean and/or aseptic procedure • After exposure to blood and/or body fluid • 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. **(follow diagram)** 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 RADIAL PULSE (Some of the following steps/tasks should be performed simultaneously.)	**CASES (minimum 3 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 RESPIRATORY RATE (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 patientthat you are taking the RR).**				
8. 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				

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.)	**Minimum 3 entries**		
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)			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Position the patient in a sitting position and uncover one of his/her arms. (Make sure the patient is relaxed and comfortable).			
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			
12. Wash hands.			
13. Document the findings			
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 GLOVING (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 bloodfrom 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 notperform 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.
Satisfactory: **Describes** the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to **describe** the step or task according to the standard procedure or guideline

Date Observed ____

CHECKLIST FOR VENIPUNCTURE (minimum 2 entries) **(Some of the following steps/tasks should be performed simultaneously.)**		
1. Identification of patient		
2. Washed hands/ sanitized hands		
3. Preparation: gloves, in place		
SKILL/ACTIVITY DESCRIBED SATISFACTORILY		
4. Explain procedure to the patient and obtain consent		
Select an appropriate site for venipuncture, such as the antecubital fossa or the back of the hand		
6. Clean the site with an antiseptic solution and allow it to dry		
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		

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 **describe** the step or task according to the standard procedure or guidelines

Date Observed ___

CHECKLIST FOR PALLOR **(minimum 2 entries)** **(Some of the following steps/tasks should be performed simultaneously.)**		
1. Identification of patient		
2. Presence of natural light		
SKILL/ACTIVITY OBSERVED AND DESCRIBED SATISFACTORILY		
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: *1. posterior rim: the posterior portion of the half-moon shape attached to the sclera.* *2. 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)		
9.Examining the hands for pallor		
10. Holds the patient's hand gently and checks the palm, compares the color of the palm with his/her own palm.		
11. Reports pallor (severe pallor-very pale or white, some pallor-pale)		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
Signatures of Supervisor		

BLOCK 2

MUSCULOSKELETAL SYSTEM M O D U L E

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
*Identify common fractures showing in x rays of lower limb	X ray common fractures lower limb	Knows how

*these skills are at the 'Knows how" level of the miller's pyramid, meaning thereby that students need notperform them themselves but may develop a perception regarding them by observing performance/working on simulated patients/facilitation with videos.

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 orguidelines
Unsatisfactory: Unable to perform the step or task according to the standardprocedure or guidelines

Date Observed ___

CHECKLIST FOR BODY TEMPERATURE (Some of the following steps/tasks should be performed simultaneously.)	**CASES (minimum 3 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			

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 orguidelines
Unsatisfactory: Unable to perform the step or task according to the standardprocedure 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			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
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 "(Image A). 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" (Image B), 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 pan is felt they should report immediately.			
9. Repeat movements 6 and 7 passively.			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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not performed **satisfactorily**, or **N/O** if not observed.
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Unsatisfactory: Unable to perform the step or task according to the standardprocedure or guidelines

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			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
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: i. appearance of the muscle (wasted, highly developed or normal) ii. 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 first 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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Unsatisfactory: Unable to perform the step or task according to the standardprocedure or guidelines

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			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
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 abduction of the legs by placing your hands on the inner thighs of the patient and asking them to bring both legs together. This tests 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			
10. wash hands, thank and reassure the patient			
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			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
The procedure:			
1. Explain the procedure to the patient and get a verbal consent to proceed.			
2. Ensure adequate exposure of the knee joints while maintaining patient privacy			
3. Inspect the alignment of both legs, both paellas. Check for varus/vulgus deformities (Image A), swellings. Inspect skin for any scars, plaques, erythema.			
4. Check swelling at level of joints			
5. simultaneously assess **and** compare knee joint temperature **using the back of your hands.**			
6. Measure quadriceps with an inch tape 20 cm diameter above the tibial tuberosity and compare with other side.			
7. Ask the patient regarding any pan and discomfort and then start examining normal side of patient (in supine position)			
8. Flex the knee to (0 degrees, then feel along the joint line (quadriceps tendon → patella → patella tendon → tibial tuberosity → tibial plateau → femoral epicondyles and over course of medial collateral ligament and lateral collateral ligament → popliteal fossa) for ant swelling/ thickness/tenderness			
Test active then passive movements, keeping one hand on the knee to feel for crepitus. 9. Flexion (140˚) (Image B1 and B2) 10. Extension (0˚) (Image C1 and C2)			
11. Passively raise leg at ankle and look for knee hyperextension			
12. Perform the patellar tap: with patients knee fully extended, empty the suprapatellar pouch by sliding your left hand down the thigh to the upper border of the patella. 13. Keep your left hand in position and use right hand to press downwards on the patella with your fingertips. if there is fluid present you will feel a			

distinct tap as patella bumps against femur (Image D)			
Post procedure			
14. wash hands, thank and reassure the patient			
Signatures of Supervisor			

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Unsatisfactory: Unable to perform the step or task according to the standardprocedure or guidelines

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CHECKLIST FOR EXAMINATION OF HIP JOINT EXAMINATION (Some of the following steps/tasks should be performed simultaneously.)	**CASES (minimum 3 entries)**		
STEP/TASK			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
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 hp 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 le so that it les 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			

To perform passive hip abduction: **1.** 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. **2.** Move the patient's ankle **laterally** to **abduct** the hip until the pelvis begins to tilt.			
16.To perform passive hip adduction: **1.** 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. **2.** Move the patient's ankle **medially** to **adduct** the hip until the pelvis begins to tilt.			
16. 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.			
17. 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			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
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* (mentioned in annexure A)			
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			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
The procedure:			
1. Observe the ABC's: i. Alignment and joint space ii. Bone texture iii. 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: **Transverse:** fracture at right angles to the shaft **Oblique:** fracture at an angle to the shaft **Spiral:** caused by twisting injury **Comminuted:** 2 or more bone fragments **Impacted:** fractured bone forced together			
8. Recognize an **incomplete fracture** as one not involving the whole cortex.			
9. Types of incomplete fractures include: **Torus/Buckle:** a bulge in the cortex **Bowing:** associated bend in the bone shaft **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.			
Signatures of Supervisor			

BLOCK 3

CARDOVASCULAR SYSTEM 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**
Identify main organs of the thorax on CXR	**CXR**	**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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Date Observed ___

CHECKLIST FOR HEART SOUNDS (Some of the following steps/tasks should be performed simultaneously.)	**CASES (minimum 3 entries)**		
STEP/TASK			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
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			
Signatures of Supervisor			

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Unsatisfactory: Unable to perform the step or task according to the standardprocedure 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		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
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.		
Signatures of Supervisor		

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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			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
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 CAROTIDS IMULTANEOUSLY ON BOTH SIDES			
Signatures of Supervisor			

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CHECKLIST FOR EXAMINATION OF JVP (Some of the following steps/tasks should be performed simultaneously.)	**CASES (minimum 3 entries)**		
STEP/TASK			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
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			
Signatures of Supervisor			

Date Observed _

CHECKLIST FOR EXAMINATION OF LYMPH NODES (Some of the following steps/tasks should be performed simultaneously.)	CASES (minimum 3 entries)		
STEP/TASK			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
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			
Signatures of Supervisor			

RESPIRATORY SYSTEM MODULE

Objective	Skill	Miller's Pyramid Level reflected
Auscultation of Chest	Chest sounds	Shows
Detection of clubbing	Clubbing	Shows
Performance and significance of Arterial blood gases	ABGs	Shows
Identification of pneumonic patch on chest x ray	Pneumonia CXR	Shows
Identification of COPD on chest x ray	COPD CXR	Shows
Administering inhaler to a patient	Inhaler use	Shows

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Date Observed ___

CHECKLIST FOR IDENTIFICATION OF ORGANS ON CXR (Some of the following steps/tasks should be performed simultaneously.)	**CASES (minimum 3 entries)**		
STEP/TASK			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
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			
Signatures of Supervisor			

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CHECKLIST FOR PERFORMANCE OF CHEST COMPRESSIONS (Some of the following steps/tasks should be performed simultaneously.)	**CASES (minimum 2 entries)**		
STEP/TASK			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
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.			
Signatures of Supervisor			

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Date Observed ___

CHECKLIST FOR PERFORMANCE OF CHEST AUSCULTATION (Some of the following steps/tasks should be performed simultaneously.)	**CASES (minimum 2 entries)**		
STEP/TASK			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
1. Prepare the stethoscope: Make sure the earpieces are pointing forward and the diaphragm is clean and warm			
2. Explain the procedure: Introduce yourself to the patient, explain what you will be doing and obtain their consent.			
3. Position the patient: Have the patient sit or lie down with their chest exposed			
4. Select the appropriate chest area: Identify the area of the chest where the breath sounds are to be assessed. The anterior chest has four quadrants, and the posterior chest has three sections on each side			
5. Place the stethoscope: Place the diaphragm of the stethoscope on the chest in the selected area. Make sure it is pressed firmly against the skin			
6. Listen to the breath sounds: Instruct the patient to take deep breaths and listen to the breath sounds. Listen for the intensity, pitch, duration, and quality of the breath sounds. Compare the breath sounds on both sides of the chest			
7. Move the stethoscope to the next location: Repeat steps 5 and 6 at the next selected location until all the areas have been assessed. 8. Thank the patient			
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			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
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			
Signatures of Supervisor			

ARTERIAL BLOOD GASES

Date Observed _

CHECKLIST FOR ABGs (Some of the following steps/tasks should be performed simultaneously.)	CASES (minimum 1 entry)		
STEP/TASK			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
1. Observe the Explanation of the procedure and consent taking			
2. Observe the required equipment: 23 G needle, heparinized syringe, alcohol swabs, local anesthetic , gauze, gloves.			
3. Check position of the patients arm with the wrist extended			
4. Identify the radial artery with index and middle fingers			
5. Observe the performance of Allen's test: compress both the radial and ulnar arteries at the same time. The hand should become white, release the ulnar artery and the color should return to the hand. This ensures that there will still be a blood supply to the hand should the ABG cause a blockage in the radial artery. 6. Observe wearing of gloves and injection of local anesthetic over palpable radial artery			
7. Let the patient know you are about to proceed and to expect a sharp scratch. 8. Observe insertion of needle, at 30 degrees to the skin at the point of maximum pulsation of the *radial artery*. Needle is advanced until arterial blood flushes into the syringe. The arterial pressure will cause the blood to fill the syringe			
9. Needle is removed and puncture site firmly pressed over. with the gauze to halt the bleeding. Remain pressed for 5 minutes			
10. Syringe is capped, sample sent in ice and gloves removed			
Signatures of Supervisor			

IDENTIFICATION OF PNEUMONIC PATCH ON X-RAY

Date Observed _

CHECKLIST FOR IDENTFICATION OF PNEUMONIC PATCH (Some of the following steps/tasks should be performed simultaneously.)	CASES (minimum 2 entries)		
STEP/TASK			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
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			
Signatures of Supervisor			

CXR FOR COPD

Date Observed __

CHECKLIST FOR CXR COPD (Some of the following steps/tasks should be performed simultaneously.)	CASES (minimum 2 entries)		
STEP/TASK			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
1. Look for hyperinflation: Identify an increase in the anteroposterior diameter of the chest, which indicates hyperinflation of the lungs. This can be seen as flattening of the diaphragm and widening of the intercostal spaces			
2. Evaluate lung markings: Evaluate the lung markings. In COPD, the lung markings may appear decreased, or there may be areas of decreased lung density due to air trapping.			
3. Check for bullae or blebs: Look for bullae or blebs, which are large air-filled spaces within the lung tissue. These are commonly seen in patients with advanced COPD.			
4. Assess the presence of a flattened hemidiaphragm: Identify a flattened hemidiaphragm, which is often seen in patients with severe COPD due to the increased pressure on the diaphragm from hyperinflation			
5. Look for signs of pulmonary hypertension: Identify signs of pulmonary hypertension, such as an enlarged pulmonary artery or right ventricular hypertrophy			
6. Report your findings			
Signatures of Supervisor			

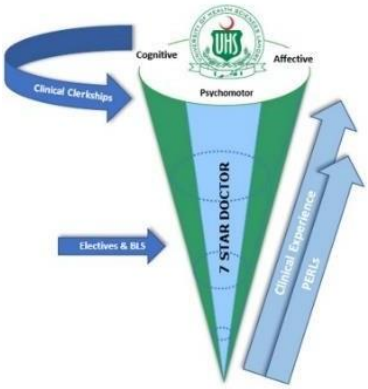
INHALER USAGE

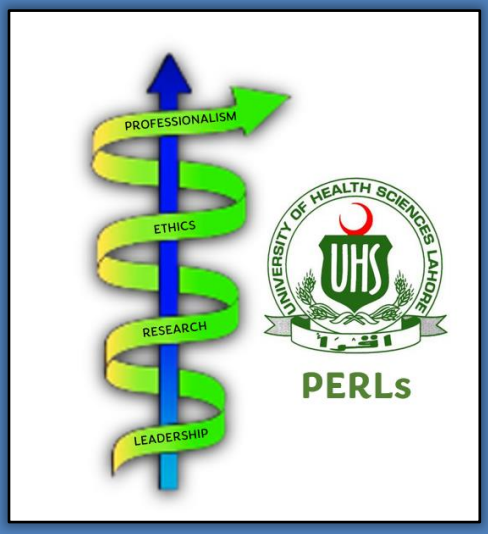
Date Observed __

CHECKLIST FOR INHALER USAGE (Some of the following steps/tasks should be performed simultaneously.)	CASES (minimum 2 entries)		
STEP/TASK			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
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			
Signatures of Supervisor			

CONCEPT & DESIGN: DR. KOMAL ATTA
COVER DESIGN: MS. SARA SOHAIL

Curriculum 2K23

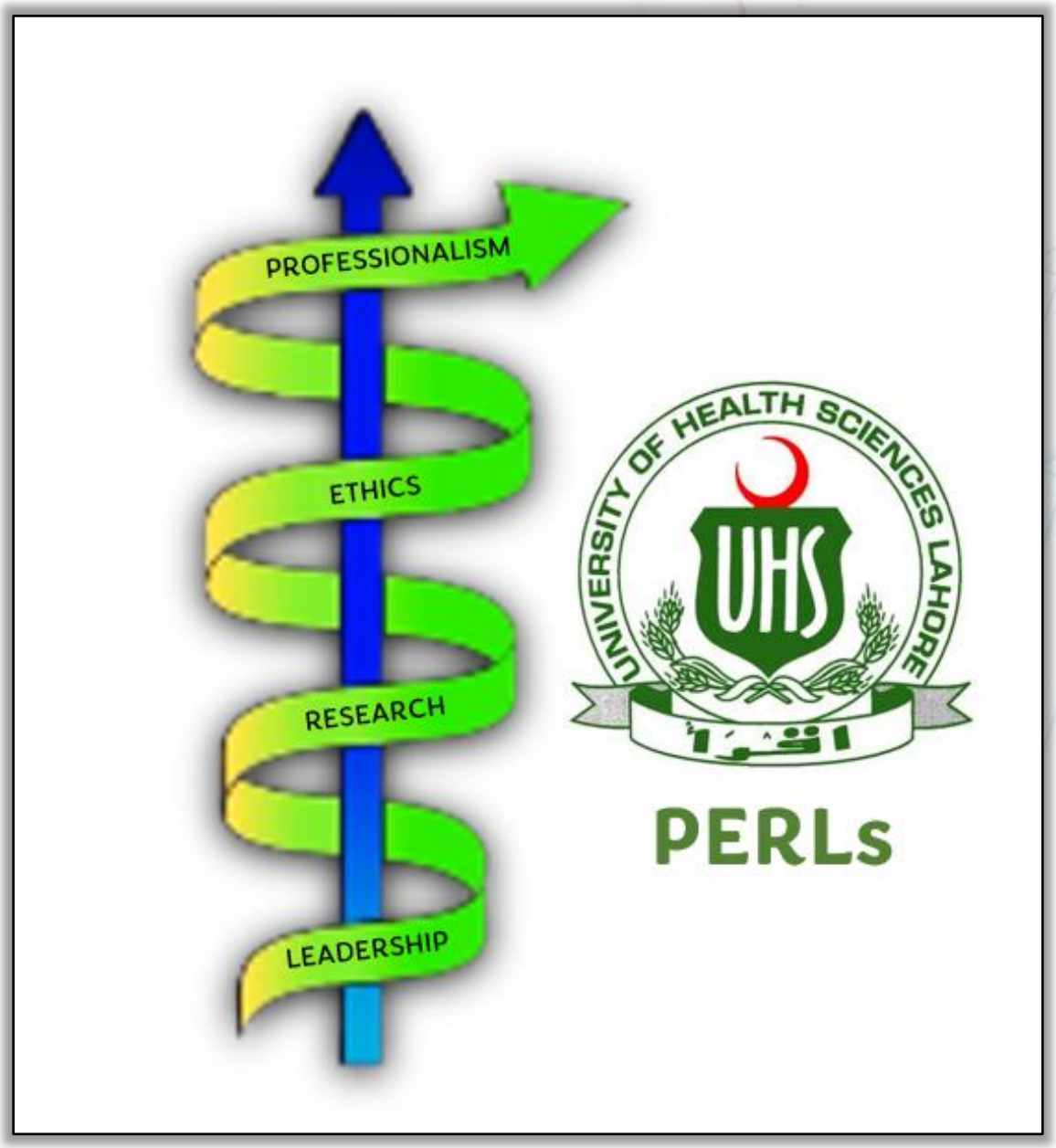




Professionalism, Ethics, Research & Leadership skills portfolio

Name of the Student

Name of the Mentor


PROFESSIONALISM
ETHICS
RESEARCH
LEADERSHIP
UNIVERSITY OF HEALTH SCIENCES LAHORE
UHS
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PERLs

PERLs Module Year 1

ATTRIBUTES	COMPETENCIES
	PROFESSIONALISM
Communicator	1. Demonstrate non-verbal, verbal, written and electronic communication skills with peers and teachers
	2. Develop an argument
Caring & Empathic	3. Demonstrate respect of diversity in gender, age, culture, race, religion, disabilities, and sexual orientation for peers
Responsible & Accountable	4. Follow the dress code and rules and regulation of the institution
	5. Demonstrate punctuality
	6. Discuss professional code of conduct
	7. Take responsibility of one's actions and be accountable to oneself
	8. Engage in orientation, co-curricular and extracurricular activities
Team Player	9. Work respectfully and effectively with their peers and participate in different team roles
Self-Aware	10. Identify personal strengths and areas of improvement
ETHICS SKILLS	
Digital Citizen	11. Keep personal and professional data and information safe
	12. Understand cyberbullying, harassing, sexting.
	13. Design a professional digital footprint and use appropriate online etiquette and follow rules for every Internet resource
RESEARCH SKILLS	
Evidence Based Practitioner	14. Locate credible scientific data
LEADERSHIP SKILLS	
Resilient & Adaptable	15. Demonstrate healthy coping mechanisms to respond to stress
	16. Demonstrate patience and tolerance
Self-directed Learner	17. Manage time effectively
	18. Identify the gap in own learning
	19. Set and track learning and improvement goals
	20. Identify and seek help as and when required to achieve the set goals

BLOCK 1 ENTRIES					
CODE	**SPECIFIC LEARNING OUTCOMES**	**DOMAIN**	**ATTRIBUTE**	**TOPIC**	**PORTFOLIO ENTRY**
PERLs- 1-01	Describe a Portfolio Describe types of portfolios Identify Portfolio entries Write reflection based on Gibbs reflective cycle	PERLs	PERLs	Reflective Writing	Reflective writing on portfolio outline development
PERLs- 1-02	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 non-verbal communication. Demonstrate active Listening. Describe assertive Communication techniques. Describe barriers to Effective Communication.	Professionalism	Communicator	Verbal and non-verbal Communication Skills	Communication encounter with a peer or teacher
PERLs- 1-03	Follow the dress code and rules and regulations of the institution. Demonstrate punctuality	Professionalism	Responsible & Accountable	Responsibility towards institution and the profession	Quiz on rules and regulations of the institution
PERLs- 1-04	Describe characteristics of a team Describe types of teams Discuss stages of team development Identify various team roles Discuss barriers to effective teamwork	Professionalism	Team Player	Teamwork	Self- evaluation through reflective writing
PERLs- 1-05	Maintain personal privacy while sharing information Identify cyberbullying, harassing, and sexting Describe cybersecurity laws Discuss digital rights and responsibilities	Ethics	Digital Citizen	Digital Identity & footprint	Case discussion of cyberbullying
PERLs- 1-06	Discuss Science and scientific evidence	Research	Evidence based practitioner	Difference between science, philosophy, art and Scientific method	Assignment on application of scientific method to a problem

PERLs- 1-07	Identify gaps in learning through reflection	Leadership	Self-directed Learner	Strategic planning Personal development plans Goal Setting	Written gaps in being a learner with goals
BLOCK 2 ENTRIES					
CODE	**SPECIFIC LEARNING OUTCOMES**	**DOMAIN**	**ATTRIBUTE**	**TOPIC**	**PORTFOLIO ENTRY**
PERLs- 1-08	Demonstrate punctuality	Professionalism	Responsible & Accountable	Responsibility towards self and the profession	Attendance record
PERLs- 1-09	Manage time effectively	Leadership	Self-Directed Learner	Time Management	Self and/or teacher feedback
PERLs- 1-10	Demonstrate respect of diversity in gender, age, culture, race, religion, abilities, and sexual orientation for peers	Professionalism	Caring & Empathic	Diversity Equity Inclusion	An encounter with a specially abled person
PERLs- 1-11	Design a professional digital footprint and use appropriate online etiquette and follow rules for every Internet resource	Ethics	Digital Citizen	Professional Social Media Platforms Rules and regulations of two social media platforms	Professional profile on LinkedIn
PERLs- 1-12	Describe responsibility to oneself Discuss responsibilities of being a learner	Professionalism	Responsible & accountable	Learning styles Learning Domains Motivation	Written assignment
PERLs- 1-13	Discuss professional code of conduct	Professionalism	Responsible & accountable	Responsibilities of a doctor	Case analysis of non-professional practice
PERLs- 1-14	Work respectfully and effectively with their peers	Leadership	Team Player	Effective teamwork Building Rapport	Peer feedback
PERLs- 1-15	Set Learning Goals	Leadership	Self-directed learner	Value identification Goal setting	List of goals

PERLs- 1-16	Locate credible scientific evidence	Research	Evidence based practitioner	Sources of scientific data Databases Search Engines Grey Literature	Assignment on building a literature search
BLOCK 3 ENTRIES					
CODE	**SPECIFIC LEARNING OUTCOMES**	**DOMAIN**	**ATTRIBUTE**	**TOPIC**	**PORTFOLIO ENTRY**
PERLs- 1-17	Demonstrate patience and tolerance	Leadership	Resilient and Adaptable	Tolerance Patience Role of emotional regulation Giving feedback	Teacher feedback
PERLs- 1-18	Demonstrate healthy coping mechanisms to respond to stress	Leadership	Resilient and Adaptable	Stress Coping mechanisms	Self or peer evaluation
PERLs- 1-19	Developing an argument	Professionalism	Communicator	Structure of an argument Validity of an argument	Write an argument
PERLs- 1-20	Identify and seek help as and when required to achieve the set goals	Leadership	Self-directed learner	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