2022

GUIDELINES FOR

UNDERGRADUATE MEDICAL EDUCATION CURRICULUM (MBBS)

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TABLE OF CONTENTS

PREAMBLE

The word Curriculum is derived from the Latin word *curare* which means race-course and refers to the course of study. In medical education it is defined as “planned educational experience or activity”.

A curriculum needs to be responsive to the changes that occur in society. In its narrow sense, curriculum is viewed merely as a listing of subjects to be the taught in a teaching environment. In a broader sense, it refers to the complete learning experience of individuals not only in educational institutions but in society as well**.** There are various models of curriculum; apprenticeship, discipline-based curriculum, integrated curriculum, problem-based curriculum and outcome-based curriculum.

In Pakistan three models are in practice;
The **Integrated Medical Curriculum** is increasingly being adopted internationally. An Integrated Medical Curriculum addresses basic scientific knowledge in parallel with clinical science, enabling students to learn through the lens of normal and abnormal human body systems than by discipline. It is different from Traditional Medical Curriculum, where you learn the science first in the pre-clinical years and then move on to learning in a clinical setting. Most curricula for medical education have traditionally been integrated horizontally between basic sciences and clinical sciences.

The goal of integration is to break down the barriers between the basic and clinical sciences. Integration aims to promote retention of knowledge and acquisition of skills through repetitive and progressive development of concepts and their application.

Vertical integration in the curriculum in addition to basic and clinical sciences, must also include socio-humanistic and population health sciences. This leads to a broader understanding of medicine and health and the impact of both on society. An integrated curriculum is “education that is organized in such a way that it cuts across subject matter lines, bringing together various aspects of the curriculum into the meaningful association to focus upon broad areas of study”.

The **Traditional Medical Curriculum** is based on the staged introduction of basic and biomedical sciences during the initial years of the program followed by the clinical sciences. A common criticism of this approach is that students will not see the relevance of basic and biomedical sciences applied to clinical practice.

The **Hybrid Medical Curriculum** is where parts of both integrated and traditional curriculum are implemented in a learning environment.

In a recent survey conducted under the auspices of the Pakistan Medical Commission (PMC) where more than 90% of colleges and medical universities participated; a vast majority are still following traditional or subject-based curriculum (65%) with a minimal level of either horizontal or vertical integration, 25% have integrated curriculum and the remaining follow a hybrid model. Almost all followers of traditional/subject-based are willing to shift to the integrated modular curriculum but desired an adjustment period and support from universities.

Based on evidence through various meta-analysis (1-4) and input of senior medical educationist from all provinces and AJK; Committee on Accreditation and Curriculum (CAC) strongly believes that an integrated curriculum is more effective compared to the traditional model and is well accepted by students and faculty. Both faculty and students show a positive attitude toward this teaching innovation. It is recommended that all medical and dental schools and universities shift towards an integrated curriculum. The process should be completed by 2023 for implementation for the batch of 2024.

In this document, PMC provides broad guidelines and a template for standard curriculum (both traditional and integrated) and competencies to be achieved. Universities are required to develop curricula according to the framework given in this document.

OPERATIONAL DEFINITIONS / GUIDELINES

Following are some important operational definitions for curriculum development:

1. Traditional curriculum

In this format, the curriculum is completely focused on basic sciences during the first two years. Content is frequently taught in a didactic, discipline-based format. Clinical education and patient exposure are initiated in the third year of the program.

2. Integrated Curriculum

The integrated curriculum allows integration of the different disciplines of the basic sciences and clinical sciences.

Additionally, key concepts or themes related to communication skills, clinical skills, professionalism, ethics, research, and medical humanities are addressed across the 5-year program.

A spiral curriculum refers to frameworks where there is an early introduction to clinical skills, which increases over time and basic sciences run throughout the curriculum, decreasing over time.

3. Hybrid Curriculum

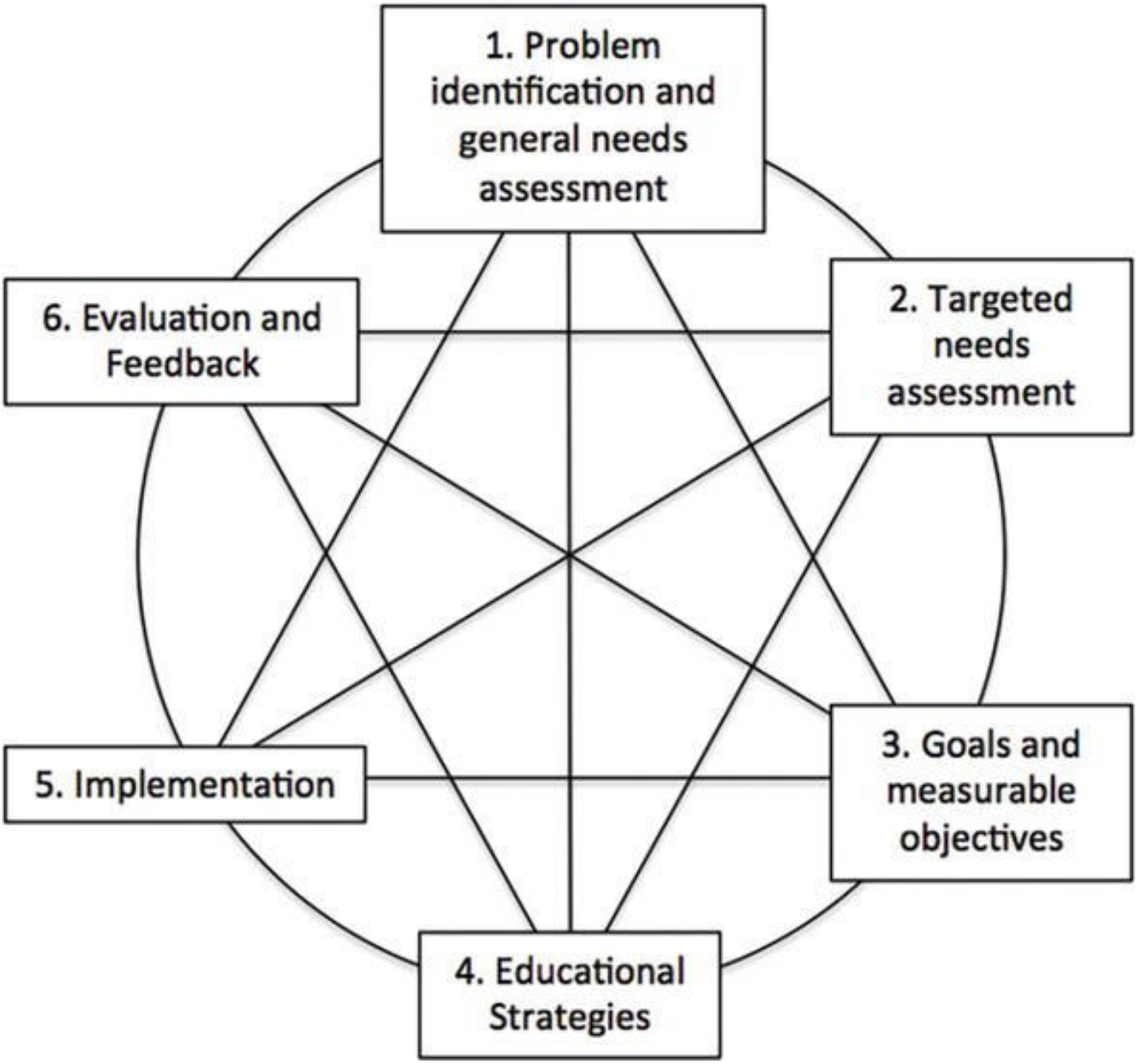
The framework combines didactic teaching with clinical rotations to equip students with the necessary skills to become a good and competent doctor. It encompasses both the traditional style of teaching and some elements of integration. It appears to be feasible for developing countries.

SECTION –1

CURRICULUM DEVELOPMENT

1.1 Overview of Curriculum Development

Curriculum outcomes should reflect the mission and vision statements of the University*



*Kern, D. E. (1998). *Curriculum development for medical education: A six-step approach*. Baltimore: Johns Hopkins University Press

1.2 Strategies, Goals And General Guidelines For Curricular Development

A medical curriculum is designed to produce competent, compassionate and efficient professionals capable of caring for the sick. The following defines the characteristics of such an individual:

1.2.1 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.

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:

- Diagnosing and managing common health problems independently.
- Using cost-effective best evidence patient-safe approaches, reporting adverse drug reactions and drug interactions.
- Recognizing alternate medicine as an option with its effect on health.
- 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.
- Recognizing, stabilizing (first aid and basic life support), investigating and managing the patient as necessary (Transport, Triage, Neglect, Abuse).
- Being readily accessible when on duty.
- Alleviating pain and distress, including end-of-life care.
- 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.

h. 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.

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

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

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

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

m. 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 the 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 the health of their community.

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

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

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

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

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

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

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

i. Make decisions for healthcare using demography, biostatistics and epidemiology as well as national, regional and local surveillance data.

4. CRITICAL THINKER (PROBLEM SOLVING AND REFLECTIVE PRACTICE)

The ability to critically evaluate existing knowledge, technology and information, and to be able to reflect on 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 and the patients benefit.

f. Flexibility and a problem-solving approach

g. Commitment to quality assurance and monitoring by participating in chart audits and reporting critical 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. The 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, in order to justify the trust reposed in them by the public. Their behavior must enhance public trust in the profession.

i. Life-long Self-directed Learner

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

a. Demonstrate continuous learning based on regular self-assessment
b. Seek peer feedback. This also includes a continuous undertaking of self-directed study and credited, continuous medical education activities up to re-licensure and recertification.
c. Manage information effectively to use it for efficient and effective self-learning, medical problem solving and decision-making:

- **accurately document** and maintain records of their practice for better patient care and for analysis 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 credible databases and sources.
- **match patient information to evidence available in literature** to form judgments for diagnostic, therapeutic, preventive or prognostic decisions and for surveillance and monitoring of health status.

d. Provide evidence of continuing career advancement by pursuing further training in specific fields or continuing professional development (CPD) by attending CPD programs in their primary discipline or as a professional. This evidence may be collated by maintaining professional development portfolios.
e. Function effectively as a mentor and a trainer in order to appraise, assess, teach, and provide feedback to themselves, peers, colleagues and students.
f. Respond positively to appraisals and feedback.

ii. Altruistic and Empathetic

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

a. Appropriate **demeanor and dress code**.
b. Responsibility, compassion, empathy, honesty, and integrity.
c. Tolerance for diversity.
d. Caring attitude towards patients and health problems.
e. Put patients first and the patient's needs before their own.
f. Have patient safety as a top priority.
g. Culturally sensitive and respectful of all religious beliefs.
h. Special sensitivity towards vulnerable populations.

iii. Ethical

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

a. Without discrimination on the basis of age, gender, religion or beliefs, color, race, ethnic or national origin, culture, disability, disease, lifestyle, marital or parental status, sexual orientation and 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, confidentiality and 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.
f. 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 other commercial enterprises.

iv. Collaborator

The medical graduate should be able to demonstrate skills of teamwork to best serve the interests of the patient, 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.
e. Focusing on a collegial but problem-solving approach.

v. Communicator

The medical graduates should be able to demonstrate:

a. Non-Verbal communication skills, including active listening, empathy and a caring attitude; and demonstrating considerate and sensitive manners while dealing with patients and their families, nurses, other health professionals, community, the general public and the media.
b. Verbal communication skills, clearly expressing themselves in layman's language; counselling patients sensitively and effectively, providing information in a manner which ensures that 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.
e. Dissemination of information and research findings to improve health care.

6. SCHOLAR & RESEARCHER

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

a. Identify a researchable problem and critically review the literature

b. Phrase succinct research questions and formulate hypotheses

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

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

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

7. LEADER AND ROLE MODEL

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

a. Advancing healthcare.

b. Enhancing medical education.

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

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

e. Accepting leadership roles if required.

f. Providing leadership in issues concerning society.

1.2.2 GUIDELINES/ METHODOLOGY FOR PRODUCING SEVEN-STAR DOCTORS

Following guidelines are meant to facilitate development of educational plan to accomplish desired competencies as defined by PMC:

1. Medical universities will accommodate traditional and modular forms of curriculum. However, the level of integration in either curriculum should be at level 'seven' (Correlation) or above. In subject-based, the emphasis will be given to bring together the areas of common interest in different subjects. In addition, an integrated teaching session/course must also be introduced.(reference available at: https://www.longdom.org/open-access/curriculum-integration-in-medical-education-a-theoretical-review-ipr.1000113.pdf).

2. The **universities already practicing modular teaching** should continue with their curriculum.

3. Curriculum should have **clearly defined learning outcomes for all competencies** including those of cognition (knowledge), psychomotor (skills), critical thinking, professionalism, research, leadership and role modeling, with a focus on addressing community needs.

4. Curricular document should **outline principles of curricular organization** to clarify how different subjects will combine to promote comprehensive learning.

5. Distribution of curricular hours among different subjects of basic and clinical sciences will be as per PMC recommendations. Curricular plan must span over ***6000 hours*** of learning.

6. Humanities and Elective Rotations outside the parent institutions and affiliated hospitals may be incorporated in the curricular plan for the development of visionary professional.

7. Joint sessions of basic and clinical subjects should be an integral component of timetable where facilitators from different specialties will combine to exhibit clinical problem solving through contribution from different learning domains.

8. Instructional tools for information transfer should be student-centered to groom the student to be a self-directed learner.

A-Cognitive Domain

9. Instructional strategies employed for knowledge transfer should be student centered focusing on principles of active learning e.g., Problem-Based Learning, Case-Based Learning, Team-Based Learning. Teaching should promote group activities in the form of small group discussions, assignments to encourage teamwork, collaboration and peer-assisted learning among students

10. Self-directed learning shall have ***500 dedicated hours*** during the program. It will be used to encourage students to take responsibility for their learning. Self-directed learning time should precede their work in laboratories, dissection hall and bedside teaching as it will ensure discussion and better understanding among students during their practical work.

11. Cognition should focus on **Clinical Reasoning And Critical Thinking**, not just memorization of facts.

12. This includes a focus on addressing **Community Needs**.

B-Psychomotor Domain

13. Skills' Training should be carried out in laboratories, skill labs and bedside/chairside. The curriculum should have clearly defined learning outcomes for skill acquisition. It should ensure opportunities for students to first observe than do hands-on training under supervision, with the provision of corrective feedback during practice, followed by a supervised, independent performance with due care for patient safety.

14. Sufficient opportunities for ***practice, feedback and remediation*** should be provided to students for skill development.

15. During clinical training, students should actively participate in ward rounds, patient care in outpatient departments and in Accident and Emergency under close supervision of clinical teachers to allow real life experiences and contextual learning.

16. This includes skills for improving community health and health systems.

C-Research

17. Students should learn the *basic methodology in demography, basic biostatistics and study design of research* and be given opportunities for experiential learning in research.

D-Professionalism, Ethics, Leadership & Role Modeling

18. The **Five Pillars of Professionalism** include: personal honesty and integrity; accountability and disclosures of errors; a trust-building patient-doctor relationship with truthfulness, empathy, compassion and cultural sensitivity; knowing one's limitations, self-directed learning and constant improvement; improvement of others and the health systems; and self-regulation and constant improvement of the profession.

19. Training in Affective Domain should get its due share in the curriculum. Institutions should have dress codes, clearly conveyed rules and regulations and policies in handling misbehavior, bad conduct and negligence. Behavioral sciences should be taught using tools like role play, incidence reporting and reflective exercises to produce well behaved professionals.

20. Institutions should **maintain proper record of student's attendance**, participation in academic activities, performance in term and annual assessments. This record should be used for the student's appraisal. Students should be counselled in case of unsatisfactory performance with feedback and identification of corrective measures.

21. Professionalism, ethics, communication skills, leadership, role modelling and patient safety should be essential components in all five years of education to develop a competent professional. Students should be provided with opportunities for developing and demonstrating altruism, compassion, empathy, a trusting doctor-patient relationship, teamwork and evidence-based medical practice

E-Assessments

22. The curriculum must have a **clearly outlined assessment program**. Both formative and summative assessments should be part of the curriculum.

23. Summative assessments at the end of the session in the form of professional examinations should include an assessment of all competencies in accordance with their weightage in the curriculum. Diverse tools of assessments should be used appropriately to ensure high reliability of results to make valid decisions for pass-fail etc.

24. Assessment should be aligned with the content taught during the academic year.

25. As assessment drives learning, distribution of questions should be in line with the **Table Of Specifications** which should be a mirror image of the curriculum.

26. Transparency, Security and Secrecy of Examinations are the responsibility of the examining body. Institutions should have clearly documented policies and checks and balances in place to avoid leakage of paper, cheating and frauds during examination.

27. Summative examination papers should be *ready at least one month before the examination date*. They should be *finalized by senior faculty members* of the subject, including member(s) from outside the institution.

28. Each examination should be followed by a **Post-Exam Analysis**. Examination department should utilize this analysis for continuous improvement of their examinations. The examination department should use post-exam analysis for continuous improvement of the process, by providing guidance to subject specialists.

29. Institutions should develop their own **Question Bank** for each subject being taught. Faculty members should regularly contribute questions throughout the academic year to this bank. Committee of subject specialists and educationists should regularly scrutinize these questions for quality before selection for examination.

30. In addition to the summative assessments, **Term-Assessments** should be planned in the curriculum during the year to promote learning. Results of these term-assessments should get ***20% weightage in final result***. Curriculum should clearly define timing of assessments, content to be examined and assessment tools to be used for it.

31. **Formative Assessment Tools** such as MCQ, SEQ, EMQ, etc. for knowledge, OSCE/OSPE, DOPS, etc. for communication and psychomotor skills should be used to assess students' progress in learning and to give corrective feedback to students that will encourage reflection among students to promote life-long reflective practices. Appropriate tools should be used to assess and provide feedback in professionalism, research, leadership and scholarship.

F-Program Evaluation

32. Institution must have a **Curriculum Evaluation Committee** c*omprising of Medical Educationists* who should be entrusted with the responsibility to monitor the curriculum throughout the year to determine whether curriculum has succeeded in producing professionals with desired attributes.

33. They should take **regular feedback from all stakeholders** including students, teachers and administration regarding learning activities, difficulties being faced and suggestions for improvement.

34. Focus groups should be organized periodically with teachers and students to discuss issues being faced during learning.

35. All this information should be used to **modify and improve the curriculum** to enhance and encourage learning.

36.The **Academic Program should be periodically reviewed** internally biennially for integrated improvement, to enhance reinforcements and to delete redundancies.

1.3 Role Of Universities

Every university has to design its curriculum for all its constituent and affiliated colleges. The PMC will set standards and provide general guidelines for universities to develop their curricula. PMC will not provide a prescriptive curriculum. Following are suggested guidelines:

1.3.1. A Curriculum should:

a. Define the learning outcomes in terms of the competencies laid out in this document. While doing it, a few key questions enlighten the path e.g., how were the intended outcomes for the course as a whole and for each part of the course designed and developed? Which stakeholders were involved in their development? How do they relate to the intended career roles of graduates in society? What makes the chosen outcomes appropriate to the social context of the institution?

b. Curricular organization and structure include the curriculum model and inter- relationship of component disciplines. Various models are available from a typical 'Traditional' (subject-based) to 'Trans-disciplinary' (modular, integrated). The choice of curriculum design is dictated by its mission, intended outcomes, context and resources of the institution. Key questions to consider are: What are the principles behind the institution's curriculum design? What is the relationship between the different disciplines of study which the curriculum encompasses? How were the model of curriculum organization chosen? To what extent was the model constrained by local regulatory requirements? How does the curriculum design support the mission of the institution?

c. Curricular content includes all the competencies. These domains are expected to include basic, clinical, social and behavioral sciences. Key questions are: Who is responsible for determining the content and how? How much time is allocated to these sciences and its rationale? How and on which basis soft skills and other disciplines have been incorporated and how much time allocated to them? Which mechanism operates for modifying the content, when needed? How the research and student selected components (SSCs) have been addressed in curriculum?

d. Educational methods and teaching and learning techniques. The experiences can range from individuals to small groups to large ones, formal or otherwise and sited at campus, community or a healthcare facility. The learning methods may, in addition, be face-to-face, virtual or distance. Key questions are: Why and how the specific method(s) were selected? Do these methods span the whole curriculum? Do these methods have any indigenous contextualization?

e. Online teaching and assessment. Universities need to formulate and adopt a transparent policy and SOPs that reveal how it decides whether a course can be taught through online means. Functional, effective, and operational, Learning Management System (LMS)/ Virtual Teaching Platforms (VTP) are needed to ensure that the students are able to find all relevant information about their course. The development of online programs should be according to the HEC policies. Subject specific online teaching modalities should be used for teaching basic/clinical psychomotor skills. All Councils and bodies of the universities/ institutions should have provision for online meetings.

f. **Information technology (IT) resource system**. A robust IT infrastructure should be in place for proper delivery of online education. The university/institution must have at least two certified IT professionals with a minimum qualification of Bachelor's in computer sciences from recognized institutions who can manage the LMS/VTP. University/institution should develop and impart training to both faculty and students for online teaching and learning.

g. Artificial Intelligence and the role it will play in health and disease

h. **Assessment policy and system** includes how the students will be assessed and how such an exercise helps their learning? What system is available to support the vulnerable students? How is the blueprint of examinations developed and standards set? What appeal system is there to address students' complaints? How feedback on assessments is provided to the stakeholders? Which mechanisms for quality assurance in assessment are in place? How are the pre-assessment processes and post-assessment analysis carried out and the relevant data used?

Assessment programs aligned with online teaching should be developed by the universities/institutions. These should include examinations, assignments, in-class activities, self-assessments, evaluations, built into the instructional design, and timely and constructive feedback.

1.3.2. Allocated Time

MBBS will comprise of five years of tutoring with at least 6000 teaching hours (32-36 weeks per year)

1.3.3. Academic Staff

a. **Staff establishment policy:** A clear policy **c**onsidering the number, level and qualifications of academic faculty required to deliver the planned curriculum to the intended number of students should be defined. The distribution of faculty should be according to the grade and experience.

b. **Staff performance and conduct:** Develop clear statements regarding the responsibilities (job description) of faculty for teaching, research, patient care and code of academic conduct. Anti-harassment policy, maternity leaves, grievance policy, etc. must be in place.

c. **Continuing professional education (CPE) for staff:** Develop guidelines regarding how the institution will support and manage the academic and professional development of the faculty.

1.3.4. Students

a. Student induction policy should match with the resources and number of students' intake.

b. Student selection criteria should be in accordance with the PMC guidelines.

c. Student counseling and support should be provided to all students. This includes accessible and confidential academic, social, psychological and financial support services, as well as career guidance.

1.3.5. Quality Assurance

To ensure effective implementation of the curriculum, robust quality assurance mechanisms should be in place. A policy framework for quality assurance of the curriculum should be adopted by the university/institution in accordance with HEC guidelines. A Quality Assurance Cell (QAC) should be established in all the universities/institutions.

1.3.6. Governance & Administration

Effective implementation of the educational, research and quality assurance activities of the institution requires management, administration, budget allocation and accountability which should involve all stakeholders.

1.4 Total Teaching Hours for Undergraduate Medical Education (MBBS) Curriculum

	HOURS
Preclinical Sciences with clinical correlation	2400 (40%)
Clinical Sciences (Medicine and allied)	1500 (25%)
Self-Directed Learning	500 hours (9%)
Grand Total	**2400+1500+1600+500 = 6000 Hours**
Optional elective rotation in 4th year MBBS = 4 weeks = 6 hours per day for 5 days per week = 120 hours.	
Please note that the breakup of teaching hours is at the discretion of individual universities. The suggested distribution is being provided as an example. It must not be taken as a prescriptive distribution of teaching hours.	

Total Teaching Hours for Preclinical Sciences	Teaching Hours
Anatomy	500 (21%)
Physiology	400 (17%)
Biochemistry	200 (8%)
Pharmacology	300 (12.5%)
Pathology	500 (21%)
Community Medicine	200 (8%)
Infection Control	25 (1%)
Radiology	25 (1%)
Research Methodology and Evidence Based Medicine (EBM)	50 (2%)
Pakistan Studies	25 (1%)
Islamic Studies	25 (1%)
Behavioral Sciences, Professionalism and Ethics	50 (2%)
Forensic Medicine and Toxicology	100 (4%)
Total	**2400**

Total Teaching Hours for Clinical Sciences (Medicine & Allied)	Teaching Hours
General Medicine	500 (33%)
Psychiatry	100 (7%)
Emergency Medicine	50 (3%)
Dermatology	50 (3%)
Cardiology	50 (3%)
Pulmonology	50 (3%)
Nephrology	50 (3%)
Gastroenterology	50 (3%)
Oncology	25 (2%)
Patient Safety	25 (2%)
Pediatrics	300 (20%)
Family Medicine	100 (7%)
Any three of following sub-specialties: Neurology Endocrinology Infectious Diseases Rheumatology Neonatology Geriatrics Pediatric Cardiology	150 (10%)
Total	**1500**
Total Teaching Hours for Clinical Sciences (Surgery & Allied)	**Teaching Hours**
General Surgery	600 (37.5%)
Anaesthesia	50 (3%)
Critical Care	50 (3%)
Orthopedics and Trauma including Neurosurgery / Head Injuries	100 (6%)
Urology	50 (3%)
Any three of the following sub-specialties: Thoracic Surgery Paediatric Surgery Plastic Surgery Cardiac surgery Vascular Surgery Breast Surgery Colorectal Surgery Hepato-Biliary Surgery Upper GI Surgery, Pediatric Cardiac Surgery	150 (9%)
Ophthalmology (Eye)	150 (9%)
Otorhinolaryngology (ENT)	150 (9%)
Obstetrics and Gynecology	300 (19%)
Total	1600

Please note that the breakup of teaching hours is at the discretion of individual universities. The suggested distribution is being provided as an example. It must not be taken as a prescriptive distribution of teaching hours.

SECTION –2

TRADITIONAL UNDERGRADUATE MEDICAL EDUCATION (MBBS) CURRICULUM

Traditional Undergraduate Medical Education (MBBS) Curriculum

2.1 INTRODUCTION

The Traditional Medical Curriculum is based on the staged introduction of basic and biomedical sciences during the initial years of the program followed by the clinical sciences. A common criticism to this approach is that students will not see the relevance of basic and biomedical sciences applied to clinical practice. It is based on a framework developed over a century ago.

2.2 MISSION

To provide students with the highest quality of medical education and experiential learning, to develop them into competent physicians, to groom their personality and inculcate in them a sense of responsibility, confidence, commitment and dedication towards their profession, society, and country.

2.3 VISION

Aspires to raise the status of medical education to one of the leading educational standards recognized globally for excellence in learning, research; and supporting a community of health professionals committed to public service; and enabling the students to attain their true potential in becoming competent, caring, and inquisitive members of the healthcare team.

2.4 YEAR WISE BREAKUP OF TOTAL TEACHING HOURS (FOR TRADITIONAL MBBS CURRICULUM)

Please note that the year wise break up of teaching hours is at the discretion of individual universities. The suggested distribution is being provided as an example. It must not be taken as a prescriptive distribution of teaching hours.

MBBS Years 1 and 2

SUBJECT	CONTACT HRS	INSTRUCTIONAL STRATEGY	ASSESSMENT METHODOLOGY
Anatomy	250+250	• Large group sessions (Lectures) • Demonstrations • Tutorials including Problem-based Learning and Case-based Learning • Assignments and / or projects • Group work by students • Seminars • Videos • Clinical-pathological conferences • Symposiums • Webinars • Self-learning	**Theory** • MCQs, EMQs & SAQs (50% weightage of each) **Practical** • Discipline based practical and viva • Long & short case for clinical subjects • OSCEs
Physiology	200+200		
Biochemistry	100+100		
Behavioral Sciences, Professionalism and Ethics	25+25		
Research Methodology & Evidence Based Medicine	25+25		
Infection Control	25		
Pakistan Studies	12.5+12.5		

Islamic Studies	12.5+12.5	**Practical:** • Laboratory & Skill lab sessions • Field Visits • Research apprenticeship • Others	
Total	**1625**		

MBBS Year 3

SUBJECT	CONTACT HRS	INSTRUCTIONAL STRATEGY	ASSESSMENT METHODOLOGY
General Pathology & Microbiology	200 (17%)	**Theory:** • Large group sessions (Lectures) • Demonstrations • Tutorials including Problem-based Learning and Case-based Learning • Assignments and / or projects • Others • Group work by students • Seminars • Videos • Clinical-pathological conferences • Symposiums • Webinars • Self-learning **Practical:** • Laboratory & Skill lab sessions • Field Visits • Research apprenticeship • Others	**Theory** • MCQs, EMQs & SAQs (50% weightage of each) **Practical** • Discipline based practical and viva • Long & short case for clinical subjects • OSCEs
Pharmacology	300 (24%)		
Forensic Medicine and Toxicology	100 (8%)		
Medicine	175 (14%)		
Surgery	175 (14%)		
Paediatrics	100 (8%)		
Obstetrics and Gynaecology	100 (8%)		
Psychiatry	25 (2%)		
Family Medicine	30 (2.5%)		
Patient Safety	25 (2%)		
General Pathology & Microbiology	200 (17%)		
Total	**1230**		

MBBS Year 4

SUBJECT	CONTACT HRS	INSTRUCTIONAL STRATEGY	ASSESSMENT METHODOLOGY
Ophthalmology (Eye)	150 (11.5%)		
Otorhinolaryngology (ENT)	150 (11.5%)		

Community Medicine	200 (15%)	**Theory:** • Large group sessions (Lectures) • Demonstrations • Tutorials including Problem-based Learning and Case-based Learning • Assignments and / or projects • Others • Group work by students • Seminars • Videos • Clinical-pathological conferences • Symposiums • Webinars • Self-learning **Practical:** • Laboratory & Skill lab sessions • Field Visits • Research apprenticeship • Others	**Theory** • MCQs, EMQs & SAQs (50% weightage of each) **Practical** • Discipline based practical and viva • Long & short case for clinical subjects • OSCEs
Family Medicine	30 (2%)		
Special Pathology	300 (23%)		
Medicine	125 (9.5%)		
Surgery	125 (9.5%)		
Paediatrics	100 (8%)		
Obstetrics and Gynaecology	100 (8%)		
Oncology	25 (2%)		
Total	**1303**		

MBBS Year 5

SUBJECT	CONTACT HRS	INSTRUCTIONAL STRATEGY	ASSESSMENT METHODOLOGY
Medicine	150 (11%)	**Theory** • Large group sessions (Lectures) • Clinicopathological Conferences • Small Group Learning including tutorials • Case-based Discussion • Evidence-based Medicine • Others **Skills** • Clinical Rotations with evening/night duties • Outpatient, Inpatient, Operation Theatre and Emergency departments • Skill lab, • Direct Observation of student performance with feedback	**Theory** • MCQs, EMQs & SAQs (50% weightage of each) **Practical** • Discipline based practical and viva • Long & short case for clinical subjects • OSCEs
Psychiatry	50 (4%)		
Emergency Medicine	50 (4%)		
Dermatology	50 (4%)		
Cardiology	50 (4%)		
Pulmonology	50 (4%)		
Nephrology	50 (4%)		
Gastroenterology	50 (4%)		
Any three of sub-specialties: Neurology, Endocrinology, Infectious Diseases, Rheumatology, Neonatology, Geriatrics, Pediatric Cardiology	150 (11%)		

Paediatrics	50 (4%)		
Family Medicine	40 (3%)		
Surgery	150 (11%)		
Anaesthesia	50 (4%)		
Critical Care	50 (4%)		
Orthopaedics	100 (7.5%)		
Neurosurgery	50 (4%)		
Any three of the sub-specialties: Urology, Thoracic Surgery, Paediatric Surgery, Plastic Surgery, Cardiac Surgery, Vascular Surgery, Breast Surgery, Colorectal Surgery, Hepato-Biliary Surgery, Upper GI Surgery, Paediatric Cardiac Surgery	150 (11%)		
Obstetrics and Gynaecology	50 (4%)		
Total	1340		
Self-Directed Learning	500		
Grand Total (1625+1230+1305+1340= 5500+500)	**6000**		

The hours of Medicine, Surgery, Pediatrics & Obstetrics and Gynecology include evening & night duties. Grand total of five years MBBS program is 6000 study hours.`

2.5 Proposed Distribution of Marks for Internal Assessment Plan of Traditional Curriculum

20% internal assessment and 80% professional examination weightage
Internal assessment of annual professional university examination will remain the same for supplementary examination.

COMPONENT	INTERNAL ASSESSMENT SCORING PARAMETER	% DISTRIBUTION OF 10%
Theory	Attendance in lectures >90% = 3; 89-80% = 2; 79-70% = 1; <70% = 0	3%
	Term examination/s	2%
	Pre-professional examination	2%
	Research	1%
	Continuous assessment (average score of all tests attempted after every learning session during the academic year)	2%

COMPONENT	INTERNAL ASSESSMENT SCORING PARAMETER	% DISTRIBUTION OF 10%
Practical & Behavioral (Professionalism) Assessment	Attendance in practical and clinical work >90% = 3; 89-80% = 2; 79-70% = 1; <70% = 0	3%
	Practical books/Logbooks	1%
	Continuous assessment (average score of all practical tests attempted after every learning session during the academic year)	2%
	Summative assessment	3%
	Discipline/attitude, responsibility and teamwork	1%

SECTION –3

INTEGRATED UNDERGRADUATE MEDICAL EDUCATION (MBBS) CURRICULUM

Integrated Undergraduate Medical Education (MBBS) Curriculum

3.1 INTRODUCTION

An integrated curriculum is described as one that connects different areas of study by cutting across subject-matter lines and emphasizing unifying concepts. Integration focuses on making connections for students, allowing them to engage in relevant, meaningful activities that can be connected to real life clinical scenarios. An integrated curriculum aims to connect the theory learned in the classroom, with practical, real-life knowledge and experiences. The practical and experiential learning aspect of an integrated curriculum is facilitated through service-learning.

The integration has to be multidisciplinary, interdisciplinary and transdisciplinary. It starts from selecting achievable outcomes and ends with development of a plan to measure the achievement outcomes. A good integrated medical curriculum is community based and clearly keeps the service in mind. It should relate to local norms and must be acceptable to the teachers and the students and must relate to national needs. Its contemporaneous nature denotes that it is a dynamic document, having built-in mechanisms for implementation and evaluation. In view of new knowledge being continuously added, a medical curriculum cannot survive in the absence of the aforementioned characteristics.

3.2 YEAR WISE BREAKUP OF TOTAL TEACHING HOURS (FOR INTEGRATED OR HYBRID MBBS CURRICULUM)

Please note that the year wise break up of teaching hours is at the discretion of individual universities. The suggested distribution is being provided as an example. It must not be taken as a prescriptive distribution of teaching hours.

SUBJECT	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total hours out of 6000
Anatomy	250	250				500 (8.3%)
Physiology	200	200				400 (6.6%)
Biochemistry	100	100				200 (3.3%)
Islamic Studies	12	13				25 (0.4%)
Pakistan Studies	12	13				25 (0.4%)
Behavioral Sciences, Professionalism and Ethics	25	15	35			75 (1.25%)
Pharmacology			300			300 (5%)
Pathology	18	27	255	200		500 (8.3%)
Forensic Medicine and Toxicology			100			100 (1.6%)
Community Medicine	45			155		200 (3.3%)
Research and Evidence Based Medicine (EBM)	15			35		50 (0.8%)
Infection Control		12	13			25 (0.4%)
Patient Safety		12	13			25 (0.4%)

SUBJECT	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total hours out of 6000
Radiology	12	13				25 (0.4%)
Ophthalmology (Eye)	16	16	30	88		150 (2.5%)
Otorhinolaryngology (ENT)	16	16	30	88		150 (2.5%)
Obstetrics and Gynecology	6	6		50	238	300 (5%)
Pediatrics	25	25	22	44	184	300 (5%)
General Surgery	26	27	50	110	387	600 (10%)
Anesthesia	10	10	14		16	50 (0.8%)
Critical Care	20	20	10			50 (0.8%)
Orthopedics & Trauma	24	28	8	15		75 (1.25%)
Urology	14	14	8	14		50 (0.8%)
Cardiac Surgery	18	18		14		50 (0.8%)
Plastic Surgery	16	21	8	5		50 (0.8%)
Neurosurgery	19		8	5	18	50 (0.8%)
General Medicine	27	27	60	70	316	500 (8.3%)
Endocrinology	25	25				50 (0.8%)
Rheumatology	20	30				50 (0.8%)
Geriatrics	13	12	13	12		50 (0.8%)
Oncology	12	13				25 (0.4%)
Psychiatry	20	30		50		100 (1.6%)
Dermatology	2	2	46			50 (0.8%)
Emergency Medicine				15	35	50 (0.8%)
Cardiology	27		8	15		50 (0.8%)
Pulmonology	27			23		50 (0.8%)
Nephrology		20	16	14		50 (0.8%)
Gastroenterology		28		22		50 (0.8%)
Family Medicine			30	30	40	100 (1.6%)
Self-Directed Learning	100	100	100	100	100	500 (8.3%)
Total	**1172**	**1143**	**1177**	**1174**	**1334**	**6000**

Note: Clinical Pathological Conferences will be considered in Self Directed Learning.

Elective rotation	4th year = 34 x 2wks = 68 hours	Total Hours 136
	Final year = 34 x 2wks = 68 hours	

3.3 Proposed Timelines of Modules for an Integrated Curriculum

No.	Name of Module	Subjects integrated in Module	Weeks
1	Introduction to the Study of Medicine	Philosophy of medicine, history of medicine, Hippocrates, Rod (Staff) of Asclepius, Declaration of Geneva (Physician's Oath), International Code of Medical Ethics, Declaration on the rights of patients, Professionalism, Confidentiality, Doctor-patient relationship, informed consent, moral obligations, compassion, empathy	2
2	Cell and Genetics	Anatomy, Physiology, Biochemistry, relevant clinical disciplines	5
3	Information Technology	Library Sciences	3
4	Growth and Development	Relevant Basic Sciences (Anatomy, Physiology, Biochemistry, Pathology, Pharmacology, Community Medicine relevant clinical disciplines	3
5	Gastrointestinal Tract and Hepato-biliary System	Basic Sciences, Community, Medicine relevant clinical disciplines.	4
6	Nutrition	Biochemistry, Community Medicine, relevant clinical disciplines	2
7	Blood and Related Disorders	Basic Sciences, Community, Medicine relevant clinical disciplines.	4
8	Homeostasis	Physiology, Biochemistry, Medicine	4
9	Cardiovascular System	Basic Sciences, Community, Medicine relevant clinical disciplines.	4
10	Respiratory System	Basic Sciences, Community, Medicine relevant clinical disciplines.	4
11	Genitourinary System	Basic Sciences, Community, Medicine relevant clinical disciplines.	4
12	Reproductive System and Reproductive Health	Basic Sciences, Community, Medicine relevant clinical disciplines.	4
13	Endocrine System	Basic Sciences, Community, Medicine relevant clinical disciplines.	4
14	Special Senses and Head and Neck	Basic Sciences, Community, Medicine relevant clinical disciplines	4
15	Locomotion	Basic Sciences, Community, Medicine relevant clinical disciplines.	6
16	Nervous System and Behavioral Sciences	Basic Sciences, Community, Medicine relevant clinical disciplines.	8
17	Inflammation and Neoplasia	Pathology, Microbiology and relevant clinical disciplines	4

No.	Name of Module	Topics	Weeks
18	Immunity, Infectious agents and Infections	Pathology, Microbiology and relevant clinical disciplines	8
19	Community Medicine	Community Medicine, Health Systems (including District Health Departments).	12
20	Medical Ethics	Communication Skills, General Behavior	4
21	Forensic Medicine	Forensic Medicine, Basic Sciences, Community Medicine relevant clinical disciplines.	4
22	Clinical Methods	Interspersed in Medicine, Surgery, Obstetrics and Gynecology, Pediatrics, ENT, Eye	4
23	Medicine	General Medicine and specialty rotations, Community Medicine and Pathology and Therapeutics	12
24	Medicine Subspecialty Rotations relevant to medical students	General Medicine and specialty rotations, Community Medicine and Pathology and Therapeutics	4
25	Psychiatry and Behavioral Sciences	Psychiatry, Community Medicine	4
26	Dermatology	Dermatology, Medicine, Community Medicine	2
27	Surgery	General Surgery	12
28	Urology	Kidneys, ureters, urinary bladder, prostate seminal vesicles, urethra, penis, testis, scrotum	2
29	Orthopedics and Traumatology	Orthopedic surgery, Surgery and Emergency Medicine	4
30	Radiology	Radiology	2
31	Obstetrics, Gynaecology and Reproductive Health	Obstetrics and Gynaecology, Medicine, Pediatrics, Community Medicine.	10
32	Pediatrics	Pediatrics, Obstetrics and Gynaecology, Community Medicine	10
33	Community Pediatrics	Pediatrics, Preventive Pediatrics, Community Medicine, Family Medicine	2
34	Ophthalmology (Eye)	Ophthalmology (Eye), Medicine, Community Medicine	4
35	Otorhinolaryngology (ENT)	Otorhinolaryngology (ENT) and Community Medicine	4
36	Accident and Emergency/Casualty	Trauma, Cardiac Emergencies, Medical and Surgical Emergencies	6
37	Electives	In any field, including research electives	4
TOTAL			**138**

3.4 Instructional Strategies for Integrated Curriculum

Teaching in integrated curriculum is based on themes which unite different disciplines by blurring their boundaries. These themes allow teachers of different disciplines to meaningfully link content of their respective disciplines to enable students to see the big picture and appreciate relevance of their learning to their future practical life.

Selection of tools for information transfer should ensure simultaneous input of different disciplines to enhance understanding and implementation of knowledge being taught. Different disciplines may need to have joint teaching sessions to help students in developing links between information coming from different subjects. While tools and methods mentioned in the traditional curricula above may continue to be used, the following tools are commonly used for module or theme-based teaching:

Cognition:

- Joint or paired lectures by different disciplines
- Problem based learning sessions
- Case base learning sessions
- Group work by students
- Seminars
- Tutorials
- Videos
- Clinical-pathological conferences
- Symposiums
- Webinars
- Self-learning
- Assignments

Psychomotor training:

- Workshops
- Skill labs
- Cadaveric dissection
- Models
- Laboratory work
- Bedside teaching
- Emergency or casualty department
- Operation theatres
- Ward rounds
- Community work
- Attitude or behavior training
- Videos
- Role plays
- Role modeling
- Workshops
- Group assignments

3.5 Proposed Assessment Methodologies for Integrated Curriculum

3.5.1 OVERVIEW

Lack of assessment and feedback, based on observation of performance in the workplace, is one of the most serious deficiencies in current medical education practice.

John Norcini and Vanessa Burch 2007

Assessing the learner is the most important and difficult task for the tutor as students may be able compensate for sub-optimal teaching, but misaligned/poor assessment of their abilities can have long-lasting effects on their personal and professional goals.

Assessment is important not only for students but also for tutors, course/syllabi organizers, and the accrediting body (affiliated university/PMC). Assessment data informs important decisions related to whether learning outcomes have been achieved to allow progression to the next level of the course. More importantly, holistic assessment determines whether the potential graduate is competent and can practice as a safe doctor.

In curricula which are theme or module based, each module needs to be followed by assessment to determine achievement of learning outcomes defined for that module. Assessment can be both summative and formative, thereby using it for grading of students as well as for providing students with feedback to enhance and improve their learning respectively. Knowledge, skills and attitude learned during the modules will need separate tools for assessment.

Integrated assessment:
Integrated curriculum must be aligned with integrated assessment policies as it is an instrumental and integral part of curricular development.

Assessment Process:
Integrated assessment requires an in-depth analysis and understanding of the process. A good starting point for this is seeking to answer important questions, the answers of which will help form the basis of these assessments.

1. Why assess the students?

The purpose of assessment has to be clear and must include assessment for learning (as a learning strategy) and assessment of learning (summative assessment) for progression, remediation or promotion.

2. Who should assess the students?

The stakeholders should include program advisors/organizers, accrediting body, affiliated university, enrolled college, tutors, other health care professionals and students themselves, as well as standardized patients.

PMC will oversee the assessment process to be implemented by medical universities in their affiliated colleges.

3. What should be assessed?

All the competencies must be assessed. The integrated curricular objectives must be aligned with the content to be assessed according to the context in which it is taught to students. The chosen assessing material will demonstrate what is valued for example knowledge of higher order thinking, clinical skills, behavior/attitudes and professionalism among other requirements.

4. How the students should be assessed?

Integrative assessment fosters a wide variety of tools which can be incorporated to assess students. The methods to be used should be:

a. Reliable and consistent
b. Valid in measuring what it is to measure
c. Feasibility according to the resources available
d. Assessment must have an impact on student learning
e. Amenable to appropriate standard setting method

5. When should the students be assessed?

The enrolled colleges can devise their own strategy of number of internal assessments to be carried out within the prescribed timelines of the affiliated universities.

The University may provide a template of the "Course, Module or Rotation Objective Assessment Map" in the assessment procedure document.

Each course will develop an examination blueprint, which will include all competencies and information on the methods, timing, and relative contribution to the final mark of all summative assessments, criteria for passing and remediation must be specified by the university.

The final assessment by universities must be within timelines by the accrediting body.

6. Where the students should be assessed?

Internal and external assessments must conduct theory examination/practical in appropriate examination venues.

3.5.2 ASSESSMENT TOOLS

These tools should assess higher level of cognition like understanding, application, interpretation, analysis and decision making rather than simple recall. Different disciplines will need to develop these assessments together to judge holistic comprehension and ability to practice what is learnt by student. Tools of assessment which can be used for integrated curriculum are as following.

Cognitive Domain	Psychomotor Domain	Affective Domain
<u>Formative & Summative assessment:</u> 1. MCQs 2. Extended matching questions (EMQs) 3. Short Answer Questions (SAQs) 4. Short Essay questions (SEQs) 5. Oral Examinations	<u>Formative assessment:</u> 1. OSCE/OSPE (Objective Structured Practical/ Clinical Examination) 2. Mini-Clinical Evaluation Exercise (Mini-CEX) 3. Surgical DOPS (Directly Observed Procedural Skills) 4. Case Based Discussions <u>Summative Assessment:</u> 1. OSPE/ OSCE (Objective Structured Practical/ Clinical Examination) 2. Practical Examination. 3. Direct Observation of clinical skills 4. Long case 5. Short case	The following tools can assess behavior, communication skills, ethics and professionalism. 1. Interviews 2. Direct observation of communication skill and behavior 3. OSPE/OSCE 4. Portfolios 5. Reflections (only for formative assessment)

3.5.3 DISTRIBUTION OF MARKS		
1	Final/External (University) Assessment (MCQ, SAQs, OSCE/OSPE and Practical/Clinicals)	80%
2	Internal assessments	20%

3.5.3a Allocation of Internal Assessment Marks		
COMPONENT	**SCORING MATRIX**	**PERCENTAGE (Marks out of 10%)**
THEORY	Attendance (in lectures) >90% = 3; 89-80% = 2; 79-70% = 1; <70% = 0	3%
	Block examinations	4%
	Research	1%
	Continuous assessment (average score of MCQs attempted after every learning session)	2%
		10%
PRACTICAL (OSCE/OSPE)	Attendance (in practical and clinicals) >90% = 3; 89-80% = 2; 79-70% = 1; <70% = 0	3%
	Practical books/logbooks	1%
	*Continuous assessment (Average Score of OSPEs/OSCEs attempted after every learning session)	2%
	Summative assessment (pre-professional examination)	3%
	Discipline/attitude, responsibility and teamwork	1%
		10%

OSPE to be conducted at the end of each learning module and OSCE to be conducted at the end of each clinical rotation. The average of OSPEs and OSCEs will be considered as continuous assessment.

3.6 Competencies Required at Undergraduate Level

A. PATIENT ASSESSMENT

No.	Procedure	Description	Level of competence
PA 1	Take baseline physiological observation and record appropriately (all wards)	Measure temperature, respiratory rate, pulse rate, blood pressure, oxygen saturations, NG output and urine output.	Safe to practice under indirect supervision
PA 2	Carry out systemic examination abdominal, chest, nervous system, CVS, vascular (all wards)	Systemic approach in clinical examination Complete All steps of examination and document appropriately	Safe to practice under indirect supervision
PA 3	Ophthalmoscopy - eye ward rotation	Perform basic ophthalmoscopy and identify common abnormalities	Safe to practice under indirect supervision
PA 4	Otoscopy- ENT Ward	Perform basic otoscopy and identify common abnormalities	Safe to practice under indirect supervision

B. PROCEDURAL SKILLS

No.	Procedure	Description	Level of competence
PS 1	Blood cultures	Take samples of venous blood to test for the growth of infectious organisms in proper culture bottles.	Safe to practice under indirect supervision
PS 2	Carry out arterial blood gas and acid base sampling from the radial artery in adults	Insert a needle into a patient's radial artery (in the wrist) to take a sample of arterial blood and interpret the results. Use appropriate measures to prevent hematoma formation at the site	Safe to practice under direct supervision
PS 3	Carry out venipuncture	Insert a needle into a patient's vein to take a sample of blood for testing. Make sure that blood samples are taken in the correct order, placed in the correct containers, that these are labelled correctly and sent to the laboratory promptly.	Safe to practice under indirect supervision
PS 4	Measure capillary blood glucose	Measure the concentration of glucose in the patient's blood at the bedside using appropriate equipment. Record and interpret the results.	Safe to practice under indirect supervision

No.	Procedure	Description	Level of competence
PS 5	Carry out a urine multi dipstick test	Explain to patient how to collect a midstream urine sample. Test a sample of urine to detect abnormalities. Perform a pregnancy test where appropriate.	Safe to practice under indirect supervision
PS 6	Carry out a 3- and 12-lead electrocardiogram	Set up a continuous recording of the electrical activity of the heart, ensuring that all leads are correctly placed.	Safe to practice under indirect supervision
PS 7	Take and/or instruct patients how to take a swab/urine or stool culture	Use the correct technique to apply sterile swabs to the nose, throat, skin and wounds. Make sure that samples are placed in the correct containers, that they are labelled correctly and sent to the laboratory promptly and in the correct way.	Safe to practice under indirect supervision for nose, throat, skin or wound swabs

C. PATIENT CARE

No.	Procedure	Description	Level of competence
PC 1	Perform surgical scrubbing	Follow approved processes for cleaning hands and wearing appropriate personal protective equipment before procedures or surgical operations	Safe to practice under indirect supervision
PC 2	Set up an infusion	Set up run through and intravenous infusion. Have awareness of the different equipment and devices used.	Safe to practice under indirect supervision
PC 3	Use correct techniques for moving and handling, including patients who are frail	Use, and/ or direct other team members to use, approved methods for moving, lifting and handling people or objects, in the context of clinical care, using methods that avoid injury to patients, colleagues, or oneself.	Safe to practice under indirect supervision

D. PRESCRIBING

No.	Procedure	Description	Level of competence
P 1	Instruct patients in the use of devices for inhaled medication	Explain to a patient how to use an inhaler correctly, including spacers, and check that their technique is correct. Should know about various types of inhalers.	Safe to practice under indirect supervision
P 2	Prescribe and administer oxygen	Prescribe and administer oxygen safely using a delivery method appropriate for the patient's needs and monitor and adjust oxygen as needed. Know the exact volume given per minute.	Safe to practice under indirect supervision up to 2 liters per minute
P 3	Prepare and administer injectable (intramuscular, subcutaneous, intravenous) drugs	Prepare and administer injectable drugs with prefilled syringes Knows about various channels of CVP	Safe to practice under indirect supervision

E. THERAPEUTIC PROCEDURES

No.	Procedure	Description	Level of competence
TP 1	Carry out intravenous cannulation	Insert a cannula into a patient's vein and apply an appropriate dressing.	Safe to practice under indirect supervision
TP 2	Carry out safe and appropriate blood transfusion	Following the correct procedures, give a transfusion of blood (including correct identification of the patient and checking blood groups). Observe the patient for possible reactions do the transfusion and take action if they occur.	Experienced in a simulated setting; further training required before direct supervisi on
TP 3	Carry out male and female urinary catheterization	Insert a flexible intermittent urethral catheter in both male and female simulated models or patients. Should know its complications and management.	Safe to practice under indirect supervision

No.	Procedure	Description	Level of competence
TP 4	Carry out simple wound care and basic wound closure and dressing	Provide basic care of surgical or traumatic wounds and apply dressing appropriately.	Safe to practice under indirect supervision
TP 5	Carry out nasogastric tube placement	Pass a tube into the stomach through the nose and throat for feeding and administering drugs or draining the stomach's contents. Should know how to ensure correct placement.	Safe to practice in simulation
TP 6	Use local anesthetics	Inject or topically apply a local anesthetic. Understand maximum doses of local anesthetic agents.	Safe to practice under indirect supervision
TP 7	Apply splint for fractures	Can apply routine splints for fractures like Thomas, - Neck of femur	Safe to practice under indirect supervision
TP 8	Interpretation of X-rays of upper and lower limbs	should be able to identify gross musculoskeletal pathology on X-rays	safe to practice under indirect supervision
TP 9	Interpretation of x-rays of chest, abdomen and pelvis	should be able to identify pleural effusion, pneumothorax, free air under diaphragm, pelvic fractures	safe to practice under indirect supervision
TP 10	Should be able to perform essential lifesaving procedure (BLS)	Should be competent at Basic Life Support)	safe to practice under indirect supervision
TP 11	Digital rectal examination	Should be able to competently perform a digital rectal examination.	safe to practice under indirect supervision
TP 12	Nutritional assessment	Calculate BMI, carry out nutritional assessment of patients and guide them according to their caloric requirements	safe to practice under indirect supervision

REFERENCES

1) Basic medical education, World Federation for Medical Education (WFME) global standards for quality improvement, 2020.

2) Accreditation council for graduate medical education (ACGME) common program requirements for Graduate Medical Education, 2015.

3) Canadian Medical Education Directives for Specialists (CanMEDS) Physician Competency Framework, 2015.

4) Higher education commission, establishment of online academic council (OAC) to oversee the quality of online education, 2020.

SECTION – 4

UNDERGRADUATE MEDICAL EDUCATION (MBBS) SYLLABUS

Undergraduate Medical Education (MBBS) Syllabus

Please note that syllabus design is at the discretion of individual universities. The following suggested syllabus is being provided as an example. It must not be taken as being prescriptive.

4.1 - ANATOMY

4.1.1 - DEVELOPMENTAL ANATOMY

S.NO	TOPIC	TOPIC OBJECTIVES
1	Development of Nervous System	i. Congenital anomalies of brain and spinal cord ii. Neural tube defects iii. Hypophyseal defects
2	Development of Head and Neck	i. Ectopic thymus and parathyroid tissue ii. Branchial fistulas, Brachial sinuses, cysts and fistulas iii. 1st arch syndrome (Treacher Collins syndrome, Pierre Robin Syndrome) iv. Neural crest cells and craniofacial defects v. Tongue-Tie, macro and micro-glossia and bifid tongue vi. Thyroglossal duct and Congenital thyroid abnormalities (congenital hypothyroidism, accessory thyroid and thyroidal agenesis) vii. Facial clefts (facial and palatal clefts, including anterior and posterior clefts of lips and palates) viii. Developmental anomalies of nasolacrimal duct ix. Tooth abnormalities x. Deafness and external ear abnormalities xi. Eye abnormalities (Colobomas, congenital cataracts, cyclopia)
3	Development of Digestive & Urogenital System	i. Esophageal abnormalities (Esophageal atresia, tracheoesophageal fistulas) ii. Stomach abnormalities (Pyloric stenosis) iii. Liver and gall bladder abnormalities (Accessory hepatic ducts and duplication of the gallbladder, extrahepatic biliary atresia, intrahepatic biliary duct atresia and hypoplasia) iv. Pancreatic abnormalities (Annular pancreas and accessory pancreatic v. Abnormalities of mesenteries vi. Body wall defects (Umbilical Hernia, Gastroschisis, Omphelocele) vii. Gut rotation defects viii. Gut atresia and stenosis ix. Hindgut Abnormalities (Recto anal atresia, and fistulas, imperforate anus, congenital megacolon)

S.NO	TOPIC	TOPIC OBJECTIVES
		x. Renal tumors and congenital defects(renal cystic disease, accessory kidney, malrotation, renal agenesis) xi. Abnormal location of the kidneys xii. Urinary bladder defects xiii. Uterine and vaginal Defects xiv. Defects of male Internal and external genitalia xv. Defects in sex differentiation xvi. Hernias and cryptorchism xvii. Diaphragmatic hernias
4	**Development of Musculoskeletal system**	i. Craniofacial defects and skeletal dysplasias ii. Limb defects (Meromelia, phocomelia, amelia, micromelia, polydactyly, ectrodactyly, syndactyly) iii. Cleft hand and foot iv. Clubfoot v. Congenital absence or deficiency of the radius vi. Amniotic bands vii. Congenital hip dislocation viii. Vertebral defects
5	**Development of Cardiovascular system**	i. Abnormalities of cardiac looping ii. Endocardial cushions and heart defects iii. Atrial septal and ventricular septal defects iv. Ectopia cordis & Dextrocardia v. Arterial and venous system defects
6	**Development of Respiratory system**	i. Tracheoesophageal fistulas, tracheal stenosis and atresia ii. Respiratory distress syndrome iii. Congenital cysts of the lung
7	**Development of Integumentary system**	i. Keratinization of the skin & Disorders of Keratinization ii. Hypertrichosis iii. Polythelia, polymastia and inverted nipples
8	**General Embryology**	i. Genetic disorders ii. Infertility iii. Ectopic pregnancy iv. Twinning v. Placental abnormalities vi. Abortion vii. Anomalies of orogenesis and fetal period viii. Artificial insemination and In Vitro Fertilization

4.1.2 - NEUROANATOMY

S.NO	TOPIC	TOPIC OBJECTIVES
1	**Organization of Nervous system**	i. Spinal Cord Injuries at different spinal levels ii. Spinal Nerve Injuries (Disease and the intervertebral foramina) iii. Herniated Intervertebral Discs iv. Spinal Tap v. Caudal Anesthesia vi. Intracranial Hemorrhage (Epidural, subdural, subarachnoid, cerebral) vii. The Shaken-Baby Syndrome
2	**Spinal cord Lesions**	i. Injury to the Ascending Tracts Within the Spinal Cord ii. Upper Motor Neuron Lesions iii. Lower Motor Neuron Lesions iv. Types of Paralysis v. Spinal Shock Syndrome vi. Cord Transection Syndrome vii. Brown-Séquard Syndrome or Hemi-section of the Cord viii. Syringomyelia ix. Poliomyelitis x. Multiple Sclerosis xi. Amyotrophic Lateral Sclerosis
3	**Brain stem lesions**	i. Arnold-Chiari Phenomenon ii. Vascular Disorders of the Medulla Oblongata (Lateral and medial medullary syndromes) iii. Tumors of the Pons iv. Pontine Hemorrhage v. Midbrain Trauma vi. Infarctions of the Pons vii. Blockage of the Cerebral Aqueduct viii. Vascular Lesions of the Midbrain
4	**Cerebellar diseases**	i. Signs and Symptoms of Cerebellar Disease ii. Cerebellar Syndromes
5	**Cerebral diseases**	i. Lesions of the Internal Capsule ii. Lesions of motor and sensory cortex of cerebrum iii. Epilepsy
6	**Diseases of basal ganglia**	i. Chorea ii. Huntington's Disease iii. Sydenham Chorea, iv. Hemiballismus v. Parkinson Disease vi. Athetosis
7	**Cranial nerve lesions**	i. Signs and symptoms of cranial nerve lesions

S.NO	TOPIC	TOPIC OBJECTIVES
8	**Lesions of the Thalamus**	i. Sensory loss ii. Thalamic Pain iii. Thalamic Hand
9	**Clinical Disorders Associated with Hypothalamic Lesions**	i. Obesity and Wasting ii. Sexual Disorders iii. Hyperthermia and Hypothermia iv. Diabetes Insipidus v. Disturbances of Sleep vi. Emotional Disorders
10	**Diseases Involving the Autonomic Nervous System**	i. Diabetes Mellitus ii. Horner Syndrome iii. Argyll Robertson Pupil iv. Hirschsprung's Disease and other common autonomic disorders v. Autonomic Reflex bladder
11	**Diseases involving meninges**	i. Meningitis ii. Intracranial Hemorrhages
12	**Diseases involving ventricular system**	i. Hydrocephalus ii. Brain Trauma and the Blood-Brain Barrier iii. Drugs and the Blood-Brain Barrier

4.1.3 - REGIONAL ANATOMY

S.NO	TOPIC	TOPIC OBJECTIVES
1	**Upper limb**	i. Fractures of Clavicle, Humerus, Radius, Ulna, Scaphoid & Hamate ii. Injuries to Brachial Plexus, Cords & branches of brachial plexus, Axillary, Musculocutaneous, Radial, Median & Ulnar nerves iii. Dupuytren's Contracture, Hand infections & palmar wounds with surgical incisions iv. Dislocation of sternoclavicular, shoulder, acromioclavicular, elbow, radioulnar & wrist joints v. Rotator Cuff injuries, Frozen shoulder & Calcific Supraspinatus Tendinitis vi. Use of vessels for cannulation & coronary angiography vii. Carcinoma of Breast & its spread, Surgical incisions of breast & mastectomy, Mammography
2	**Lower limb**	i. Fractures of Hip Bone, Femur, Tibia, Fibula, Calcaneum & Talus ii. Neurological Examination of leg iii. Varicose veins, Cannulation & lacerations of Femoral artery, Saphenous cutdown,

S.NO	TOPIC	TOPIC OBJECTIVES
		iv. Femoral Hernias, Groin & Hamstring injuries, Calcanean Tendinitis, rupture & bursitis, v. Injuries to Femoral, Sciatic, Superior Gluteal, Inferior Gluteal, Tibial & Common Fibular nerves, Planter nerves morton's neuroma vi Dislocation of hip joint, Patella, Hip & Knee joint replacement, Bursitis in knee region, Pes Planus & Clubfoot
3	**Abdomen and pelvis**	i. Abdominal & Inguinal Hernias, Laparoscopic surgery ,Abdominal incisions, Hydrocele, Hematocoele, Varicocele & Carcinoma of Testes & Scrotum ii. Peritonitis & Ascites, Peritoneal Adhesions, Paracentesis, Intraperitoneal injections & spread of pathological fluids in various peritoneal compartments with their surgical approach iii. Esophageal varices, Hiatal Hernia, gastroesophageal reflux, Barret Esophagus, Pyloric Stenosis, Gastric & Peptic ulcers, Carcinoma Stomach, applied endoscopy, barium swallow iv. Visceral referred pains, Duodenal ulcers, Appendicitis, Meckel's Diverticulum, Colonoscopy, Diverticulosis & volvulus, applied Barium meal v. Rupture of Spleen & Splenectomy, Splenic needle biopsy vi. Blockage of Hepatopancreatic Ampulla & Pancreatitis, Endoscopic Retrograde Cholangiopancreatography, Pancreatic Cancer, Subphrenic Abscess, Hepatic lobectomies & segmentectomy, Cirrhosis of Liver, Liver biopsy, Gall stones & Cholecystectomy & Portosystemic Shunts vii. Vasculature of abdomen: Abdominal aortic aneurysm(stent or graft),Abdominal lymph node surgery, chronic thrombosis of inferior vena cava viii. Perinephric abscesses, Renal & Ureteric calculi with referred pain & Renal Transplantation ix. Diaphragm & referred pain, Injury to Phrenic nerve, Aortic Aneurysm, Psoas Abscess & Diaphragmatic Hernia x. Pelvic fractures & variations of male & female pelvic girdles, Pelvimetry, bone marrow biopsy, sacroiliac joint involvement xi. Cystoscopy, Rupture of male & female urethra, Catheterizations (supra pubic and urethral), bladder cancer xii. Benign Prostatic Hyperplasia, prostatic Cancer, vasectomy xiii. Hysterosalpingography, Tubal ligation, Ectopic Pregnancy, Uterine Prolapse, Hysterectomy, Carcinoma of uterus, cervix & ovaries, vaginal fistulae, Culdoscopy & Culdocentesis

S.NO	TOPIC	TOPIC OBJECTIVES
		xiv. Disruption of Perineal Body, Episiotomy, Cystocele & Rectocele, Bartholin Abscesses & Cysts xv. Rectal examination & discuss Anal Fissures & Perianal Abscesses, Hemorrhoids, Anorectal incontinence xvi. Pudendal block xvii. Disc prolapse
4	**Head and neck**	i. Head injuries (fractures and vascular) & intracranial hemorrhages, Fracture of Mandible, ii. Scalp injuries & infections, iii. Facial lacerations & incisions, Facial Palsy, Trigeminal neuralgia iv. Pulsations of arteries in face & scalp, Compression of Facial artery, Carcinoma of lips v. Orbital tumors & fractures, injury to nerves supplying Eyelids & extraocular muscles, Retinal detachment, Presbyopia, Cataract, Glaucoma, Corneal ulcers & transplants, Horner's Syndrome vi. Infection of Parotid gland , tumor of parotid gland and parotid gland stone, Mandibular & Inferior alveolar nerve block, Dislocation of Temporomandibular joint vii. Horner syndrome viii. Cleft lip & palate, lingual carcinoma ix. Deflected Nasal Septum, Epistaxis, Sinusitis x. Acute otitis externa & media, Tympanic membrane perforations, Mastoiditis, Motion Sickness, Hearing loss, Meniere Syndrome, Blockage of Pharyngotympanic tube xi. Torticollis, Right cardiac catheterization, Surgical dissection of carotid triangle xii. Enlargement of Thyroid gland, Thyroidectomy, Injury to laryngeal & recurrent laryngeal nerve, Laryngoscopy, aspiration of foreign bodies from laryngopharynx, Tracheostomy, Tonsillectomy, Adenoiditis, Esophageal cancer, Tracheo-esophageal fistula xiii. Cranial nerves injuries
5	**Thorax**	i. Fractures of Sternum, Ribs and Vertebrae, cervical rib ii. Flail Chest, Thoracotomy, Supernumerary ribs, Sternal biopsy, Thoracic outlet syndrome, Dislocation of ribs, Paralysis of diaphragm iii. Intercostal nerve block, Thoracocentesis iv. Pulmonary collapse, Pneumothorax, Hydrothorax, Hemothorax, Insertion of chest tube, Pleuritis, Aspiration of foreign bodies, Bronchoscopy, Lung resection. Segmental atelectasis, Pulmonary Embolism, Hemoptysis, Bronchogenic carcinoma, Carcinoma of lungs, Pleural pain v. Surgical significance of Transverse Pericardial Sinus, Pericarditis, Pericardial rub and Pericardial effusion, Cardiac Tamponade, Pericardiocentesis

S.NO	TOPIC	TOPIC OBJECTIVES
		vi. Cardiac catheterization, Percussion & auscultation of heart, Valvular heart diseases, Coronary angiography, Echocardiography, Myocardial Infarction, Coronary artery disease, Angina Pectoris, Coronary Bypass Graft, Coronary Angioplasty, Artificial cardiac pacemaker, Fibrillation of heart, Cardiac referred pain vii. Central venous line.

4.2 - PHYSIOLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
1	Homeostasis	i. Control systems in the body ii. Intercellular Connections iii. Cell organelles iv. Membrane transport including active transport, passive transport, v. simple and facilitated diffusion vi. Importance of selectively permeable membranes, osmosis and vii. Osmotic pressure, surface tension, viscosity also in relation to body fluids
		Clinical/Applied Concepts i. Failure of homeostasis (Illness) ii. Abnormalities of the cell and its organelles (apoptosis, mutation, cancer and aging)
2	**Blood**	i. Composition and functions ii. Plasma proteins: albumin, globulin fibrinogen, and their functions iii. Hemoglobin and blood indices, iron metabolism, fate of hemoglobin. iv. White blood cells, Leucopoiesis, functions v. Platelets vi. Haemostasis, clotting factors, anticoagulants vii. Blood groups, Blood transfusion and complications viii. Reticuloendothelial system – Spleen
		Clinical/Applied Concepts i. Anemia and its types, polycythemia ii. Blood indices in various disorders Thalassemia iii. Leucopoenia, Leucocytosis, leukemia, AIDS, allergy, vaccination

S.NO	TOPIC	TOPIC OBJECTIVES
		i. Thrombocytopenia ii. Clotting disorders (Hemophilia etc.) iii. Blood grouping/cross matching and significance iv. Effect of anemia on cardiac output and on the CVS
3	**Nerve and muscle**	i. Properties of nerve fibers ii. Physiology of action potential including compound action potentials iii. Conduction of nerve impulse, nerve degeneration and regeneration Synapses iv. Types of muscle, functions v. Skeletal muscle contraction vi. Isometric and isotonic contraction vii. Smooth muscle contraction viii. Neuromuscular junction ix. Excitation-contraction coupling x. Motor unit xi. Neuromuscular junction blockers
		3.1 Clinical/Applied Concepts i. Nerve conduction studies ii. Electromyograms (EMG) iii. Nerve injury iv. Rigor mortis and contractures v. Myasthenia gravis vi. Myopathies/Neuropathies
4	**Cardiovascular system**	i. Properties of cardiac muscle ii. Action potential in atrial and ventricular muscle and pace-maker potential iii. Artificial pacemaker iv. Cardiac impulse- origin and propagation v. Cardiac cycle Regulation of cardiac functions vi. ECG-recording and interpretation vii. Arrhythmias & their mechanism of development viii. Functional types of blood vessels ix. Hemodynamics of blood flow x. Local control of blood flow xi. Systemic circulation - basic principles/characteristics and control xii. Cardiac output (regulation/measurement) peripheral resistance and its regulation xiii. Arterial pulse xiv. Arterial blood pressure (short/long term regulation) xv. Heart sounds/murmurs xvi. Venous return and its regulation xvii. Coronary circulation xviii. Splanchnic circulation xix. Cerebral circulation xx. Cutaneous circulation- Triple response xxi. Fetal circulation and readjustments at birth xxii. Cardiovascular changes during exercise

S.NO	TOPIC	TOPIC OBJECTIVES
		Clinical/Applied Concepts i. Blood pressure monitoring ii. Correlation of cardiac cycle with Electrocardiogram (ECG) and heart sounds Echocardiogram iii. Significance of apex beat / abnormalities iv. ECG interpretation in cardiac muscle abnormalities and cardiac arrhythmias v. Flutter, fibrillation, ectopic beats vi. Conduction defects vii. Radial/other pulses viii. Hypertension, types and effects ix. Clinical evaluation of heart sounds and murmurs x. Jugular venous pulse xi. Ischemic heart disease xii. Cerebrovascular accidents xiii. Types of heart failure and circulatory shock
5	**Respiratory system**	i. Functions of lungs (respiratory and non-respiratory) ii. Mechanics of breathing, pulmonary pressure changes iii. Surfactant and compliance iv. Protective reflexes v. Lung volumes and capacities vi. Dead spaces vii. Diffusion of gases (gas laws, composition) viii. Pulmonary Circulation Ventilation / perfusion ix. Transport of O2 in blood O2/CO2 disassociation curves x. Transport of CO2 in blood xi. Regulation of respiration (nervous/chemical) xii. Abnormal breathing xiii. Hypoxia-types and effects xiv. Physiology of cyanosis xv. Physiology of high altitude, space, deep sea diving xvi. Oxygen debt xvii. Respiratory changes during exercise
		Clinical/Applied Concepts i. Types of respiration (intrapleural pressure, pneumothorax, effusion) ii. Atelectasis iii. Lung function tests (Spirometry) iv. Sneezing, yawning, cough v. Obstructive / Restrictive lung disease (FEV1/FVC) vi. Abnormal Ventilation / Perfusion

S.NO	TOPIC	TOPIC OBJECTIVES
		Respiratory failure: Types I & II i. Asphyxia ii. Hypoxia, cyanosis, dyspnea, hypo- and hypercapnia iii. Artificial respiration iv. Oxygen therapy and its toxicity v. Caisson's disease, Acute Mountain Sickness
6	**Body fluids and kidneys**	i. Compartments of body fluids and measurement ii. Tissue and lymph fluids iii. Fluid excess / depletion iv. General functions of kidney v. GFR-factors regulating vi. Formation of urine, filtration, reabsorption, secretion vii. Plasma clearance viii. Concentration and dilution of urine ix. Electrolyte balance x. Water balance xi. Regulation of blood pressure by kidneys xii. Hormones of kidneys xiii. Acidification of urine xiv. Acid-Base balance xv. Micturition
		Clinical/Applied Concepts i. Renal function tests ii. Renal failure/uremia iii. Nephrotic syndrome iv. Dialysis: Artificial kidney/hemodialysis/ peritoneal dialysis v. Metabolic acidosis/alkalosis vi. Abnormalities of micturition including incontinence
7	**Gastrointestinal Tract (GIT)**	i. Enteric nervous system (gut, brain) ii. Mastication, swallowing and their control iii. functions and movements of stomach iv. Functions of pancreas v. Functions and movements of small intestine vi. Functions and movements of large intestine vii. Hormones of GIT viii. Vomiting and its pathway ix. Defecation and its pathway x. Regulation of feeding and energy Expenditure xi. Functions of liver/gall bladder
		Clinical/Applied Concepts i. Dysphagia, achalasia of esophagus ii. Examination of abdomen in acute and chronic pain iii. Gastric function tests

S.NO	TOPIC	TOPIC OBJECTIVES
		vi. Vomiting and its effects v. Diarrhea, constipation vi. Jaundice, liver functions tests and their interpretation
8	**Nervous system**	i. Organization of nervous system ii. Classification of nerve fibers iii. Properties of synaptic transmission iv. Neurotransmitters and neuropeptides v. Types and function of sensory receptors vi. Functions of spinal cord and tracts vii. Reflex action/reflexes viii. Muscle spindle/muscle tone ix. Tactile, temperature and pain sensations x. Sensory Cortex xi. Motor Cortex xii. Motor pathways (pyramidal and extra pyramidal) xiii. Basal ganglia, connections and functions xiv. Cerebellum, connections and functions xv. Vestibular apparatus/regulation of posture and equilibrium xvi. State of brain activity Reticular formation xvii. Physiology of sleep xviii. Electroencephalogram (EEG) Physiology of memory xix. Physiology of speech xx. Thalamus- nuclei and functions xxi. Hypothalamus and limbic system xxii. Cerebrospinal fluid xxiii. Regulation of body temperature xxiv. Memory & learning xxv. Autonomic nervous system
		Clinical/Applied Concepts i. Significance of dermatomes ii. Receptors and neurotransmitters (applied aspect) iii. Interpretation of reflexes iv. Injuries and diseases of spinal cord, analgesia system v. Disorders of cranial nerves vi. Hemiplegia / paraplegia, Upper and lower motor neuron lesions: vii. features and localization viii. Parkinsonism and other lesions of basal ganglia ix. Cerebellar disorders x. Postural disorders xi. Epilepsy xii. Sleep disorders xiii. Higher mental function assessment xiv. Alzheimer's disease xv. Abnormalities of speech xvi. Thalamic syndrome xvii. Lesion of hypothalamus xviii. Hydrocephalous xix. Heat Stroke

S.NO	TOPIC	TOPIC OBJECTIVES
9	**Special senses**	i. Physiological structure and functions of eyeball ii. Principles of optics iii. Accommodation of eye iv. Visual acuity v. Photochemistry of vision vi. Colour vision vii. Dark and light adaptation Neural function of retina viii. Visual pathway, light reflex and pathway Visual cortex ix. Eye movements and control x. Physiological anatomy of cochlea xi. Functions of external and middle ear xii. Functions of inner ear- organ of Corti xiii. Auditory pathway xiv. Physiology of smell - receptors and pathway xv. Physiology of taste xvi. Olfaction/taste abnormalities
		Clinical/Applied Concepts i. Glaucoma, Cataract ii. Errors of refraction iii. Color blindness, Fundoscopy iv. Field of vision and lesions of visual pathway, visual evoked potentials and electroretinogram v. Rinne's and Weber's tests vi. Hearing test audiometry, types of deafness, auditory evoked potentials (Endocochlear potential, with reference to Meniere's disease)
10	**Endocrinology**	i. General principles (classification, mechanism of action, feedback control) ii. Physiology of growth iii. Biosynthesis, transport, metabolism, actions and control of secretion of hormones of: a. Hypothalamus b. Anterior pituitary c. Posterior pituitary d. Thyroid gland e. Parathyroid, calcitonin and calcitriol f. Adrenal cortex & medulla g. Pancreas h. GIT i. Pineal gland j. Thymus k. Kidney
		Clinical/Applied Concepts i. Hormonal assays ii. Panhypopituitarism, dwarfism acromegaly, gigantism, Sheehan's syndrome iii. Diabetes insipidus, syndrome of inappropriate ADH secretion iv. Myxedema, cretinism, thyrotoxicosis

S.NO	TOPIC	TOPIC OBJECTIVES
		v. Tetany, Hypercalcemia vi. Pheochromocytoma vii. Cushing's syndrome, Conn's syndrome, Addison's disease, adrenogenital syndrome viii. Diabetes mellitus and hypoglycemia, Zollinger Ellison's syndrome
11	**Reproduction**	i. Erection and ejaculation ii. Testosterone iii. gonads and oogenesis iv. Estrogen and progesterone v. Menstrual cycle vi. Puberty and menopause vii. Pregnancy- physiological changes in mother's body during viii. pregnancy ix. Placenta x. Parturition xi. Lactation xii. Fetal and neonatal physiology
		Clinical/Applied Concepts i. Semen analysis ii. Chromosomal abnormalities iii. Male infertility iv. Female infertility v. Contraception vi. Pregnancy Tests

4.3 -BIOCHEMISTRY

S.NO	TOPIC	TOPIC OBJECTIVES
1	**Proteins**	i. Principle and applications of electrophoresis ii. Immunoglobulins and their biomedical significance iii. Plasma proteins and their clinical significance iv. Structure and functional relationship of proteins e.g. malfunction of protein receptors within membranes result in disease like Diabetes Mellitus Type II. v. Nutritional importance of proteins, e.g. Protein Malnutrition related conditions
2	**Lipids and fatty Acids**	i. Eicosanoids and their functions in health and disease ii. Steroids and their biomedical significance iii. Lipid peroxidation and its significance iv. Essential fatty acids and their significance

S.NO	TOPIC	TOPIC OBJECTIVES
3	**Enzymes**	i. Isozymes and their clinical importance ii. Therapeutic uses and application of enzymes in clinical diagnosis
4	**Porphyrins and hemoglobin**	i. Major steps in biosynthesis of porphyrins and related disorders ii. Degradation of heme, hyperbilirubinemia, biochemical causes and differentiation iii. Biochemical causes of hemoglobinopathies (Hemoglobin S disease, Hemoglobin C disease, Hemoglobin SC disease, Methemoglobinemia, Thalassemia)
5	**Vitamins and minerals**	i. Hypo- and hyper-vitaminosis ii. Sources and biochemical importance of sodium, potassium, chloride, calcium, phosphorus, iodine, iron, & zinc
6	**Nutrition**	i. Caloric requirements of the body ii. Balanced diet, essential amino acids and essential fatty acids iii. Nutritional requirements in pregnancy, lactation, newborn, young and elderly subjects iv. Nutritional disorders and protein energy malnutrition (obesity, Marasmus, Kwashiorkor and Marasmic-Kwashiorkor)
7	**Bioenergetics and biological oxidation**	i. Un-couplers and their biochemical effects ii. Site-specific inhibitors of electron transport chain and their effects
8	**Metabolism of carbohydrates**	i. Disorders of glycogen metabolism (glycogen storage diseases) ii. Importance of Hexose Mono-Phosphate (HMP) shunt and glucose-6-phosphate dehydrogenase deficiency iii. Disorders related to metabolism of fructose and galactose iv. Regulation of blood glucose level v. Causes of hyperglycemia and hypoglycemia vi. Biochemistry of Diabetes Mellitus, its laboratory findings and diagnosis
9	**Metabolism of lipids**	i. Ketosis and its mechanism ii. Hypercholesterolemia and atherosclerosis iii. Plasma lipoproteins (VLDL, LDL, HDL, and chylomicrons): their functions and importance in health and disease
10	**Metabolism of proteins and amino acids**	i. Congenital and acquired causes of hyperammonemia ii. Biochemical explanation for ammonia intoxication iii. Metabolic defects in amino acid metabolism (phenylketonuria, maple syrup urine disease, albinism, homocystinuria, alkaptonuria)
11	**Metabolism of nucleotides**	i. Causes and consequences of hyperuricemia (gout)

S.NO	TOPIC	TOPIC OBJECTIVES
12	**Biochemical genetics**	i. Disorder related to DNA repair (xeroderma pigmentosum) ii. Various types of mutations and their consequences iii. Steps and applications of polymerase chain reaction (PCR)
13	**Biochemistry of endocrine system**	i. Biosynthesis and mechanism of action of hormones ii. Effects of hormones on carbohydrate, lipid, protein, and mineral metabolism
14	**Biochemistry of water and electrolyte imbalance and acid-base balance**	i. Body buffers and their mechanism of action ii. Acid base regulation in human body and related disorders

4.4 -PHARMACOLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
1	**General Pharmacology**	i. Definition of drug, drug nomenclature and sources of drugs. ii. Dosage forms and doses of drugs. iii. Pharmacokinetics: basic principles and their clinical application ○ Route of drug administration. ○ Absorption of drugs and bioavailability ○ Drug reservoirs, distribution and redistribution of drugs, plasma ○ protein binding and volume of distribution. ○ Bio-transformation of drugs. ○ Excretion of drug, enterohepatic recirculation, plasma half-life, ○ clearance iv. Pharmacodynamics ○ Mechanism of drug action. ○ Receptors and post receptor molecular mechanism of drug ○ action ○ Mechanism of drug action other than mediated through drug ○ receptors. ○ Factors modifying action and doses of drugs. ○ Pharmacogenetics. ○ Adverse drug reactions and drug toxicity/poisoning ○ Drug-drug Interactions

S.NO	TOPIC	TOPIC OBJECTIVES
2	**Locally Acting Drugs**	i. Dermatological and topical drugs ii. Anti-seborrhoeics, locally acting enzymes iii. Antiseptics and disinfectants.
3	**Autacoids**	i. Histamine & antihistamines ii. Introduction to other mediators: ○ Eicosanoids ○ Serotonin ○ Substance P ○ Bradykinin
4	**Drugs Acting on Gastrointestinal Tract**	i. Emetics and anti-emetics. ii. Pharmacotherapy of Peptic ulcer disease iii. Pharmacotherapy of Constipation iv. Pharmacotherapy of Diarrhea v. Pharmacotherapy of irritable bowel syndrome vi. Prokinetics
5	**Drugs Acting on Autonomic Nervous System**	i. Parasympathetic nervous system ○ Parasympathomimetics ○ Parasympatholytics ○ Autonomic ganglionic stimulants and blockers ○ Skeletal muscle relaxants ii. Sympathetic nervous system ○ Sympathomimetics ○ Sympatholytics ○ Adrenergic neuron blockers
6	**Drugs acting on renal system**	i. Diuretics ii. Anti-Diuretics iii. Drugs for acid base and electrolyte balance
7	**Drugs acting on Cardiovascular System**	i. Antihypertensive drugs. ii. Anti-anginal drugs iii. Drug management of C Heart F and Inotropic drugs. iv. Thrombolytics/anticoagulants/antiplatelets. v. Anti-arrhythmic drugs. vi. Antihyperlipidemic drugs. vii. Drugs used in anemias viii. Pituitary-hypothalamic drugs. ix. Thyroid antithyroid drugs. x. Pancreatic hormones and anti-diabetic drugs. xi. Adrenocorticoids.
8	**Drugs Acting on Respiratory System**	i. Pharmacotherapy of cough: ○ Antitussives, Expectorants and Mucolytics. ○ Bronchial asthma.

S.NO	TOPIC	TOPIC OBJECTIVES
9	**Drugs Acting on Endocrine System**	i. Pituitary-hypothalamic drugs. ii. Thyroid antithyroid drugs. iii. Pancreatic hormones and anti-diabetic drugs. iv. Adrenocorticoids. v. Anabolic steroids. vi. Reproductive hormones: Testosterone, Estrogen, Progesterone, vii. Contraceptives
10	**Drugs acting on Central Nervous System**	i. Sedative-hypnotics, Pharmacotherapy of sleep disorder ii. Pharmacotherapy of Epilepsy, Parkinsonism, Migraine. iii. Psychopharmacology: antipsychotics, antidepressants, anxiolytics, iv. Anti-mania drugs v. Anesthetics: Local and general anesthetics. vi. CNS stimulant drugs vii. Pharmacotherapy of Pain and inflammation: ○ Opioids and Non-Steroidal Anti-inflammatory Drugs (NSAIDs) ○ Pharmacotherapy of Gout, Rheumatoid arthritis ix. Drugs for movement disorder/muscle relaxant.
11	**Drugs Acting on Uterus**	i. Drugs increasing and drugs decreasing uterine motility ii. Drugs decreasing uterine motility
12	**Chemotherapy**	i. Introduction to chemotherapy ii. Antimicrobials acting on cell wall iii. Protein synthesis inhibitors iv. Nucleic acid synthesis inhibitors v. Antifolates vi. Gyrase inhibitors vii. Anti-mycobacterial drugs viii. Anti-fungal drugs ix. Antiviral drugs x. Anti-protozoal drugs: Antimalarials and Anti-amoebic drugs xi. Chemotherapy for Sexually Transmitted Diseases (STDs) xii. Cancer chemotherapy: Principle and general consideration, treatment approach in some common malignancies
13	**Immuno-pharmacology**	i. Immunostimulants including Probiotics ii. Immunosuppressants iii. Vaccines and sera
14	**Miscellaneous**	i. Pharmacotherapy of Glaucoma and Cataract ii. Pharmacotherapy of anemias iii. Drug therapy in children, elderly, during pregnancy and lactation. iv. Drug therapy in disease states such as renal and hepatic disease. v. Overview of radiation therapy. vi. Guideline for rational use of drugs

4.5 - PATHOLOGY & MICROBIOLOGY

4.5.1- GENERAL PATHOLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
1	**Cell injury**	i. Clinical Causes of Irreversible and Reversible Cell injury & Role of free radical. ii. Apoptosis versus necrosis and types of necrosis with examples. iii. Clinical aspects of Intracellular accumulations e.g. Dystrophic and metastatic calcification along with clinical significance and examples. iv. Clinical aspects of cellular Adaptations with examples. Atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia.
2	**Healing and Repair**	
3	**Inflammation**	i. Vascular and cellular events and Chemical mediators of acute inflammation. ii. Morphological patterns &Clinical outcomes of acute inflammation. iii. Transudate vs exudate with clinical examples. iv. Types of chronic inflammation (simple and granulomatous) with clinical examples. v. Define repair, regeneration, growth factors and scar formation vi. Factors affecting wound healing & Pathological aspects of complications of wound healing. vii. Clinical aspects of healing by primary and secondary intention.
4	**Neoplasia**	i. Nomenclature with clinical examples of benign and malignant tumors. ii. Define protooncogenes and oncogenes with clinical examples. iii. Clinical aspects of carcinogenesis, carcinogenic agents, tumor metastasis and tumor markers iv. Clinical aspects of grading and staging of tumors with laboratory diagnostic methods of tumors.
5	**Disorders of circulation**	Clinical aspects with types and examples of hemorrhage, infarction, thrombosis, emboli, oedema and shock.

4.5.2- IMMUNOLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
1		i. Clinical aspects of innate and acquired immunity. Active and passive immunity. ii. Types of cells taking part in immune response (Phagocytes, T cells, B cells and NK cells) and their clinical importance.

S.NO	TOPIC	TOPIC OBJECTIVES
		iii. Complement activation pathways and their role in immune response to infections, autoimmunity, transplant rejection and immune deficiency diseases. iv. MHC and their role in clinical diseases. v. Types and clinical aspects of antibodies. vi. Clinical aspects of hypersensitivity reactions (infectious diseases and autoimmune diseases). vii. Types of transplant rejections & Graft Vs Host Disease viii. Clinical aspects of autoimmunity and autoimmune diseases.

4.5.3 - GENETICS

S.NO	TOPIC	TOPIC OBJECTIVES
		i. Types of mutation. ii. Clinical aspects of X linked diseases, Autosomal dominant & autosomal recessive diseases with clinical examples. iii. Clinical aspects of Down syndrome, Turner syndrome, Klinefelter syndrome, Ehlers Danlos syndrome &Marfan syndrome.

4.5.4- MICROBIOLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
1	**General Bacteriology**	i. Important components of bacterial cell (cell wall, cell membrane, nucleoid, ribosomes, pilli, flagella, plasmids, transposons, spores). ii. Exotoxins vs Endotoxin. iii. Mechanisms of actions of exotoxins and their clinical outcomes. iv. Classification of important groups of bacteria. v. Bacterial growth curve vi. Classification of culture media. vii. Colonization resistance and clinically important bacteria of Normal Flora. viii. Clinical aspects of sterilization process and its various methods and uses of disinfectants in various clinical settings. ix. Clinical aspects of conjugation, transduction and transformation. x. Clinical uses of bacterial vaccines. xi. Clinical aspects of antimicrobial resistance. xii. Clinical aspects of antimicrobial mechanisms of actions.
2	**Special Bacteriology**	i. Clinical aspects of ○ Gram positive cocci: • Staphylococci ▪ Streptococci ▪ Gram negative cocci ▪ Gonococci ▪ Meningococci ▪ Enterococci

S.NO	TOPIC	TOPIC OBJECTIVES
		○ Gram negative rods: ▪ Bacillus ▪ Clostridia ▪ Diphtheria ▪ Listeria ○ Spirochetes: ▪ Treponema pallidum ▪ Borrelia ▪ Leptospira ○ Mycobacteria: ▪ MTB, M. Leprae, Atypical Mycobacteria ○ Gram negative rods: ▪ E. coli ▪ Salmonella ▪ Shigella ▪ Proteus ▪ Pseudomonas ▪ Klebsiella ▪ Bacteroides ▪ Bordetella ▪ H. influenza ▪ Legionella ○ Chlamydia, rickettsia ○ Mycoplasma ○ Actinomycetes

4.5.5- PARASITOLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
1		Clinical aspects of: ○ Plasmodium ○ Leishmania ○ Trypanosomes, ○ Toxoplasma, ○ Entamoeba ○ Giardia ○ Trichomonas ○ Entrobius ○ Ascaris ○ Trichuris ○ Ancylostoma duodenale ○ Wuchereria ○ Dracunculus ○ Teniasaginata ○ Teniasolium ○ Echinococcus ○ D. Latum ○ Schistosomes

4.5.6- VIRUSES

S.NO	TOPIC	TOPIC OBJECTIVES
		i. Viral structure and replication ii. Classification of viruses with clinical conditions caused by each. iii. Clinical aspects of ○ Corona viruses ○ Herpes viruses ○ Variola virus ○ Measles, mumps, rubella ○ Rhinoviruses ○ Adenoviruses ○ Influenza virus ○ Polio virus ○ Dengue ○ Rabies ○ Hepatitis ○ Human Immunodeficiency Virus (HIV)

4.5.7- MYCOLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
		i. Fungal structure and classification of clinically important fungi. ii. Clinical aspects of Dermatophytes, Tinea Versicolor, Sporothrix, Histoplasma, Coccidioiodes, Blastomyces, Candida, Aspergillus, Mucor, Rhizopus, Cryptococcus

4.5.8- SYSTEMIC PATHOLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
1	**Blood Vessels and Heart**	i. Differentiation between atherosclerosis, Monkeberg's medial calcific sclerosis and arteriolosclerosis. ii. Etiology, pathogenesis & complications of atherosclerosis. iii. Types of primary and secondary hypertension and vascular changes in hypertension. iv. Common pathogenic mechanisms of vasculitis. v. Aneurysms, classification, and aetiology and pathogenesis of atherosclerotic aneurysm vi. Pathology of varicose veins vii. Benign and malignant tumors of blood vessels. viii. Pathogenesis of ischemic heart disease including etiological factors, pathogenesis, diagnosis and complications of Myocardial infarction.

S.NO	TOPIC	TOPIC OBJECTIVES
		ix. Rheumatic fever with respect to aetiology, pathogenesis, morphological and clinical features. The sequelae of Rheumatic Fever. x. Infective endocarditis with respect to aetiology, pathogenesis, morphological and clinical features, and its sequelae xi. Myocarditis: causes and its morphological and clinical features xii. Cardiomyopathy: clinico-pathological groups and diagnosis xiii. Causes of pericarditis and its clinical and morphological features xiv. Primary and secondary cardiac tumors xv. Main features of Fallot's tetralogy and coarctation of aorta, Valvular heart disease and mitral valve prolapse xvi. The concept of cardiac transplantation
2	**Haematopoietic And Lymphoid Systems**	i. Stages in the formation of red blood cells (RBCs), white blood cells (WBCs), platelets and correlate hematopoiesis with various hematopoietic growth factors including morphology of a normal bone marrow. ii. Normal values of red cell count, hemoglobin level, packed cell volume, MCH, MCV, MCHC, WBC count and platelet count. iii. Anemias, classification on the basis of morphology and underline pathogenesis of RBC production. iv. Causes and clinical features, clinical presentation, and diagnosis of hypochromic anemia, Megaloblastic Anemia, Anemia of chronic disease, Hereditary spherocytosis, Aplastic anemia and Hemolytic Anemias. v. Aetiology, pathogenesis, clinical types, diagnosis of thalassemia with emphasis on incidence, common mutations, associated psychosocial problems and prevention. vi. Inheritance, clinical features, lab diagnosis of von Willebrand’s disease, Hemophilia A& B and Polycythemia. vii. Mechanisms which can cause neutropenia/agranulocytosis. viii. Differentiation between infective and malignant causes of leucocytosis with special reference to infectious mononucleosis, acute and chronic non-specific lymphadenitis. ix. Non-Hodgkin's lymphoma, classification and diagnosis. x. Classification, aetiology, pathogenesis and clinical stages of Hodgkin's disease xi. Aetiology, clinical features, laboratory diagnosis and prognostic factors of acute and chronic lymphoblastic and myeloblastic leukemia. xii. Multiple myeloma with respect to aetiology, pathogenesis, morphology, clinical features and diagnosis. xiii. Disseminated intravascular coagulation with respect to aetiology, pathogenesis, clinical features and laboratory diagnosis

S.NO	TOPIC	TOPIC OBJECTIVES
		xiv. Causes of decreased production and decreased survival of Platelets with special reference to the pathogenesis of idiopathic & thrombotic thrombocytopenic purpura xv. The value of coagulation profile in the assessment of bleeding disorders xvi. ABO and Rhesus blood groups, their clinical importance and method of group typing. xvii. Common indications of blood products (red cells, platelets and plasma) and hazards of blood transfusion and methods of their prevention
3	**Respiratory System**	i. Differentiate between pleural effusion, hemothorax, hydrothorax, pleuritis, pneumothorax and chylothorax. ii. Classification of atelectasis on the basis of underlying mechanisms. iii. Etiology, pathogenesis, morphology and clinical features and diagnosis of asthma. iv. Disorders associated with airflow obstruction disease with reference to their aetiology, Pathogenesis, morphology and diagnosis v. Restrictive lung diseases including sarcoidosis, pulmonary eosinophilia, with reference to their aetiology, Pathogenesis, morphology and clinical diagnosis vi. Pathogenesis, morphology and clinical features of adult respiratory distress syndrome. vii. Clinical features of Goodpasture's syndrome based on the pathology. viii. Morphology & clinical features of pulmonary infarction. ix. Causes of pulmonary hypertension and vascular sclerosis. x. Etiology, pathogenesis, morphology and clinical Features, complications and clinical diagnosis of acute and chronic pneumonias including atypical pneumonia. xi. Etiology, pathogenesis and clinical features, clinical diagnosis of tuberculosis of the lung. xii. Classification, aetiology, pathogenesis and clinical features of different lung tumors.
4	**Gastrointestinal Tract and Liver**	i. Risk factors, clinical and morphological features and diagnosis of oral Cancer with special reference to early lesions like leucoplakia. ii. Benign and malignant tumors of salivary glands. iii. Different types of esophagitis and its relation with carcinoma of the esophagus. iv. Predisposing factors, pathogenesis, morphological and clinical features of acute and chronic gastritis and peptic ulcer disease. v. Gastric carcinoma with respect to risk factors, pathogenesis, clinical and morphological features and prognosis; and differentiate from Gastric Lymphoma and Gastrointestinal Stromal Tumor (GIST). vi. Clinical and morphological features of Hirschsprung's disease.

S.NO	TOPIC	TOPIC OBJECTIVES
		vii. Pathogenesis, morphological and clinical features of malabsorption diseases. viii. Predisposing conditions, clinical and morphological features of ischemic bowel disease. ix. Crohn's disease and ulcerative colitis including major causes of intestinal obstruction. x. Clinico-pathological features, clinical presentation and diagnosis of bacterial and parasitic diseases of intestines. xi. Benign and malignant tumors of intestines with reference to etiological factors, pathogenesis, diagnosis and prognosis. xii. Types of jaundice with respect to the causes, clinical features and laboratory diagnosis xiii. Causes, morphological and clinical features and complications of hepatic failure xiv. Causes, pathogenesis, complications of cirrhosis xv. Route of transmission, Incubation period, Clinical features and complications of acute and chronic viral hepatic infection. xvi. Liver abscess: causes, clinical features, diagnosis xvii. Pathogenesis, clinical features and diagnosis of alcohol liver disease. xviii. Clinico-morphological features and diagnosis of deposition diseases of liver. xix. Neonatal hepatitis. xx. Epidemiology, pathogenesis, morphological and clinical features of hepatocellular carcinoma. xxi. Pathogenesis and risk factors of Cholelithiasis and acute and chronic cholecystitis. xxii. Features of gall bladder cancer. xxiii. Acute and chronic pancreatitis with respect to aetiology, pathogenesis, clinical and morphological features. xxiv. Clinical and morphological features of carcinoma of pancreas.
5	**Renal and Male Reproductive System**	i. Etiology, pathogenesis, clinical features and complications of; Azotemia, Uremia, Acute renal failure, Chronic renal failure ii. Polycystic kidney disease (and its Classification) iii. Glomerulonephritis and (its Classification) iv. Nephrotic and nephritic syndrome v. Acute and chronic pyelonephritis. vi. Hydronephrosis vii. Pathogenesis and clinical course of acute tubular necrosis. viii. Benign and malignant nephrosclerosis ix. Characteristics of various types of renal stones x. Pathogenesis, clinical features and lab diagnosis of nephrolithiasis xi. Epidemiology, morphology, clinical features and prognosis of Wilm's tumor xii. Classification, Epidemiology, morphology, clinical features and prognosis of renal cell carcinoma

S.NO	TOPIC	TOPIC OBJECTIVES
		xii. Etiology, morphology & clinical features of cystitis. xiii. Clinical features, etiology and morphology of transitional cell carcinoma of the urinary bladder. xiv. Etiology, route of infection, pathogenesis and methods of diagnosing Gonococcal and non-gonococcal urethritis xv. Etiology, pathogenesis, diagnosis of prostatitis, prostatic hyperplasia and prostatic carcinoma xvi. Inflammatory disease and tumors of testis and epididymis xvii. Causes, pathogenesis and investigations of male infertility.
6	**Female Genital System and Breast**	i. Causes, routes of infection and methods of diagnosis of Sexually transmitted diseases: micro-organisms involved, route of infection, pathogenesis and methods of diagnosis ii. Vulvar and vaginal squamous intraepithelial lesions iii. Neoplasms of Cervix with reference to cervical intraepithelial neoplasia. iv. Causes, pathogenesis and clinical features of dysfunctional uterine bleeding and its relation with endometrial hyperplasia, endometrial polyp and carcinoma. v. Clinical features and pathogenesis of adenomyosis and endometriosis. vi. Tumors of endometrial stroma and myometrium. vii. Tumors of the ovary: classification, etiological factors, pathogenesis, diagnosis and prognosis. viii. Etiology, clinical features and pathogenesis of ectopic pregnancy and toxemia of pregnancy. ix. Gestational trophoblastic tumors x. Causes of nipple discharge and lump breast and its differentiation on the basis of aetiology, pathogenesis, morphology, clinical features, diagnosis and complications xi. Benign breast diseases proliferative and non- proliferative xii. Carcinomas of the breast: Epidemiology, classification, aetiology and pathogenesis, diagnosis and prognosis xiii. Gynecomastia and list its causes.
7	**Musculoskeletal System**	i. Pathogenesis, clinical features and diagnosis of genetic and metabolic bone diseases. ii. Causes of osteoporosis, its pathogenesis, morphological and clinical features. iii. Acute and chronic Osteomyelitis with respect to causative organisms, routes of spread, and complications. iv. Benign and malignant bone forming tumors v. Benign and malignant cartilaginous tumors vi. Pathogenesis, morphological and clinical features of Degenerative Arthritis vii. Pathogenesis, morphological and clinical features of immune mediated arthritis viii. Pathogenesis, morphological and clinical features of crystal deposition diseases. ix. Pathogenesis, morphological and clinical features and diagnosis of muscular dystrophies

S.NO	TOPIC	TOPIC OBJECTIVES
		x. Pathogenesis, morphological and clinical features and diagnosis of inflammatory myopathies xi. Clinico-pathological features of Myasthenia Gravis xii. Classification and important distinguishing points of soft tissue tumors
8	**Endocrine System**	i. Causes, Pathogenesis, and diagnosis of anterior and posterior Pituitary hormone defects. ii. Adrenal Cortex and Medulla iii. Causes, aetiology, pathogenesis and lab. Diagnosis of adrenal cortical medullary hyper and hypo-function. iv. List the aetiology and clinical features, types, diagnosis of different thyroid diseases v. Causes of solitary thyroid nodule and outline of clinical diagnostic approach. vi. Etiology, pathogenesis, morphology and diagnosis of Thyroid tumors vii. Types of MEN syndromes. viii. Investigation, clinical features, aetiology of Parathyroid dysfunction ix. Diabetes Mellitus: Type 1 and 2, pathogenesis, morphology, clinical features, laboratory diagnosis and complications.
9	**Skin**	i. Morphological and clinical features of different types of dermatitis ii. Pathogenesis, morphological and clinical features of Bullous disease of the skin iii. Types of warts and their most frequent locations. iv. Predisposing factors for squamous cell carcinoma of skin. v. Etiology, pathogenesis, morphology, diagnosis and prognosis of squamous cell carcinoma and its differentiation from basal cell carcinoma. vi. Different types of Nevi, with reference to clinical and morphological features, and diagnosis of malignant melanoma
10	**Nervous System**	i. Clinical and morphological features of intra-cranial hemorrhage. ii. Acute and chronic meningitis including Tuberculous meningitis iii. Brain abscesses, its clinical and morphological features and diagnosis iv. Clinico-pathological features of Guillain-Barre syndrome. v. Types of intracranial tumors including common metastatic tumors to the brain
11	**Chemical Pathology**	i. Biochemical markers of ischemic heart disease ii. Renal function tests. iii. Causes of proteinuria and its laboratory diagnosis. iv. Lab diagnosis of acid base disorders. v. Lab diagnosis of Diabetes mellitus. vi. Liver function tests. vii. Laboratory diagnosis of hyperlipidemia and its clinical interpretation. viii. Role of enzymes in diagnosis of pancreatitis.

S.NO	TOPIC	TOPIC OBJECTIVES
		xi. Laboratory diagnosis/investigations of endocrine disorders xii. Role of hormone estimation in diagnosis of infertility & growth disorders

4.6- COMMUNITY MEDICINE

S.NO	TOPIC	TOPIC OBJECTIVES
10	**Concept of Health and Disease**	• Concept of health • Definition of health • Dimensions, physical, mental, social and spiritual • Spectrum of health, Determinants of health • Responsibility for health. • Indicators of health. • Health promotion. • Concept of disease, concept of causation (all theories including ecological triad, agent, host and environmental factors), spectrum of disease • Natural history of disease • Levels of prevention • Disease elimination and eradication • Disease surveillance and disease prevention
11	**Introduction to Public Health**	• Historical Background • Evolution of Public health • Definition of Public Health • Branches of Public Health • Preventive Medicine, Social • Medicine, Population Medicine, Community Medicine • International Health • Health for all
12	**Health Systems in Pakistan**	• Development of Public Health in Pakistan. • Health Policy and planning in Pakistan. • “Health for all”, background, concepts and progress. • “Primary Health Care”: Concepts and progress. • The National Disease Control programs; policies, strategies and operations. • Health System in Pakistan: The role of Federal and Provincial Governments in Health Care

S.NO	TOPIC	TOPIC OBJECTIVES
		• . • The District Health System, in the context of devolution. The Physician as a manager: Functions of manager management of material, human and financial resources. • Leadership and motivation. • Partners in Health: The public and private sector. • Non-governmental Organizations and International Agencies. • Resources for health. • Community Mobilization
13	**General Epidemiology and Research Methodology**	• Background and concepts, uses, basic measurements in epidemiology (morbidity, mortality, disability and fatality). • Epidemiological methods (descriptive, analytic and experimental). • Association and causation. • Investigation of an outbreak or an epidemic. • Screening for disease. • Community diagnosis. • Research and survey methodology. • Introduction to qualitative research methodology.
14	**Biostatistics**	• Concepts and uses • Data and its types • Rates, ratios and proportions • Crude, specific and standardized rates. • Collection and registration of vital events in Pakistan • Measures of central tendency, (Mean, Median, Mode), • Measures of dispersion (Range, Standard deviation, Standard error) • Normal curve. • Methods of data presentation (tables, graphs & diagrams) • Sampling and its various techniques. • Sampling and its various techniques.
15	**Demography and Population Dynamics**	• Concept, demographic principles and demographic processes • Census, definition, methodology, types • Determinants of fertility, mortality • Population Pyramid, and its interpretation • Demographic Transition, Demographic Trap and its public health importance

S.NO	TOPIC	TOPIC OBJECTIVES
16	**Nutrition and Health (Integrated)**	• Demographic and social implication of high population growth • Social Mobilization • Urbanization • Concepts (Nutrition, Nutrient, Food, Diet). • Food groups and their functions. • Role of fiber in diet. Balanced Diet • Malnutrition at all stages of life, its types causes and prevention. • Common nutritional problems of public health importance and their prevention and control • Dietary requirements of normal human being at different stages of life • Food hygiene, pasteurization, fortification, additives and adulteration and preservation • Nutritional diseases and Programs • Assessment of nutritional status of a community
17	**Reproductive and Child Health (Integrated)**	• Safe motherhood and its components. • (Ante-natal, Post-natal, Family Planning and Emergency Obstetric Care) • Maternal mortality and its causes and prevention • Infant care: Growth and development. • Breast feeding, common causes of morbidity and mortality, their prevention and control • Child Care: Child health surveillance • Strategic approaches of Integrated Management of Childhood • Illness (IMCI) • Adolescent health • Reproductive tract infections • Sexually transmitted diseases
18	**Environmental Health Sciences**	• Air: Composition of air. • Causes of Air pollution. • Purification of Air. • Diseases caused by impurities in air and their prevention • Water: Sources of Water. Daily water requirement. • Water pollution its causes and prevention. Water pollution its causes and prevention. • Purification of Water. Water quality standards. • Diseases due to polluted water • Waste disposal: Contents, hazards and safety measures for solid and liquid; Domestic, Industrial and Hospital waste (Global and Marine problems) • Climate: Climate and weather. • Global environmental concerns (Greenhouse effect, depletion of Ozone layer, Acid rains). Effect of extremes of temperature, humidity, atmospheric pressure on human health and their prevention

S.NO	TOPIC	TOPIC OBJECTIVES
		• Radiation: Sources, types, causes, hazards and prevention • Healthful housing. Urban and rural slums. • Noise: Definition, causes, acceptance level, hazards and control
19	**Occupational Health**	• Concepts, of occupational health, occupational medicine and occupational hygiene • Ergonomics and its importance • Occupational hazards • General principles of occupational disease prevention • Organization of occupational health services • Health Insurance and Social Security Schemes, Labor Laws
20	**Prevention and control of Infectious diseases**	• Definitions to differentiate between Infection, contamination, pollution, infestation • Infectious disease, communicable disease, contagious disease • Host, Immune and susceptible persons • Sporadic, Endemic, Epidemic, Pandemic • Epizootic, Exotic, Zoonotic • Contact, fomites, Carriers, Insect Vectors, Reservoir of infection • Incubation period, Infective period, Generation time • Cross infection, Nosocomial infection, Opportunistic infections, Iatrogenic (Physician induced) disorders • Surveillance control, Eradication, Elimination
21	**Control and Prevention of Non-Infectious Diseases of Public Health Importance**	• Hypertension • Coronary heart disease • Cancers • Injuries • Diabetes mellitus • Obesity • Acute Rheumatic fever and heart diseases
22	**Arthropods and their Public Health Importance**	• Common arthropod borne diseases • Control of arthropods of medical importance • Insecticides and their public health importance
23	**Snake Bites:**	Identification, personal protection and management
24	**Mental Health and Behavioral Sciences**	• Concept. Common Mental Health Problems, their Causes, Prevention and Control • Juvenile Delinquency • Drug Abuse, Addiction, Alcoholism and Smoking • Child Abuse and Child Labor • Self-medication

S.NO	TOPIC	TOPIC OBJECTIVES
25	**Disaster and accidents**	• Definition, Classification (Natural disasters like earthquake, floods) • Epidemic of communicable diseases, Man Made Disasters. • Thermo nuclear warfare • Magnitude and effects of disaster and Public Health consequences • Disaster: preparedness and management • Accidents: Definition, classification, prevention
26	**Health Planning and Management**	• Health Planning. Planning cycle. • Management and administration. • Management methods and techniques. • Planning-programming-budgeting system.

4.7 - INFECTION CONTROL

S.NO	TOPIC	TOPIC OBJECTIVES
		• Introduction to Healthcare associated infections • Standard Precautions • Transmission based precautions • Basic Microbiology for Infection Prevention & Control • Hand Hygiene • Personal Protective Equipment • Use of personal protective equipment during viral hemorrhagic fever • Injection safety • Infection prevention and control aspect of occupational health in healthcare settings • Sharpe injuries & management of exposure to blood borne pathogens • Work practices in healthcare facilities • Environmental cleaning • Managing Food and water services for the prevention of Healthcare associated infections • Processing of reusable healthcare textile • Waste management in healthcare setting • Cleaning, disinfection and sterilization of reusable surgical instruments and medical devices • Investigation of outbreak in Healthcare institutions • Prevention of surgical site Infections • Preventing catheter associated Infections • Preventing intravascular catheter associated blood borne infections • Preventing Hospital acquired Pneumonia • Preventing maternal and new born infections in Healthcare settings

S.NO	TOPIC	TOPIC OBJECTIVES
		• Prevention of surgical site Infections • Preventing catheter associated Infections • Preventing intravascular catheter associated blood borne infections • Preventing Hospital acquired Pneumonia • Preventing maternal and new born infections in Healthcare settings • Preventing healthcare Associated diarrhea • Structure and oversight of Infections prevention & Control program • Principals of Public Health emergency preparedness and outbreak management for healthcare facilities

4.8 - RADIOLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
		• The basic principles of radiation protection and knowing the law in relation to the use of ionizing radiation. • Principles of different imaging techniques and their advantages and disadvantages in different clinical scenarios (X-ray, ultrasound, CT-Scan, MRI, Fluoroscopy) • Role of imaging in directing treatment in various surgical scenarios. • How to request imaging and interpreting images. • Hazards of imaging and ionizing radiation. • Wasteful use of radiology. • Typical effective doses from diagnostic medical exposure.

4.9 - RESEARCH METHODOLOGY & EVIDENCE BASED MEDICINE

S.NO	TOPIC	TOPIC OBJECTIVES
		• Design an effectiveness research question, using the PICO method (patient or problem, intervention, comparison and outcome) • Effectively search for and select the best evidence using all available medical databases • Critically appraise the evidence for validity and clinical importance using a reliable appraisal tool, as well as evaluate and grade the articles' hierarchical level of evidence extract and analyse data from primary research articles and apply basic statistical concepts (meta-analysis);

S.NO	TOPIC	TOPIC OBJECTIVES
		• Apply evidence to clinical practice and formulate clinical recommendations • Formulate implications and recommendations for future research. These outcomes concurred with the graduate attributes that are promoted by the Faculty of Medicine and Health Sciences, SU, and are also in keeping with the work of Laidlaw et al., who used different methodologies to define and rank the most important graduate attributes and skills for undergraduate medical programmes from both a research and a professional perspective

4.10 - ISLAMIC STUDIES

S.NO	TOPIC	TOPIC OBJECTIVES
		i. Islamic perspective of the practice of Medical profession ii. The view of the Muslim doctor regarding human life and other forms of life iii. How to make my profession Ibadah - The perspective of the Muslim doctors iv. A prologue on Essential Communication Skills v. Etiquettes of visiting the Patient vi. Dealing with human tissues, cadavers and animals in medical practice- medical risks and Islamic concepts. vii. Ethical issues in organ transplantation viii. Research: its importance and need ix. Ethics of Bio-medical research x. Confidentiality xi. Euthanasia and other end of life care issues xii. Islamic concepts of response to pandemics (Covid-19) for protection of public xiii. Death & Dying xiv. Islam and tolerance xv. Family planning and contraception (FPC) xvi. Gender Interaction in personal and Professional Communication xvii. Halal and Haram

INTRODUCTION

"Cultivate the core values of professionalism in future practitioners....[and] stand firmly in support of the values that make our profession 'honored and honorable." ..**Jordan Cohen, president of the Association of American Medical Colleges (AAMC).** [1]

Medical profession that started off as a philosophy and went on to become a hard science, is trying to re-establish itself as a caring profession that heavily employs scientific knowledge and principles

in its practice. Health care professionals are perplexed by the dualism of mind & body; reason & emotions; hard sciences & the soft sciences; curricular integration & segmentation; formal curriculum & the lurking hidden curriculum; competence & performance and last but not the least technological expertise & humanism in health care education and provision. Over the years these dualities have assumed conflicting semantics kindling the need to critically reflect upon and reorient the philosophy & practice of the profession.

Principles and guidelines that shape our current understanding and practice of 'soft skills' and 'humanism' in health care practice are largely borrowed from the West. Rene´e Fox, the renowned sociologist has very aptly recognized the shortcomings of this borrowed paradigm as she writes,

"*seen in cross-cultural perspective, the dualism of our medical thinking and our difficulties in breaking through it are distinctively and rather oddly Western. In non-Western societies and medical systems whose world views are more holistic than our own, there is no need for special fields, meetings, lectures, courses, and rhetoric to "remind" and teach medical students and practitioners that human beings have bodies and minds, and minds and brains that are dynamically interrelated; that ideally, the prevention, diagnosis, and treatment of illness should be approached in a "biopsychosocial" framework*; that medicine is "both a science and an art"—to use some of the clumsy, aphoristic phrases that we have coined in this connection."[2]

Keeping in view, the contemporary debate concerning behavioral sciences and the perspective of Islamic concepts to provide faith based care to Muslim patients is grossly deficit in medical curriculum. There is a dire need that the search for "magical bullet"[2]that could enable the medical students to internalize the highly aspired professional values in line with the divine teaching, this curriculum has been designed to provide a holistic, integrated learning experience for the students to develop the desired competencies in Islamyath and apply it in professional life. The curriculum is grounded in Islamic concepts with local context and is responsive to the societal needs and international developments in medical education. Though there is need for vertical integration of Islamic concepts in medical curriculum but only some basic relevant subjects are introduced below.

1. Cohen JJ. Annual Report: Connections That Strengthen the Nation's Health. Washington, DC: Association of American Medical Colleges, 1997–1998.
2. Fox R. Training in caring competence: the perennial problem in North American medical education. In: Hendrie HC, Lloyd C (eds). Educating Competent and Humane Physicians. Bloomington, IN: Indiana University Press, 1990.

S.No. / Title	Objective: By the end of this session the students would be able to	Core Contents
1. Islamic perspective of the practice of Medical profession	Envision the concept of treatment in Islam. Recognize the roles, responsibilities and characteristics of a Muslim doctor.	i. Concept of treatment in Islam ii. Medical Ethics Vs Islamic medical ethics iii. Doctor Vs Muslim doctor iv. Roles of a Muslim doctor v. Historic perspective of health care and the contribution of Muslim physicians vi. Hamdard-e Khalaiq , Marja –e-Khalaiq -Leadership role of doctors in the society

S.No. / Title	Objective: By the end of this session the students would be able to	Core Contents
2. The view of the Muslim doctor regarding human life and other forms of life	Broaden their perspective of human life and its interaction with other living forms created by Allah سبحانہ وتعالی based on the teachings of Quran and Hadith.	i. Preservation of human life (1. the right of foetus to live, 2. The suckling right to life, 3. Preference of life maintenance to all other legislative considerations). ii. The reward for saving human life – Ayah 5:25 iii. Preservation of the life to non-Muslim – The principle of "Hifz U Nafs" iv. Preservation of the constituents of human life v. Preservation of human dignity. vi. Life related legislative controls. vii. Human related factors of equality and preference viii. Maintenance of non-human life and relationship with other living forms and the environment
3. How to make my profession Ibadah - The perspective of the Muslim doctors	Identify the strategy to make routine professional practice Ibadah and apply it in their own life.	i. What is Ibadah? ii. How can our daily routine practice of our profession be made Ibadah? iii. What would be the implications of this paradigm shift for us as an individual, our patients, the community and the profession?
4. A prologue on Essential Communication Skills	Gain insight into the physical, moral, spiritual and emotional aspects of communication. Define effective communication, draw a checklist for effective communication and identify barriers for communicating effectively.	i. The anatomy of communication skills- the need, the spirit, the physical aspects, emotional perspective and outcome ii. Communication skills a gift from Allah سبحانہوتعالی- Surah Ar Rahman [55:2-3] 'He has created man: He has taught him speech (the art of communication). iii. Essence of communication- sharing ideas and emotions iv. Principle of all communication- 33:70 v. "O you believer! Remain conscious of Allah, and (always) say words that are true to the mark

S.No. / Title	Objective: By the end of this session the students would be able to	Core Contents
		i. The four Quranic grades of excellence in communication ii. The way of the Prophet ﷺ(9:128, 3:159) iii. Making the addressee feel important and valued iv. His body language while speaking to Sahaba Emphasis and repetition Engaging the audience Cross-checking information v. Types of communication vi. Effective communication vii. What is effective communication viii. Role of context in effective communication ix. Barriers to effective communication
5. Etiquettes of visiting the Patient	Disease is not a punishment, but it is to help one realize health as a blessing. It has many benefits also. Visiting patients is an important part of the etiquettes of Islamic brotherhood. Visiting patients provides solace to his feelings and brings reward to the visitor if one adopts the requisite protocol and etiquettes.	Feeling other's pain and giving solace to one another in tribulations has a great role in the establishment and maintenance of Islamic brotherhood. Disease is an effective mean to realize the value of health in addition to it being a test. Visiting patients helps in giving consolation to the patient as well as directs the healthy to be grateful over his health. Therefore, there is a need to make the patient understand that disease is the mean of blessings by ALLAH Ta'ala which is also expatiation of sins, upgradation and nearness to ALLAH Ta'ala.
6. Dealing with human tissues, cadavers and animals in medical practice-medical risks and Islamic concepts.	Describe the importance of respecting human body, organs and tissues in light of the Islamic teachings and medical ethics. Recognize the health risks in handling cadaveric / body tissues. Demonstrate respect of human body, organs and tissues while studying medical sciences and managing patients.	i. Respect of the human body, organs and tissues (Including teeth) during treatment, surgical operations, research and health professions education. ii. Use of animals in biomedical research and study of medical and other sciences in the ethical and Islamic perspective.

S.No. / Title	Objective: By the end of this session the students would be able to	Core Contents
7. Ethical issues in organ transplantation	Evaluate the various ethical issues involved in organ transplantation in light of the Islamic Perspective	i. Organ-transplant related ethical issues with reference to the Islamic perspective and ethical challenges ii. Permissibility of organ transplant and donation iii. The evidence from Sunnah about tooth transplant iv. Imam Abu Hanifah views on cadaver transplant v. Issues in re productive organs transplant and Islamic concepts vi. Organ- trafficking & commercial use of human remains and embryonic tissue vii. Cosmetic Surgery and use of same patients tissues
8. Research: its importance and need	i. Recognize the Importance of research in national development. ii. Explain the importance of research according to the teachings of the Holy Quran and Sunnah. iii. Recognize the role of Muslim scholars in the establishment of research as a discipline and as a tool for development and advancement of knowledge. Understand that fall and rise of nations is related to research	i. Knowledge and research as basis of economy. The importance of "research" in the Quranic perspective and Sunnah. Research an obligation of Muslim doctors. The role of Muslim Scholars and researchers ii. More than 500 verses of Quran on research and total of around 150 on Islamic jurisprudence (Fiqh) iii. 2:164سورۃالبقرہ iv. 3:190 -191سورۃالعمران v. 41:53سورۃفصلت vi. 30:22سورۃالروم vii. The breakthrough for research through the concept of "توحید" viii. The role of experience and logic in research ix. Research and "eeman-bil-ghaeb"
9. Ethics of Bio-medical research	i. Describe the importance of research as an obligation for a Muslim. ii. Identify the paradigms of ethics for biomedical research iii. Describe the principles of research ethics iv. List the characteristics of quality research and the role of IRB for ensuring quality and safety for research. v. Recognize the perilous outcomes of research where ethics are compromised	i. Research as an obligation of Muslim doctors ii. Historical development of the research methodology in Islamic History iii. How ethics govern the conduct of research and its outcomes; Paradigms of ethics for biomedical research, Principles of research ethics

S.No. / Title	Objective: By the end of this session the students would be able to	Core Contents
		iv. Perils of unethical research- some examples e.g. Tuskegee Trial, Nuremberg trial v. History of Muslim Scientist and researchers and their role in the development of ethical medical practice and biomedical research.
10. Confidentiality	Evaluate current practices of maintaining patient confidentiality in light of the teachings of Islam.	i. Meaning of confidentiality ii. Trust relationship between doctor and patient iii. Types of secrets; ordinary and extraordinary iv. What is the ruling of Islam on the one who discloses secrets? The three signs of hypocrite [Hadith Sahib Bukhari] v. Virtues of keeping secrets: Reference from Hadith; **vi. لا ایمان لمن لا امانہ** **vii.المجالس بالامنۃ** viii. Narrated Uqbah ibn Amir: "The Prophet ﷺ said: He who sees something which should be kept hidden and conceals it will be one who has brought to life a girl buried alive." (Abu Daud) ix. What are the situations where divulging secrets is allowed according to Islamic teachings
11. Euthanasia and other end of life care issues	Evaluate the contemporary issues related to end-of-life care in light of the Islamic teachings.	i. End-of-life care issues in the modern practice of medicine like advance directives, euthanasia, role of the dying person and the family in decision making regarding end-of-life care ii. Disclosure of terminality of disease to the patient, issues related to confidentiality and consent for palliative treatment for the dying person iii. How to deal with these situation in the most appropriate manner in light of the teaching of Islam.
12. Islamic concepts of response to pandemics (Covid-19) for protection of public	Comprehend the concept of saving human life at all costs. Prevention is the key concept in protection against these problems. Role of the Moral code of Islam in preventing human life during pandemics even by restricting basic obligatory Ibadah	i. Sanctity of human life. Forbidding communal prayers and Islamic congregations in Pandemics. Examples from Ahadith and practical demonstrations of the prophet and the right Caliphs.

S.No. / Title	Objective: By the end of this session the students would be able to	Core Contents
		ii. Not going to or leaving the pandemic area. The misconception of “Allah’s will” (Tawakkal) in such situations. Quranic Ayah 17:32 and others on concept of prevention. The principle of “Sadd i Dharai” (ذرائع سد)
13. Death & Dying	Envision the spiritual and metaphysical aspects of death in light of the teachings of Quran & Hadith.	i. The Qura’nic concept of Life and Death (خلقالموتوالحياةليبلوكمايكماحسنعملا) ii. Man a combination of body and soul- the body dies the soul remains. iii. Death – Inevitable and Time is fixed – Reference from Quran iv. Physical and Spiritual death v. Protocol for the Muslim at the time of death -Responsibilities of doctors and persons present at the time of dying (Death) vi. Preparedness for death. Is death the end of life? vii. Who is called dead? Islamic concepts – reference from Quran and Hadith viii. End of life care for a Muslim patient
14. Islam and tolerance	i. To recognize that Islam give very high priority to tolerance while dealing with Muslims and Non-Muslim individuals. ii. Narrate examples from life of Prophet and Sahabah. iii. Recognize the reward of tolerance in this world and the hereafter	i. The importance of tolerance in Quran and Sunnah ii. Examples from the life of Prophet and Sahabah iii. Attitude of a true Muslim in felonious situations as per guidance of Quran and Sunnah iv. Three Quranic principles v. ادْفَعْبِالَّتِيْهِيَاَحْسَنُالسَّيِّئَةَنَحْنُاَعْلَمُبِمَايَصِفُوْنَ 96ۤ وَقُلْرَّبِّاَعُوْذُبِكَمِنْهَمَزٰتِالشَّيٰطِيْنِ 97ۤ vi. وَعِبَادُالرَّحْمٰنِالَّذِيْنَيَمْشُوْنَعَلَىالْاَرْضِهَوْنًاوَّاِذَاخَاطَبَهُمُالْجٰهِلُوْنَقَالُوْاسَلٰمًا 63ۤ vii. وَجَزٰٓؤُاسَيِّئَةٍسَيِّئَةٌمِّثْلُهَاۚفَمَنْعَفَاوَاَصْلَحَفَاَجْرُهٗعَلَى اللّٰهِۚاِنَّهٗلَايُحِبُّالظّٰلِمِيْنَ 40ۤ **viii. Hadith:** stepping back even if one is right, to avoid a clash and furious situation

S.No. / Title	Objective: By the end of this session the students would be able to	Core Contents
15. Family planning and contraception (FPC)	Examine psycho-social and ethical issues related to family planning and contraception.	i. Definitions & basic concepts; family planning, contraception (FPC), Concept of Hafz-un Nafs and Hafz un Nasl and FPC [مقاصد شریعہ] ii. Ethical issues in family planning and permanent tubal ligation iii. Prohibitions/ permission iv. Conditions of permissibility v. Consent of both the partners when indicated under Islamic Teachings vi. Which method to be preferred vii. Abuse of procedures and its impact on society (Examples from Western Universities and societies) viii. The inverse population pyramid and its socio-economic effects; The graying nations and the growing nations ix. For how long- social and medical implication of FPC x. References / guidance from Quran and Hadith
16.Gender Interaction in personal and Professional Communication	i. Envision the wisdom of gender- based roles and responsibilities and limits of cross-gender interaction in personal and professional contexts in light of the teachings of Islam. ii. The Study of American University Association on gender free gender interaction iii. The American Muslim Jurist guidelines on Gender interaction	i. The concept of cross-gender interaction (CGI) in Islam ii. The etiquettes of cross gender interaction in personal and professional communication- During education, telephonic communication, cyber/social media interaction, student-teacher CGI iii. Etiquettes of CGI in light of the Qura'n and Sunnah iv. References from Quran v. Al Tauba- 9:71 vi. Al Noor- 24:30-31 vii. Al Ahzab- 33:32 viii. Al Qasas-28:25 ix. References from Hadith x. Reference: PMC Booklet on Cross- Gender Interaction

S.No. / Title	Objective: By the end of this session the students would be able to	Core Contents
17. Halal and Haram	Comprehend and internalize the concept of Halal (allowed) and forbidden in Islam and its application to professional life	i. Definition of Halal and Haram. The concept of Makrooh (distasteful) and Mabah (allowable) ii. Application of this in professional life specially Doctor-Pharma relations, Use of medication and gender interaction iii. The concept of mitigation to use even Haram for saving human life and sever hardship. The three level of hardship and its relation to use of forbidden items / actions iv. The basic principles governing Halal and Haram v. The principle of necessity and mitigation vi. Hadith of defining Halal and Haram and leaving the doubtful.

4.11 - PAKISTAN STUDIES

S.NO	TOPIC	TOPIC OBJECTIVES
1	Structure of health service delivery system in Pakistan	• Health houses (LHWs) • Basic health unit – its composition and function • Rural health centre – composition and function • Tehsil headquarter hospitals – composition and function • District headquarters hospital – composition and function • Tertiary care hospitals – composition and functions • Medical teaching institutions
2	District health information systems	
3	Millennium development goals – goals and achievements	
4	National surgical obstetric and anaesthetic plan – vision 2025	
5	Sustainable development goals - universal health coverage	
6	Innovations in improving health care delivery – private public partnership	
7	Prevention of diseases - strategies – medical, surgical, trauma, obstetric	
8	Awareness campaigns	
9	Role of WHO, NGOs	

4.12 - BEHAVIORAL SCIENCES, PROFESSIONALISM & ETHICS

S.NO	TOPIC	TOPIC OBJECTIVES
		• Introduction to Behavioral Sciences and its importance in health. • Understanding Behavior- Sensation and sense organs, Perception, Attention and concentration, Memory, Thinking , Communication • Individual differences - Personality, Intelligence, Emotions - Motivation/need/drive, Learning • Interviewing/psychological History Taking • Doctor-Patient relationship • Medical/Dental Ethics and Mental Health Acts • Culture and medical/dental practice • Psychological aspects of Health and Disease • Pain, Sleep, Consciousness, Sexuality • Non-pharmacological interventions • Communication skills, Counseling, Crisis Intervention, Conflict Resolution, Informational care, Breaking bad news, Child rearing practice • Life events - Psychotrauma, Psychological reactions, Stress and stressors, Stress management

4.13- FORENSIC MEDICINE & TOXICOLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
1	**Law**	1.1 Pakistan's legal system i. Organization and functioning of courts ii. Application of relevant sections of law of Pakistan e.g., PPC/CrPC iii. Documentation and certification for legal procedures iv. Protocol of court evidence 1.2 Law in relation to physicians i. Physician patient relationship ii. Professional secrecy and privileged communication iii. Bio-ethics and its application iv. Professional misconduct v. Certification of cause of death vi. Transplantation of organs and tissues: its medicolegal scope and relevant laws vii. Regulatory/accrediting bodies: Their functioning and mandate viii. Healthcare Commission Act, Consumer Protection Act
2	**Personal identification**	i. Determination of parameters of personal identification in living and dead ii. Use of special techniques and methodologies for identification iii. Certification of age iv. Relevant laws

S.NO	TOPIC	TOPIC OBJECTIVES
3	**Autopsy and exhumation**	i. Types, objectives, rules and techniques of autopsy ii. Estimation of fatal and post mortem period iii. Risks and hazards associated with autopsy iv. Autopsy protocol for collection/ recovery, preservation, labeling and dispatch of biological and non-biological material v. Unrewarding (negative) autopsy vi. Exhumation (protocol, procedure, scope and limitation) vii. Autopsy in special situations (Putrefied, Dismembered, Mass disaster) viii. Post-mortem artifacts and their medico-legal significance ix. Autopsy certificate x. Relevant laws
4	**Thanatology**	i. Concept of death ii. Medicolegal aspects of brain death iii. Indicators of death iv. Indicators of death v. Early and late corporeal post-mortem changes, their interpretation and significance vi. Inter-relationship of Cause, Mechanism, Mode and Manner of death vii. Post-mortem chemical changes viii. Forensic Entomology ix. Flowcytometry x. Sudden and unexpected deaths xi. Certification of death as per WHO guidelines xii. Relevant laws
5	**Asphyxia**	i. Bio mechanics and indicators of asphyxial deaths ii. Anatomy of asphyxia iii. Biochemistry and patho-physiology of asphyxia iv. Suffocation v. Gagging and choking vi. Traumatic asphyxia vii. Hanging, strangulation, throttling viii. Postural asphyxia ix. Relevant laws
6	**Drowning**	i. Pathophysiology of drowning ii. Autopsy findings (external, internal) iii. Medicolegal aspects (identification, weather the person drowned, injuries in water, diatoms) iv. Mechanisms of drowning in different media v. Relevant laws
7	**Traumatology**	i. Biomechanics of wound production ii. Examination, interpretation and medicolegal significance of: ○ Blunt force trauma ○ Sharp force trauma ○ Firearm and Blast injuries ○ Thermal injuries (generalized and local) ○ Custodial torture and death ○ Transportation injuries ○ Electrical injuries

S.NO	TOPIC	TOPIC OBJECTIVES
		○ Injuries due to cold ○ Regional injuries (head, vertebral column, neck, chest. Abdomen and their contents, limbs and musculoskeletal system) iii. Differentiation between ante mortem and postmortem wounds iv. Determination of the manner of injury v. Examination of injured person, documentation of injuries and certification vi. Sequela of injuries vii. Dating of injuries viii. Manner of causation of injuries ix. Relevant laws
8	**Forensic sexology**	i. Interpretation and Medicolegal significance of virginity, pregnancy and delivery ii. Abortion: Types, methods to procure, iii. Examination and certification of such cases, in living and dead iv. Relevant laws
9	**Sexual offences**	i. Medicolegal aspects of natural and unnatural sexual offences ii. Sexual perversions iii. Examination of victim and assailant iv. Collection of specimens and their dispatch v. Documentation and certification of injuries and violations vi. Relevant laws
10	**Forensic pediatrics**	i. Medicolegal aspects of: ○ Infanticide ○ Non accidental injuries and death of newborn/ infants/ child ○ Sudden infant death syndrome (SIDS) ii. Relevant laws
11	**Forensic psychiatry**	i. Diagnosis and certification of mental illness ii. Procedures for restraint of mentally ill iii. Differentiation between true and feigned insanity iv. Testamentary capacity v. Relevant laws
12	**Forensic serology**	i. Examination of biological specimen ii. Methods of their collection, preservation and dispatch to concerned labs
13	**Role of Forensic science in crime detection**	i. Principles and methods of crime scene investigation ii. Fingerprints iii. DNA iv. Examination of firearms and tool marks evidence v. Examination of broken glass vi. Role of Chemistry and specialized techniques vii. Relevant laws
14	**Forensic Odontology**	i. Role of dental evidence in identification ii. Bite marks and their analysis iii. Dental evidence: Trauma and Poisoning iv. Basic dental charting/record v. Relevant laws

4.13.1TOXICOLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
1	**General Principles of Toxicology**	i. Law relevant to toxicology ii. Factor influencing the manifestation of poisoning iii. Collection and despatch of evidentiary material, in living and dead iv. Drug dependence v. Diagnosis and treatment of acute and chronic poisoning in living vi. Diagnosis of acute and chronic poisoning in dead vii. Medicolegal certification (in living and dead)
2	**Special Toxicology**	i. Volatile poisons and corrosives (carbon monoxide, hydrocarbons, cyanides, sulphuric acid, oxalic acid, carbolic acid, alkalis) ii. Inorganic elements (arsenic, lead, mercury, copper, phosphorus) iii. Poisonous plants (Aconite, Belladonna, Hyoscyamus, Stramonium, Digitalis, Ergot, Nux Vomica, Oleander, Tobacco) iv. Venomous animals v. Alcohols vi. Opiates, opioids and other narcotics vii. Salicylates, Paracetamol and other medicinal poisons viii. Hypnotics and sedatives ix. Stimulants (cocaine, cannabis) x. Pesticides, herbicides and insecticides

4.13.2 POISONINGS AND IMPACT OF ENVIRONMENT

S.NO	TOPIC	TOPIC OBJECTIVES
		i. Benzodiazepine Poisoning ii. Organophosphate poisoning iii. Wheat pill poisoning iv. Heavy metal poisoning v. Snake bite vi. Hypothermia and Hyperthermia vii. Drowning viii. Electric shock

4.14- GENERAL MEDICINE

4.14.1 INFECTIOUS DISEASES

S.NO	TOPIC	TOPIC OBJECTIVES
1	Approach to the patient with a suspected infection	○ Pyrexia of unknown origin ▪ Definition ▪ Investigations ▪ Treatment

S.NO	TOPIC	TOPIC OBJECTIVES
		○ Sepsis and septic shock ▪ Causes ▪ Pathophysiology ▪ Clinical presentation ▪ Treatment • Supportive • Empirical • Definitive
2	Viral Infections (clinical features, diagnosis, treatment, immunization)	○ Exanthematous diseases ▪ Measles ▪ Chicken pox ▪ Rubella ○ Without exanthema ▪ Mumps ▪ Infectious mononucleosis ▪ Influenza ▪ COVID 19 ▪ Dengue ○ HIV
3	Bacterial Infections	○ Gram positive infections ▪ Pharyngitis ▪ Skin infections ▪ Toxic shock syndrome ▪ Pneumonia ▪ Meningitis ○ Clostridial infections ▪ Botulism ▪ Gas gangrene ○ Gram negative infections ▪ Enteric fever ▪ E. coli gastroenteritis ▪ Cholera ▪ Dysentery ○ Syphilis ○ Food poisoning
4	Mycobacterial	○ Pulmonary and abdominal TB under respective systems
5	Fungal infections	
6	Protozoal infection	○ Acute and chronic amoebiasis • Clinical features • Investigations • Treatment
7	Helminthic infections	○ Ascariasis ○ Hook worm • Life cycle • Clinical features • How it causes anemia • Treatment and prevention

S.NO	TOPIC	TOPIC OBJECTIVES
		○ Tapeworm ○ Hydatid cyst ▪ Clinical features with area of involvement ▪ Treatment - Medical - Surgical

4.14.2 LIVER & PANCREATIC DISEASES

S.NO	TOPIC	TOPIC OBJECTIVES
1	Jaundice	○ Types ▪ Congenital ▪ Pre-hepatic ▪ Hepatocellular ▪ Cholestatic - Differentiation - Investigations - Treatment
2	Acute and chronic hepatitis with clinical features, complications, investigations, serology and treatment and vaccination	○ Hepatitis A Virus ○ Hepatitis B Virus ○ Hepatitis C Virus ○ Hepatitis E Virus ○ Auto-immune hepatitis
3	Metabolic liver disease	○ Hemochromatosis ○ Wilson disease ○ Alpha 1 trypsin deficiency ○ Non-Alcoholic fatty liver disease, non-alcoholic steatohepatitis
4	Fulminant hepatic failure	○ Causes and differentiation ○ Investigations ○ Treatment
5	Cirrhosis	○ Causes ▪ Viral B, C ▪ Alcoholic liver disease ▪ Metabolic causes ▪ Primary biliary ○ Complications with clinical features, investigations and treatment of each ▪ Ascites ▪ Hepatorenal syndrome ▪ Variceal bleed ▪ Hepatic encephalopathy ▪ Spontaneous bacterial peritonitis ▪ Hepatocellular Carcinoma (HCC)

S.NO	TOPIC	TOPIC OBJECTIVES
6	Liver Abscess	
7	Liver tumor, Hepatocellular carcinoma	
8	Acute and chronic pancreatitis	○ Clinical features ○ Risk assessment ○ Complications ○ Investigations ○ Treatment
9	Pregnancy and liver	○ Acute Fatty Liver of Pregnancy ○ Intrahepatic cholestasis ○ Pre-eclampsia and HELLP

4.14.3 HEMATOLOGICAL DISEASES

S.NO	TOPIC	TOPIC OBJECTIVES
1	Anemias	○ Microcytic ▪ Iron deficiency (clinical features, investigations, treatment) ▪ Thalassemia - Alpha - Beta thalassemia ○ Macrocytic ▪ B12 deficiency anemia - Pernicious anemia (clinical features, investigation, treatment) - Other causes ▪ Folic acid deficiency ○ Normocytic ▪ Hemolytic anemias - Classification - Autoimmune hemolytic (Coomb positive and negative) - Enzyme deficiency - Membrane disorders - Hemoglobinopathies (sickle cell anemia) ▪ Aplastic anemia
2	Leukemias (clinical features, differential diagnosis, investigations, treatment)	○ Acute lymphoblastic leukemia ○ Acute myeloid leukemia ○ Chronic lymphoblastic leukemia ○ Chronic myeloid leukemia ○ Myelofibrosis ○ Polycythemia
3	Lymphomas (classifications, diagnosis, investigations, treatment)	○ Hodgkin ○ Non-Hodgkin

S.NO	TOPIC	TOPIC OBJECTIVES
4	Paraproteinemia	○ Multiple myeloma ○ Waldenstrom macroglobulinemia ○ Amyloidosis
5	Diseases of Platelet and clotting factors	○ Qualitative congenital platelet disorders ○ Idiopathic thrombocytopenic purpura (ITP) ○ Disseminated intravascular coagulation ○ Thrombotic thrombocytopenic purpura (TTP) and hemolytic uremic syndrome (clinical features, differentiation, investigations, treatment) ○ Von Wilebrand disease (physiology, clinical features and treatment) ○ Hemophilia A and B
6	Blood transfusion and bone marrow transplant	

4.14.4 WATER,ELECTROLYTES AND ACID-BASE BALANCE

S.NO	TOPIC	TOPIC OBJECTIVES
1	Disorders of Electrolytes (Na, K, Ca, Cl)	
2	Acid Base Balance (causes, clinical features, diagnosis, treatment)	○ Acidosis ▪ Metabolic ▪ Respiratory ○ Alkalosis ▪ Metabolic ▪ Respiratory

4.15- MEDICINE & ALLIED

4.15.1 LIVER & PANCREATIC DISEASES

S.NO	TOPIC	TOPIC OBJECTIVES
1	Jaundice	○ Types ▪ Congenital ▪ Pre-hepatic ▪ Hepatocellular ▪ Cholestatic - Differentiation - Investigations - Treatment
2	Acute and chronic hepatitis with clinical features, complications, investigations, serology and treatment and vaccination	○ Hepatitis A Virus ○ Hepatitis B Virus ○ Hepatitis C Virus ○ Hepatitis E Virus ○ Auto-immune hepatitis

S.NO	TOPIC	TOPIC OBJECTIVES
3	Metabolic liver disease	○ Hemochromatosis ○ Wilson disease ○ Alpha 1 trypsin deficiency ○ Non-Alcoholic fatty liver disease, non-alcoholic steatohepatitis
4	Fulminant hepatic failure	○ Causes and differentiation ○ Investigations ○ Treatment
5	Cirrhosis	○ Causes ▪ Viral B, C ▪ Alcoholic liver disease ▪ Metabolic causes ▪ Primary biliary ○ Complications with clinical features, investigations and treatment of each ▪ Ascites ▪ Hepatorenal syndrome ▪ Variceal bleed ▪ Hepatic encephalopathy ▪ Spontaneous bacterial peritonitis ▪ Hepatocellular Carcinoma (HCC)
6	Liver Abscess	
7	Liver tumor, Hepatocellular carcinoma	
8	Acute and chronic pancreatitis	○ Clinical features ○ Risk assessment ○ Complications ○ Investigations ○ Treatment
9	Pregnancy and liver	○ Acute Fatty Liver of Pregnancy ○ Intrahepatic cholestasis ○ Pre-eclampsia and HELLP

4.15.2 HEMATOLOGICAL DISEASES

S.NO	TOPIC	TOPIC OBJECTIVES
1	Anemias	○ Microcytic ▪ Iron deficiency (clinical features, investigations, treatment) ▪ Thalassemia - Alpha - Beta thalassemia ○ Macrocytic ▪ B12 deficiency anemia - Pernicious anemia (clinical features, investigation, treatment) - Other causes ▪ Folic acid deficiency

S.NO	TOPIC	TOPIC OBJECTIVES
		○ Normocytic ▪ Hemolytic anemias - Classification - Autoimmune hemolytic (Coomb positive and negative) - Enzyme deficiency - Membrane disorders - Hemoglobinopathies (sickle cell anemia) ▪ Aplastic anemia
2	Leukemias (clinical features, differential diagnosis, investigations, treatment)	○ Acute lymphoblastic leukemia ○ Acute myeloid leukemia ○ Chronic lymphoblastic leukemia ○ Chronic myeloid leukemia ○ Myelofibrosis ○ Polycythemia
3	Lymphomas (classifications, diagnosis, investigations, treatment)	○ Hodgkin ○ Non-Hodgkin
4	Paraproteinemia	○ Multiple myeloma ○ Waldenstrom macroglobulinemia ○ Amyloidosis
5	Diseases of Platelet and clotting factors	○ Qualitative congenital platelet disorders ○ Idiopathic thrombocytopenic purpura (ITP) ○ Disseminated intravascular coagulation ○ Thrombotic thrombocytopenic purpura (TTP) and hemolytic uremic syndrome (clinical features, differentiation, investigations, treatment) ○ Von Wilebrand disease (physiology, clinical features and treatment) ○ Hemophilia A and B

4.15.3 WATER,ELECTROLYTES AND ACID-BASE

S.NO	TOPIC	TOPIC OBJECTIVES
1	Disorders of Electrolytes (Na, K, Ca, Cl)	
2	Acid Base Balance (causes, clinical features, diagnosis, treatment)	○ Acidosis ▪ Metabolic ▪ Respiratory ○ Alkalosis ▪ Metabolic ▪ Respiratory

4.15.4 PSYCHIATRY

S.NO	TOPIC
1	Organic, including symptomatic, mental disorders
2	Mental and behavioral disorders due to psychoactive substance use
3	Mental and behavioral disorders due to substance use disorder
4	Schizophrenia, schizotypal and delusional disorders
5	Mood [affective] disorders
6	Neurotic, stress-related and somatoform disorders
7	Eating disorders
8	Nonorganic sleep disorders
9	Sexual dysfunction, not caused by organic disorder or disease
10	Mental and behavioral disorders associated with the puerperium
11	Abuse of non-dependence-producing substances as Antidepressant, Laxatives, Analgesics, Antacids, Vitamins, Steroids or hormones, Specific herbal or folk remedies
12	Unspecified behavioral syndromes associated with physiological disturbances and physical factors
13	Disorders of adult personality and behavior
14	Habit and impulse disorders
15	Gender identity disorders
16	Psychological and behavioral disorders associated with sexual development and orientation
17	Other psychosexual development disorders as heterosexuality, homosexuality, bisexuality
18	Other disorders of adult personality and behavior
19	Elaboration of physical symptoms for psychological reasons
20	Mental retardation
21	Disorders of psychological development
22	Pervasive developmental disorders as Childhood autism, Atypical autism, Rett's syndrome, Asperger's syndrome
23	Behavioural and emotional disorders with onset usually occurring in childhood and adolescence
24	Emotional disorders with onset specific to childhood
25	Other behavioral and emotional disorders with onset usually occurring in childhood and adolescence

4.15.5 EMERGENCY MEDICINE

S.NO	TOPIC	TOPIC OBJECTIVES
1	Cardio-circulatory Diseases	• Acute coronary syndrome and myocardial infarction • Pathophysiology of circulatory shock • Congestive heart failure • Sepsis • Aortic aneurysm and dissection • Hypertensive Crisis
2	Respiratory Compromising Diseases	• Chronic obstructive pulmonary disease, asthma and pneumonia • Pulmonary embolism and deep venous thrombosis • Pneumothorax
3	Neurological	• Stroke • Nerve Compression • Cauda Equina • Peripheral Nerve injuries
4	Abdominal Emergencies	• Appendicitis • Bowel obstruction • Diseases of the gall bladder and biliary system • Acute abdomen • Gastrointestinal bleeding • Peritonitis
5	Orthopedics	• Hip fractures • Wrist fractures • Ankle fractures • Spinal Fractures
6	Nephrological Emergencies	• Kidney stones • Urosepsis
7	Toxicology	• Poison • Overdose • Chemical Ingestion
8	Basic knowledge of trauma care	• Head injury • Chest trauma • Abdominal trauma • Extremity trauma • Facial trauma • Spinal cord injury • Genitourinary trauma • Pelvic trauma • Soft tissue injury • Burn Management
9	Burn injuries	• Different types of burns • The pathophysiology of burns • Assessment of the area and depth of burns • Management of burn patients

4.15.6 DERMATOLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
1	Diagnosis and management of Itching and Pruritus	○ Scabies, Pediculosis ○ Eczemas: Atopic, Seborrheic, Contact dermatitis ○ Urticaria
2	Diagnosis and management of Acne Vulgaris	
3	Diagnosis and management of Psoriasis	
4	Diagnosis and management of Lichen Planus	
5	Diagnosis and management of Erythema Multiforme, Steven Johnsons Syndrome, Toxic Epidermal Necrolysis	
6	Diagnosis and management of Infections	○ Acute Bacterial: Staphylococcal, Streptococcal ○ Chronic Bacterial: Tuberculosis, Leprosy ○ Viral: Warts, M.Cs, Herpes Simplex, Herpes Zoster ○ Fungal: Tinea, Pityriasis Versicolor ○ Protozoal: Leishmaniasis
7	Diagnosis and management of Bullous Disorders	○ Immune mediated: Pemphigus, Pemphigoid, Dermatitis Herpetiformis ○ Genetic: Epidermolysis Bullosa ○ Infective
8	Diagnosis and management of Pigmentary disorders	○ Vitiligo ○ Melasma
9	Diagnosis and management of Hair disorders	○ Alopecia Areata ○ Androgenic Alopecia
10	Diagnosis and management of Cutaneous tumors	○ Basal cell carcinoma ○ Squamous cell carcinoma ○ Malignant melanoma

4.15.7 CARDIOLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
1	**Cardiovascular Disease**	i. Fetal and neonatal circulation ii. Congenital heart disease iii. Acquired heart diseases (rheumatic heart disease, myocarditis) iv. Cardiomyopathy, CCF

S.NO	TOPIC	TOPIC OBJECTIVES
2	Coronary artery disease	○ Stable angina ○ Unstable angina ○ Myocardial Infarction ▪ Clinical features ▪ Differential Diagnosis ▪ Lab Investigation ▪ Scans ▪ Angiography ▪ Medical treatment ▪ Interventions - Percutaneous Coronary Intervention - Coronary artery bypass graft ▪ Complications and their treatment ▪ Primary and secondary prevention
3	Congestive Cardiac Failure	○ Causes ○ Acute pulmonary edema ○ Clinical features ○ Investigations ○ Treatment
4	Valvular heart disease	○ Mitral Stenosis, Mitral Regurgitation ○ Atrial Stenosis, Atrial Regurgitation ▪ Clinical features ▪ Investigations ▪ Treatment
5	Congenital heart disease	○ Cyanotic ○ Non-cyanotic
6	Arrhythmias	○ Paroxysmal supraventricular tachycardia ○ Atrial flutter and fibrillation ○ Heart blocks ○ V-tach and V-fibrillation ○ Cardiac arrest ▪ Basic Life Support, Acute Cardiac Life Support ▪ Classification of antiarrhythmic drugs
7	Infective endocarditis	
8	Cardiomyopathies	○ Dilated cardiomyopathy ○ Hypertrophic obstructive cardiomyopathy ○ Restrictive
9	Diseases of Pericardium	
10	Hypertension	○ Classification ○ Definition ○ Clinical features ○ Classification and treatment with antihypertensive drugs
11	Peripheral vascular disease	

4.15.8 PULMONOLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
1	**Respiratory Disorders**	i. Acute Respiratory Infections (ARI) ii. Tonsils and adenoids, epiglottitis, croup iii. Laryngomalacia, otitis media iv. Bronchiolitis, bronchopneumonia v. Lobar pneumonia, cystic fibrosis vi. Asthma, foreign body
2	Asthma	○ Clinical features ○ Complications ○ Grading ○ Emergency treatment ○ Long term management
3	Chronic Obstructive Pulmonary Disease	○ Chronic bronchitis ○ Emphysema ▪ Differences ▪ Clinical features ▪ Investigations ▪ Treatment
4	Pneumonia	○ Community acquired ▪ Etiology ▪ Clinical features ▪ Treatment ○ Hospital acquired
5	Tuberculosis (TB)	○ Types ○ Causative agents ○ Clinical features ○ Investigations ○ Primary vs post primary ○ Cultures ○ Treatment ▪ Non complicating cases ▪ Multi-drug resistant TB
6	Diffuse parenchymal lung disease	○ Interstitial pneumonias ○ Extrinsic allergic alveolitis ○ Sarcoidosis
7	Type 1 and type II respiratory failures	
8	Primary pulmonary hypertension	
9	CA bronchus	
10	Occupational Lung disease	
11	Diseases of Pleura	

4.15.9 NEPHROLOGY

S.NO	TOPIC
1	Laboratory evaluation and imaging of urinary tract
2	Congenital anomalies of kidneys and urinary tract
3	Acute post streptococcal Glomerulonephritis
4	Nephrotic Syndrome
5	Acute and Chronic Kidney Disorders
6	Urinary Tract Infections, renal stones
7	Wilm's Tumor

4.15.10 GASTROINTESTINAL SYSTEM

S.NO	TOPIC	TOPIC OBJECTIVES
GASTEROINTESTINAL SYSTEM		
1	Diseases of pharynx and esophagus	○ Gastro-Esophageal Reflux Disease / Non-ulcer dyspepsia (NUD) ▪ Symptomatology ▪ Diagnosis ▪ Role of endoscopy ▪ Treatment ○ Esophagitis and Barret's esophagus ○ Vomiting ▪ Causes ▪ Investigations ▪ Treatment ○ Hematemesis ▪ Differential diagnosis ▪ Investigations ▪ Management - Hemodynamic assessment - Resuscitation - Medical treatment - Therapeutic interventions ○ Carcinoma Esophagus ○ Achalasia
2	Diseases of stomach and duodenum	○ Types of gastritis, diagnosis, treatment ○ Peptic ulcer disease ▪ Etiology ▪ Pylori, NSAID's ▪ Clinical features, complications ▪ Treatment ○ Carcinoma stomach

S.NO	TOPIC	TOPIC OBJECTIVES
3	Diseases of small intestine	○ Acute diarrhea's ▪ Infective ▪ Osmotic ▪ Irritable Bowel Syndrome ○ Malabsorption disorders ▪ Celiac disease ▪ Tropical sprue ▪ Enzyme deficiencies ▪ Whipple disease
4	Diseases of large intestine	○ Inflammatory Bowel Disease (differential of the two, clinical features, investigations and treatment) ▪ Crohn's disease ▪ Ulcerative colitis ○ Carcinoma colon ○ Pseudo-membrane colitis
5	Functional GI Disorders (Irritable Bowel Syndrome)	
GASTROINTESTINAL & LIVER DISORDERS		
6	Vomiting, GERD,	
7	Constipation, Diarrhea, Dysentery	
8	Approach to abdomen pain	
9	Celiac disease, IBD, acute hepatitis	
10	Hepatic failure, Portal hypertension, liver abscess	

4.15.11 ONCOLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
1	Causes of cancer formation	• What is Cancer and its causes • History taking and Physical Examination • Staging • Performance status • Patient Communication and discussing prognosis • MDT approach
2	Principles of Surgical Oncology	
3	Principles of Medical Oncology	• Distinction between curative and palliative approach • Modalities of treatment (Cytotoxic Chemotherapy, Endocrine therapy, Biological agents and Immunotherapy • Toxicities

S.NO	TOPIC	TOPIC OBJECTIVES
4	Principles of Radiation Oncology	• Mechanism of action • Distinction between Curative and Palliative approach • Modalities of treatment (External Beam, Brachytherapy, 3DCRT, IMRT, SRS) • Toxicities
5	Oncological Emergencies	• Neutropenic sepsis • Spinal cord compression • Tumor lysis syndrome • SVC obstruction • Hypercalcemia
6	Screening of cancers for early detection	
7	Diagnosis and classification of cancers	
8	Investigations and staging of cancers	
9	Principles of nonsurgical treatment of cancer	
10	Principles of surgical treatment of cancer	
11	Principles of chemotherapy	
12	Principles of radiotherapy	
13	Follow-up for cancer patients	
14	Palliative care	• Pain management • Antiemesis • Counseling (Patient & Families) • End of Life management

4.16 PATIENT SAFETY

S.NO	TOPIC	TOPIC OBJECTIVES
1	**Introduction to Patient Safety**	• Understanding Adverse Events and Patient Safety • Your Role in a Culture of Safety • Your Role in Building Safer, More Reliable Systems
2	**From Error to Harm**	• The Swiss Cheese Model • Understanding Unsafe Acts • A Closer Look at Harm
3	**Human Factors and Safety**	• Understanding the Science of Human Factors • Design Principles to Reduce Human Error • The Risks and Rewards of Technology
4	**Teamwork and Communication**	• Fundamentals of Teamwork and Communication • Tools and Techniques for Effective Communication • Safety During Transitions Across the Continuum of Care
5	**Responding to Adverse Events**	• Responding to an Adverse Event: A Step-by-Step Approach • Communication, Apology, and Resolution
6	**Root Cause Analyses and Actions**	• Preparing for Root Cause Analyses and Actions • Conducting Root Cause Analyses • Actions to Build Safer Systems
7	**Achieving Total Systems Safety**	• Eight Recommendations for Total Systems Safety • Supporting the Health Care Workforce • with Patients and Families
8	**Pursuing Professional Accountability and a Just Culture**	• A Just Culture Case Study • Building a Culture of Safety • Understanding and Improving Organizational Culture

4.17 PAEDIATRICS

S.NO	TOPIC	TOPIC OBJECTIVES
1	**SOCIAL AND PREVENTIVE PAEDIATRICS**	i. EPI program ii. Advantage of breast feeding iii. Child rights/abuse/neglect iv. IMCI / IMNCI (Integrated Management of Childhood Illnesses/Integrated Management of Newborn and Childhood Illnesses) programs v. Vaccinations (other than EPI) Varicella, influenza, hepatitis A Meningococcal vaccine Rabies i. Health indicators (definitions and national statistics) ○ U5MR, IMR, neonatal mortality rate ○ Maternal mortality rate ○ Perinatal mortality rate ○ Low birth weight (intra uterine growth retardation), large for gestational age, small for gestational age, appropriate for gestational age

S.NO	TOPIC	TOPIC OBJECTIVES
2	**Growth And Development / Nutrition**	i. Nutritional requirements ii. Under and over nutrition (obesity and overweight) iii. Malnutrition classifications iv. Vitamins and micronutrients deficiencies (effects, management) v. Normal development vi. Puberty and tanner's stagging vii. Growth charts (plotting) viii. Factors affecting growth
3	**Behavior And Psychiatric Disorders**	i. Pica ii. Nocturnal enuresis, encopresis (clinical presentation, classification, management) iii. Attention-deficit/hyperactivity disorder, Autism spectrum disorder (clinical presentation, classification, management) iv. Tics, anorexia nervosa and bulimia nervosa
4	**Fluids And Electrolytes**	i. Maintenance fluids / electrolytes therapy (normal requirements) ii. Dehydration and replacements of electrolytes (clinical types and management) iii. Acid-base balance and disorders
5	**Paeds Surgery / Congenital Malformation**	i. Developmental dysplasia of the hip, telepes, kyphosis, scoliosis ii. Biliary atresia, duodenal atresia iii. Tracheoesophageal fistula iv. Hirschsprung's disease v. Neural tube defects vi. Posterior urethral valve vii. Hernias viii. Intussusception ix. Cleft lip and palate
6	**Poisoning And Toxicology**	i. General rules of management ii. Common poisoning (kerosine oil, organophosphate) (clinical presentation, management) iii. Poisoning with common drugs (clinical presentation, management)
7	**Burn / Drowning And Foreign Bodies In Children**	
8	**Metabolic Disease**	i. Glycogen storage diseases (types, presentation) ii. Galactosemia, PKU iii. Mucopolysaccharidoses (clinical presentation, management)

S.NO	TOPIC	TOPIC OBJECTIVES
9	**Rheumatic Disease / Neuromuscular Disorders**	i. Juvenile idiopathic arthritis ii. SLE / Neonatal lupus iii. Kawasaki Disease iv. Henoch-Schönlein Purpura v. Duchenne muscular dystrophy vi. Myasthenia Gravis vii. Floppy infant viii. Acute Flaccid Paralysis, GBS
10	**Human Genetics**	i. Genetic counselling (general rules of genetic counselling) ii. Pre-natal diagnosis (methodologies) iii. Chromosomal disorders (trisomies, turner syndrome) iv. Single gene defects v. Polygenic (multi factorial inheritance)
11	**Dermatology**	i. Atopic dermatitis ii. Bacterial, viral and fungal, protozoal infections of skin iii. Steven Jonson syndrome (presentation, management) iv. Scabies, ectodermal dysplasia v. Urticaria
12	**Immunologic Disorders**	i. Evaluation of suspected immunodeficiency ii. Acquired immune deficiency including AIDS iii. Cellular, humoral and complement related immunodeficiencies iv. Neutrophil related defects
13	**Hematologic Disorders**	i. Anemias (deficiency, aplastic, hemolytic) ii. Hemophilias, disorders of platelets iii. ITP iv. Blood and blood products transfusions v. Bone marrow transplantation
14	**Endocrine Disorders**	i. Short stature ii. Precocious and delayed puberty iii. Hypothyroidisms iv. Hypoparathyroidisms, addison's disease v. Congenital adrenal hyperplasia, Cushing syndrome, diabetes mellitus, diabetes insipidus
15	**Neonatology**	i. Birth asphyxia, prematurity, neonatal jaundice, IDM (infant of diabetic mother) ii. Causes of respiratory distress / respiratory distress syndrome iii. Causes of seizures in newborn iv. NEC (necrotizing enterocolitis) v. Neonatal sepsis vi. TORCH infections vii. Hemorrhagic disease of newborn
16	**Infectious Diseases**	i. Diarrhea: etiology and management of acute and chronic diarrhea ii. Typhoid fever, poliomyelitis iii. Diphtheria, tetanus, measles, mumps iv. Varicella (chickenpox), tuberculosis v. Dengue fever vi. Rabies
17	**Respiratory Disorders**	i. Acute respiratory infections (ARI) ii. Tonsils and adenoids, epiglottitis, croup iii. Laryngomalacia, otitis media

S.NO	TOPIC	TOPIC OBJECTIVES
		vi. Bronchiolitis, bronchopneumonia vii. Lobar pneumonia, cystic fibrosis viii. Asthma, foreign body
18	**Gastrointestinal And Liver Disorders**	i. Vomiting, GERD, ii. Constipation, diarrhea, dysentery iii. Approach to abdomen pain iv. Celiac disease, IBD, acute hepatitis v. Hepatic failure, Portal hypertension, liver abscess
19	**Cardiovascular Disease**	i. Fetal and neonatal circulation ii. Congenital heart disease iii. Acquired heart diseases (rheumatic heart disease, myocarditis) iv. Cardiomyopathy, CCF
20	**Neurological Disorders**	i. Meningitis (pyogenic, tuberculous) ii. Encephalitis, febrile convulsions iii. Epilepsy, headaches / space occupying lesions iv. Increased intracranial pressure, hydrocephalus v. Cerebral palsy, microcephaly vi. Leukemia, lymphomas vii. Brain tumors, langerhans histiocytosis
21	**Nephrology**	i. Laboratory evaluation and imaging of urinary tract ii. Congenital anomalies of kidneys and urinary tract iii. Acute post streptococcal glomerulonephritis iv. Nephrotic syndrome v. Acute and chronic kidney disorders vi. Urinary tract infections, renal stones vii. Wilm's tumor
22	**Bones And Joints Disorders**	i. Septic arthritis ii. Osteomyelitis iii. Clubfoot (talipes equinovarus) iv. Scoliosis v. Osteogenesis imperfecta vi. Achondroplasia vii. Marfan's syndrome

4.18 FAMILY MEDICINE

S.NO	6TOPIC
1	To become familiar with the core concepts of Family Medicine
2	To appreciate the importance of high-quality primary (first point-of-contact) care in maintaining patients' health and well-being
3	Manage common clinical problems in the family and community setting and ensure continuity of patient care
4	Understand how illnesses present at an early, undifferentiated stage in a primary care setting as compared to other clinical settings
5	Understand the concept of multiple settings with different diagnostic prevalence

S.NO	TOPIC
6	Perform an appropriately-focused history and physical examination, appropriate to the presenting problem and sensitive to patient's comfort and interpret findings
7	Identify and prioritize probable systems at fault and correlate pathophysiology of disease to signs and symptoms
8	Offer a staged and evidence-based approach to use of diagnostics for common presentations and interpret results
9	Utilize the concept of a "multipurpose visit" to avoid missed opportunities for age-appropriate preventive care and screenings
10	Demonstrate effective communication skills in carrying out a patient-centered interview, exploring the patient's illness experience, personal history and social context with a caring, empathetic and professional attitude. (biopsychosocial model)
11	Identify and use appropriate resources to support the delivery of patient care including inter-professional teams and community resources
12	Participate in health promotion and disease prevention activities in the context of the patient by visiting the household and conducting health awareness sessions
13	Identify cases needing referrals and write referral letters to appropriate Institutions/personnel
14	Demonstrate knowledge of the principles of Palliative Care in the community
15	Apply these skills in all socio-economic settings
16	Review and critically appraise current literature and apply findings to clinical learning and practice

4.19 NEUROLOGY

S.NO	TOPIC
NEUROLOGICAL DISORDERS	
1	Meningitis (pyogenic, tuberculous)
2	Encephalitis, febrile convulsions
3	Epilepsy, headaches / Space Occupying Lesions
4	Increased intracranial pressure, hydrocephalus
5	Cerebral palsy, microcephaly
6	Leukemia, Lymphomas
7	Brain tumors, Langerhans histiocytosis

S.NO	TOPIC	TOPIC OBJECTIVES
CNS		
1	Unconsciousness and coma	○ Causes ▪ Metabolic - Diabetic - Hypoglycemia - Uremia - Hepatic encephalopathy - Respiratory failure ▪ Vascular ▪ Encephalitis • Infective • Autoimmune ▪ Tumors/raised Intra-Cranial Pressure ▪ Drugs/poisoning
2	Cerebrovascular disease	○ Ischemic stroke ○ Subarachnoid hemorrhage and intracerebral bleed ▪ Differentiation between two ▪ Immediate resuscitation ▪ Control of BP ▪ Investigations ▪ Therapeutic options for both ▪ Surgery
3	Headache	○ Classification ○ Migraine ○ Cluster headaches ▪ Differentiating points ▪ Role of CT ▪ Treatment
4	Epilepsy	
5	Movement disorders	○ Tics ○ Chorea ▪ Huntington ○ Parkinson's disease
6	Multiple sclerosis	
7	CNS infections	○ Meningitis ○ Encephalitis
8	Paraplegia	○ Spinal cord disorders ▪ Autoimmune ▪ Tumors ▪ Vascular ○ Vertebral disorders ▪ Fracture ▪ Collapse/stress ○ Disc disorder
9	Neurodegenerative disorder	○ Alzheimer ○ Motor neuron diseases

S.NO	TOPIC	TOPIC OBJECTIVES
10	Neuropathies	○ Hereditary ▪ Hereditary motor sensory neuropathy I to IV ▪ Fredrick ataxia ○ Guillian-Barre Syndrome (GBS) ○ Systemic disease ○ Toxic
11	Myopathies	
12	Myasthenia gravis	

4.20 ENDOCRINOLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
1	Diseases of Pituitary	○ Anterior and posterior pituitary hormones ○ Dwarfism ○ Gigantism, acromegaly ○ Short stature ○ Precocious and delayed puberty ○ Sheehan syndrome ○ Diabetes insipidus
2	Diseases of Thyroid	○ Grave's disease ▪ Lab Diagnosis, scans ▪ Treatment - Medical - Radioactive Iodine - Treatment during pregnancy ○ Myxedema ○ Hypothyroidisms ○ Hypoparathyroidisms, Addison's disease
3	Diseases of Adrenal	○ Cushing's disease and syndrome ○ Addison's disease and crisis. Its diagnosis and treatment ○ Congenital Adrenal Hyperplasia, ○ Diabetes Mellitus ○ Diabetes Insipidus
4	Diseases of Parathyroid	
5	Diseases of reproduction and sex	
6	Diabetes mellitus	○ Types (1,2 and Gestational Diabetes Mellitus) ○ Maturity onset diabetes of the young, Endocrinopathies - Clinical features - Diagnostic criteria (for 1 and 2 and Gestational Diabetes Mellitus) - Investigations

S.NO	TOPIC	TOPIC OBJECTIVES
		- Complications ▪ Microvascular • Nephropathy • Retinopathy • Neuropathy ▪ Macrovascular ○ Treatment of diabetes ▪ Oral drugs • Classification of various groups • Mechanisms, side effects and doses ▪ Insulins • Human insulins • Analogs ○ Coma's ▪ Diabetic Keto Acidosis • Clinical features • Interpreting ABG's • Treatment steps ▪ Hyperglycaemic hyperosmolar non-ketotic coma (HONK) ▪ Lactic acidosis ▪ Hypoglycemia
7	Disorders of Lipids	Hyperlipidemias

4.21 INFECTIOUS DISEASES

S.NO	TOPIC	TOPIC OBJECTIVES
1	Approach to the patient with a suspected infection	○ Pyrexia of unknown origin ▪ Definition ▪ Investigations ▪ Treatment ○ Sepsis and septic shock ▪ Causes ▪ Pathophysiology ▪ Clinical presentation ▪ Treatment • Supportive • Empirical • Definitive
2	Viral Infections (clinical features, diagnosis, treatment, immunization)	a. Exanthematous diseases i. Measles ii. Chicken pox iii. Rubella

S.NO	TOPIC	TOPIC OBJECTIVES
		b. Without exanthema i. Mumps ii. Infectious mononucleosis iii. Influenza iv. COVID 19 v. Dengue c. HIV
3	Bacterial Infections	a. Gram positive infections i. Pharyngitis ii. Skin infections iii. Toxic shock syndrome iv. Pneumonia v. Meningitis b. Clostridial infections i. Botulism ii. Gas gangrene c. Gram negative infections i. Enteric fever ii. E. coli gastroenteritis iii. Cholera iv. Dysentery d. Syphilis e. Food poisoning
4	Mycobacterial	a. Pulmonary and abdominal TB under respective systems
5	Fungal infections	
6	Protozoal infection	a. Acute and chronic amoebiasis i. Clinical features ii. Investigations iii. Treatment
7	Helminthic infections	a. Ascariasis b. Hook worm i. Life cycle ii. Clinical features iii. How it causes anemia iv. Treatment and prevention c. Tapeworm d. Hydatid cyst • Clinical features with area of involvement • Treatment ○ Medical ○ Surgical
8	Diarrhea	etiology and management of acute and chronic diarrhea
9	Typhoid fever, poliomyelitis	
10	Diphtheria, tetanus, measles, mumps	

S.NO	TOPIC	TOPIC OBJECTIVES
12	Varicella (chickenpox), tuberculosis	
13	Dengue fever	
14	Rabies	

4.22 RHEUMATOLOGY

S.NO	TOPIC
1	Osteoarthritis (OA)
2	Rheumatoid arthritis (RA)
3	Crystal arthritis
4	Infections of joints and bones
5	Autoimmune rheumatic diseases (Rheumatoid Arthritis, Systemic Lupus Erythematosis, Sjogren Syndrome, Systemic Sclerosis, Polymyositis, dermatomyositis)
6	Systemic inflammatory vasculitis (Anti-Neutrophil Cytoplasmic Antibodies-ANCA)
7	Osteoporosis
8	Rickets and osteomalacia

4.23 NEONATOLOGY

S.NO	TOPIC
1	Birth asphyxia, prematurity, neonatal jaundice, IDM (Infant Of Diabetic Mother)
2	Causes of respiratory distress / Respiratory Distress Syndrome
3	Causes of seizures in newborn
4	NEC (Necrotizing Enterocolitis)
5	Neonatal sepsis
6	TORCH infections
7	Hemorrhagic disease of newborn

4.24 GERIATRICS

S.NO	TOPIC	TOPIC OBJECTIVES
1	Patient respect	
2	Ageing principles	
3	Common medical conditions	
4	Performance of geriatric assessment	
5	Medication use	
6	Multiple co-morbidities and social factor	
7	Ethical/Legal Issues	
8	Role of other health professions	
9	Health care in different settings	
10	Normal physiology of aging	• Develop an appreciation of the general theories of aging • Understand how organ function changes in the elderly
11	How common diseases affect the elderly (different presentations and modified by the often-present co-morbid conditions)	
12	Pathophysiology, diagnosis and management of geriatric-specific diseases and syndromes (all provide opportunities to develop all core competencies):	• Failure to thrive (frailty) • Weight loss & malnutrition • Immobility & decubiti • Falls & balance & gait disorders • Change of mental status (delirium) • Dementia • Depression • Behavioral disorders • Cerebrovascular accidents • Sensory impairments • Incontinence (urine & stool) • “Iatrogenesis” • Elderly abuse

4.25 PAEDIATRIC CARDIOLOGY

S.NO	TOPIC
1	Cardiovascular collapse in infancy
2	Cardiac failure in infants and children

S.NO	TOPIC
3	Cyanosis in the newborn period
4	Cyanosis beyond the newborn period
5	Evaluation of the child with a cardiac murmur
6	Evaluation of children and adolescents with chest pain, palpitations, presyncope or syncope
7	Left to right shunting defects
8	Duct dependent systemic circulation
9	Acyanotic obstructive right heart lesions
10	Patients with cyanotic congenital heart disease
11	Duct dependent pulmonary circulation
12	Transposition of the great arteries
13	Cyanotic congenital heart disease with high pulmonary flow
14	Pulmonary hypertension
15	Fontan circulation
16	Inflammatory cardiovascular disease
17	Cardiomyopathy and myocarditis
18	Prevention and management of infective endocarditis
19	Cardiovascular abnormalities in neonatal intensive care
20	Cardiovascular evaluation of children with genetic disorders and syndromes
21	Cardiac evaluation of the child with stridor
22	Nutrition and growth in congenital heart disease
23	Assessment of children prior to cardiac surgery
24	Care of children following cardiac surgery
25	Assessment of children with cardiac disease prior to non-cardiac surgery
26	Management of critically ill children with cardiovascular compromise

4.26 GENERAL SURGERY

S.NO	TOPIC	TOPIC OBJECTIVES
1	Metabolic Response To Injury, Shock, And Blood Transfusion	i. Basic concepts in homeostasis ii. Graded nature of response to injury iii. Mediators of the metabolic response to injury iv. Metabolic stress response to surgery and trauma: the ‘ebb and flow’ model v. Changes in body composition following injury vi. Avoidable factors that compound the response to injury. vii. Pathophysiology of Shock viii. Classification of shock ix. Cardiovascular and metabolic characteristics of shock x. Severity and consequences of shock xi. Resuscitation, fluid therapy, blood and blood components for shock. .

S.NO	TOPIC	TOPIC OBJECTIVES
		xii. Hemorrhage, types of hemorrhage, degree and classification of hemorrhage, indications for transfusion, transfusion of blood and blood components for hemorrhage, hazards of massive blood transfusion, transfusion reactions.
2	Nutrition, Fluid, Electrolyte And Acid-base Balance	i. Causes and consequences of malnutrition in the surgical patient ii. Nutritional status assessment techniques, Nutritional requirements of surgical patients and the nutritional consequences of intestinal resection, different methods of providing nutritional support and their complications iii. Body fluid compartments, minimal obligatory output, daily fluid and electrolyte requirements for normal individuals, Fluid and electrolyte requirements in the pre-operative, peri-operative and postoperative period (insensible fluid losses, maintenance fluid requirements, individual patient's fluid requirements, replacement fluid and electrolytes, Macronutrient requirements, Crystalloids and colloids fluids, isotonic, hypertonic, hypotonic fluids), management of fluid overload. iv. Common acid base balance disorders (Diagnosis and management) (Metabolic acidosis, respiratory acidosis, metabolic alkalosis, respiratory alkalosis).
3	Wound Healing	i. Factors influencing wound healing ii. Classification of wound closure and healing iii. Phases of normal wound healing iv. Abnormal wound healing v. Types of wounds vi. Hypertrophic Scar, Keloids and their treatment vii. Differentiation between acute and chronic wounds viii. Management of acute and chronic wounds, scars, contracture ix. Compartment syndrome
4	Surgical Infections	i. Microbiology of surgical infections, sources of infection, ii. Factors in wound infection iii. Risk factors for increased risk of wound infection iv. The decisive period v. Major and minor surgical site infection (SSI) vi. Specific local wound infections (gas gangrene, necrotizing fasciitis etc.) vii. Bacteremia, septicemia, and SIRS viii. Viral infections relevant to surgery (HIV, AIDS, Hepatitis B and C) ix. Hospital acquired infections x. Tropical infections (Amebiasis, ascariasis, typhoid, Tuberculosis, hydatid disease) xi. Prevention of surgical infection xii. Role of antimicrobials in prevention and treatment of infection
5	Pre And Postoperative Investigations	Accurate use of appropriate investigations to assist diagnosis and monitor treatment of patients (full blood count, Urea and electrolytes, Liver function tests, clotting screen, pregnancy test, blood glucose, HbA1c, Arterial blood gases, ECG, Echocardiography, Chest X-ray, urinalysis).

S.NO	TOPIC	TOPIC OBJECTIVES
6	Pre-operative Assessment Of Surgical Patient	i. Evaluation of different diseases to assess fitness of patient before surgery ii. Cardiovascular diseases (hypertension, ischemic heart disease, angina, arrythmias, Peripheral vascular disease) iii. Evaluation of coagulation disorders (Thrombophilia etc.) iv. Respiratory diseases (Chronic obstructive pulmonary disease, Asthma, Respiratory infections) v. Gastrointestinal diseases (Peptic ulcer disease and gastro-esophageal reflux, Liver disease) vi. Genitourinary tract (Urinary tract infection and Renal dysfunction) vii. Neurological (Epilepsy, Cerebrovascular accidents and transient ischemic attacks, Psychiatric disorders, Cognitive function) viii. Endocrine/metabolic (Malnutrition, obesity, Diabetes mellitus, Thyroid dysfunction) ix. Locomotor system (Osteoarthritis, rheumatoid arthritis x. Other diseases (Human immunodeficiency virus, Hepatitis, Tuberculosis, Malignancy, Allergy) xi. Previous surgery (Problems encountered, Family history of problems with anesthesia) xii. Identification and Assessment of high-risk patients (Patient factors that predispose to high risk of morbidity and mortality, scoring systems for identifying high-risk patients e.g., Physiological and Operative Severity Score for the enumeration of Mortality and Morbidity (POSSUM), The Revised Cardiac Risk Index (RCRI) of Lee, American College of Surgeons National Surgical Quality Improvement Program score- ACS NSQIP) xiii. Optimization of the high-risk patient before surgery xiv. Minimizing the impact of surgery in the high-risk patient xv. Consent for surgery.
7	Post-operative Care	i. Standards of anesthesia care in the immediate postoperative period ii. System specific postoperative complications (respiratory, cardiac, renal, central nervous system) iii. General postoperative complications (hemorrhage, Wound infection, fever, hypothermia, shivering, Deep venous thrombosis, pulmonary embolism, wound dehiscence, paralytic ileus, nausea, vomiting) iv. Post-operative Wound care
8	Ethics, Human Factors, Patient Safety, Quality Improvement	**i. Surgical ethics** (The importance of autonomy in good surgical practice, the moral and legal boundaries and practical difficulties of informed consent, Good practice in making decisions about the withdrawal of life-sustaining treatment, the importance and boundaries of confidentiality in surgical practice, the importance of appropriate regulation in surgical research, the importance of rigorous training and maintenance of good practice standards)

S.NO	TOPIC	TOPIC OBJECTIVES
		ii. **Human factors** (understanding of human factors, what they are, and their importance in understanding and rectifying error and working together as teams) iii. **Patient safety** (The importance of patient safety and the scale of the problem, Medical error and its definitions including adverse events and near misses, patient safety strategies and solutions, applying the science of patient safety into clinical practice and quality improvement, Patient safety as it relates to the surgeon) iv. **Quality improvement** (The different kinds of quality measures, Quality improvement as an overarching activity designed to address gaps in the quality of healthcare delivery, the patient's surgical journey and its potential for inefficiency and waste, some of the methodologies, tools and skills needed for quality improvement)

4.27 SURGERY & ALLIED

S.NO	TOPIC	TOPIC OBJECTIVES
1	**ARTERIAL DISORDERS**	i. Arterial anatomy ii. Signs, symptoms, investigations, and treatment of acute arterial limb ischemia iii. Signs, symptoms, investigation and treatment of chronic arterial limb ischemia iv. Signs, symptoms, investigation and treatment of different types of arterial gangrene (dry gangrene, wet gangrene, diabetic gangrene)
2	**VENOUS DISORDERS**	i. Venous anatomy of lower limb ii. Pathophysiology of veins of lower limb iii. Clinical features of venous hypertension of the leg iv. Signs, symptoms, classification, investigations and treatment of varicose vein v. Signs, symptoms, investigation and treatment of venous ulcers vi. Signs, symptoms, investigation and treatment of Venous thromboembolism
3	**PRINCIPLES OF LAPAROSCOPIC AND ROBOTIC SURGERY**	i. Principles of laparoscopic and robotic surgery ii. Advantages and disadvantages of laparoscopic and robotic surgery iii. Safety issues and indications for laparoscopic and robotic surgery iv. The principles of postoperative care for laparoscopic and robotic surgery

S.NO	TOPIC	TOPIC OBJECTIVES
	SYSTEMIC DISEASES	
4	**Head, Face and Neck**	i. Developmental abnormalities of face, palate, lips (Pathology, classification, Clinical features & investigations and treatment) ii. Pre-malignant diseases (Pathology, classification, Clinical features & investigations and treatment) iii. Oral cavity malignancies (Pathology, classification, Clinical features & investigations and treatment) iv. Benign and malignant Diseases of salivary glands (Parotid, submandibular and sublingual glands) (Pathology, classification, Clinical features & investigations and treatment) v. Tongue ulcer (etiology, Pathology, Clinical features & investigations and treatment)
5	**Breast**	i. Surgical anatomy of breast ii. Clinical features and investigations of breast lumps iii. Triple assessment of breast lump iv. Diseases of nipple and areola (Signs, symptoms, investigations, and treatment) v. Benign breast diseases (Signs, symptoms, investigations, and treatment vi. Malignant breast diseases (Signs, symptoms, Staging, prognosis, and treatment) vii. Breast reconstructions viii. Male breast carcinoma (Signs, symptoms, Staging, prognosis, and treatment)
6	**Thyroid Gland**	i. Embryology & surgical anatomy ii. Physiology of thyroid functions iii. Thyroid imaging iv. Thyroid enlargement v. Hyperthyroidism vi. Hypothyroidism vii. Thyroiditis viii. Neoplasms of the thyroid (Signs, symptoms, investigation, Staging, prognosis , and treatment) ix. Thyroid surgery
7	**Parathyroid Gland**	i. Embryology, anatomy, physiology, functions of parathyroid glands ii. Primary hyperparathyroidism iii. Secondary hyperparathyroidism iv. Tertiary hyperparathyroidism v. Investigations for parathyroid gland vi. Hypoparathyroidism vii. Multiple Endocrine Neoplasia syndrome viii. Parathyroid carcinoma (Signs, symptoms, Staging, prognosis, and treatment) ix. Parathyroid surgery

S.NO	TOPIC	TOPIC OBJECTIVES
8	**Adrenal Gland**	i. Embryology, anatomy, physiology, functions of adrenal glands ii. Diseases of the adrenal cortex and their management (Incidentaloma, Primary hyperaldosteronism – Conn's syndrome, Cushing's syndrome, Adrenocortical carcinoma, Congenital adrenal hyperplasia, Adrenal insufficiency) iii. Diseases of the adrenal medulla and neural crest derived tissue and their management (Pheochromocytoma and paraganglioma, Neuroblastoma, Ganglioneuroma)
9	**Thorax**	i. The anatomy and physiology of the thorax ii. Investigation of thoracic diseases iii. Benign diseases of lungs (Signs, symptoms, investigations, diagnosis, and treatment) iv. Benign tumors of thorax (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment) v. Malignant tumors of thorax (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment) vi. Surgical approach to lung cancer resection vii. Complications of lung resection viii. Management of Lung metastases
10	**Peritoneum, Omentum, mesentery & Retroperitoneum**	i. Anatomy and physiology of the peritoneum, omentum, mesentery & retroperitoneum ii. Peritonitis, Investigations, and management of peritonitis iii. Prognosis and complications iv. Special forms of peritonitis v. Intraperitoneal abscess vi. Ascites vii. Adhesions viii. Torsion of the omentum ix. Mesenteric injury x. Mesenteric ischemia xi. Mesenteric adenitis xii. Mesenteric cysts xiii. Retroperitoneal fibrosis xiv. Retroperitoneal (psoas) abscess xv. Tumors of the peritoneum xvi. Retroperitoneal tumors
11	**Hernias, Umbilicus & Abdominal wall**	i. Basic anatomy and function related to pathology ii. Pathophysiology of hernia formation iii. Common principles in abdominal hernia iv. Clinical history and diagnosis in hernia cases v. Examination for hernia vi. Investigations for hernia vii. Management principles viii. Surgical approaches to hernia ix. Inguinal hernia x. Femoral hernia xi. Ventral hernias xii. Parastomal hernia xiii. Traumatic hernias xiv. Abdominal compartment syndrome

S.NO	TOPIC	TOPIC OBJECTIVES
12	**Esophagus**	i. Anatomy and physiology of the esophagus ii. Symptoms of esophageal diseases iii. Investigations for esophageal disorders iv. Esophageal motility disorders v. Premalignant conditions of esophagus vi. Esophageal perforations and their treatment vii. Paraoesophageal hernias viii. The clinical features, investigations, prognosis and treatment of benign diseases ix. The clinical features, investigations, prognosis, and treatment of malignant diseases
13	**Stomach and duodenum**	i. Anatomy and physiology of the stomach and duodenum ii. Gastric mucus and the gastric mucosal barrier iii. Helicobacter pylori infection iv. Gastritis v. Peptic ulcer (Duodenal & Gastric) vi. Hematemesis and melaena vii. Stress ulceration viii. Gastric erosions ix. Mallory–Weiss tear x. Gastric outlet obstruction xi. Acute gastric dilatation xii. Trichobezoar and phytobezoar xiii. Gastric volvulus xiv. Gastric cancer xv. Gastrointestinal stromal tumors xvi. Gastric Lymphomas xvii. Duodenal obstruction xviii. Zollinger–Ellison syndrome xix. Benign and malignant duodenal tumors
14	**Pancreas**	i. The anatomy and physiology of the pancreas ii. Investigations of the pancreas iii. Congenital abnormalities of the pancreas iv. Assessment and management of acute pancreatitis v. Assessment and management of chronic pancreatitis vi. Pancreatic cancer (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment) osis, and treatment)
15	**Spleen**	i. Embryology, anatomy, physiology, functions of spleen ii. Investigations of spleen iii. Congenital anomalies of spleen iv. Splenic artery aneurysm v. Splenic infarction vi. Splenic rupture vii. Splenic abscess viii. Splenomegaly and hypersplenism ix. Causes of splenic enlargement x. Haemolytic anaemias xi. Neoplasms of spleen (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment) xii. Splenectomy and complications

S.NO	TOPIC	TOPIC OBJECTIVES
16	**Gallbladder and bile ducts**	i. Anatomy and physiology of the gallbladder and bile ducts ii. Pathophysiology and management of gallstones iii. Obstructive jaundice diagnosis and its management iv. Unusual disorders of the biliary tree v. Management of bile duct injuries vi. Benign and malignant tumors of the biliary tree (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)
17	**Liver**	i. The Pathology, classification, Clinical features & investigations Cystic liver disease ii. The Pathology, classification, Clinical features & investigations Liver infections iii. The Pathology, classification, Clinical features & investigations of liver abscess iv. The Pathology, classification, Clinical features & investigations and management of hydatid disease v. Benign and malignant tumors of the liver (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)
18	**Small intestine**	i. Anatomy and Physiology of the small intestine ii. Inflammatory bowel disease iii. Tuberculosis of the intestine iv. Intestinal diverticula v. Mesenteric ischemia vi. Stomas and their complications vii. Enterocutaneous fistula viii. Short bowel syndrome ix. Benign and malignant tumors of the small intestine (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)
19	**Large intestine**	i. Anatomy and physiology of the large intestine ii. Ulcerative colitis iii. Diverticular disease of the colon iv. Angiodysplasia v. Ischemic colitis vi. Irritable bowel syndrome vii. Benign and malignant tumors of the large intestine (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)
20	**Appendix**	i. Etiology and surgical anatomy of acute appendicitis ii. Signs, symptoms, investigations, diagnosis and differential diagnoses of acute appendicitis iii. Complications of acute appendicitis and their management iv. Management of acute and chronic appendicitis v. Benign and malignant Tumors of the appendix (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)
21	**Intestinal obstruction**	i. Classification and Pathophysiology ii. Special types of mechanical intestinal obstruction iii. Clinical features of intestinal obstruction iv. Clinical features of strangulation v. Investigations for intestinal obstruction vi. Treatment of acute intestinal obstruction vii. Paralytic ileus viii. Pseudo obstruction

S.NO	TOPIC	TOPIC OBJECTIVES
21	**Rectum**	i. Surgical anatomy ii. clinical features of rectal disease iii. Injuries of the rectum and their management iv. Rectal prolapse and its management v. Rectal evacuation disorder vi. Rectal intussusception vii. Solitary rectal ulcer syndrome (SRUS) viii. Proctitis and its types and management ix. Rectal polyps x. Benign and malignant Rectal tumors (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment))
22	**Anal canal**	i. Surgical anatomy of anal canal ii. Digital examination of the anal canal iii. Proctoscopy and sigmoidoscopy and their indications iv. Congenital anomalies of anal canal v. Pilonidal sinus disease, Perianal abscess, anal fissure, perianal fistula, Hemorrhoids (Signs, symptoms, investigations, diagnosis, and treatment) vi. Benign and Malignant tumors of the anal canal (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)

4.27.1 ANAESTHESIA

S.NO	TOPIC	TOPIC OBJECTIVES
1	**PRINCIPLES OF ANAESTHESIA AND PAIN MANAGEMENT**	i. key principles of general anesthesia ii. Pre-operative assessment of patients and pre-medication iii. Preparation of patient for general anesthesia iv. Management of airway during general anesthesia v. Intravenous Anesthetic agents vi. Inhalational Anesthetic agents vii. Muscle relaxation and artificial ventilation during general anesthesia viii. Monitoring and care of patient during general anesthesia ix. Recovery from Anesthesia x. Complications of general anesthesia and their management xi. Regional anesthesia (spinal, epidural, nerve blocks) xii. Complications of regional anesthesia and their management xiii. Perioperative Management xiv. Acute and chronic Pain Management xv. Postoperative care xvi. ICU Monitoring

4.27.2 CRITICAL CARE

S.NO	TOPIC	TOPIC OBJECTIVES
1	Basic /advanced cardiac support	
2	Shock types , diagnosis assessment management	
3	Acid base and electrolytes	a. Hyponatremia b. Hypernatremia i. Hypokalemia ii. Hyperkalemia c. Acidosis alkalosis
4	Respiratory failures types management	
5	Mechanical ventilation types indications complication	
6	Mechanical ventilation basic modes	
7	Acute respiratory distress syndrome	
8	Venous thromboembolism	
9	Central venous lines	
10	Arterial pressure monitoring	
11	Capnography oximetry	

4.27.3 ORTHOPAEDIC & TRAUMA

S.NO	TOPIC	TOPIC OBJECTIVES
1	History and examination of musculoskeletal disease (look, feel, move, special tests, investigations, radiology) of extremity trauma (ATLS principles)	
2	Description and classification of soft tissue, neurological and bony extremity injuries (AO classification, growth plate injuries, open fractures)	
3	Fracture healing (terminology and principles of treatment)	
4	Treatment by fracture location and region	
5	Treatment in skeletally immature (Pediatric fractures), osteoporotic fractures, pathological fractures and compartment syndrome	
6	Triage and damage control surgery in Orthopedics.	
7	Bones & joints disorders	i. Septic arthritis ii. Osteomyelitis iii. Clubfoot (talipes equinovarus) iv. Scoliosis v. Osteogenesis imperfecta vi. Achondroplasia vii. Marfan's Syndrome

S.NO	TOPIC	TOPIC OBJECTIVES
8	**Principles Of Management Of Trauma Patients**	i. Early assessment and management of severe trauma ii. Traumatic brain injury iii. Neck and spine trauma iv. Maxillofacial trauma v. Thoracic trauma vi. Abdominal trauma vii. Extremity trauma viii. Disaster surgery

4.27.3 NEUROSURGERY

S.NO	TOPIC
1	Headache
2	Back Pain/sciatica, neck pain / brachialgia
3	Head injury
4	Intracranial pressure
5	Spinal injury
6	Hydrocephalus
7	Congenital anomalies
8	Cranial tumors
9	Spinal tumors
10	Infections
11	Peripheral nerves
12	Cerebrovascular disease

4.27.4 UROLOGY

S.NO	TOPIC	TOPIC OBJECTIVES
1	**Kidneys and ureters**	i. Embryology, surgical anatomy, congenital anomalies of Kidneys and ureters ii. Urinary symptoms and investigations iii. Kidney stones (etiology, pathogenesis, investigations, treatment) iv. Urinary tract infection (etiology, pathogenesis, investigations, treatment) v. Renal and ureter trauma (epidemiology, investigations and treatment) vi. Benign and malignant tumors of Kidneys and ureters (etiology, pathogenesis, investigations, staging, treatment)
2	**The urinary bladder**	i. Surgical anatomy of the bladder ii. Congenital defects of the bladder iii. Bladder trauma iv. Cystitis (etiology, pathogenesis, investigations, treatment) v. Acute retention of urine vi. Chronic retention of urine vii. Urinary incontinence

S.NO	TOPIC	TOPIC OBJECTIVES
		viii. Urinary bladder calculi (etiology, pathogenesis, investigations, treatment) ix. Urinary bladder fistulae (etiology, pathogenesis, investigations, treatment) x. Neoplasms of the urinary bladder (etiology, pathogenesis, staging, investigations, treatment)
3	**The Prostate and Seminal Vesicles**	i. Embryology, surgical anatomy, physiology, of prostate gland ii. Lower urinary tract symptoms iii. Bladder outflow obstruction iv. Assessment of the patient with lower urinary tract symptoms v. Anatomical structure and biochemical function to the development and treatment of benign and malignant disease of the prostate vi. Benign prostatic hyperplasia (etiology, pathogenesis, investigations, treatment) vii. Prostatic calculi (etiology, pathogenesis, investigations, treatment) viii. Prostatitis (etiology, pathogenesis, investigations, treatment) ix. Carcinoma of prostate (pathology, staging, clinical features, investigations, treatment)
4	**Renal**	i. Glomerular diseases ○ Nephrotic (minimal Change, membranous) ○ Nephritic Syndrome (Acute Glomerulo-Nephritis , Rapidly progressive glomerulonephritis, IgA, ANCA related GN, Goodpasture syndrome) ○ Acute Kidney Injury, Acute Tubular Necrosis ▪ Causes ▪ Clinical features ▪ Natural history ▪ Investigations ▪ Emergency dialysis ▪ Treatment i. Tubular diseases ii. Interstitial diseases iii. Chronic Kidney Disease ○ Causes ○ Clinical features ○ Uremia vs azotemia ▪ Bone changes ▪ Mineral metabolic changes ▪ CVS complications ▪ Neurological complications ▪ Hematological complications i. Kidney involvement in systemic diseases ii. Renal cell carcinoma

S.NO	TOPIC	TOPIC OBJECTIVES
5	**Urethra and Penis**	i. The common congenital abnormalities of the urethra ii. The diagnosis and management of urethral trauma iii. The diagnosis and management of urethral stricture iv. The diagnosis and management of phimosis v. The principles of management of a man with erectile dysfunction vi. The common diseases of the penis and urethra and the principles of their surgical management
6	**Testis and scrotum**	i. Embryology, anatomy, physiology, functions of Testis ii. Incompletely descended testis iii. Testicular injury iv. Testicular torsion v. Varicocele vi. Spermatocele vii. Hydrocoele viii. Epididymal cysts ix. Epididymo-orchitis x. Testicular tumors and their management

4.27.5 THORACIC SURGERY

S.NO	TOPIC
1	Chest trauma
2	Pleural disease
3	Congenital Malformations
4	Inflammatory Lung Disease
5	Chest malignancies

4.27.6 PAEDIATRIC SURGERY

S.NO	TOPIC	
1	History, examination, and resuscitation of pediatric patients	
2	Pediatric trauma	
3	Common pediatric surgical conditions	i. Inguinal hernias ii. Hydrocele, iii. Undescended testes, iv. Testicular torsion, v. Hypospadias, vi. Midline hernias, vii. Infantile hypertrophic pyloric stenosis, viii. Intussusception, ix. Acute abdominal pain in children, x. Acute appendicitis, xi. Acute non-specific abdominal pain, xii. Necrotizing enterocolitis

S.NO	TOPIC	TOPIC OBJECTIVES
4	Congenital malformations	i. Esophageal atresia, ii. Congenital diaphragmatic hernia, iii. Intestinal atresia, iv. Gastroschisis, v. Exomphalos, vi. Biliary atresia, vii. Hirschsprung's disease, viii. Anorectal malformations

4.27.7 PLASTIC SURGERY

S.NO	TOPIC
1	Anatomy and physiology of tissues used in reconstruction
2	Types of skin grafts and their use in surgery
3	Types of flaps and their use in surgery
4	Use of plastic surgery to manage difficult and complex tissue loss

4.27.8 CARDIAC SURGERY

S.NO	TOPIC
1	Principles of cardiopulmonary bypass.
2	Surgery for IHD.
3	Valvular surgery.
4	Constrictive pericarditis
5	Heart failure surgery

4.27.9 VASCULAR SURGERY

S.NO	TOPIC	TOPIC OBJECTIVES
1	Arterial disorders	• Trauma • Thrombosis • Acute obstructions- embolism • Aneurysms • A-V fistulae • Hemangiomas • Vascular access
2	Venous disorders	• Varicose veins • DVT
3	Lymphatic disorders	• Congenital • Acquired • Lymphadenopathy • Lymphangitis

4.27.10 BREAST SURGERY

S.NO	TOPIC
1	Gynecomastia
2	Bacterial infections
3	Mycotic infections
4	Fibrocystic disease
5	Benign breast disorders
6	Cyst
7	Fibroadenoma
8	Periductal mastitis
9	Primary breast cancer
10	Axillary lymph node metastases
11	Distant metastases
12	Carcinoma in situ
13	Invasive carcinoma

4.27.11 COLORECTAL SURGERY

S.NO	TOPIC	TOPIC OBJECTIVES
1	Benign conditions	• Infections, • Obstruction, • Ischemia, • Polyps, • Trauma, • Crohn's disease • Ulcerative colitis
2	Cancers	• Colon • Rectum
3	Anal and perianal region	• Congenital anomalies • Abscesses • Fistula • Cancer
4	Appendix	• Appendicitis • Carcinoid tumor

4.27.12 HEPATO-BILIARY SURGERY

S.NO	TOPIC
1	Liver- cysts, benign tumors, Hepatomas, primary tumors , metastatic
2	Obstructive jaundice

S.NO	TOPIC
3	Gall bladder disorders, gall stones, cancer
4	Pancreatic disorders, pancreatitis, cancer
5	Portal hypertension
6	Basics of liver transplant surgery

4.27.12 UPPER GI SURGERY

S.NO	TOPIC
1	Motility disorders of oesophagus
2	Oesophageal structures
3	Oesophageal congenital malformations
4	Oesophageal malignancies
5	Congenital malformations of stomach
6	Inflammatory diseases of stomach
7	Malignant diseases of stomach

4.27.13 PAEDIATRIC CARDIAC SURGERY

S.NO	TOPIC
1	Cyanotic congenital heart diseases palliative surgery.
2	Curative surgery for cyanotic congenital heart disease.
3	Palliative surgery for acyanotic congenital heart disease
4	Curative surgery for acyanotic heart disease

4.28 - OPHTHALMOLOGY (EYE)

S.NO	TOPIC	
1	Adnexa & Orbit	i. Thyroid eye disease ii. Orbital cellulitis
2	Lacrimal Apparatus	i. Epiphora ii. Lacrimation iii. Acute and chronic dacryocystitis
3	Lids	i. Entropion ii. Ectropion blepharitis iii. Stye iv. Chalazion v. Ptosis.

S.NO	TOPIC	
4	Conjunctiva	i. Dry eyes ii. Infective and allergic conjunctivitis iii. Pterygium.
5	Cornea	i. Keratitis, ii. Corneal ulcers
6	Uveal Tract	Uveitis, and its differential diagnosis from other causes of the red-eye
7	Pupil	Pupil reaction – Normal and abnormal
8	Lens	Cataract and its management
9	Glaucoma	Diagnosis, and general principles of management
10	Retina And Vitreous	Diabetic retinopathy and its management
11	Squint	Paralytic and non-paralytic squint
12	Neuro-ophthalmology	i. Papilledema ii. Optic atrophy iii. 3rd, 4th, 6th, and 7th cranial nerve palsies
13	Ocular Trauma	Principles of management
14	Systemic Diseases	i. Vitamin A deficiency ii. Diabetes iii. Hypertension iv. Collagen vascular disorders v. Thyroid eye disease.
15	Ophthalmic Therapeutics	i. Antibiotics ii. Antiviral iii. Antifungal iv. Local anesthetics v. Antiglaucoma vi. Fluorescein dye vii. Mydriatic- cycloplegic and steroids

4.29 - OTORHINOLARYNGOLOGY (ENT)

S.NO	TOPIC	
	DISORDERS OF EXTERNAL EAR	
1	Congenital Disorders	i. Anotia. ii. Microtia. iii. Atresia of external auditory canal. iv. Pre-auricular sinus.
2	Inflammatory Conditions Of External Ear	**i. Bacterial:** • Acute otitis externa. • Diffuse otitis externa. • Malignant otitis externa. ii. **Fungal** • Otomycosis. iii. **Viral:** • Herpes zoster oticus.
3	Traumatic Conditions Of External Ear	i. Frost bite ii. Haematomaauris.

S.NO	TOPIC	
4	Impacted Wax And Methods Of Its Removal	
5	Foreign Bodies In Ear And Their Management	
	DISORDERS OF MIDDLE EAR	
6	Inflammatory Disorders	i. Acute otitis media. ii. Chronic otitis media. iii. Glue ear/ otitis media with effusion.
	DISORDERS OF INNER EAR	
7	Congenital	Pre-lingual sensorineural hearing loss, causes and management
8	Acquired Vestibular Disorders	**Vertigo** i. Benign paroxysmal positional vertigo. ii. Vestibular neuritis. iii. Meniere's disease.
9	Hearing Loss	i. Presbyacusis. ii. Noise induced hearing loss. iii. Ototoxity.
10	Facial Nerve	i. Surgical anatomy. ii. Causes of Facial paralysis. iii. Bell's palsy iv. Ramsay –Hunt syndrome v. Management of facial paralysis in acute and chronic otitis media
11	Nose And Para-nasal Sinuses	Surgical anatomy and physiology of nose and paranasal sinuses
12	Diseases Of External Nose And Nasal Vestibule	
13	Congenital Disorders	i. Dermoid cyst. ii. Glioma. iii. Meningocele /meningoencephalocele.
14	Rhinitis	i. Allergic rhinitis. ii. Vasomotor rhinitis
15	Epistaxis	i. Causes and management. ii. Types of foreign bodies in nose and their management. iii. Rhinolith and its management.
16	Inflammatory Conditions	i. Acute and chronic rhinosinusitis and their management. ii. Ethmoidal polypi and its management. iii. Antrochoanal polypi and its management
17	Disorder Of The Septum	i. Deviated nasal septum. ii. Septal perforation iii. Septal hematoma/ abscess
18	Granulomatous Disorders	**i. Bacterial:** • Tuberculosis • Leprosy **ii. Fungal:** • Invasive aspergillosis • Mucormycoticgement and voice rehabilitation **iii. Autoimmune:** • Wegener's granulomatosis • Systemic lupus erythematosis • Sarcoidosis
19	**SINO NASAL NEOPLASM**	Inverted papilloma Transitional cell carcinoma

S.NO	TOPIC	
20	**PHARYNX**	Surgical anatomy and physiology of nasopharynx, oropharynx, hypopharynx
21	Inflammatory Conditions Of Oropharynx	i. Acute and chronic pharyngitis. ii. Acute and chronic tonsillitis and its management. iii. Peritonsillar abscess.
22	Neoplasms	i. Squamous cell carcinoma and its management. ii. Lymphoma and its management.
23	Inflammatory Conditions Of Nasopharynx	Adenoid Hyperplasia, its complications and management
24	Neoplasms Of Nasopharynx	i. Juvenile Nasopharyngeal Angiofibroma. ii. Nasopharyngeal carcinoma.
25	Hypopharynx	i. Plummer-vinson syndrome. ii. Hypopharyngeal carcinoma.
26	**LARYNX**	
27	Congenital Conditions	i. Laryngomalacia ii. Juvenile recurrent laryngeal papillomatosis
28	Acute Inflammation Of Larynx	i. Acute laryngitis ii. Chronic laryngitis iii. Vocal nodule iv. Acute epiglottitis v. Acute laryngo-tracheobronchitis. vi. Vocal polyp vii. Tracheostomy (indications, steps of procedure and complications) viii. Management of Foreign bodies of upper aerodigestive tract.
29	Tumors	Carcinoma larynx/ management and voice rehabilitation

4.30 - OBSTETRICS AND GYNAECOLOGY

S.NO	TOPIC	
1	Contraception	i. Principles of contraception counseling ii. Reversible methods of contraception iii. Complications associated with reversible methods iv. Emergency contraception v. Permanent methods of sterilization in male and female
2	Fertility Problems (both male and female)	i. Causes of male and female infertility ii. Investigations of male and female infertility iii. Principles of management of an infertile couple
3	Puberty	i. Normal Pubertal Development ii. Delayed puberty and associated endocrine problems iii. Precocious Puberty and associated endocrine problems
4	Normal Pregnancy	i. Physiological Changes in Pregnancy ii. Antenatal Care iii. Pre pregnancy counseling
5	Labor	i. Mechanism of labor ii. Diameters of fetal skull and female pelvis iii. Stages of labor and their management iv. Analgesia during labor
6	Abnormal Labor	i. Abnormalities of 1st stage of labor (Prolonged Labor) ii. Abnormalities of 2nd stage of labor (Instrumental delivery)

S.NO	TOPIC	
		i. Abnormalities in 3rd stage of labor (Placental retention, Inversion of Uterus) ii. Malposition and malpresentation
7	Problems in Pregnancy	Diagnosis, etiology and principles of management in pregnancy including fetal and maternal complications arising in: i. Diabetes mellitus ii. Hypertension iii. Thyroid disease iv. Heart disease v. Liver Disease vi. Renal disease vii. Autoimmune diseases viii. Infections
8	Bleeding in Early Pregnancy	i. Miscarriage – Etiology, diagnosis and management ii. Ectopic pregnancy – Etiology, diagnosis and management iii. Molar pregnancy – Etiology, diagnosis and management
9	Puerperium	i. Etiology and Management of Puerperal Pyrexia, ii. Deep vein thrombosis iii. Problems in Lactation
10	Etiology of Bleeding in Pregnancy & Management of Shock (complications of pregnancy)	Diagnosis and Management of Antepartum and Postpartum Hemorrhage
11	Essential Anatomy of Genital Tract	
12	Endocrine Basis of Menstrual Cycle	
13	Abnormal Uterine Bleeding – Causes, Diagnosis and Management	
14	Etiology, Pathophysiology, Complications and Management of Endometriosis	
15	Etiology, Pathophysiology, Complications and Management of Fibroids	
16	Etiology, Pathophysiology and Management of Pelvic Inflammatory Disease	
17	Etiology of Premalignant Diseases of the Uterus	
18	Principles of Diagnosis and Management of Carcinoma of Uterus	
19	Benign Disease of Cervix	
20	Principles of Cervical Cytology and Colposcopy	
21	Etiology, Diagnosis and Management of Benign Ovarian Cysts	
22	Principles of Diagnosis and Management of Malignant ovarian neoplasms	
23	Differential Diagnosis, Diagnosis and Management of Pelvic Mass	
24	Principles of Diagnosis and Management of Vulval Lesions and Lumps	
25	Causes, Diagnosis and Options for Management of Utero-Vaginal Prolapse	
26	Micturition	

SECTION –5

HOUSE JOB/ INTERNSHIP/ FOUNDATION YEAR

5.1 - Rotation Plan for One Year House Job/ Internship

GROUP A	GROUP B	GROUP C	GROUP D
4 months rotation in Medicine	**4 months** rotation in General Surgery	**4 months** rotation in Obstetrics and Gynecology	**4 months** rotation in Pediatric Medicine
2 months rotation in family medicine or medical sub-specialties	**2 months** rotation in surgical sub-specialties including Anesthesiology	**2 months** rotation in General Surgery or surgical sub-specialties	**2 months** rotation in general medicine, family medicine or medical sub-specialties
Please note: A candidate has to choose one option from group A or D and second option from Group B or C.			

5.2 - Skills And Competencies Required Of A House Officer/ Intern By The End Of Housejob/ Intership/ Foundation Year

Following are the competencies expected by graduating house officers and will be used to develop the Clinical Skills Examination (CSE) in conjunction with the theory syllabus above.

S.NO	CLINICAL SKILLS LIST
1	Obtaining an appropriate and relevant history and identifying the main findings
2	Performing systemic and mental state examination along with appropriate documentation
3	Establishing a differential diagnosis
4	Measurement of temperature, respiratory rate, pulse rate, blood pressure, oxygen saturations, NG output and urine output
5	Taking samples of venous blood to test for the growth of infectious organisms in proper culture bottles
6	Carrying out arterial blood gas and acid base sampling from the radial artery in adults
7	Perform essential lifesaving procedure (Basic Life Support, tracheostomy, endotracheal intubation and chest intubation)
8	Carrying out nasogastric tube placement
9	Measurement of central venous pressure (CVP)
10	Performing airway care including simple adjuncts (oro-pharyngeal airway or laryngeal masks, naso-tracheal airway)
11	Carrying out venepunctures
12	Measuring capillary blood glucose
13	Carrying out a urine multi-dipstick test
14	Carrying out a 3- and 12-lead electrocardiogram
15	Use the correct technique to apply sterile swabs to the nose, throat, skin and wounds
16	Requesting and interpreting the results of appropriate investigations to confirm clinical findings
17	Interpretation of X-rays of upper and lower limbs, chest, abdomen and pelvis
18	Setting up an infusion
19	Prescribing and administering oxygen
20	Preparing and administering injectable (intramuscular, subcutaneous, intravenous) drugs
21	Injecting or topically applying local anesthetics
22	Carrying out intravenous cannulation
23	Carrying out safe and appropriate blood transfusion
24	Carrying out male and female urinary catheterization

S.NO	CLINICAL SKILLS LIST
25	Carrying out wound care and basic wound closure and dressing
26	Applying splint for fractures
27	Performing surgical scrubbing up
28	Performing digital rectal examination and Proctoscopy
29	Performing and interpreting peak flow using simple devises
30	Calculating BMI, carrying out nutritional assessment of patients and guiding them according to their caloric requirements
31	Performing basic ophthalmoscopy and identifying common abnormalities
32	Performing basic oto-scopy and identifying common abnormalities
33	Demonstrating that they are good communicators
34	Communicating with patients about the procedures
35	Demonstrating that they are sensitive (empathetic) and respond to the needs and expectations of patients irrespective of their caste, gender and economic status
36	Using the correct techniques for moving and handling patients, including those who are frail
37	Asking for patient's informed consent
38	Instructing patients in the use of devices for inhaled medication
39	Prescribing medicines safely and effectively and giving clear explanations to patients
40	Demonstrating an understanding of the safety procedures involved in prescribing controlled drugs
41	Demonstrating sound knowledge concerning confidentiality and anonymity
42	Introducing themselves to patients and colleagues with appropriate confidence and authority ensuring that patients and colleagues understand their role, remit and limitations
43	Demonstrating respect for patients' rights to refuse treatment or take part in teaching or research

SECTION –6

NATIONAL LICENCING EXAM (NLE) FOR MEDICAL GRADUATES

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Pakistan Medical Commission (PMC) has initiated Pakistan's first professional exit examination – National Licensing Examination (NLE) at a national level. This examination is organized based on section 20 of the Pakistan Medical Commission Act No XXXIII of 2020.

6.1 FORMAT AND STRUCTURE:

The National Licensing Examination (NLE) is designed under PMC ACT Section 20. It is administered to gauge the ability of MBBS graduates' competence to practice independently. Passing the NLE (both the theory and clinical skills examination components) is mandatory for obtaining a full license to practice as General Practitioner.

6.2 ELIGIBILITY:

Candidates who have successfully graduated from PMC approved Pakistani Medical Colleges with an MBBS degree are eligible to sit for NLE. Foreign medical graduates will be required to follow the regulations as given in the licensing pathways available on the PMC website.

6.3 CENTRES:

NLE is conducted at multiple centers across Pakistan to facilitate the candidates. It is envisaged that NLE will be offered certain international centers as well.

6.4 FREQUENCY:

The NLE will be held at least four times a year.

6.5 NUMBER OF ATTEMPTS:

There is no bar on the number of times a candidate can attempt the complete NLE.

6.6 STRUCTURE

The NLE will consist of (i) a theory component and (ii) a skill-based, clinical component – Clinical Skills Examination (CSE):

i. The theory component consists of MCQs targeting higher cognition and will check a candidate's ability to apply knowledge.
ii. The Clinical Skills Examination (CSE) is meant to assess essential clinical skills required for practice by a general medical practitioner. The format of CSE will be similar to that of an Objective Structured Clinical Examination (OSCE).

6.7 PASSING CRITERIA:

Candidates will have to pass both the theory and the CSE components separately in order to be declared successful in NLE.

6.8 VALIDITY

Passing of the theory (MCQs) component of NLE will remain valid for five (5) years from the date of passing the theory (MCQs) component. CSE component must be passed within five (5) years of passing the theory (MCQs) component of NLE. If a candidate fails the CSE in three consecutive attempts, s/he will have to reappear in both the theory and CSE components of the NLE. That is, after every three failed attempts at the CSE, candidates will have to retake the entire NLE.

For more and latest details on NLE, please visit http://www.pmc.gov.pk

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