



**Pakistan Medical
&
Dental Council**

Guidelines

for

**Undergraduate Medical Education
(MBBS)**

Curriculum – 2024

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PREAMBLE

Curriculum is derived from a Latin word *curare* that means race-course. In simple terms it is the course of study. In medical education it is defined as “Planned educational experience or activity”.

The concept of curriculum is as dynamic as the changes that occur in society. In its narrow sense, curriculum is viewed merely as a listing of subject to be the taught in a teaching environment. In a broader sense, it refers to the total learning experiences of individuals not only in institutes 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 becoming an increasingly popular concept internationally. An Integrated Medical Curriculum will teach scientific knowledge alongside clinical training, enabling students to learn the material by topic, rather than by discipline.

The goal of integration is to break down the current barriers between the basic and clinical sciences currently in practice with the Traditional Medical Curriculum. Integration should promote retention of knowledge and acquisition of skills through repetitive and progressive development of concepts and their application.

The vertical integration should include not only basic and clinical sciences but also socio-humanistic and population health sciences, leading to a broader conception of ways to teach and learn medicine. 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 meaningful association to focus upon broad areas of study.

The Traditional Medical Curriculum of teaching medicine implies that students should first learn basic and Para clinical/biomedical sciences and then move to clinical sciences; however, this is not how patients present in practical settings. A common criticism to this approach is that students will not see the relevance of basic and biomedical sciences applied to clinical practice, and it is preferable to encourage students to think as doctors from the day they enter medical school. Integration is therefore of key importance in medical education because basic science learning is placed in the context of clinical and professional practice and is considered by students to be more meaningful and relevant.

The Hybrid medical curriculum is where parts of both integrated and traditional curricula are implemented in a learning environment.

In a recent survey conducted under the auspices of PM&DC where more than 90% of colleges and medical universities participated; majority are still following traditional or subject based curriculum (65%) with minimal level of either horizontal or vertical integration. 25% have integrated curriculum and the rest follow a hybrid. Almost all followers of traditional/subject based are willing to shift to integrated modular curriculum but desired to have some window 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; CAC strongly believes that integrated curriculum is more effective compared to the traditional and is well accepted by students and faculties. Both faculties and students show a positive attitude toward this teaching innovation; therefore, it is time to formally introduce integrated medical curriculum and it is recommended that all medical and dental schools and universities shift towards integrated curriculum and complete the process by 2025 so that it is fully implemented for the batch of 2026.

In this document PM&DC provides broad guidelines and a template of standard curriculum (both traditional and integrated) and competencies to be achieved. Universities are required to develop curricula according to framework given in this document.



OPERATIONAL DEFINITIONS / GUIDELINES

Following are some important operational definitions for curriculum development:

1. Traditional curriculum

The traditional discipline-based curriculum is still being used in some medical schools across the globe, including Pakistan. Students are not exposed to clinical education or patients till the third year of their medical program. During the first two years of their medical education, the curriculum is completely focused on basic sciences. The first 2 years are frequently taught in a didactic, discipline-based format.

Discipline based curriculum being the oldest form of teaching where no effort is made to teach the basic sciences in the clinical context.

2. Integrated Curriculum

It is defined as combining and coordinating the different contents to form a single curriculum new whole. Horizontal Integration refers to the provision of learning within the structure where individual departments/subject areas contribute to the development and delivery of learning in a meaningful, holistic manner, organized in blocks or units corresponding to body systems.

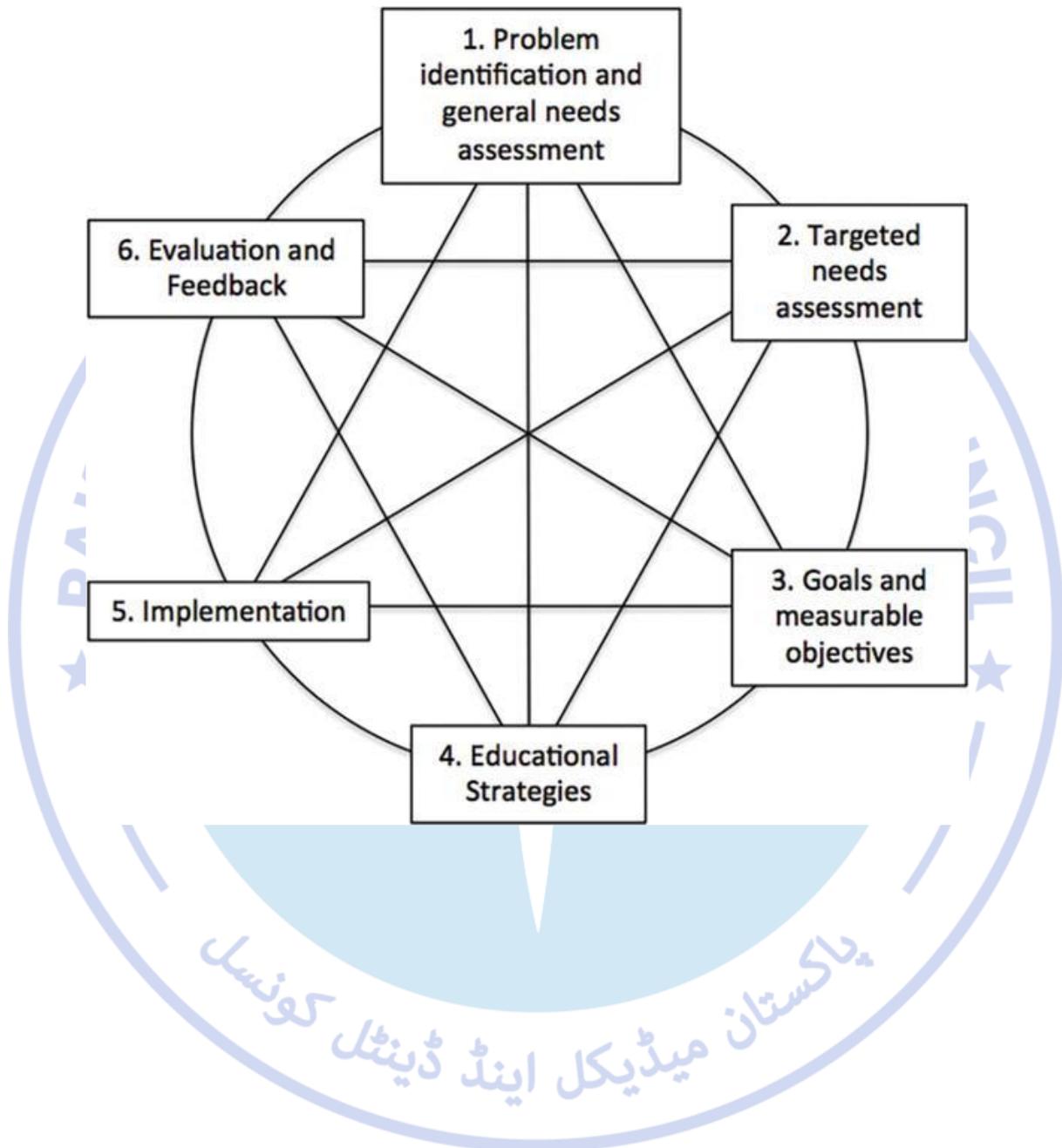
In Vertical Integration information during the various curricular phase is taught together focused on key concepts or themes which run throughout all years with revisiting of knowledge. There is early introduction to clinical skills and their development alongside basic sciences.

3. Hybrid Curriculum

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

OVERVIEW OF CURRICULUM DEVELOPMENT

Universities should develop a detailed & comprehensive curricular document following the guidelines as mentioned below;



GENERAL GUIDELINES FOR CURRICULAR DEVELOPMENT

1. Vision

To produce a safe, competent, compassionate, and efficient professional capable of caring for the sick.

2. Mission

To provide our students with quality medical education that groom their personality and inculcate in them a sense of responsibility, confidence, commitment and dedication towards their profession, society, and country.

University shall develop curriculum document aligned with the vision and mission of PM&DC.

3. Expected Competencies in Medical Graduates of Pakistan

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

1. Knowledgeable
2. Skillful
3. Professional
4. Scholar & Researcher
5. Critical thinker
6. Leader & Role model
7. Community Health Promotor

A 'seven-star doctor' Pakistani medical graduate should be able to demonstrate various attributes as detailed under each competency. These attributes are a minimum and not exhaustive by any means.

1. Knowledgeable (Scientific Knowledge for Good Medical Practice)

This embodies knowledge of basic medical and clinical sciences required for the practice of medicine. A medical/dental graduate should be able to:

a. Differentiate between:

- **Normal and abnormal structure and functions** of the body, in order to recognize and identify abnormalities in body structure in 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 psychopathological and pathophysiological basis.
- **Effects of growth, development and aging** 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.

2. Skillful (Clinical, Cognitive and Patient Care Skills)

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

- 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.
- Perform physical and psychological** examinations in order to identify specific problems and differentiate those from others and non-conformity to anatomical or physiological configurations.
- Formulate a provisional diagnosis** with justification, and two to three most likely differential diagnoses.
- Order appropriate investigations** and interpret their reports to either confirm the diagnosis or differentiate from others.
- 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.
- Debate** the advantages, disadvantages, indications, and contraindications.

Limitations and complications of the current treatment modalities, justifying the use of each by best available evidence.

- 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.

3. Professional (Behavior and Professionalism)

Competent medical/dental 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/dental graduates should be cognizant with the PM&DC Competencies. Graduates should role model 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.

a. **Lifelong self-directed learner**

Medical/dental 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/dental education during professional life through personal development activities to continuously acquire and use new knowledge and technologies. Medical and dental graduates should be able to:

- 1) **Demonstrate continuous learning** based on regular self-assessment, seeking peer feedback. This also includes a continuous undertaking of self-directed study and

credited, continuous medical education activities up to re-licensure and recertification.

- 2) **Manage information effectively** in order to use it for efficient and effective self-learning, medical problem solving and decision-making:
 - **Accurately document** and maintain records of their own 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.
- 3) **Provide evidence of continuing career advancement** by pursuing further training in specific fields or continuing professional development by attending CPD programs in their primary discipline or as a professional. This evidence may be collated by maintaining professional development portfolios.
- 4) **Function effectively as a mentor and a teacher with training,**
 - a. In order to appraise, assess, teach, and provide feedback to themselves, peers, colleagues and students.
- 5) **Respond positively to appraisals and feedback.**

b. Altruistic and Empathetic

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

- 1) Appropriate **demeanor and dress code.**
- 2) **Responsibility, compassion, empathy, honesty, and integrity.**
- 3) **Tolerance for diversity.**
- 4) **Caring** attitude towards patients and health problems.
- 5) **Put patients first** and the patient's needs before their own.
- 6) **Have patient safety** as of paramount priority.
- 7) **Culture-sensitive practice** which is also sensitive to patient's religious beliefs.
- 8) **Special sensitivity towards vulnerable populations.**

c. Ethical

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

- 1) **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.
- 2) **Strive for constant improvement of self & health delivery systems.**
- 3) **Respect the views & interests** of the patient and patient's family
 - **Uphold principles** of patient autonomy, beneficence, non-maleficence, justice, confidentiality, and informed consent.
 - **Use moral reasoning in decision-making** while dealing with conflicts amongst ethical, legal, and professional issues including those raised by economic constraints, commercialization of healthcare, and scientific advances.

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

d. Collaborator

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

- 1) Working as an effective team member, understanding the importance of each role.
- 2) Demonstrating collegiality and respect for juniors, peers, seniors and the healthcare team
- 3) Continuously assessing themselves and others in their roles and acting accordingly.
- 4) Sharing information and handing over care appropriately.
- 5) Focusing on a collegial but problem-solving approach.

e. Communicator

The medical/dental graduates should be able to demonstrate:

- 1) **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.
- 2) **Verbal Communication Skills**, clearly expressing themselves in layman's language; counseling 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.
- 3) **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.
- 4) **Confidentiality**, and balance confidentiality with public risk.
- 5) **Dissemination of information & research findings** to improve health care.

4. Scholar & Researcher

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

- a. Identify a researchable problem and critically review 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.

5. 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 own practice** and on standards of medical practice.
- e. **Initiating, participating in or adapting to change as required**, to ensure that the profession and the patients, both 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.**

6. Leader and Role Model:

The medical/dental 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 public in the medical and dental profession by being exceptional role models at work and when away.
- e. Accept leadership if required.
- f. Provide leadership in issues concerning society.

7. 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/dental 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 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 community.
- b. Relate effects of lifestyles, genetic, demographic, environmental, social, cultural, economic and psychological **determinants of health** and their impact on 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 community.
- 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
- j. **Address the needs and challenges of the society.**

8. EDUCATIONAL ROAD MAP FOR PRODUCING A SEVEN-STAR DOCTOR:

These guidelines are meant to facilitate development of educational plan to accomplish desired competencies as defined by PM&DC:

- Medical universities shall preferably implement hybrid or integrated curriculum, at least at the level 7 (correlation) of Harden's Integration ladder.
- Curricular document should outline principles of curricular organization to clarify how different subjects will combine to promote comprehensive learning.
- Distribution of curricular hours among different subjects of basic and clinical sciences will be as per PM&DC recommendations. Curricular plan will span over minimum 6200 hours of teaching of medical subjects.
- Instructional tools for information transfer should be student-centered to groom the student to be a self-directed learner.
- Joint sessions of basic and clinical subjects should be integral component of timetable where facilitators from different specialties will combine to exhibit clinical problem solving through contribution from different learning domains.
- Early Clinical Exposure (ECE) from first year of professional education should be included to facilitate understanding of basic sciences through applied and practical information transfer. Suggested plan for ECE is as under:
 - **Year I;** Integrated sessions and relevant patient exposure on campus
 - **Year II;** Hands-on training in a controlled environment such as a skill lab/simulation, Bench to bedside teaching
 - **Year III;** Clinical environment in-patient, outpatient clinics, Accident & Emergency
- Humanities and elective rotations outside parent institution and affiliated hospital may be incorporated in curricular plan for development of a visionary professional.

9. Cognitive Domain:

- 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, Directed Self Learning. Teaching should promote group activities in the form of small group discussion, assignments to encourage teamwork, collaboration and peer assisted learning among students.

10. Psychomotor Domain:

- Skills' training will be carried out in laboratories, skill labs and bedside/chairside. Curriculum will have clearly defined learning outcomes for skill acquisition. It will ensure opportunities for student to first observe then do hands-on training under supervision, with provision of corrective feedback during practice, followed by supervised, independent performance with due care for patient safety.
- Sufficient opportunities for practice, feedback and remediation should be provided to student for skill development.
- During clinical training students should actively participate in ward rounds, patient care in outpatient department and in Accident and Emergency under close supervision of clinical teachers to allow real life experience and contextual learning.
- Log of clinical activities and procedures shall be maintained (clerkship portfolios)

11. Affective Domain:

- Training in affective domain should get its due share in curriculum. Institutions should have dress codes, clearly conveyed rules and regulations, and policies in handling misbehavior, bad conduct and negligence.
- Institutions will maintain proper record of student's attendance, participation in academic activities, performance in term and annual assessments. This record will be used for student's appraisal. Students will be counselled in case of unsatisfactory performance with feedback and identification of corrective measures.
- Longitudinal themes like Behavioral Science, Professionalism, Ethics, Leadership, and patient safety will be an essential component of curriculum to develop a competent professional.
- Behavioral sciences will be taught using tools like role play, incident reporting and reflective exercises to produced well behaved professional.

12. Assessment Domain:

- Curriculum must have clearly outlined assessment plan. Both formative and summative assessments should be part of curriculum.
- Summative assessments at the end of session in form of professional examination should include assessment of knowledge, skill and attitude in accordance their weightage in curriculum. Diverse tools of assessments should be used to ensure high validity and reliability. Assessment must reflect achievement of each outcome.
- As assessment drives learning, distribution of questions should be in line with table of specification.
- Transparency, security and secrecy of examination are responsibility of examining body. Institution should have clearly documented policies to avoid leakage of paper, cheating and frauds during examination.
- Summative examination papers should be ready at least one month before examination date. It should be finalized by senior faculty members of the subject, including member(s) from outside the institution. At least two papers should be prepared for the subject to be examined and controller of examination should decide which paper will be put up for examination.
- Pre & Post hoc analysis should be conducted to improve the validity & reliability of an exam
- Examination department along with Medical Educationist will utilize this analysis for continuous improvement of their examination. The examination department will use post-exam analysis for continuous improvement of the process, by seeking guidance from subject specialists. The result should be declared after critical analysis

- 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 should regularly scrutinize these questions for quality before selection for examination.
- In addition to summative assessments, term/ end of block / end of rotation assessments should be planned in curriculum during the year to promote learning. Results of these term/ end of block / end of rotation 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.
- Formative assessment tools, e.g. for knowledge MCQ, SEQ, EMQ etc, OSCE/OSPE, DOPS, Mini- CEX self-assessment, reflective writings for skills & attitudes 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.

13. Programme Evaluation:

- Institution must have curriculum evaluation committee comprising of medical educationists who should be entrusted with responsibility to evaluate curriculum throughout the year to determine whether curriculum has succeeded in producing professionals with desired attributes.
- Institutional quality assurance cell may be established at each institute for program evaluation
- They will take regular feedbacks from all stakeholders including students, teachers and administration regarding learning activities, difficulties being faced and suggestions for improvement.
- They will arrange focus group discussions with teachers and students periodically to discuss issues being faced during learning.
All this information will be used to modify and improve curriculum to enhance and encourage process of learning.

ROLE OF UNIVERSITIES

The PM&DC will set standards and provide general guidelines for universities to develop their own curricula by following the steps as given below;

1. **A curriculum should:**

- a. **Define the learning outcomes.** 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 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 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 was 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 Knowledge, Skills and Attitude. 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 range from individual to small groups to very large ones that may be 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 or not 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 programme 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 will 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/ CMS/ VTP. University / institution should develop and impart training to both faculty and students for online teaching and learning.
- g. **Assessment policy and system** include as to how the students are assessed and how such exercise helps their learning? What system is available to support the vulnerable students? How the blueprint of examination is 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 is the post-assessment analysis carried out and the relevant data used?

Assessment programs aligned with the 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. All the universities must be prepared to conduct online annual examination in two years' time.

Allocated time

Five-year program of MBBS, minimum 6200 hours, 36 weeks per year.

2. Academic Staff:

- a. **Staff Establishment policy:** Clear Policy considering 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. Optimum number of faculty will be specified by the PM&DC.
- b. **Staff performance and conduct:** Develop clear statement regarding the responsibilities (job description) of faculty for teaching, research, patient care and code of academic conduct. Anti-harassment policy, maternity leaves, grievance policy, and others related to faculty and staff affairs 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.

3. Students:

- a. **Student induction policy-** Should match with the resources and number of students' intake.
- b. **Student selection criteria-** In accordance with the PM&DC guidelines
- c. **Student counseling and support-** The institution should provide students with accessible and confidential academic, social, psychological, and financial support services, as well as career guidance.

4. Quality Assurance:

To ensure the optimum delivery of 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 the HEC guidelines. Program must be evaluated by institutional quality assurance cell in coordination with University QEC who should be entrusted with responsibility to evaluate curriculum throughout the year to determine whether curriculum has succeeded in producing professionals with desired attributes.

5. Governance and Administration:

There shall be well-defined governance structure in place, indicating the responsibilities, roles, and authorities of individuals and bodies involved in overseeing and managing the program.

This includes the roles of academic leaders, administrators, faculty, students and other stakeholders in curriculum planning, resource allocation and management



TOTAL TEACHING HOURS FOR UNDERGRADUATE MEDICAL EDUCATION (MBBS) CURRICULUM

Preclinical and Para-clinical Sciences	= 2875
Clinical Sciences (Medicine and allied)	= 1700
Clinical Sciences (Surgery and allied)	= 1625
Grand Total: 2875+1700+1625	= 6200 Hours

Subject	Hours
Anatomy	500
Physiology	450
Medical Biochemistry	250
Pharmacology & Therapeutics	300
Pathology	500
Community Medicine and Public Health	200
Basics of Radiology	25
Research and EBM	100
Pakistan Studies/ Ideology and Pakistan Constitution	25
Islamiyat /Ethics for Non-Muslim	25
Quran Kareem	50
Introduction to Computer	25
Expository Writing	25
Leadership	25
Professionalism	25
Arts & Humanities (one course)	25
Communication Skills	25
Co-curricular activities	200
Forensic medicine and toxicology	100
Total	2875
SURGERY & ALLIED	
Subject	Hours
General Surgery	600
Anesthesia	50
Critical care	50
Orthopedics & Trauma	100
Any three of the sub-specialties:	
<ul style="list-style-type: none"> • Urology, Neurosurgery, Thoracic Surgery, Paediatric Surgery, Plastic Surgery, Vascular Surgery 	225 (75 hrs each)
Ophthalmology	150
Otorhinolaryngology	150
Gynaecology and Obstetrics	300
Total	1625

MEDICINE & ALLIED	
Subject	Hours
General Medicine	600
Psychiatry & Behavioral Sciences	150
Emergency medicine & Critical Care	25
Dermatology	50
Cardiology	50
Pulmonology	50
Nephrology	50
Gastroenterology	50
Medical Oncology	25
Patient Safety	25
Infection control	25
Family Medicine	75
Any three of sub-specialties: (For clinical rotations) Neurology, Endocrinology, Rheumatology, Geriatrics, Paediatric Cardiology	225 (75 each)
Paediatrics and Neonatology	300
Total	1700

Total = 6200 Contact hours

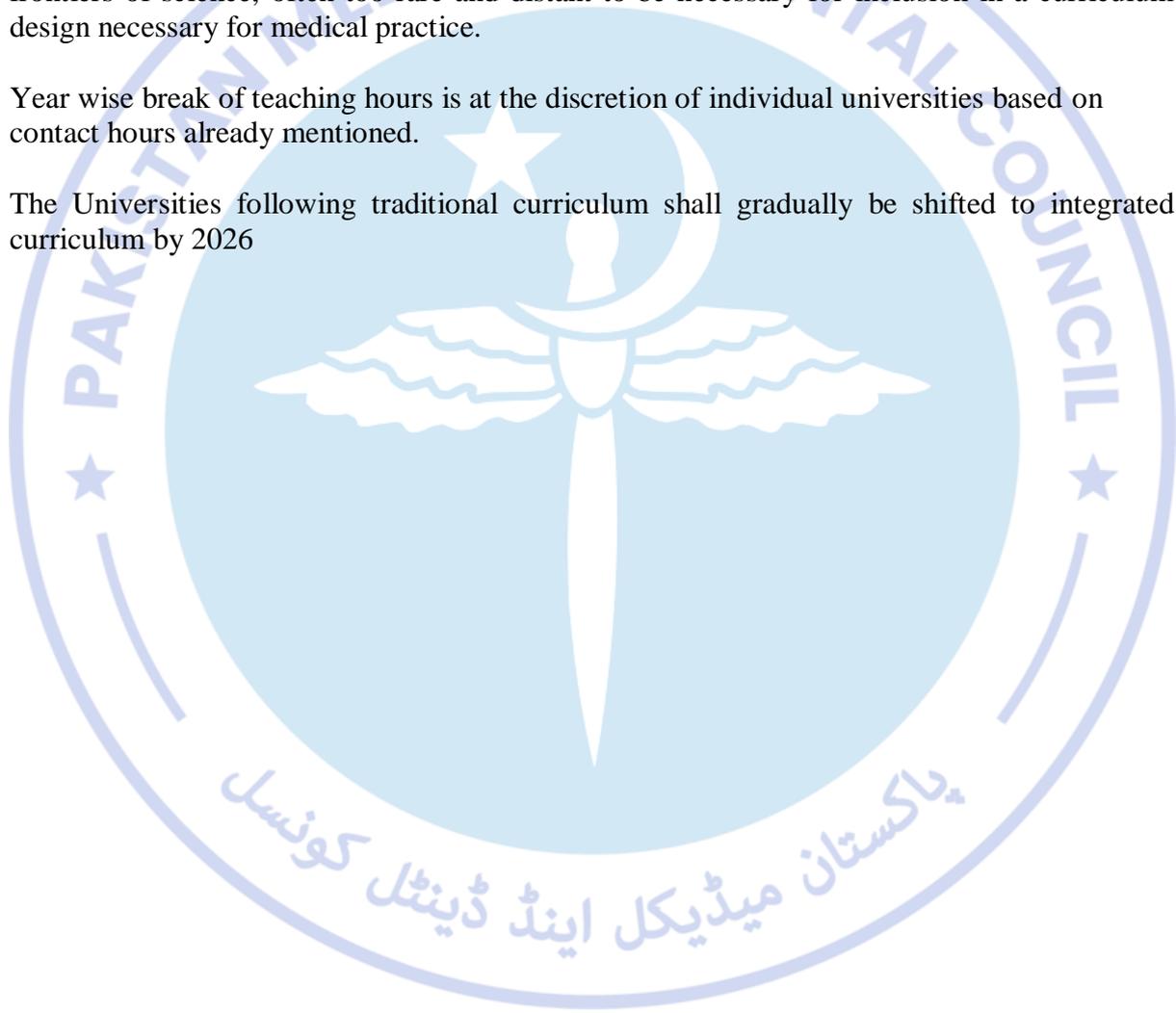
TRADITIONAL UNDERGRADUATE MEDICAL EDUCATION (MBBS) CURRICULUM

Introduction:

The traditional discipline-based curriculum is still being used in some medical schools across the globe, including Pakistan, some other Asian countries, and some Caribbean medical schools. Here students are not exposed to clinical education or patients until the third year of their medical program. During the first two years of their medical education, the curriculum is completely focused on basic sciences. The first 2 years are frequently taught in a didactic, discipline-based format. The traditional curriculum tends to be a mixture of the wishes of the various participating faculties, occasionally with content bordering on the rare and distant frontiers of science, often too rare and distant to be necessary for inclusion in a curriculum design necessary for medical practice.

Year wise break of teaching hours is at the discretion of individual universities based on contact hours already mentioned.

The Universities following traditional curriculum shall gradually be shifted to integrated curriculum by 2026



STRATEGIES FOR TRADITIONAL CURRICULUM

a. Basic Health Sciences

Theory:

- Large group sessions (Lectures)
- Demonstrations
- Tutorials
- Directed Self Learning

Practical:

- Laboratory & Skill lab sessions

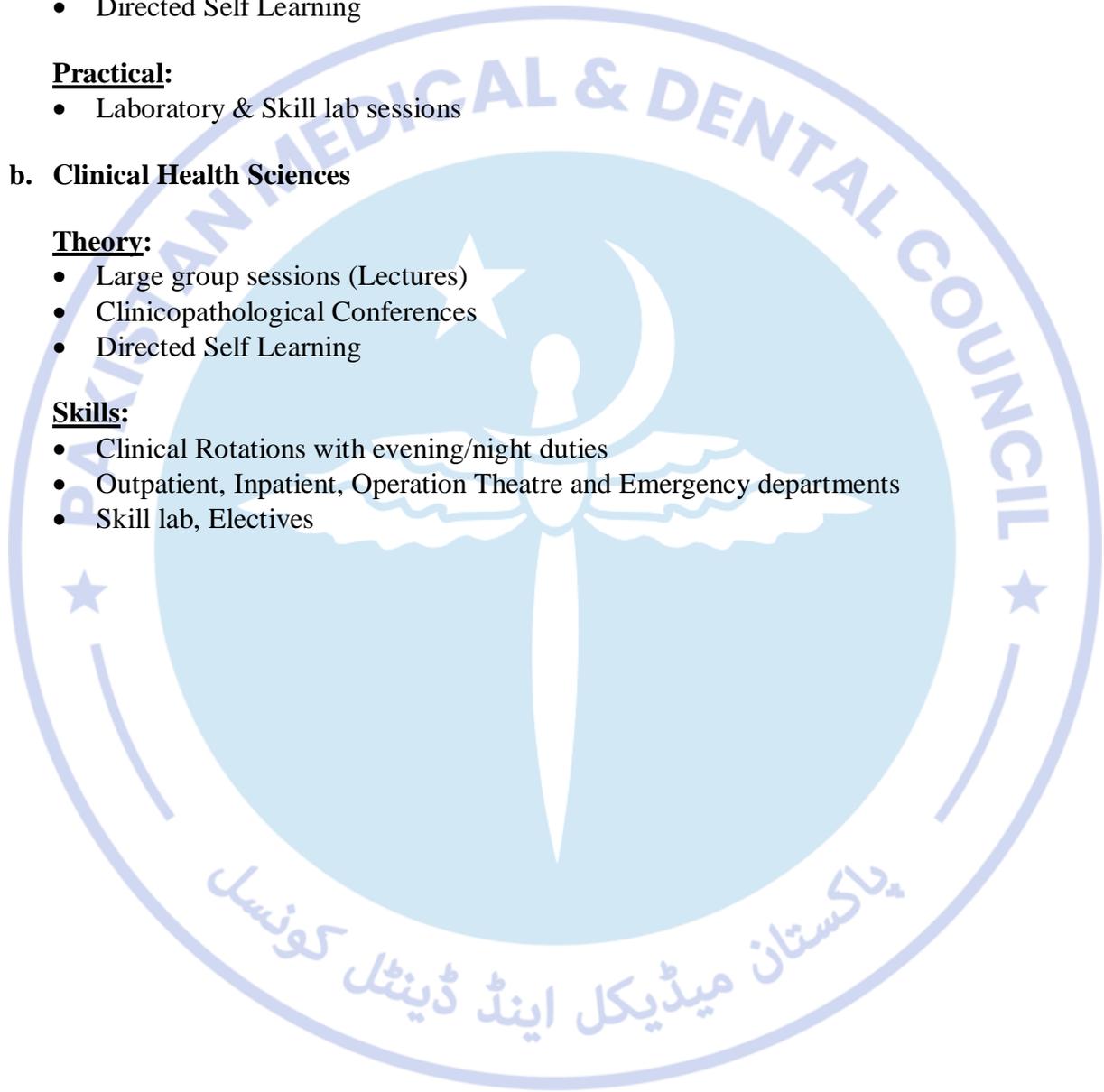
b. Clinical Health Sciences

Theory:

- Large group sessions (Lectures)
- Clinicopathological Conferences
- Directed Self Learning

Skills:

- Clinical Rotations with evening/night duties
- Outpatient, Inpatient, Operation Theatre and Emergency departments
- Skill lab, Electives



PROPOSED ASSESSMENT METHODOLOGIES FOR TRADITIONAL CURRICULUM

a. Discipline/subject based

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

b. Theory

- MCQs & SEQs/ SAQs (weightage of each tool shall be mentioned in the assessment blueprint as decided by the University)

c. Practical

- Discipline based practicals & viva
- OSCE, Long & short case for clinical subjects

INTERNAL ASSESSMENT

THEORY

S. No.	Scoring Parameter	Marks out of 20%
1.	Attendance in lectures $\geq 95\% = 02\%$, 90- 94% = 01%	02 %
2.	Block Exam	06 %
3.	Pre-Prof. Exam	07 %
6.	Continuous Assessment (Average Score of MCQs attempted after every learning session)	05 %

PRACTICAL AND BEHAVIORAL ASSESSMENT

S. No	Scoring Parameter	Marks out of 20%
1.	Attendance in practicals & clinical work $\geq 95\% = 02\%$, 90- 94% = 01%	02 %
2.	Practical books/Logbooks	02 %
3.	*Continuous Assessment (Average Score of OSPEs/OSCEs attempted after every learning session)	05 %
4.	Summative Assessment (Pre Prof)	07 %
6.	Discipline/Attitude, Responsibility and Teamwork	04 %

*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.

INTEGRATED UNDERGRADUATE MEDICAL (MBBS) CURRICULUM

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. 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.

A good integrated medical curriculum like any other, is community based and clearly keeps the service in mind. It relates to local norms and must be acceptable to the teachers and the students. Its contemporaneous nature denotes that it is a dynamic document, having built-in mechanisms for implementation and evaluation.

- Each university can decide the level of integration as per the context of its constituent and affiliated institutes. However, minimum level of integration shall be at level 7 i.e. Correlation.



STRATEGIES FOR INTEGRATED CURRICULUM

Teaching in integrated curriculum is based on themes/ module which unite different disciplines by blurring their boundaries. This allows 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. Following tools may be 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
- Clinico-pathological conferences
- Symposiums
- Webinars
- Directed Self Learning
- 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

PROPOSED ASSESSMENT METHODOLOGIES FOR INTEGRATED CURRICULUM

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)

OVERVIEW

Assessing the learner is the most important and difficult task for the tutor as students may be able to walk away from not up to mark teaching, but they cannot avoid misaligned/bad assessment.

Assessment importance is not only for student but also for tutor, course/ syllabi organizers, accrediting body (affiliated university/PM&DC). Assessment scores lead to important decisions effecting whether student has achieved the prescribed learning outcomes, appropriate level of mastery to be able to move onto the next level of their course/ programme and on completion competent enough to practice as a doctor.

As the integrated curriculum is 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 student with feedback to enhance and improve his learning respectively. Knowledge, skill, and attitude learned during the module will need separate tools for assessment.

INTEGRATIVE ASSESSMENT:

Integrated curriculum must be aligned with integrative assessment policies as it is a key and integral part of curricular development.

Assessment drives learning and requires a process such as following questions:

- 1 Why assess the students?
- 2 Who should assess the students?
- 3 What should be assessed?
- 4 How should the students be assessed?
- 5 When should the students be assessed?
- 6 Where should the students be assessed?

1. WHO SHOULD ASSESS THE STUDENTS?

The stakeholders include programme advisors/organizers, accrediting bodies, affiliated university, enrolled college, tutors and students themselves.

PM&DC will oversee the assessment process to be implemented by the medical & dental universities in their affiliated colleges.

2. WHY ASSESS THE STUDENTS?

The purpose of assessment has to be clear as in internal (enrolled college) and external (affiliated university professional examinations) assessments. These will differ in internal being more formative, providing feedback continually as to the progress of the student.

External will be decisive as to promotion for next level of the programme with students having achieved satisfactorily the learning outcomes/course objectives.

3. WHAT SHOULD BE ASSESSED?

The integrative 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. Assessment is a compromised process therefore only if assessments are spread over the whole academic year will all content be assessed.

4. HOW THE STUDENTS SHOULD BE ASSESSED?

Integrative assessment fosters a wide variety of tools which can be incorporated to assess students. The selected assessing tools must be employed as is appropriate in the way it is to be used. 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 the student learning.
- e. Amenable to appropriate standard setting method.

5. WHEN SHOULD THE STUDENTS BE ASSESSED?

- a. The University may provide a template of the “Module/ Block or Clinical Rotation Assessment Map” in the assessment procedure document.
- b. Each University will develop an Assessment Blueprint”, which will include information on the methods, timing, and relative contribution to the final mark of all summative assessments.
- c. Criteria for passing and remediation must be specified by the university.
- d. The final assessment by universities must be within timelines by the accrediting body.

6. WHERE SHOULD THE STUDENTS BE ASSESSED?

Internal and external assessments must employ written papers / practicals in proper examination halls, labs, and formal clinical examinations in hospital wards.

These tools should assess higher levels 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 learned by student. Tools of assessment which can be used for integrated curriculum are as following.

1. Cognitive domain:

- 1.1 Multiple Choice Questions (MCQs)
- 1.2 Extended Matching Questions (EMQs)
- 1.3 Structured Answer Questions (SAQs)
- 1.4 Structured Essay questions (SEQs)
- 1.5 Long Answer Question
- 1.6 Oral Examination

2. Psychomotor domain:

2.1 Formative assessment: (Low to Medium Stake)

- 2.1.1 OSPE (Objective Structured Practical Examination)
- 2.1.2 Mini-Clinical Evaluation Exercise (Mini-CEX)
- 2.1.3 Surgical DOPS (Directly Observed Procedural Skills)
- 2.1.4 Case Based Discussion

2.2 Summative Exam: (High Stake)

- 2.2.1 MCQs (Few skills can be assessed)
- 2.2.2 Objective Structured Clinical Examination (OSCE)
- 2.2.3 Practical examination.
- 2.2.4 Direct Observation of clinical skills
- 2.2.5. Long case
- 2.2.6. Short case

3. Affective domain: (Behavior)

The following tools can assess behaviors, communication skills, Ethical practice and professionalism.

- 3.1 Interviews
- 3.2 Direct observation of communication skill and behavior
- 3.3 OSPE/OSCE
- 3.4 Portfolios
- 3.5 Reflections
- 3.6 360 degree feedback

INTERNAL ASSESSMENT **THEORY**

S. No.	Scoring Parameter	Marks out of 20%
1.	Attendance in lectures $\geq 95\% = 10$, 90- 94% = 9	02 %
2.	Block Exam	05 %
3.	Pre-Prof. Exam	10 %
6.	Continuous Assessment (Average Score of MCQs attempted after every learning session)	03 %

PRACTICAL AND BEHAVIORAL ASSESSMENT

S. No	Scoring Parameter	Marks out of 20%
1.	Attendance in practicals & clinical work ≥ 95 % = 10, 90- 94% = 9	02 %
2.	Practical books/Logbooks	02 %
3.	*Continuous Assessment (Average Score of OSPEs/OSCEs attempted after every learning session)	03 %
4.	Summative Assessment (Pre Prof)	10 %
6.	Discipline/Attitude, Responsibility and Teamwork	03 %

*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.



COMPETENCIES REQUIRED IN A DOCTOR TO BE ACHIEVED AT UNDERGRADUATE LEVEL

A. PATIENT ASSESSMENT

S. No.	Procedure	Description	Level of competence
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
2.	Carry out general and systemic examination abdominal, chest, nervous system, CVS, vascular, breast lump, neck and thyroid ,(all wards)	Systemic approach in clinical examination Complete All steps of examination and document appropriately	Safe to practice under indirect supervision
3.	Ophthalmoscopy- Eye ward rotation	Perform basic ophthalmoscopy and identify common abnormalities	Safe to practice under indirect supervision
4.	Otoscopy- ENT Ward	Perform basic otoscopy and identify common abnormalities	Safe to practice under indirect supervision
5.	Obstetric & Gynaecological wards	Perform Obstetric & Gynaecological examination	Safe to practice under indirect supervision
6.	Taking informed consent		Safe to practice under indirect supervision
7.	Preoperative counselling		Safe to practice under indirect supervision

B. PROCEDURAL SKILLS

S. No.	Procedure	Description	Level of competence
8.	Blood sampling	Take samples of venous blood to test for the growth of infectious organisms in proper culture bottles	Safe to practice under direct supervision
9.	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

10.	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
11.	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
12.	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
13.	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
14.	Take and/or instruct patients how to take a swab	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
15.	Carry out Urinary Bladder Catheterization	Insertion of a catheter tube through the urethra and into the bladder to drain urine.	Safe to practice under indirect supervision
13.	Nebulization	Follow the directions for the specific brand of nebulizer machine and cup	Safe to practice under indirect supervision
16.	Carry out removal of surgical drains	Firmly grasp drainage tube close to skin with dominant hand, and with a swift and steady motion withdraw the drain and place it on the waterproof drape/pad (other hand should stabilize skin with 4 x 4 sterile gauze around drain site).	Safe to practice under direct supervision
17.	Removal of sutures	Remove sutures by following aseptic techniques	Safe to practice under direct supervision
18.	Application of POP	Apply the POP on top of the cotton wool padding from distal to proximal, without applying tension to the roll, overlapping each layer by 50%.	Safe to practice under direct supervision
19.	Take HVS	To test vaginal discharge for the presence of vaginal thrush, bacterial vaginosis and trichomonas vaginalis.	Safe to practice under direct supervision

		Carried out in clean conditions, using a speculum to look at the cervix and vagina.	
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C. PATIENT CARE

S. No.	Procedure	Description	Level of competence
20.	Perform surgical scrubbing up	Follow approved processes for cleaning hands and wearing appropriate personal protective equipment before procedures or surgical operations	Safe to practice under direct supervision
21.	Set up an infusion	Set up run through and intravenous infusion. Have awareness of the different equipment and devices used.	Safe to practice under direct supervision
22.	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
23.	Positioning for breast feeding	Should be able to direct patient on positioning of breast feeding	Safe to practice under indirect supervision
24.	Performing CTG and its interpretation		Safe to practice under direct supervision

D. PRESCRIBING

S. No.	Procedure	Description	Level of competence
25.	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 direct supervision
26.	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. Knows the exact volume given per Minute	Safe to practice under direct supervision
27.	Prepare and administer injectable (intramuscular, subcutaneous, intravenous) drugs	Prepare and administer injectable drugs and prefilled syringes Knows about various channels of CVP	Safe to practice under direct supervision
28.	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
29.	Interpretation of x-rays of chest, abdomen and pelvis	should be able to identify rib fractures, hemothorax, pneumothorax, free air under diaphragm, pelvic fractures	safe to practice under direct supervision

E. THERAPEUTIC PROCEDURES

S. No.	Procedure	Description	Level of competence
30.	Carry out intravenous cannulation	Insert a cannula into a patient's vein and apply an appropriate dressing.	Safe to practice under direct supervision
31.	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 Supervision
32.	Carry out male and female urinary catheterization	Insert a urethral catheter in both male and female patients. Should know its complications and Management	Safe to practice under direct supervision
33.	Carry out wound care and basic wound closure and dressing	Provide basic care of surgical or traumatic wounds and apply dressing appropriately.	Safe to practice under direct supervision
34.	Carry out nasogastric tube placement	Pass a tube into the stomach through the nose and throat for feeding and administering drugs or draining the	Safe to practice simulation

		stomach's contents. Should know how to ensure correct placement.	
35.	Use local anesthetics	Inject or topically apply a local anesthetic. Understand maximum doses of local anesthetic agents.	Safe to practice under direct supervision
36.	Apply splint for fractures	Can apply routine splints for fractures like Thomas, - Neck of femur	Safe to practice under direct supervision
37.	Measure CVP (central venous pressure)	should be able to measure, interpret and monitor central venous pressure readings	safe to practice under direct supervision
38.	Should be able to perform essential lifesaving procedure (BLS)	(tracheostomy, endotracheal intubation and chest intubation. Should be competent at Basic Life Support)	safe to practice under direct supervision
39.	Digital rectal examination and Proctoscopy	Should know common causes of bleeding per rectum and common perianal diseases and be able to diagnose them by means of digital rectal examination and proctoscopy.	safe to practice under direct supervision
40.	Nutritional assessment	Calculate BMI, carry out nutritional assessment of patients and guide them according to their caloric requirements	safe to practice under direct supervision

ANNEXURE - 1
UNDERGRADUATE MEDICAL EDUCATION (MBBS) SYLLABUS

ANATOMY

DEVELOPMENTAL ANATOMY

1.0 Development of the Nervous system

- a. Congenital anomalies of brain and spinal cord
- b. Neural tube defects
- c. Hypophyseal defects

1.1 Development of Head and Neck

- a. Ectopic thymus and parathyroid tissue
- b. Branchial fistulas, Brachial sinuses, cysts and fistulas
- c. 1st arch syndrome (Treacher Collins syndrome, Pierre Robin Syndrome)
- d. Neural crest cells and craniofacial defects
- e. Tongue-Tie, macro and micro-glossia and bifid tongue
- f. Thyroglossal duct and Congenital thyroid abnormalities (congenital hypothyroidism, accessory thyroid and thyroidal agenesis)
- g. Facial clefts (facial and palatal clefts, including anterior and posterior clefts of lips and palates)
- h. Developmental anomalies of nasolacrimal duct
- i. Tooth abnormalities
- j. Deafness and external ear abnormalities
- k. Eye abnormalities (Colobomas, congenital cataracts, cyclopia)

1.2 Development of Digestive & Urogenital System

- a. Esophageal abnormalities (Esophageal atresia, tracheoesophageal fistulas)
- b. Stomach abnormalities (Pyloric stenosis)
- c. Liver and gall bladder abnormalities (Accessory hepatic ducts and duplication of the gallbladder, extrahepatic biliary atresia, intrahepatic biliary duct atresia and hypoplasia)
- d. Pancreatic abnormalities (Annular pancreas and accessory pancreatic)
- e. Abnormalities of mesenteries
- f. Body wall defects (Umbilical Hernia, Gastroschisis, Omphalocele)
- g. Gut rotation defects
- h. Gut atresia and stenosis
- i. Hindgut Abnormalities (Recto anal atresia, and fistulas, imperforate anus, congenital megacolon)
- j. Renal tumors and congenital defects (renal cystic disease, accessory kidney, malrotation, renal agenesis)
- k. Abnormal location of the kidneys
- l. Urinary bladder defects
- m. Uterine and vaginal Defects
- n. Defects of male Internal and external genitalia
- o. Defects in sex differentiation
- p. Hernias and cryptorchism
- q. Diaphragmatic hernias

1.3 Development of Musculoskeletal system

- a. Craniofacial defects and skeletal dysplasias
- b. Limb defects (Meromelia, phocomelia, amelia, micromelia, polydactyly, ectrodactyly, syndactyly)
- c. Cleft hand and foot
- d. Clubfoot
- e. Congenital absence or deficiency of the radius
- f. Amniotic bands
- g. Congenital hip dislocation
- h. Vertebral defects

1.4 Development of Cardiovascular system

- a. Abnormalities of cardiac looping
- b. Endocardial cushions and heart defects
- c. Atrial septal and ventricular septal defects
- d. Ectopia cordis & Dextrocardia
- e. Arterial and venous system defects

1.5 Development of Respiratory system

- a. Tracheoesophageal fistulas, tracheal stenosis and atresia
- b. Respiratory distress syndrome
- c. Congenital cysts of the lung

1.6 Development of Integumentary system

- a. Keratinization of the skin & Disorders of Keratinization
- b. Hypertrichosis
- c. Polythelia, polymastia and inverted nipples

1.7 General Embryology

- a. Genetic disorders
- b. Infertility
- c. Ectopic pregnancy
- d. Twinning
- e. Placental abnormalities
- f. Abortion
- g. Anomalies of orogenesis and fetal period
- h. Artificial insemination and In Vitro Fertilization

2. NEUROANATOMY

2.0 Organization of Nervous system

- a. 7 Spinal Cord Injuries at different spinal levels
- b. Spinal Nerve Injuries (Disease and the intervertebral foramina)
- c. Herniated Intervertebral Discs
- d. Spinal Tap
- e. Caudal Anesthesia
- f. Intracranial Hemorrhage (Epidural, subdural, subarachnoid, cerebral)
- g. The Shaken-Baby Syndrome

2.1 Spinal cord Lesions

- a. Injury to the Ascending Tracts Within the Spinal Cord
- b. Upper Motor Neuron Lesions
- c. Lower Motor Neuron Lesions
- d. Types of Paralysis
- e. Spinal Shock Syndrome
- f. Complete Cord Transection Syndrome
- g. Brown-Séquard Syndrome or Hemi-section of the Cord
- h. Syringomyelia
- i. Poliomyelitis
- j. Multiple Sclerosis
- k. Amyotrophic Lateral Sclerosis

2.2 Brain stem lesions

- a. Arnold-Chiari Phenomenon
- b. Vascular Disorders of the Medulla Oblongata (Lateral and medial medullary syndromes)
- c. Tumors of the Pons
- d. Pontine Hemorrhage
- e. Midbrain Trauma
- f. Infarctions of the Pons
- g. Blockage of the Cerebral Aqueduct
- h. Vascular Lesions of the Midbrain

2.3 Cerebellar diseases

- a. Signs and Symptoms of Cerebellar Disease
- b. Cerebellar Syndromes

2.4 Cerebral diseases

- a. Lesions of the Internal Capsule
- b. Lesions of motor and sensory cortex of cerebrum
- c. Epilepsy

2.5 Diseases of basal ganglia

- a. Chorea
- b. Huntington's Disease
- c. Sydenham Chorea,
- d. Hemiballismus
- e. Parkinson Disease
- f. Athetosis

2.6 Cranial nerve lesions

- a. Signs and symptoms of cranial nerve lesions

2.7 Lesions of the Thalamus

- a. Sensory loss
- b. Thalamic Pain
- c. Thalamic Hand

2.8 Clinical Disorders Associated with Hypothalamic Lesions

- a. Obesity and Wasting

- b. Sexual Disorders
- c. Hyperthermia and Hypothermia
- d. Diabetes Insipidus
- e. Disturbances of Sleep
- f. Emotional Disorders

2.9 Diseases Involving the Autonomic Nervous System

- a. Diabetes Mellitus
- b. Horner Syndrome
- c. Argyll Robertson Pupil
- d. Hirschsprung's Disease and other common autonomic disorders
- e. Autonomic Reflex bladder

2.10 Diseases involving meninges

- a. Meningitis
- b. Intracranial Hemorrhages

2.11 Diseases involving ventricular system

- a. Hydrocephalus
- b. Brain Trauma and the Blood-Brain Barrier
- c. Drugs and the Blood-Brain Barrier

3. REGIONAL ANATOMY

3.1 Upper limb

- a. Fractures of Clavicle, Humerus, Radius, Ulna, Scaphoid & Hamate
- b. Injuries to Brachial Plexus, Cords & branches of brachial plexus, Axillary, Musculocutaneous, Radial, Median & Ulnar nerves
- c. Dupuytren's Contracture, Hand infections & palmar wounds with surgical incisions
- d. Dislocation of sternoclavicular, shoulder, acromioclavicular, elbow, radioulnar & wrist joints
- e. Rotator Cuff injuries, Frozen shoulder & Calcific Supraspinatus Tendinitis
- f. Use of vessels for cannulation & coronary angiography

3.2 Lower limb

- a. Fractures of Hip Bone, Femur, Tibia, Fibula, Calcaneum & Talus
- b. Neurological Examination of leg
- c. Varicose veins, Cannulation & lacerations of Femoral artery, Saphenous cutdown,
- d. Femoral Hernias, Groin & Hamstring injuries, Calcanean Tendinitis, rupture & bursitis,
- e. Injuries to Femoral, Sciatic, Superior Gluteal, Inferior Gluteal, Tibial & Common Fibular nerves, Planter nerves morton's neuroma
- f. Dislocation of hip joint, Patella, Hip & Knee joint replacement, Bursitis in knee region, Pes Planus & Clubfoot

3.3 Abdomen and pelvis

- a. Abdominal & Inguinal Hernias, Laparoscopic surgery, Abdominal incisions, Hydrocele, Hematocoele, Varicocele & Carcinoma of Testes & Scrotum
- b. Peritonitis & Ascites, Peritoneal Adhesions, Paracentesis, Intraperitoneal injections & spread of pathological fluids in various peritoneal compartments with their surgical approach
- c. Esophageal varices, Hiatal Hernia, gastroesophageal reflux, Barret Esophagus, Pyloric Stenosis, Gastric & Peptic ulcers, Carcinoma Stomach, applied endoscopy, barium swallow
- d. Portal systemic venous anastomosis sites & their clinical significance
- e. Visceral referred pains, Duodenal ulcers, Appendicitis, Meckel's Diverticulum, Colonoscopy, Diverticulosis & volvulus, applied Barium meal
- f. Rupture of Spleen & Splenectomy, Splenic needle biopsy
- g. 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
- h. Vasculature of abdomen: Abdominal aortic aneurysm (stent or graft), Abdominal lymph node surgery, chronic thrombosis of inferior vena cava
- i. Perinephric abscesses, Renal & Ureteric calculi with referred pain & Renal Transplantation
- j. Diaphragm & referred pain, Injury to Phrenic nerve, Aortic Aneurysm, Psoas Abscess & Diaphragmatic Hernia
- k. Pelvic fractures & variations of male & female pelvic girdles, Pelvimetry, bone marrow biopsy, sacroiliac joint involvement
- l. Cystoscopy, Rupture of male & female urethra, Catheterizations (supra pubic and urethral), bladder cancer
- m. Benign Prostatic Hyperplasia, prostatic Cancer, vasectomy
- n. Hysterosalpingography, Tubal ligation, Ectopic Pregnancy, Uterine Prolapse, Hysterectomy, Carcinoma of uterus, cervix & ovaries, vaginal fistulae, Culdoscopy & Culdocentesis
- o. Disruption of Perineal Body, Episiotomy, Cystocele & Rectocele, Bartholin Abscesses & Cysts
- p. Rectal examination, Anal Fissures & Perianal Abscesses, Hemorrhoids, Anorectal incontinence
- q. Pudendal block
- r. Disc prolapse

3.4 Head and neck

- a. Head injuries (fractures and vascular) & intracranial hemorrhages, Fracture of Mandible,
- b. Scalp injuries & infections,
- c. Facial lacerations & incisions, Facial Palsy, Trigeminal neuralgia
- d. Pulsations of arteries in face & scalp, Compression of Facial artery, Carcinoma of lips
- e. Orbital tumors & fractures, injury to nerves supplying Eyelids & extraocular muscles, Retinal detachment, Presbyopia, Cataract, Glaucoma, Corneal ulcers & transplants, Horner's Syndrome

- f. Infection of Parotid gland , tumor of parotid gland and parotid gland stone, Mandibular & Inferior alveolar nerve block, Dislocation of Temporomandibular joint
- g. Horner syndrome
- h. Cleft lip & palate, lingual carcinoma
- i. Deflected Nasal Septum, Epistaxis, Sinusitis
- j. Acute otitis externa & media, Tympanic membrane perforations, Mastoiditis, Motion Sickness, Hearing loss, Meniere Syndrome, Blockage of Pharyngotympanic tube
- k. Torticollis, Right cardiac catheterization, Surgical dissection of carotid triangle
- l. 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
- m. Cranial nerves injuries

3.5 Thorax

- a. Fractures of Sternum, Ribs & Vertebrae, cervical rib
- b. Sternal angle, anatomical changes at this landmark. Divisions, contents & significance of mediastinum
- c. Flail Chest, Thoracotomy, Supernumerary ribs, Sternal biopsy, Thoracic outlet syndrome, Dislocation of ribs, Paralysis of diaphragm
- d. Intercostal nerve block, Thoracocentesis
- e. 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
- f. Surgical significance of Transverse Pericardial Sinus, Pericarditis, Pericardial rub & Pericardial effusion, Cardiac Tamponade, Pericardiocentesis
- g. 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
- h. Central venous line.

PHYSIOLOGY

1. **Homeostasis:**

- a. Control systems in the body
- b. Intercellular Connections
- c. Cell organelles
- d. Membrane transport including active transport, passive transport,
- e. simple and facilitated diffusion
- f. Importance of selectively permeable membranes, osmosis and
- g. Osmotic pressure, surface tension, viscosity also in relation to body fluids
- h. Clinical concepts regarding osmolarity of body fluids
- i. Body immune system and its regulation

1.1 Clinical/Applied Concepts

- a. Failure of homeostasis (Illness)
- b. Abnormalities of the cell and its organelles (apoptosis, mutation, cancer and aging)

2. **Blood:**

- a. Composition and functions
- b. Plasma proteins: albumin, globulin fibrinogen, and their functions
- c. Hemoglobin and blood indices, iron metabolism, fate of hemoglobin.
- d. White blood cells, Leucopoiesis, functions
- e. Platelets
- f. Haemostasis, clotting factors, anticoagulants
- g. Blood groups, Blood transfusion and complications
- h. Reticuloendothelial system – Spleen

2.1 Clinical/Applied Concepts

- a. Anemia and its types, polycythemia
- b. Blood indices in various disorders Thalassemia
- c. Leucopenia, Leucocytosis, leukemia, AIDS, allergy, vaccination
- d. Thrombocytopenia
- e. Clotting disorders (Hemophilia etc.)
- f. Blood grouping/cross matching and significance
- g. Effect of anemia on cardiac output and on the CVS

3. **Nerve and muscle:**

- a. Properties of nerve fibers
- b. Physiology of action potential including compound action potentials
- c. Conduction of nerve impulse, nerve degeneration and regeneration Synapses
- d. Types of muscle, functions
- e. Skeletal muscle contraction
- f. Isometric and isotonic contraction
- g. Smooth muscle and its function
- h. Smooth muscle contraction
- i. Neuromuscular junction

- j. Excitation-contraction coupling
- k. Motor unit
- l. Neuromuscular junction blockers

3.1 Clinical/Applied Concepts

- a. Nerve conduction studies
- b. Electromyograms (EMG)
- c. Nerve injury
- d. Rigor mortis and contractures
- e. Myasthenia gravis
- f. Myopathies/Neuropathies

4. Cardiovascular system:

- a. Properties of cardiac muscle
- b. Action potential in atrial and ventricular muscle and pace-maker potential
- c. Artificial pacemaker
- d. Cardiac impulse- origin and propagation
- e. Cardiac cycle Regulation of cardiac functions
- f. ECG-recording and interpretation
- g. Arrhythmias- mechanism of development
- h. Functional types of blood vessels
- i. Hemodynamics of blood flow
- j. Local control of blood flow
- k. Systemic circulation - basic principles/characteristics and control
- l. Cardiac output (regulation/measurement) peripheral resistance and its regulation
- m. Arterial pulse
- n. Arterial blood pressure (short/long term regulation)
- o. Heart sounds/murmurs
- p. Venous return and its regulation
- q. Coronary circulation
- r. Splanchnic circulation
- s. Cerebral circulation
- t. Cutaneous circulation- Triple response
- u. Fetal circulation and readjustments at birth
- v. Cardiovascular changes during exercise

4.1 Clinical/Applied Concepts

- a. Blood pressure monitoring
- b. Correlation of cardiac cycle with Electrocardiogram (ECG) and heart sounds
Echocardiogram
- c. Significance of apex beat / abnormalities
- d. ECG interpretation in cardiac muscle abnormalities and cardiac arrhythmias
- e. Flutter, fibrillation, ectopic beats
- f. Conduction defects
- g. Radial/other pulses
- h. Hypertension, types and effects
- i. Clinical evaluation of heart sounds and murmurs
- j. Jugular venous pulse
- k. Ischemic heart disease
- l. Cerebrovascular accidents

m. Types of heart failure and circulatory shock

5. Respiratory system:

- a. Functions of lungs (respiratory and non-respiratory)
- b. Mechanics of breathing, pulmonary pressure changes
- c. Surfactant and compliance
- d. Protective reflexes
- e. Lung volumes and capacities
- f. Dead spaces
- g. Diffusion of gases (gas laws, composition)
- h. Pulmonary Circulation Ventilation / perfusion
- i. Transport of O₂ in blood O₂/CO₂ disassociation curves
- j. Transport of CO₂ in blood
- k. Regulation of respiration (nervous/chemical)
- l. Abnormal breathing
- m. Hypoxia-types and effects
- n. Physiology of cyanosis
- o. Physiology of high altitude, space, deep sea diving
- p. Oxygen debt
- q. Respiratory changes during exercise

5.1 Clinical/Applied Concepts

- a. Types of respiration (intrapleural pressure, pneumothorax, effusion)
- b. Atelectasis
- c. Lung function tests (Spirometry)
- d. Sneezing, yawning, cough
- e. Obstructive / Restrictive lung disease (FEV₁/FVC)
- f. Abnormal Ventilation / Perfusion
- g. Respiratory failure: Types I & II
- h. Asphyxia
- i. Hypoxia, cyanosis, dyspnea, hypo- and hypercapnia
- j. Artificial respiration
- k. Oxygen therapy and its toxicity
- l. Caisson's disease, Acute Mountain Sickness

6. Body fluids and kidneys:

- a. Compartments of body fluids and measurement
- b. Tissue and lymph fluids
- c. Fluid excess / depletion
- d. General functions of kidney
- e. GFR-factors regulating it
- f. Formation of urine, filtration, reabsorption, secretion
- g. Plasma clearance
- h. Concentration and dilution of urine
- i. Electrolyte balance
- j. Water balance
- k. Regulation of blood pressure by kidneys
- l. Hormones of kidneys
- m. Acidification of urine
- n. Acid-Base balance

- o. Micturition

6.1 Clinical/Applied Concepts

- a. Renal function tests
- b. Renal failure/uremia
- c. Nephrotic syndrome
- d. Dialysis: Artificial kidney/hemodialysis/ peritoneal dialysis
- e. Metabolic acidosis/alkalosis
- f. Abnormalities of micturition including incontinence

7. Gastrointestinal Tract (GIT):

- a. Enteric nervous system (gut, brain)
- b. Mastication, swallowing and their control
- c. Functions and movements of stomach
- d. Functions of pancreas
- e. Functions and movements of small intestine
- f. Functions and movements of large intestine
- g. Hormones of GIT
- h. Vomiting and its pathway
- i. Defecation and its pathway
- j. Regulation of feeding and energy Expenditure
- k. Functions of liver/gall bladder

7.1 Clinical/Applied Concepts

- a. Dysphagia, achalasia of esophagus
- b. Examination of abdomen in acute and chronic pain
- c. Gastric function tests
- d. Vomiting and its effects
- e. Diarrhea, constipation
- f. Jaundice, liver functions tests and their interpretation

8. Nervous system

- a. Organization of nervous system
- b. Classification of nerve fibers
- c. Properties of synaptic transmission
- d. Neurotransmitters and neuropeptides
- e. Types and function of sensory receptors
- f. Functions of spinal cord and tracts
- g. Reflex action/reflexes
- h. Muscle spindle/muscle tone
- i. Tactile, temperature and pain sensations
- j. Sensory Cortex
- k. Motor Cortex
- l. Motor pathways (pyramidal and extra pyramidal)
- m. Basal ganglia, connections and functions
- n. Cerebellum, connections and functions
- o. Vestibular apparatus/regulation of posture and equilibrium
- p. State of brain activity Reticular formation
- q. Physiology of sleep
- r. Electroencephalogram (EEG) Physiology of memory

- s. Physiology of speech
- t. Thalamus- nuclei and functions
- u. Hypothalamus and limbic system
- v. Cerebrospinal fluid
- w. Regulation of body temperature
- x. Memory & learning
- y. Autonomic nervous system

8.1 Clinical/Applied Concepts

- a. Significance of dermatomes
- b. Receptors and neurotransmitters (applied aspect)
- c. Interpretation of reflexes
- d. Injuries and diseases of spinal cord, analgesia system
- e. Disorders of cranial nerves
- f. Hemiplegia / paraplegia, Upper and lower motor neuron lesions:
- g. features and localization
- h. Parkinsonism and other lesions of basal ganglia
- i. Cerebellar disorders
- j. Postural disorders
- k. Epilepsy
- l. Sleep disorders
- m. Higher mental function assessment
- n. Alzheimer's disease
- o. Abnormalities of speech
- p. Thalamic syndrome
- q. Lesion of hypothalamus
- r. Hydrocephalous
- s. Heat Stroke
- t. Tetanization, tetany, tetanus and Treppe

9. Special senses:

- a. Physiological structure and functions of eyeball
- b. Principles of optics
- c. Accommodation of eye
- d. Visual acuity
- e. Photochemistry of vision
- f. Colour vision
- g. Dark and light adaptation Neural function of retina
- h. Visual pathway, light reflex and pathway Visual cortex
- i. Eye movements and control
- j. Physiological anatomy of cochlea
- k. Functions of external and middle ear
- l. Functions of inner ear- organ of Corti
- m. Auditory pathway
- n. Physiology of smell - receptors and pathway
- o. Physiology of taste
- p. Olfaction/taste abnormalities

9.1 Clinical/Applied Concepts

- a. Glaucoma, Cataract

- b. Errors of refraction
- c. Colour blindness, Fundoscopy
- d. Field of vision and lesions of visual pathway, visual evoked potentials and electroretinogram
- e. Rinne's and Weber's tests
- f. Hearing test audiometry, types of deafness, auditory evoked potentials (Endocochlear potential, with reference to Meniere's disease)
- g. Disorders of taste and smell e.g. taste blindness, Aguesia, Anosmia, Hyperosmia etc

10. Endocrinology:

- a. General principles (classification, mechanism of action, feedback control)
- b. Physiology of growth
- c. Biosynthesis, transport, metabolism, actions and control of secretion of hormones of:
 - 1) Hypothalamus
 - 2) Anterior pituitary
 - 3) Posterior pituitary
 - 4) Thyroid gland
 - 5) Parathyroid, calcitonin and calcitriol
 - 6) Adrenal cortex & medulla
 - 7) Pancreas
 - 8) GIT
 - 9) Pineal gland
 - 10) Thymus
 - 11) Kidney

10.1 Clinical/Applied Concepts

- a. Hormonal assays
- b. Panhypopituitarism, dwarfism acromegaly, gigantism, Sheehan's syndrome
- c. Diabetes insipidus, syndrome of inappropriate ADH secretion
- d. Myxedema, cretinism, thyrotoxicosis
- e. Tetany, Hypercalcemia
- f. Pheochromocytoma
- g. Cushing's syndrome, Conn's syndrome, Addison's disease, adrenogenital syndrome
- h. Diabetes mellitus and hypoglycemia, Zollinger Ellison's syndrome

11. Reproduction:

- a. Erection and ejaculation
- b. Testosterone
- c. gonads and oogenesis
- d. Estrogen and progesterone
- e. Menstrual cycle
- f. Puberty and menopause
- g. Pregnancy- physiological changes in mother's body during
- h. pregnancy
- i. Placenta
- j. Parturition
- k. Lactation
- l. Fetal and neonatal physiology

11.1 Clinical/Applied Concepts

- a. Semen analysis
- b. Chromosomal abnormalities
- c. Male infertility
- d. Female infertility
- e. Contraception
- f. Pregnancy Tests
- g. Clinical concepts regarding osmolarity of body fluids
- h. Body immune system and its regulation
- i. Smooth muscle and its function
- j. Tetanization, tetany, tetanus and Treppe
- k. Disorders of taste and smell e.g. taste blindness, Aguesia, Anosmia, Hyperosmia etc



MEDICAL BIOCHEMISTRY

1. **Proteins**
 - a. Principle and applications of electrophoresis
 - b. Immunoglobulins and their biomedical significance
 - c. Plasma proteins and their clinical significance
 - d. Structure and functional relationship of proteins e.g. malfunction of protein receptors within membranes result in disease like Diabetes Mellitus Type II.
 - e. Nutritional importance of proteins, e.g. Protein Malnutrition related conditions
2. **Lipids and fatty Acids**
 - a. Eicosanoids and their functions in health and disease
 - b. Steroids and their biomedical significance
 - c. Lipid peroxidation and its significance
 - d. Essential fatty acids and their significance
3. **Enzymes**
 - a. Isozymes and their clinical importance
 - b. Therapeutic uses and application of enzymes in clinical diagnosis
4. **Porphyryns and hemoglobin**
 - a. Major steps in biosynthesis of porphyrins and related disorders
 - b. Degradation of heme, hyperbilirubinemia, biochemical causes and differentiation
 - c. Biochemical causes of hemoglobinopathies (Hemoglobin S disease, Hemoglobin C disease, Hemoglobin SC disease, Methemoglobinemia, Thalassemia)
5. **Vitamins and minerals**
 - a. Hypo- and hyper-vitaminosis
 - b. Sources and biochemical importance of sodium, potassium, chloride, calcium, phosphorus, iodine, iron, & zinc
6. **Nutrition**
 - a. Caloric requirements of the body
 - b. Balanced diet, essential amino acids and essential fatty acids
 - c. Nutritional requirements in pregnancy, lactation, newborn, young and elderly subjects
 - d. Nutritional disorders and protein energy malnutrition (obesity, Marasmus, Kwashiorkor and Marasmic-Kwashiorkor)
7. **Bioenergetics and biological oxidation**
 - a. Un-couplers and their biochemical effects
 - b. Site-specific inhibitors of electron transport chain and their effects
8. **Metabolism of carbohydrates**
 - a. Disorders of glycogen metabolism (glycogen storage diseases)
 - b. Importance of Hexose Mono-Phosphate (HMP) shunt and glucose-6-phosphate dehydrogenase deficiency
 - c. Disorders related to metabolism of fructose and galactose
 - d. Regulation of blood glucose level
 - e. Causes of hyperglycemia and hypoglycemia

- f. Biochemistry of Diabetes Mellitus, its laboratory findings and diagnosis
9. **Metabolism of lipids**
- Ketosis and its mechanism
 - Hypercholesterolemia and atherosclerosis
 - Plasma lipoproteins (VLDL, LDL, HDL, and chylomicrons): their functions and importance in health and disease
10. **Metabolism of proteins and amino acids**
- Congenital and acquired causes of hyperammonemia
 - Biochemical explanation for ammonia intoxication
 - Metabolic defects in amino acid metabolism (phenylketonuria, maple syrup urine disease, albinism, homocystinuria, alkaptonuria)
11. **Metabolism of nucleotides**
- Causes and consequences of hyperuricemia (gout)
12. **Biochemical genetics**
- Disorder related to DNA repair (xeroderma pigmentosum)
 - Various types of mutations and their consequences
 - Steps and applications of polymerase chain reaction (PCR)
13. **Biochemistry of endocrine system**
- Biosynthesis and mechanism of action of hormones
 - Effects of hormones on carbohydrate, lipid, protein, and mineral metabolism
14. **Biochemistry of water and electrolyte imbalance and acid-base balance**
- Body buffers and their mechanism of action
 - Acid base regulation in human body and related disorders
 - **Biochemistry of Digestive Tract**
 - **Protein Chemistry**
 - **Digestion and absorption of protein**
 - **Protein Metabolism**
 - **Integration and regulation of metabolic pathways in different tissue metabolism**
 - **Acid base balance**
 - **Anion Gap and its clinical significance**
 - **Biochemistry of Reproductive System**
 - **Stimulus for secretion, mechanism of action, receptors, intracellular effects, target cells, tissues and biochemical role & hypo/hyper secretion**
 - **Androgens & Estrogens.**
 - **Nucleotide Chemistry**
 - **Nucleotide Metabolism**
 - **Molecular Genetics**
 - **Neurotransmitters**
 - **Cancer and tumor markers**
 - **Aging & free radicals**
 - Different reactive oxygen species (ROS) produced by the human body

- Mechanism of production of reactive oxygen species (ROS)
- Effect of ROS on health and disease
- Mechanism of Scavenging of ROS
- **Xenobiotics**

PHARMACOLOGY AND THERAPEUTICS

1. **General Pharmacology**

- a. Definition of drug, drug nomenclature & sources of drugs.
- b. Dosage forms and doses of drugs.
- c. 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
- d. 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 & drug toxicity/poisoning
 - Drug-drug Interactions

2. **Locally Acting Drugs**

- a. Dermatological and topical drugs
- b. Anti-seborrhoeics, locally acting enzymes.
- c. Antiseptics and disinfectants.

3. **Autacoids**

- a. Histamine & antihistamines
- b. Introduction to other mediators:
 - Eicosanoids
 - Serotonin
 - Substance P
 - Bradykinin

4. **Drugs Acting on Gastrointestinal Tract**

- a. Emetics and anti-emetics.
- b. Pharmacotherapy of Peptic ulcer disease
- c. Pharmacotherapy of Constipation
- d. Pharmacotherapy of Diarrhea
- e. Pharmacotherapy of irritable bowel syndrome
- f. Prokinetics

5. Drugs Acting on Autonomic Nervous System

- a. Parasympathetic nervous system
 - Parasympathomimetics
 - Parasympatholytics
 - Autonomic ganglionic stimulants and blockers
 - Skeletal muscle relaxants
- b. Sympathetic nervous system
 - Sympathomimetics
 - Sympatholytics
 - Adrenergic neuron blockers

6. Drugs acting on Renal system

- a. Diuretics
- b. Anti-Diuretics
- c. Drugs for acid base and electrolyte balance

7. Drugs acting on Cardiovascular System

- a. Antihypertensive drugs.
- b. Anti-anginal drugs
- c. Drug management of C Heart F and Inotropic drugs.
- d. Thrombolytics/anticoagulants/antiplatelets.
- e. Anti-arrhythmic drugs.
- f. Antihyperlipidemic drugs.
- g. Drugs used in anemias

8. Drugs Acting on Respiratory System

- a. Pharmacotherapy of cough:
 - Antitussives, Expectorants and Mucolytics.
 - Bronchial asthma.

9. Drugs Acting on Endocrine System

- a. Pituitary-hypothalamic drugs.
- b. Thyroid antithyroid drugs.
- c. Pancreatic hormones and anti-diabetic drugs.
- d. Adrenocorticoids.
- e. Anabolic steroids.
- f. Reproductive hormones: Testosterone, Estrogen, Progesterone,
- g. Contraceptives

10. Drugs acting on Central Nervous System

- a. Sedative-hypnotics, Pharmacotherapy of sleep disorder
- b. Pharmacotherapy of Epilepsy, Parkinsonism, Migraine.
- c. Psychopharmacology: antipsychotics, antidepressants, anxiolytics,
- d. Anti-mania drugs
- e. Anesthetics: Local and general anesthetics.
- f. CNS stimulant drugs
- g. Pharmacotherapy of Pain and inflammation:

- Opioids and Non-Steroidal Anti-inflammatory Drugs (NSAIDs)
- Pharmacotherapy of Gout, Rheumatoid arthritis
- i. Drugs for movement disorder/muscle relaxant.

11. Drugs Acting on Uterus

- a. Drugs increasing and drugs decreasing uterine motility
- b. Drugs decreasing uterine motility

12. Chemotherapy

- a. Introduction to chemotherapy
- b. Antimicrobials acting on cell wall
- c. Protein synthesis inhibitors
- d. Nucleic acid synthesis inhibitors
- e. Antifolates
- f. Gyrase inhibitors
- g. Anti-mycobacterial drugs.
- h. Anti-fungal drugs.
- i. Antiviral drugs.
- j. Anti-protozoal drugs: Antimalarials and Anti-amoebic drugs.
- k. Chemotherapy for Sexually Transmitted Diseases (STDs)
- l. Cancer chemotherapy: Principle and general consideration,
- m. treatment approach in some common malignancies

13. Immunopharmacology

- a. Immunostimulants including Probiotics
- b. Immunosuppressants
- c. Vaccines and sera

14. Miscellaneous

- a. Pharmacotherapy of Glaucoma and Cataract
- b. Pharmacotherapy of anemias
- c. Drug therapy in children, elderly, during pregnancy and lactation.
- d. Drug therapy in disease states such as renal and hepatic disease.
- e. Overview of radiation therapy.
- f. Guideline for rational use of drugs

PATHOLOGY AND MICROBIOLOGY

GENERAL PATHOLOGY

1. Cell injury

- a. Clinical Causes of Irreversible and Reversible Cell injury & Role of free radical.
- b. Apoptosis versus necrosis and types of necrosis with examples.
- c. Clinical aspects of Intracellular accumulations e.g. Dystrophic and metastatic calcification along with clinical significance and examples.
- d. Clinical aspects of cellular Adaptations with examples. Atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia.

2. Inflammation and repair

- a. Vascular and cellular events and Chemical mediators of acute inflammation.
- b. Morphological patterns & Clinical outcomes of acute inflammation.
- c. Transudate vs exudate with clinical examples.
- d. Types of chronic inflammation (simple and granulomatous) with clinical examples.
- e. Define repair, regeneration, growth factors and scar formation
- f. Factors affecting wound healing & Pathological aspects of complications of wound healing.
- g. Clinical aspects of healing by primary and secondary intention.

3. Neoplasia

- a. Nomenclature with clinical examples of benign and malignant tumors.
- b. Define protooncogenes and oncogenes with clinical examples.
- c. Clinical aspects of carcinogenesis, carcinogenic agents, tumor metastasis and tumor markers
- d. Clinical aspects of grading and staging of tumors with laboratory diagnostic methods of tumors.

4. Disorders of circulation

- a. Clinical aspects with types and examples of hemorrhage, infarction, thrombosis, emboli, oedema and shock.

IMMUNOLOGY

- a. Clinical aspects of innate and acquired immunity. Active and passive immunity.
- b. Types of cells taking part in immune response (Phagocytes, T cells, B cells & NK cells) and their clinical importance
- c. Complement activation pathways and their role in immune response to infections, autoimmunity, transplant rejection and immune deficiency diseases.
- d. MHC & their role in clinical diseases.
- e. Types and clinical aspects of antibodies.
- f. Clinical aspects of hypersensitivity reactions (infectious diseases and autoimmune diseases).
- g. Types of transplant rejections & Graft Vs Host Disease
- h. Clinical aspects of autoimmunity and autoimmune diseases.

GENETICS

- a. Types of mutation.

- b. Clinical aspects of X linked diseases, Autosomal dominant & autosomal recessive diseases with clinical examples.
- c. Clinical aspects of Down syndrome, Turner syndrome, Klinefelter syndrome, Ehlers Danlos syndrome & Marfan syndrome.

MICROBIOLOGY

1. GENERAL BACTERIOLOGY

- a. Important components of bacterial cell (cell wall, cell membrane, nucleoid, ribosomes, pilli, flagella, plasmids, transposons, spores).
- b. Exotoxins vs Endotoxin.
- c. Mechanisms of actions of exotoxins and their clinical outcomes.
- d. Classification of important groups of bacteria.
- e. Bacterial growth curve
- f. Classification of culture media.
- g. Colonization resistance and clinically important bacteria of Normal Flora.
- h. Clinical aspects of sterilization process and its various methods and uses of disinfectants in various clinical settings.
- i. Clinical aspects of conjugation, transduction and transformation.
- j. Clinical uses of bacterial vaccines.
- k. Clinical aspects of antimicrobial resistance.
- l. Clinical aspects of antimicrobial mechanisms of actions.

2. SPECIAL BACTERIOLOGY:

- a. Clinical aspects of
 - 1) GRAM POSITIVE COCCI:
 - Staphylococci
 - Streptococci
 - Gram negative cocci
 - Gonococci
 - Meningococci
 - Enterococci
 - 2) GRAM POSITIVE RODS:
 - Bacillus
 - Clostridia
 - Diphtheria
 - Listeria
 - 3) SPIROCHETES:
 - Treponema pallidum
 - Borrelia
 - Leptospira
 - 4) MYCOBACTERIA:
 - MTB, M. Leprae, Atypical Mycobacteria
 - 5) GRAM NEGATIVE RODS:
 - E. coli

- Salmonella
- Shigella
- Proteus
- Pseudomonas
- Klebsiella
- Bacteroides
- Bordetella
- H. influenza
- Legionella

6) CHLAMYDIA, RICKETTSIA

7) MYCOPLASMA

8) ACTINOMYCETES

PARASITOLOGY

a. Clinical aspects of

- Plasmodium
- Leishmania
- Trypanosomes,
- Toxoplasma,
- Entamoeba
- Giardia
- Trichomonas
- Entrobium
- Ascaris
- Trichuris
- Hook worm
- Wuchereria
- Dracunculus
- Teniasaginata
- Teniasolium
- Echinococcus
- D. Latum
- Schistosomes

VIRUSES

a. Viral structure and replication

b. Classification of viruses with clinical conditions caused by each.

c. Clinical aspects of

- Corona viruses
- Herpes viruses
- Pox virus
- Measles, mumps, rubella
- Rhinoviruses
- adenoviruses

- Influenza virus
- Polio virus
- Dengue
- Rabies
- Hepatitis
- Human Immunodeficiency Virus (HIV)

MYCOLOGY

- Fungal structure and classification of clinically important fungi.
- Clinical aspects of Dermatophytes, Tinea Versicolor, Sporothrix, Histoplasma, Coccidioides, Blastomyces, Candida, Aspergillus, Mucor, Rhizopus, Cryptococcus

SYSTEMIC PATHOLOGY

1. BLOOD VESSELS AND HEART

- Differentiation between atherosclerosis, Monckeberg's medial calcific sclerosis and arteriosclerosis.
- Etiology, pathogenesis & complications of atherosclerosis.
- Types of primary and secondary hypertension and vascular changes in hypertension.
- Common pathogenic mechanisms of vasculitis.
- Aneurysms, classification, and aetiology and pathogenesis of atherosclerotic aneurysm
- Pathology of varicose veins
- Benign and malignant tumors of blood vessels.
- Pathogenesis of ischemic heart disease including etiological factors, pathogenesis, diagnosis and complications of Myocardial infarction.
- Causes of sudden cardiac death
- Cor-pulmonale and list the predisposing disorders
- Rheumatic fever with respect to aetiology, pathogenesis, morphological and clinical features. The sequelae of Rheumatic Fever.
- Infective endocarditis with respect to aetiology, pathogenesis, morphological and clinical features, and its sequelae
- Myocarditis: causes and its morphological and clinical features
- Cardiomyopathy: clinico-pathological groups and diagnosis
- Causes of pericarditis and its clinical and morphological features
- Primary and secondary cardiac tumors
- Main features of Fallot's tetralogy and coarctation of aorta, Valvular heart disease and mitral valve prolapse
- The concept of cardiac transplantation

2. HAEMATOPOIETIC AND LYMPHOID SYSTEMS

- 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.
- Normal values of red cell count, hemoglobin level, packed cell volume, MCH, MCV, MCHC, WBC count and platelet count.
- Anemias, classification on the basis of morphology and underline pathogenesis of RBC production.
- Causes and clinical features, clinical presentation, and diagnosis of hypochromic anemia, Megaloblastic Anemia, Anemia of chronic disease, Hereditary spherocytosis, Aplastic anemia and Hemolytic Anemias.

- e. Aetiology, pathogenesis, clinical types, diagnosis of thalassemia with emphasis on incidence, common mutations, associated psychosocial problems and prevention.
- f. Inheritance, clinical features, lab diagnosis of von Willebrand's disease, Hemophilia A& B and Polycythemia.
- g. Mechanisms which can cause neutropenia/agranulocytosis.
- h. Differentiation between infective and malignant causes of leucocytosis with special reference to infectious mononucleosis, acute and chronic non-specific lymphadenitis.
- i. Non-Hodgkin's lymphoma, classification and diagnosis.
- j. Classification, aetiology, pathogenesis and clinical stages of Hodgkin's disease
- k. Aetiology, clinical features, laboratory diagnosis and prognostic factors of acute and chronic lymphoblastic and myeloblastic leukemia.
- l. Multiple myeloma with respect to aetiology, pathogenesis, morphology, clinical features and diagnosis.
- m. Disseminated intravascular coagulation with respect to aetiology, pathogenesis, clinical features and laboratory diagnosis
- n. Causes of decreased production and decreased survival of Platelets with special reference to the pathogenesis of idiopathic & thrombotic thrombocytopenic purpura
- o. The value of coagulation profile in the assessment of bleeding disorders
- p. ABO and Rhesus blood groups, their clinical importance and method of group typing.
- q. Common indications of blood products (red cells, platelets and plasma) and hazards of blood transfusion and methods of their prevention.

3. RESPIRATORY SYSTEM

- a. Differentiate between pleural effusion, hemothorax, hydrothorax, pleuritis, pneumothorax and chylothorax.
- b. Classification of atelectasis on the basis of underlying mechanisms.
- c. Etiology, pathogenesis, morphology and clinical features and diagnosis of asthma.
- d. Disorders associated with airflow obstruction disease with reference to their aetiology, Pathogenesis, morphology and diagnosis
- e. Restrictive lung diseases including sarcoidosis, pulmonary eosinophilia, with reference to their aetiology, Pathogenesis, morphology and clinical diagnosis
- f. Pathogenesis, morphology and clinical features of adult respiratory distress syndrome.
- g. Clinical features of Goodpasture's syndrome based on the pathology.
- h. Morphology & clinical features of pulmonary infarction.
- i. Causes of pulmonary hypertension and vascular sclerosis.
- j. Etiology, pathogenesis, morphology and clinical Features, complications and clinical diagnosis of acute and chronic pneumonias including atypical pneumonia.
- k. Etiology, pathogenesis and clinical features, clinical diagnosis of tuberculosis of the lung.
- l. Classification, aetiology, pathogenesis, and clinical features of different lung tumors.

4. GASTROINTESTINAL TRACT AND LIVER

- a. Risk factors, clinical and morphological features and diagnosis of oral Cancer with special reference to early lesions like leucoplakia.
- b. Benign and malignant tumors of salivary glands.
- c. Different types of esophagitis and its relation with carcinoma of the esophagus.
- d. Predisposing factors, pathogenesis, morphological and clinical features of acute and chronic gastritis and peptic ulcer disease.

- e. Gastric carcinoma with respect to risk factors, pathogenesis, clinical and morphological features and prognosis; and differentiate from Gastric Lymphoma and Gastrointestinal Stromal Tumor (GIST).
- f. Clinical and morphological features of Hirschsprung's disease.
- g. Pathogenesis, morphological and clinical features of malabsorption diseases.
- h. Predisposing conditions, clinical and morphological features of ischemic bowel disease.
- i. Crohn's disease and ulcerative colitis including major causes of intestinal obstruction.
- j. Clinico-pathological features, clinical presentation and diagnosis of bacterial and parasitic diseases of intestines.
- k. Benign and malignant tumors of intestines with reference to etiological factors, pathogenesis, diagnosis and prognosis.
- l. Types of jaundice with respect to the causes, clinical features and laboratory diagnosis
- m. Causes, morphological and clinical features and complications of hepatic failure
- n. Causes, pathogenesis, complications of cirrhosis
- o. Route of transmission, Incubation period, Clinical features and complications of acute and chronic viral hepatic infection.
- p. Liver abscess: causes, clinical features, diagnosis
- q. Pathogenesis, clinical features and diagnosis of alcohol liver disease.
- r. Clinico-morphological features and diagnosis of deposition diseases of liver.
- s. Neonatal hepatitis.
- t. Epidemiology, pathogenesis, morphological and clinical features of hepatocellular carcinoma.
- u. Pathogenesis and risk factors of Cholelithiasis and acute and chronic cholecystitis.
- v. Features of gall bladder cancer.
- w. Acute and chronic pancreatitis with respect to aetiology, pathogenesis, clinical and morphological features.
- x. Clinical and morphological features of carcinoma of pancreas.

5. RENAL AND MALE REPRODUCTIVE SYSTEM

- a. Etiology, pathogenesis, clinical features and complications of; Azotemia, Uremia, Acute renal failure, Chronic renal failure
- b. Polycystic kidney disease (and its Classification)
- c. Glomerulonephritis and (its Classification)
- d. Nephrotic and nephritic syndrome
- e. Acute and chronic pyelonephritis.
- f. Hydronephrosis
- g. Pathogenesis and clinical course of acute tubular necrosis.
- h. Benign and malignant nephrosclerosis
- i. Characteristics of various types of renal stones
- j. Pathogenesis, clinical features and lab diagnosis of nephrolithiasis
- k. Epidemiology, morphology, clinical features and prognosis of Wilm's tumor
- l. Classification, Epidemiology, morphology, clinical features and prognosis of renal cell carcinoma
- m. Etiology, morphology & clinical features of cystitis.
- n. Clinical features, etiology and morphology of transitional cell carcinoma of the urinary bladder.
- o. Etiology, route of infection, pathogenesis and methods of diagnosing Gonococcal and non-gonococcal urethritis

- p. Etiology, pathogenesis, diagnosis of prostatitis, prostatic hyperplasia and prostatic carcinoma
- q. Inflammatory disease and tumors of testis and epididymis
- r. Causes, pathogenesis and investigations of male infertility.

6. FEMALE GENITAL SYSTEM AND BREAST

- a. Causes, routes of infection and methods of diagnosis of Sexually transmitted diseases: micro-organisms involved, route of infection, pathogenesis and methods of diagnosis
- b. Vulvar and vaginal squamous intraepithelial lesions
- c. Neoplasms of Cervix with reference to cervical intraepithelial neoplasia.
- d. Causes, pathogenesis and clinical features of dysfunctional uterine bleeding and its relation with endometrial hyperplasia, endometrial polyp and carcinoma.
- e. Clinical features and pathogenesis of adenomyosis and endometriosis.
- f. Tumors of endometrial stroma and myometrium.
- g. Tumors of the ovary: classification, etiological factors, pathogenesis, diagnosis and prognosis.
- h. Etiology, clinical features and pathogenesis of ectopic pregnancy and toxemia of pregnancy.
- i. Gestational trophoblastic tumors
- j. Causes of nipple discharge and lump breast and its differentiation on the basis of aetiology, pathogenesis, morphology, clinical features, diagnosis and complications
- k. Benign breast diseases proliferative and non- proliferative
- l. Carcinomas of the breast: Epidemiology, classification, aetiology and pathogenesis, diagnosis and prognosis
- m. Gynecomastia and list its causes.

7. MUSCULOSKELETAL SYSTEM

- a. Pathogenesis, clinical features and diagnosis of genetic and metabolic bone diseases.
- b. Causes of osteoporosis, its pathogenesis, morphological and clinical features.
- c. Acute and chronic Osteomyelitis with respect to causative organisms, routes of spread, and complications.
- d. Benign and malignant bone forming tumors
- e. Benign and malignant cartilaginous tumors
- f. Pathogenesis, morphological and clinical features of Degenerative Arthritis
- g. Pathogenesis, morphological and clinical features of immune mediated arthritis
- h. Pathogenesis, morphological and clinical features of crystal deposition diseases.
- i. Pathogenesis, morphological and clinical features and diagnosis of muscular dystrophies
- j. Pathogenesis, morphological and clinical features and diagnosis of inflammatory myopathies
- k. Clinico-pathological features of Myasthenia Gravis
- l. Classification and important distinguishing points of soft tissue tumors

8. ENDOCRINE SYSTEM

- a. Causes, Pathogenesis, and diagnosis of anterior and posterior Pituitary hormone defects.
- b. Adrenal Cortex and Medulla
- c. Causes, aetiology, pathogenesis and lab. Diagnosis of adrenal cortical medullary hyper and hypo-function.
- d. List the aetiology and clinical features, types, diagnosis of different thyroid diseases

- e. Causes of solitary thyroid nodule and outline of clinical diagnostic approach.
- f. Etiology, pathogenesis, morphology and diagnosis of Thyroid tumors
- g. Types of MEN syndromes.
- h. Investigation, clinical features, aetiology of Parathyroid dysfunction
- i. Diabetes Mellitus: Type 1 and 2, pathogenesis, morphology, clinical features, laboratory diagnosis and complications.

9. SKIN

- a. Morphological and clinical features of different types of dermatitis
- b. Pathogenesis, morphological and clinical features of Bullous disease of the skin
- c. Types of warts and their most frequent locations.
- d. Predisposing factors for squamous cell carcinoma of skin.
- e. Etiology, pathogenesis, morphology, diagnosis and prognosis of squamous cell carcinoma and its differentiation from basal cell carcinoma.
- f. Different types of Nevi, with reference to clinical and morphological features, and diagnosis of malignant melanoma

10. NERVOUS SYSTEM

- a. Clinical and morphological features of intra-cranial hemorrhage.
- b. Acute and chronic meningitis including Tuberculous meningitis
- c. Brain abscesses, its clinical and morphological features and diagnosis
- d. Clinico-pathological features of Guillain-Barre syndrome.
- e. Types of intracranial tumors including common metastatic tumors to the brain

11. CHEMICAL PATHOLOGY

- a. Biochemical markers of ischemic heart disease
- b. Renal function tests.
- c. Causes of proteinuria and its laboratory diagnosis.
- d. Lab diagnosis of acid base disorders.
- e. Lab diagnosis of Diabetes mellitus.
- f. Liver function tests.
- g. Laboratory diagnosis of hyperlipidemia and its clinical interpretation.
- h. Role of enzymes in diagnosis of pancreatitis.
- i. Laboratory diagnosis/investigations of endocrine disorders: -
- j. Role of hormone estimation in diagnosis of infertility & growth disorders

1. 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

2. 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 and public health
- International Health
- Health for all

3. 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.
- 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.

4. 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.

5. **Health management information system**

- 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.

6. **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
- Demographic and social implication of high population growth
- Social Mobilization
- Urbanization

7. **Nutrition and Health (Integrated)**

- 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

8. **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

- Childcare: Child health surveillance
- Strategic approaches of Integrated Management of Childhood
- Illness (IMCI)
- Adolescent health
- Reproductive tract infections
- Sexually transmitted diseases

9. **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
- Radiation: Sources, types, causes, hazards and prevention
- Healthful housing. Urban and rural slums.
- Noise: Definition, causes, acceptance level, hazards and control

10. **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

11. **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
- Disease transmission
- Disease prevention and control
- Disinfection

- Immunity
- Immunizing agent

12. **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

13. **Arthropods and their Public Health Importance**

- Common arthropod borne diseases
- Control of arthropods of medical importance
- Insecticides and their public health importance

14. **Snake Bites:**

- Identification, personal protection and management

15. **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

16. **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

17. **Health Planning and Management**

- Health Planning. Planning cycle,
- Management and administration.
- Management methods and techniques.
- Planning-programming-budgeting system

18. Control and Prevention of Infectious Diseases of Public Health Importance (whole chunk of communicable diseases and their prevention)
Genetics and health Communication for health education (mentioned in behavioral sciences and not in Community medicine topics)

19. **Health Systems in Pakistan**

- Sustainable development goals

- Biostatistics
- Health management information system
- Sampling and its various techniques
- Prevention and control of Infectious disease

20. Control and Prevention of Non-Infectious Diseases of Public Health Importance

- Stroke
- Blindness
- COPD (non-communicable/non -infectious diseases)

21. Control and Prevention of Infectious Diseases of Public Health Importance Genetics and health

22. Communication for health education



BASICS OF RADIOLOGY

1. The basic principles of radiation protection and know the law in relation to the use of ionizing radiation
2. Principles of different imaging techniques and their advantages and disadvantages in different clinical scenarios (X-ray, ultrasound, CT-Scan, MRI, Fluoroscopy)
3. Role of imaging in directing treatment in various surgical scenarios
4. How to request imaging and interpreting images
5. Hazards of imaging and ionizing radiation
6. Wasteful use of radiology
7. Typical effective doses from diagnostic medical exposure



BEHAVIORAL SCIENCES

1. Introduction to Behavioral Sciences and its importance in health.

- Bio-Psycho-Social Model of Health Care and the systems Approach in
- Normality vs Abnormality
- Link of Health with Behavioral Sciences (Psychology, Sociology, Anthropology)
- Importance of behavioral sciences in health
- Correlation of brain, mind and Behavioral Sciences
- Roles of a doctor
- Desirable Attitudes in Health Professionals

2. Understanding Behavior- Sensation and sense organs, Perception, Attention and concentration, Memory, Thinking, Communication

- Describe sensation, sense organs
- Define perception, factors affecting perception
- Abnormalities of Perception
- Extrasensory perception (ESP)
- Define attention and concentration, factors affecting them
- Define memory and describe its stages, types and methods to improve it
- Define thinking, describe its types and theories.
- What is cognition and what are levels of cognition.
- Discuss problem solving and decision making strategies
- Define communication. What are the types, modes and factors affecting it? Describe ways to recognize non-verbal cues. Characteristics of a good communicator.

3. Individual differences - Personality, Intelligence

- What are the stages and characteristics of psychological growth and development?
- Define personality. What are cognitive and psychodynamic theories of personality?
- What factors affect personality development?
- How personality can be assessed? Influence of personality in determining reactions during health, disease, hospitalization, stress.
- Define intelligence and the various types of intelligence. Relevance of IQ and EQ in the life of a doctor. Methods of enhancing EQ and effectively using IQ
- What factors affect it and how it can be assessed?

4. Emotions - Motivation/need/drive

- Define emotions. What are the various types of emotions?
- Emotional Quotient (EQ), concept and utility, emotional literacy
- Define motivation and what are the types of motivation?
- Use of motivational theory in improving learning, treatment adherence.

5. Learning

- Define learning, Principles of learning, modern methods and styles of learning, types of learners, cognitive theory of learning and its use in enhancing learning.
- Strategies to improve learning skills.

6. Stress and stressors

- Define and classify stress and stressors
- Relationship of stress and stressors with illness

7. Life events - Psychotrauma

- Concept of life events and their relationship with stress and illness

8. Stress management

- What are coping skills?
- What is psychological defense mechanism?
- What is conflict and frustration?
- What is the concept of adjustment and maladjustment?

9. Interviewing/psychological History Taking

- Collecting data on psychological factors in Medicine/Surgery/Gynae/
- Pediatrics and other general health conditions
- Skill of interviewing and listening

10. Doctor-Patient relationship

- Discuss the doctor-patient relationship
- What is the concept of boundaries and psychological reactions in doctor patient relationship (such as transference and counter transference)?

11. Medical/dental Ethics

- Hippocratic Oath-Do's and Don'ts
- What is the concept of medical/dental ethics?
- Common ethical dilemmas in doctor patient relations, interaction with families, teachers, colleagues, pharmaceutical industry
- Rights of patients and doctors (in international law, constitution of Pakistan, PM&DC, Islam)
- E-consultation and Telemedicine
- Euthanasia and physician assisted suicide
- Relationship with pharmaceutical Industry

12. Culture and medical/dental practice

- Concept of group, its dynamics
- Attitude, value, belief, myths, social class, stigma, sick role and illness, health belief models

13. Psychological reactions

- Grief and bereavement, family and illness, dealing with difficult patients

- Symptoms presentation and culture
- Illness and behavior (sick-role, stigma, somatization)
- Treatment Adherence (Compliance)
- What are the psychological aspects of illness, hospitalization, rape, torture, terminal illness, death and dying?

14. Psychological aspects of Health and Disease

- Psychological correlates of hospitalization, illness behavior, sick-roles
- Psychological issues in Emergency Departments, Intensive Care and Coronary Care Units, Operating Theaters, Cancer wards, Transplant Units, Anaesthesia

15. Breaking bad news

- Introduction, Models, Methods, Death of the patient, abnormal baby, intractable illness

16. Pain, Sleep, Consciousness, Sexuality

- Concept of Pain
- Physiology of pain, Psychosocial assessment and management of chronic/intractable pain.
- Stages of sleep
- Physiology of consciousness, altered states of consciousness
- Psychological influences on sleep and consciousness
- Non-pharmacological methods of inducing sleep, changes in consciousness
- Physiology of Sex, stages of sexual activity, Reproduction and Health

17. Communication skills, Counseling, Crisis Intervention, Conflict Resolution, Informational Care

- Principles of effective communication, active listening, the art of questioning, the art of listening.
- Good and bad listener.
- Counseling: Scope, indications and contraindications, steps, Do's and Don'ts. How to deal with real life crisis and conflict situations in health settings
- Informational Care: A practical method of communication between the doctor and patient about disease, drugs, prognosis etc.

18. Non-pharmacological interventions

19. Child rearing practice

- What is the concept of child rearing practice and its effect on individual and illnesses?

1. Law

1.1 Pakistan's legal system

- a. Organization and functioning of courts
- b. Application of relevant sections of law of Pakistan e.g., PPC/CrPC
- c. Documentation and certification for legal procedures
- d. Protocol of court evidence

1.2 Law in relation to physicians

- a. Physician patient relationship
- b. Professional secrecy and privileged communication
- c. Bio-ethics and its application
- d. Professional misconduct
- e. Certification of cause of death
- f. Transplantation of organs and tissues: its medicolegal scope and relevant laws
- g. Regulatory/accrediting bodies: Their functioning and mandate
- h. Healthcare Commission Act, Consumer Protection Act

2. Personal identification

- a. Determination of parameters of personal identification in living and dead
- b. Use of special techniques and methodologies for identification
- c. Certification of age
- d. Relevant laws

3. Autopsy and exhumation

- a. Types, objectives, rules and techniques of autopsy
- b. Estimation of fatal and postmortem period
- c. Risks and hazards associated with autopsy
- d. Autopsy protocol for collection/ recovery, preservation, labeling and dispatch of biological and non-biological material
- e. Unrewarding (negative) autopsy
- f. Exhumation (protocol, procedure, scope and limitation)
- g. Autopsy in special situations (Putrefied, Dismembered, Mass disaster)
- h. Post-mortem artifacts and their medico-legal significance
- i. Autopsy certificate
- j. Relevant laws

4. Thanatology

- a. Concept of death
- b. Medicolegal aspects of brain death
- c. Indicators of death
- d. Early and late corporeal post-mortem changes, their interpretation and significance
- e. Inter-relationship of Cause, Mechanism, Mode and Manner of death
- f. Post-mortem chemical changes
- g. Forensic Entomology
- h. Flowcytometry
- i. Sudden and unexpected deaths

- j. Certification of death as per WHO guidelines
- k. Relevant laws

5. Asphyxia

- a. Biomechanics and indicators of asphyxial deaths
- b. Anatomy of asphyxia
- c. Biochemistry and patho-physiology of asphyxia
- d. Suffocation
- e. Gagging and choking
- f. Traumatic asphyxia
- g. Hanging, strangulation, throttling
- h. Postural asphyxia
- i. Relevant laws

6. Drowning

- a. Pathophysiology of drowning
- b. Autopsy findings (external, internal)
- c. Medicolegal aspects (identification, weather the person drowned, injuries in water, diatoms)
- d. Mechanisms of drowning in different media
- e. Relevant laws

7. Traumatology

- a. Biomechanics of wound production
- b. 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
 - Injuries due to cold
 - Regional injuries (head, vertebral column, neck, chest. Abdomen and their contents, limbs and musculoskeletal system)
- c. Differentiation between ante mortem and postmortem wounds
- d. Determination of the manner of injury
- e. Examination of injured person, documentation of injuries and certification
- f. Sequela of injuries
- g. Dating of injuries
- h. Manner of causation of injuries
- i. Relevant laws

8. Forensic sexology

- a. Interpretation and Medicolegal significance of virginity, pregnancy and delivery
- b. Abortion: Types, methods to procure,
- c. Examination and certification of such cases, in living and dead
- d. Relevant laws

9. Sexual offences

- a. Medicolegal aspects of natural and unnatural sexual offences
- b. Sexual perversions
- c. Examination of victim and assailant
- d. Collection of specimens and their dispatch
- e. Documentation and certification of injuries and violations
- f. Relevant laws

10. Forensic pediatrics

- a. Medicolegal aspects of:
 - Infanticide
 - Non accidental injuries and death of new born/ infants/ child
 - Sudden infant death syndrome (SIDS)
- b. Relevant laws

11. Forensic psychiatry

- a. Diagnosis and certification of mental illness
- b. Procedures for restraint of mentally ill
- c. Differentiation between true and feigned insanity
- d. Testamentary capacity
- e. Relevant laws

12. Forensic serology

- a. Examination of biological specimen
- b. Methods of their collection, preservation and dispatch to concerned labs

13. Role of Forensic science in crime detection

- a. Principles and methods of crime scene investigation
- b. Finger prints
- c. DNA
- d. Examination of firearms and tool marks evidence
- e. Examination of broken glass
- f. Role of Chemistry and specialized techniques
- g. Relevant laws

14. Forensic Odontology

- a. Role of dental evidence in identification
- b. Bite marks and their analysis
- c. Dental evidence: Trauma and Poisoning
- d. Basic dental charting/record
- e. Relevant laws

TOXICOLOGY:

1. General Principles of Toxicology

- a. Law relevant to toxicology
- b. Factor influencing the manifestation of poisoning
- c. Collection and dispatch of evidentiary material, in living and dead
- d. Drug dependence
- e. Diagnosis and treatment of acute and chronic poisoning in living

- f. Diagnosis of acute and chronic poisoning in dead
- g. Medicolegal certification (in living and dead)

2. Special Toxicology

- a. Volatile poisons and corrosives (carbon monoxide, hydrocarbons, cyanides, sulphuric acid, oxalic acid, carbolic acid, alkalis)
- b. Inorganic elements (arsenic, lead, mercury, copper, phosphorus)
- c. Poisonous plants (Aconite, Belladonna, Hyoscyamus, Stramonium, Digitalis, Ergot, Nux Vomica, Oleander, Tobacco)
- d. Venomous animals
- e. Alcohols
- f. Opiates, opioids and other narcotics
- g. Salicylates, Paracetamol and other medicinal poisons
- h. Hypnotics and sedatives
- i. Stimulants (cocaine, cannabis)
- j. Pesticides, herbicides and insecticides

POISONING AND ENVIRONMENTAL MEDICINE

- a. Benzodiazepine Poisoning
- b. Organophosphate poisoning
- c. Wheat pill poisoning
- d. Heavy metal poisoning
- e. Hyperthermia
- f. Drowning
- g. Electric shock
- h. Snake bite



a. 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

b. Viral Infections (clinical features, diagnosis, treatment, immunization)

- Exanthematous diseases
 - Measles
 - Chicken pox
 - Rubella
- Without exanthema
 - Mumps
 - Infectious mononucleosis
 - Influenza
 - COVID 19
 - Dengue
- HIV

c. 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

d. Mycobacterial

- Pulmonary and abdominal TB under respective systems

e. Fungal infections

f. Protozoal infection

- Acute and chronic amoebiasis
 - Clinical features
 - Investigations
 - Treatment

g. Helminthic infections

- Ascariasis
- Hook worm
 - Life cycle
 - Clinical features
 - How it causes anemia
 - Treatment and prevention
- Tapeworm
- Hydatid cyst
 - Clinical features with area of involvement
 - Treatment
 - Medical
 - Surgical

1. LIVER AND PANCREATIC DISEASES

a. Jaundice

- Types
 - Congenital
 - Pre-hepatic
 - Hepatocellular
 - Cholestatic
 - Differentiation
 - Investigations
 - Treatment
 -

b. 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

c. Metabolic liver disease

- Hemochromatosis
- Wilson disease
- Alpha 1 trypsin deficiency
- Non-Alcoholic fatty liver disease, non-alcoholic steatohepatitis

d. Fulminant hepatic failure

- Causes and differentiation
- Investigations
- Treatment

e. 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)

f. Liver Abscess

g. Liver tumor, Hepatocellular carcinoma

h. Acute and chronic pancreatitis

- Clinical features
- Risk assessment
- Complications
- Investigations
- Treatment

i. Pregnancy and liver

- Acute Fatty Liver of Pregnancy
- Intrahepatic cholestasis
- Pre-eclampsia and HELLP

HEMATOLOGICAL DISEASE

a. 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

b. Leukemias (clinical features, differential diagnosis, investigations, treatment)

- Acute lymphoblastic leukemia
- Acute myeloid leukemia
- Chronic lymphoblastic leukemia
- Chronic myeloid leukemia
- Myelofibrosis
- Polycythemia

c. Lymphomas (classifications, diagnosis, investigations, treatment)

- Hodgkin
- Non-Hodgkin

d. Paraproteinemia

- Multiple myeloma
- Waldenstrom macroglobulinemia
- Amyloidosis

e. 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 Willebrand disease (physiology, clinical features and treatment)
- Hemophilia A and B

f. Blood transfusion and bone marrow transplant

WATER, ELECTROLYTES AND ACID-BASE BALANCE

- a. Disorders of Electrolytes (Na, K, Ca, Cl)
- b. Acid Base Balance (causes, clinical features, diagnosis, treatment)
 - Acidosis
 - Metabolic
 - Respiratory
 - Alkalosis
 - Metabolic
 - Respiratory

PATIENT SAFETY

1. Introduction to Patient Safety
2. From Error to Harm
3. Human Factors and Safety
4. Teamwork and Communication
5. Responding to Adverse Events
6. Root Cause Analyses and Actions
7. Achieving Total Systems Safety
8. Pursuing Professional Accountability and a Just Culture
9. Health Informatics
10. AI
11. QA
12. Healthcare Financing
13. Time Management
14. Self-care
15. Prevention of burnout



PSYCHIATRY

1. Organic mental disorder Delirium
2. Organic mental disorder Dementias
3. Mental and Behavioural disorder due to use of psychoactive substances I
4. Mental and Behavioural disorder due to use of psychoactive substances II
5. Schizophrenia
6. Other psychotic disorders
7. Mania and Bipolar affective disorder
8. Depressive disorders
9. Anxiety disorders and Obsessive compulsive personality disorder
10. PTSD and stress related Disorders
11. Dissociative Disorders
12. Personality disorders I
13. Personality disorders II
14. Autism and Developmental Disorders
15. Mental Retardation and Learning Disabilities
16. Non pharmacological interventions in Psychiatry



Cardio-circulatory Diseases:

- Acute coronary syndrome and myocardial infarction
- Pathophysiology of circulatory shock
- Congestive heart failure
- Sepsis
- Aortic aneurysm and dissection
- Hypertensive Crisis

Respiratory Compromising Diseases

- Chronic obstructive pulmonary disease, asthma and pneumonia
- Pulmonary embolism and deep venous thrombosis
- Pneumothorax

Neurological

- Stroke
- Nerve Compression
- Cauda Equina
- Peripheral Nerve injuries

Abdominal Emergencies

- Appendicitis
- Bowel obstruction
- Diseases of the gall bladder and biliary system
- Acute abdomen
- Gastrointestinal bleeding
- Peritonitis

Orthopedic

- Hip fractures
- Wrist fractures
- Ankle fractures
- Spinal Fractures

Nephrological Emergencies

- Kidney stones
- Urosepsis

Toxicology

- Poison
- Overdose
- Chemical Ingestion

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

Burn injuries

- Different types of burns
- The pathophysiology of burns
- Assessment of the area and depth of burns
- Management of burn patients



DERMATOLOGY

SKIN

Diagnosis and management of:

- a. Itching and Pruritus:
 - Scabies, Pediculosis
 - Eczemas: Atopic, Seborrheic, Contact dermatitis
 - Urticaria
- b. Acne Vulgaris
- c. Psoriasis
- d. Lichen Planus
- e. Erythema Multiforme, Steven Johnsons Syndrome, Toxic Epidermal Necrolysis
- f. Infections:
 - Acute Bacterial: Staphylococcal, Streptococcal
 - Chronic Bacterial: Tuberculosis, Leprosy
 - Viral: Warts, M.Cs, Herpes Simplex, Herpes Zoster
 - Fungal: Tinea, Pityriasis Versicolor
 - Protozoal: Leishmaniasis
- g. Bullous Disorders:
 - Immune mediated: Pemphigus, Pemphigoid, Dermatitis Herpetiformis
 - Genetic: Epidermolysis Bullosa
 - Infective
- h. Pigmentary disorders
 - Vitiligo
 - Melasma
- i. Hair disorders
 - Alopecia Areata
 - Androgenic Alopecia
- j. Cutaneous tumors
 - Basal cell carcinoma
 - Squamous cell carcinoma
 - Malignant melanoma

CARDIOVASCULAR DISEAS

- a. Fetal and neonatal circulation
- b. Congenital heart disease
- c. Acquired heart diseases (rheumatic heart disease, myocarditis)
- d. Cardiomyopathy, CCF

1) **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

2) **Congestive Cardiac Failure**

- Causes
- Acute pulmonary edema
- Clinical features
- Investigations
- Treatment

3) **Valvular heart disease**

- Mitral Stenosis, Mitral Regurgitation
- Atrial Stenosis, Atrial Regurgitation
 - Clinical features
 - Investigations
 - Treatment

4) **Congenital heart disease**

- Cyanotic
- Noncyanotic

5) **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

6) Infective endocarditis

7) Cardiomyopathies

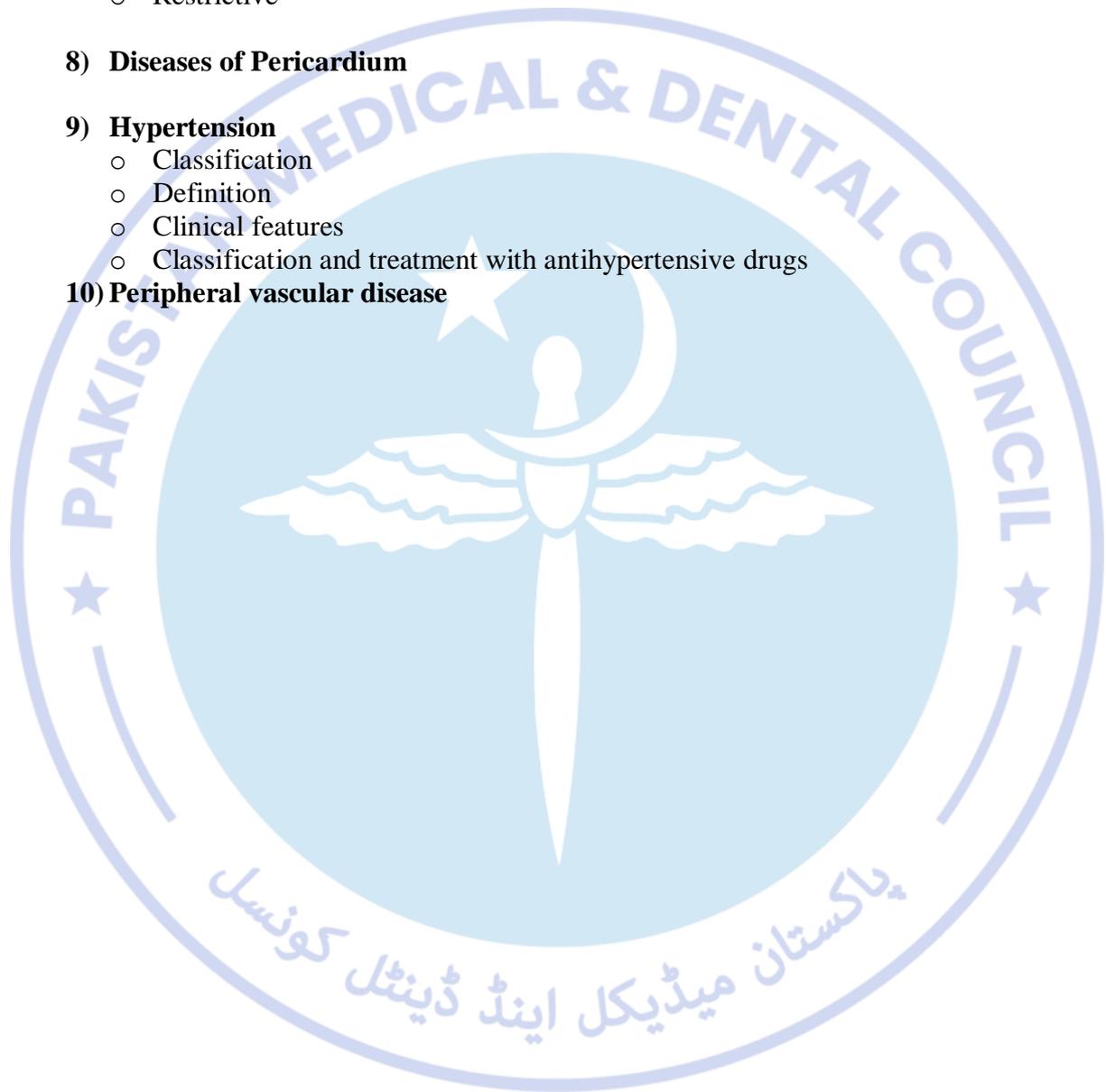
- Dilated cardiomyopathy
- Hypertrophic obstructive cardiomyopathy
- Restrictive

8) Diseases of Pericardium

9) Hypertension

- Classification
- Definition
- Clinical features
- Classification and treatment with antihypertensive drugs

10) Peripheral vascular disease



RESPIRATORY DISORDERS

1. Acute Respiratory Infections (ARI)
2. Tonsils and adenoids, epiglottitis, croup
3. Laryngomalacia, otitis media
4. Bronchiolitis, bronchopneumonia
5. Lobar pneumonia, cystic fibrosis
6. Asthma, foreign body

a. Asthma

- Clinical features
- Complications
- Grading
- Emergency treatment
- Long term management

b. Chronic Obstructive Pulmonary Disease

- Chronic bronchitis
- Emphysema
 - Differences
 - Clinical features
 - Investigations
 - Treatment

c. Pneumonia

- Community acquired
 - Etiology
 - Clinical features
 - Treatment
- Hospital acquired

d. Tuberculosis (TB)

- Types
- Causative agents
- Clinical features
- Investigations
- Primary vs post primary
- Cultures
- Treatment
 - Non complicating cases
 - Multi-drug resistant TB

e. Diffuse parenchymal lung disease

- Interstitial pneumonias
- Extrinsic allergic alveolitis
- Sarcoidosis

- f. Type 1 and type II respiratory failures
- g. Primary pulmonary hypertension
- h. CA bronchus
- i. Occupational Lung disease
- j. Diseases of Pleura



NEPHROLOGY

NEPHROLOGY

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



1. GASTROINTESTINAL SYSTEM

a. 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

b. Diseases of stomach and duodenum

- Types of gastritis, diagnosis, treatment
- Peptic ulcer disease
 - Etiology
 - Pylori, NSAID's
 - Clinical features, complications
 - Treatment
- Carcinoma stomach

c. Diseases of small intestine

- Acute diarrhea's
 - Infective
 - Osmotic
 - Irritable Bowel Syndrome
- Malabsorption disorders
 - Celiac disease
 - Tropical sprue
 - Enzyme deficiencies
 - Whipple disease

d. 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

e. Functional GI Disorders (Irritable Bowel Syndrome)

2. GASTROINTESTINAL AND LIVER DISORDERS

- a. Vomiting, GERD,
- b. Constipation, Diarrhoea, Dysentery
- c. Approach to abdomen pain
- d. Celiac disease, IBD, acute hepatitis
- e. Hepatic failure, Portal hypertension, liver abscess



PRINCIPLES OF ONCOLOGY

1. Causes of cancer formation
2. Screening of cancers for early detection
3. Diagnosis and classification of cancers
4. Investigations and staging of cancers.
5. Principles of nonsurgical treatment of cancer
6. Principles of surgical treatment of cancer
7. Principles of chemotherapy
8. Principles of radiotherapy
9. Follow-up for cancer patients
10. Palliative care



1. NEUROLOGICAL DISORDERS

- a. Meningitis (pyogenic, tuberculous)
- b. Encephalitis, febrile convulsions
- c. Epilepsy, headaches / Space Occupying Lesions
- d. Increased intracranial pressure, hydrocephalus
- e. Cerebral palsy, microcephaly
- f. Leukemia, Lymphomas
- g. Brain tumors, Langerhans histiocytosis

2. CNS

a. Unconsciousness and coma

- Causes
 - Metabolic
 - Diabetic
 - Hypoglycemia
 - Uremia
 - Hepatic encephalopathy
 - Respiratory failure
 - Vascular
 - Encephalitis
 - Infective
 - Autoimmune
 - Tumors / raised IntraCranial Pressure
 - Drugs / poisoning

b. Cerebrovascular disease

- Ischemic stroke
- Subarachnoid hemorrhage and intracerebral bleed
 - Differentiation between two
 - Immediate resuscitation
 - Control of BP
 - Investigations
 - Therapeutic options for both
 - Surgery

c. Headache

- Classification
- Migraine
- Cluster headaches
 - Differentiating points
 - Role of CT
 - Treatment

d. Epilepsy

e. Movement disorders

- Tics

- Chorea
 - Huntington
- Parkinson's disease

f. Multiple sclerosis

g. CNS infections

- Meningitis
- Encephalitis

h. Paraplegia

- Spinal cord disorders
 - Autoimmune
 - Tumors
 - Vascular
- Vertebral disorders
 - Fracture
 - Collapse / stress
- Disc disorder

i. Neurodegenerative diseases

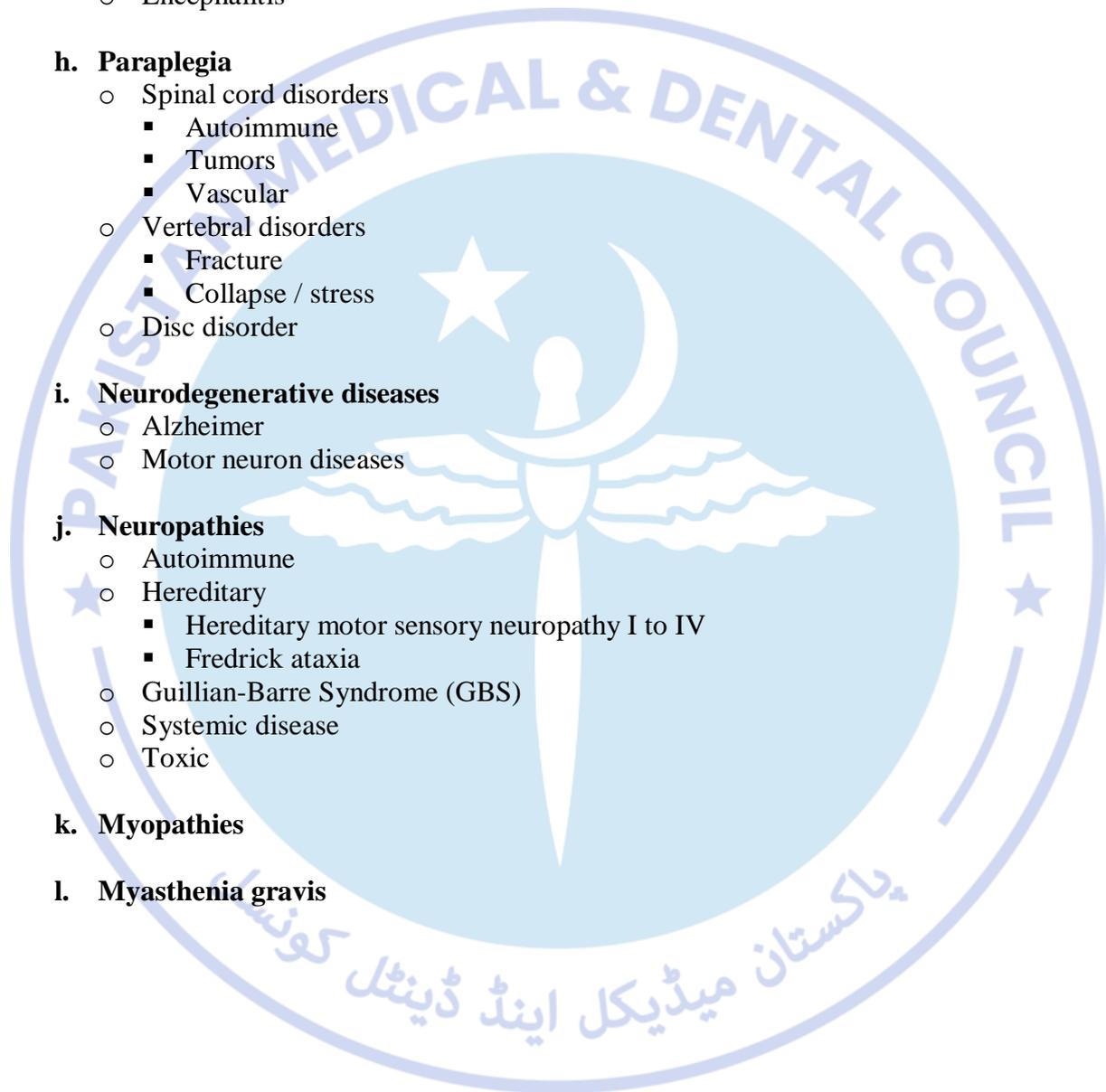
- Alzheimer
- Motor neuron diseases

j. Neuropathies

- Autoimmune
- Hereditary
 - Hereditary motor sensory neuropathy I to IV
 - Fredrick ataxia
- Guillian-Barre Syndrome (GBS)
- Systemic disease
- Toxic

k. Myopathies

l. Myasthenia gravis



ENDOCRINOLOGY

ENDOCRINE DISORDERS

1. Short stature
2. Precocious and delayed puberty
3. Hypothyroidisms
4. Hypoparathyroidisms, Addison's disease
5. Congenital Adrenal Hyperplasia, Cushing syndrome, Diabetes Mellitus, Diabetes Insipidus

a. Diseases of Pituitary

- Anterior and posterior pituitary hormones
- Dwarfism
- Gigantism, acromegaly
- Sheehan syndrome
- Diabetes insipidus

b. Diseases of Thyroid

- Grave's disease
 - Lab Diagnosis, scans
 - Treatment
 - Medical
 - Radioactive Iodine
 - Treatment during pregnancy
- Myxedema

c. Diseases of Adrenal

- Cushing's disease and syndrome
- Addison's disease and crisis. Its diagnosis and treatment

d. Diseases of Parathyroid

e. Diseases of reproduction and sex

f. 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
 - 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 KetoAcidosis
 - Clinical features
 - Interpreting ABG's
 - Treatment steps
 - Hyperglycaemic hyperosmolar non-ketotic coma (HONK)
 - Lactic acidosis
 - Hypoglycemia
- g. Disorders of Lipids**
 - Hyperlipidemias



INFECTIOUS DISEASES

a. 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

b. Viral Infections (clinical features, diagnosis, treatment, immunization)

- Exanthematous diseases
 - Measles
 - Chicken pox
 - Rubella
- Without exanthema
 - Mumps
 - Infectious mononucleosis
 - Influenza
 - COVID 19
 - Dengue
- HIV

c. 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

d. Mycobacterial

- Pulmonary and abdominal TB under respective systems

e. Fungal infections

f. Protozoal infection

- Acute and chronic amoebiasis
 - Clinical features
 - Investigations
 - Treatment

g. Helminthic infections

- Ascariasis
 - Hook worm
 - Life cycle
 - Clinical features
 - How it causes anemia
 - Treatment and prevention
 - Tapeworm
 - Hydatid cyst
 - Clinical features with area of involvement
 - Treatment
 - Medical
 - Surgical
1. Diarrhea: etiology and management of acute and chronic diarrhea
 2. Typhoid fever, poliomyelitis
 3. Diphtheria, tetanus, measles, mumps
 4. Varicella (chickenpox), tuberculosis
 5. Dengue fever
 6. Rabies



RHEUMATOLOGY

1. Osteoarthritis (OA)
2. Rheumatoid arthritis (RA)
3. Crystal arthritis
4. Infections of joints and bones
5. Autoimmune rheumatic diseases (Rheumatoid Arthritis, Systemic Lupus Erythematosus, Sjogren Syndrome, Systemic Sclerosis, Polymyositis, dermatomyositis)
6. Systemic inflammatory vasculitis (Anti-Neutrophil Cytoplasmic Antibodies-ANCA)
7. Osteoporosis
8. Rickets and osteomalacia



FAMILY MEDICINE

Outcomes:

By the end of the academic Year 5 students will be able to:

- Discuss the salient diagnostic features of the common conditions prevailing in the community.
- Should be able to formulate the differentials on the basis of presenting symptoms.
- Suggest and interpret investigations to confirm diagnosis.
- Discuss relevant management plan of the common conditions in the community.

TOPICS
Cough
Chest pain
Abdominal pain
Joint pain
Generalized weakness and weight loss
Unwell child
Headaches
Urogenital (Men and Women)
Mental health
Skin Conditions
Any other conditions

INFECTION CONTROL
Basic Microbiology for Infection Prevention & Control
<ul style="list-style-type: none"> • Introduction to Healthcare associated infections • Standard Precautions • Transmission based precautions • Infection prevention and control aspect of occupational health in healthcare settings • Waste management in healthcare setting • Cleaning, disinfection and sterilization of reusable surgical instruments and medical devices • Investigation of outbreak in Healthcare institutions • Preventing Hospital acquired Pneumonia • Preventing maternal and new born infections in Healthcare settings • Preventing healthcare Associated diarrhea • Work practices in healthcare facilities • Environmental cleaning • Managing Food and water services for the prevention of Healthcare associated infections • Structure and oversight of Infections prevention & Control program • Principles of Public Health emergency preparedness and outbreak management for healthcare facilities
<ul style="list-style-type: none"> • Personal Protective Equipment • Use of personal protective equipment during viral hemorrhagic fever • Injection safety • Preventing intravascular catheter associated blood borne infections

- Hand Hygiene
- Sharpe injuries & management of exposure to blood borne pathogens
- Prevention of surgical site Infections
- Preventing catheter associated Infections
- Processing of reusable healthcare clothing



GERIATRICS

To be taught by family medicine faculty as prescribed by the medical college document.

PAEDIATRICS AND NEONATOLOGY

1. SOCIAL AND PREVENTIVE PAEDIATRICS

- a. EPI program
- b. Advantage of breast feeding
- c. Child rights / abuse / neglect
- d. IMCI / IMNCI (Integrated Management of Childhood Illnesses/ Integrated Management of Newborn and Childhood Illnesses) programs
- e. Vaccinations (other than EPI)
 - Varicella, influenza, hepatitis A
 - Meningococcal vaccine
 - Rabies
- f. 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

2. GROWTH AND DEVELOPMENT / NUTRITION

- a. Nutritional requirements
- b. Under and over nutrition (obesity and overweight)
- c. Malnutrition classifications
- d. Vitamins and micronutrients deficiencies (effects, management)
- e. Normal development
- f. Puberty and tanner's staging
- g. Growth charts (plotting)
- h. Factors affecting growth

3. BEHAVIOR AND PSYCHIATRIC DISORDERS

- a. Pica
- b. Nocturnal enuresis, encopresis (clinical presentation, classification, management)
- c. Attention-deficit/hyperactivity disorder, Autism spectrum disorder (clinical presentation, classification, management)
- d. Tics, anorexia nervosa and bulimia nervosa

4. FLUIDS AND ELECTROLYTES

- a. Maintenance fluids / electrolytes therapy (normal requirements)
- b. Dehydration and replacements of electrolytes (clinical types and management)
- c. Acid-base balance and disorders

5. PAEDS SURGERY / CONGENITAL MALFORMATION

- a. Developmental dysplasia of the hip, talipes, kyphosis, scoliosis
- b. Biliary atresia, duodenal atresia
- c. Tracheoesophageal fistula

- d. Hirschsprung's disease
- e. Neural tube defects
- f. Posterior urethral valve
- g. Hernias
- h. Intussusception
- i. Cleft lip and palate

6. POISONING AND TOXICOLOGY

- a. General rules of management
- b. Common poisoning (kerosine oil, organophosphate) (clinical presentation, management)
- c. Poisoning with common drugs (clinical presentation, management)

7. BURN / DROWNING AND FOREIGN BODIES IN CHILDREN

8. METABOLIC DISEASE

- a. Glycogen storage diseases (types, presentation)
- b. Galactosemia, PKU
- c. Mucopolysaccharidoses (clinical presentation, management)

9. RHEUMATIC DISEASE / NEUROMUSCULAR DISORDERS

- a. Juvenile idiopathic arthritis
- b. SLE / Neonatal lupus
- c. Kawasaki Disease
- d. Henoch-Schönlein Purpura
- e. Duchenne muscular dystrophy
- f. Myasthenia Gravis
- g. Floppy infant
- h. Acute Flaccid Paralysis, GBS

10. HUMAN GENETICS

- a. Genetic counselling (general rules of genetic counselling)
- b. Pre-natal diagnosis (methodologies)
- c. Chromosomal disorders (trisomies, turner syndrome)
- d. Single gene defects
- e. Polygenic (multi factorial inheritance)

11. DERMATOLOGY

- a. Atopic dermatitis
- b. Bacterial, viral and fungal, protozoal infections of skin
- c. Steven Jonson syndrome (presentation, management)
- d. Scabies, ectodermal dysplasia
- e. Urticaria

12. IMMUNOLOGIC DISORDERS

- a. Evaluation of suspected immunodeficiency
- b. Acquired immune deficiency including AIDS
- c. Cellular, humoral and complement related immunodeficiencies
- d. Neutrophil related defects

13. HEMATOLOGIC DISORDERS

- a. Anemias (deficiency, aplastic, hemolytic)
- b. Hemophilias, disorders of platelets
- c. ITP
- d. Blood and blood products transfusions
- e. Bone marrow transplantation

14. ENDOCRINE DISORDERS

- a. Short stature
- b. Precocious and delayed puberty
- c. Hypothyroidisms
- d. Hypoparathyroidisms, Addison's disease
- e. Congenital adrenal hyperplasia, Cushing syndrome, diabetes mellitus, diabetes insipidus

15. NEONATOLOGY

- a. Birth asphyxia, prematurity, neonatal jaundice, IDM (infant of diabetic mother)
- b. Causes of respiratory distress / respiratory distress syndrome
- c. Causes of seizures in newborn
- d. NEC (necrotizing enterocolitis)
- e. Neonatal sepsis
- f. TORCH infections
- g. Hemorrhagic disease of newborn

16. INFECTIOUS DISEASES

- a. Diarrhea: etiology and management of acute and chronic diarrhea
- b. Typhoid fever, poliomyelitis
- c. Diphtheria, tetanus, measles, mumps
- d. Varicella (chickenpox), tuberculosis
- e. Dengue fever
- f. Rabies
- g. Malaria

17. RESPIRATORY DISORDERS

- a. Acute respiratory infections (ARI)
- b. Tonsils and adenoids, epiglottitis, croup
- c. Laryngomalacia, otitis media
- d. Bronchiolitis, bronchopneumonia
- e. Lobar pneumonia, cystic fibrosis
- f. Asthma, foreign body

18. GASTROINTESTINAL AND LIVER DISORDERS

- a. Vomiting, GERD,
- b. Constipation, diarrhoea, dysentery
- c. Approach to abdomen pain
- d. Celiac disease, IBD, acute hepatitis
- e. Hepatic failure, Portal hypertension, liver abscess

19. CARDIOVASCULAR DISEASE

- a. Fetal and neonatal circulation
- b. Congenital heart disease
- c. Acquired heart diseases (rheumatic heart disease, myocarditis)
- d. Cardiomyopathy, CCF

20. NEUROLOGICAL DISORDERS

- a. Meningitis (pyogenic, tuberculous)
- b. Encephalitis, febrile convulsions
- c. Epilepsy, headaches / space occupying lesions
- d. Increased intracranial pressure, hydrocephalus
- e. Cerebral palsy, microcephaly
- f. Leukemia, lymphomas
- g. Brain tumors, langerhans histiocytosis

21. NEPHROLOGY

- a. Laboratory evaluation and imaging of urinary tract
- b. Congenital anomalies of kidneys and urinary tract
- c. Acute post streptococcal glomerulonephritis
- d. Nephrotic syndrome
- e. Acute and chronic kidney disorders
- f. Urinary tract infections, renal stones
- g. Wilm's tumor

22. BONES AND JOINTS DISORDERS

- a. Septic arthritis
- b. Osteomyelitis
- c. Clubfoot (talipes equinovarus)
- d. Scoliosis
- e. Osteogenesis imperfecta
- f. Achondroplasia
- g. Marfan's syndrome

NEONATOLOGY

- a. Birth asphyxia, prematurity, neonatal jaundice, IDM (Infant Of Diabetic Mother)
- b. Causes of respiratory distress / Respiratory Distress Syndrome
- c. Causes of seizures in newborn
- d. NEC (Necrotizing Enterocolitis)
- e. Neonatal sepsis
- f. TORCH infections
- g. Hemorrhagic disease of newborn

GENERAL SURGERY

1. METABOLIC RESPONSE TO INJURY, SHOCK, AND BLOOD TRANSFUSION

- a. Basic concepts in homeostasis
- b. Graded nature of response to injury
- c. Mediators of the metabolic response to injury
- d. Metabolic stress response to surgery and trauma: the 'ebb and flow' model
- e. Changes in body composition following injury
- f. Avoidable factors that compound the response to injury.
- g. Pathophysiology of Shock
- h. Classification of shock
- i. Cardiovascular and metabolic characteristics of shock
- j. Severity and consequences of shock
- k. Resuscitation, fluid therapy, blood and blood components for shock.
- l. 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. WOUND HEALING

- a. Factors influencing wound healing
- b. Classification of wound closure and healing
- c. Phases of normal wound healing
- d. Abnormal wound healing
- e. Types of wounds
- f. Hypertrophic Scar, Keloids and their treatment
- g. Differentiation between acute and chronic wounds
- h. Management of acute and chronic wounds, scars, contracture
- i. Compartment syndrome.

3. SURGICAL INFECTIONS

- a. Microbiology of surgical infections, sources of infection,
- b. Factors in wound infection
- c. Risk factors for increased risk of wound infection
- d. The decisive period
- e. Major and minor surgical site infection (SSI)
- f. Specific local wound infections (gas gangrene, necrotizing fasciitis etc.)
- g. Bacteremia, septicemia, and SIRS
- h. Viral infections relevant to surgery (HIV, AIDS, Hepatitis B and C)
- i. Hospital acquired infections
- j. Tropical infections (Amoebiasis, ascariasis, typhoid, Tuberculosis, hydatid disease)
- k. Prevention of surgical infection
- l. Role of antimicrobials in prevention and treatment of infection

4. PRE AND POSTOPERATIVE INVESTIGATIONS

- a. 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).

5. PRE-OPERATIVE ASSESSMENT OF SURGICAL PATIENT

- a. Evaluation of different diseases to assess fitness of patient before surgery
- b. Cardiovascular diseases (hypertension, ischemic heart disease, angina, arrhythmias, Peripheral vascular disease)
- c. Evaluation of coagulation disorders (Thrombophilia etc.)
- d. Respiratory diseases (Chronic obstructive pulmonary disease, Asthma, Respiratory infections)
- e. Gastrointestinal diseases (Peptic ulcer disease and gastro-esophageal reflux, Liver disease)
- f. Genitourinary tract (Urinary tract infection and Renal dysfunction)
- g. Neurological (Epilepsy, Cerebrovascular accidents and transient ischemic attacks, Psychiatric disorders, Cognitive function)
- h. Endocrine/metabolic (Malnutrition, obesity, Diabetes mellitus, Thyroid dysfunction)
- i. Locomotor system (Osteoarthritis, rheumatoid arthritis)
- j. Other diseases (Human immunodeficiency virus, Hepatitis, Tuberculosis, Malignancy, Allergy)
- k. Previous surgery (Problems encountered, Family history of problems with anesthesia)
- l. 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)
- m. Optimization of the high-risk patient before surgery
- n. Minimizing the impact of surgery in the high-risk patient
- o. Consent for surgery.

6. POST-OPERATIVE CARE

- a. Standards of anesthesia care in the immediate postoperative period
- b. System specific postoperative complications (respiratory, cardiac, renal, central nervous system)
- c. General postoperative complications (hemorrhage, Wound infection, fever, hypothermia, shivering, Deep venous thrombosis, pulmonary embolism, wound dehiscence, paralytic ileus, nausea, vomiting)
- d. Post-operative Wound care

ANAESTHESIA

PRINCIPLES OF ANAESTHESIA AND PAIN MANAGEMENT

1. key principles of general anesthesia
2. Pre-operative assessment of patients and pre-medication
3. Preparation of patient for general anesthesia
4. Management of airway during general anesthesia
5. Intravenous Anesthetic agents
6. Inhalational Anesthetic agents
7. Muscle relaxation and artificial ventilation during general anesthesia
8. Monitoring and care of patient during general anesthesia
9. Recovery from Anesthesia
10. Complications of general anesthesia and their management
11. Regional anesthesia (spinal, epidural, nerve blocks)
12. Complications of regional anesthesia and their management
13. Perioperative Management
14. Acute and chronic Pain Management
15. Postoperative care
16. ICU Monitoring

ORTHOPAEDICS AND TRAUMA

- a. History and examination of musculoskeletal disease (look, feel, move, special tests, investigations, radiology) of extremity trauma (ATLS principles)
- b. Description and classification of soft tissue, neurological and bony extremity injuries (AO classification, growth plate injuries, open fractures)
- c. Fracture healing (terminology and principles of treatment)
- d. Treatment by fracture location and region
- e. Treatment in skeletally immature (Paediatric fractures), osteoporotic fractures, pathological fractures and compartment syndrome
- f. Triage and damage control surgery in Orthopaedics.

BONES AND JOINTS DISORDERS

- a. Septic arthritis
- b. Osteomyelitis
- c. Clubfoot (talipes equinovarus)
- d. Scoliosis
- e. Osteogenesis imperfecta
- f. Achondroplasia
- g. Marfan's Syndrome

PRINCIPLES OF MANAGEMENT OF TRAUMA PATIENTS

- a. Early assessment and management of severe trauma
- b. Traumatic brain injury
- c. Neck and spine trauma
- d. Maxillofacial trauma
- e. Thoracic trauma
- f. Abdominal trauma
- g. Extremity trauma
- h. Disaster surgery

UROLOGY

1. Kidneys and ureters

- a. Embryology, surgical anatomy, congenital anomalies of Kidneys and ureters
- b. Urinary symptoms and investigations
- c. Kidney stones (etiology, pathogenesis, investigations, treatment)
- d. Urinary tract infection (etiology, pathogenesis, investigations, treatment)
- e. Renal and ureter trauma (epidemiology, investigations and treatment)
- f. Benign and malignant tumors of Kidneys and ureters (etiology, pathogenesis, investigations, staging, treatment)

2. The urinary bladder

- a. Surgical anatomy of the bladder
- b. Congenital defects of the bladder
- c. Bladder trauma
- d. Cystitis (etiology, pathogenesis, investigations, treatment)
- e. Acute retention of urine
- f. Chronic retention of urine
- g. Urinary incontinence
- h. Urinary bladder calculi (etiology, pathogenesis, investigations, treatment)
- i. Urinary bladder fistulae (etiology, pathogenesis, investigations, treatment)
- j. Neoplasms of the urinary bladder (etiology, pathogenesis, staging, investigations, treatment)

3. The Prostate and Seminal Vesicles

- a. Embryology, surgical anatomy, physiology, of prostate gland
- b. Lower urinary tract symptoms
- c. Bladder outflow obstruction
- d. Assessment of the patient with lower urinary tract symptoms
- e. Anatomical structure and biochemical function to the development and treatment of benign and malignant disease of the prostate
- f. Benign prostatic hyperplasia (etiology, pathogenesis, investigations, treatment)
- g. Prostatic calculi (etiology, pathogenesis, investigations, treatment)
- h. Prostatitis (etiology, pathogenesis, investigations, treatment)
- i. Carcinoma of prostate (pathology, staging, clinical features, investigations, treatment)

4. RENAL

a. Glomerular diseases

- Nephrotic (minimal Change, membranous)
- Nephritic Syndrome (Acute Glomerulonephritis , Rapidly progressive glomerulonephritis, IgA, ANCA related GN, Goodpasture syndrome)
- Acute Kidney Injury, Acute Tubular Necrosis
 - Causes
 - Clinical features
 - Natural history
 - Investigations
 - Emergency dialysis
 - Treatment

b. Tubular diseases

c. Interstitial diseases

d. Chronic Kidney Disease

- Causes
- Clinical features
- Uremia vs azotemia
 - Bone changes
 - Mineral metabolic changes
 - CVS complications
 - Neurological complications
 - Hematological complications

e. Kidney involvement in systemic diseases

f. Renal cell carcinoma

g. Urethra and Penis

- 1) The common congenital abnormalities of the urethra
- 2) The diagnosis and management of urethral trauma
- 3) The diagnosis and management of urethral stricture
- 4) The diagnosis and management of phimosis
- 5) The principles of management of a man with erectile dysfunction
- 6) The common diseases of the penis and urethra and the principles of their surgical management

h. Testis and scrotum

- 1) Embryology, anatomy, physiology, functions of Testis
- 2) Incompletely descended testis
- 3) Testicular injury
- 4) Testicular torsion
- 5) Varicocele
- 6) Spermatocele
- 7) Hydrocoele
- 8) Epididymal cysts
- 9) Epididymo-orchitis
- 10) Testicular tumors and their management

PAEDIATRIC SURGERY

1. History, examination, and resuscitation of pediatric patients
2. Pediatric trauma
3. Common pediatric surgical conditions (inguinal hernias, hydrocele, Undescended testes, testicular torsion, hypospadias, Midline hernias, Infantile hypertrophic pyloric stenosis, Intussusception, Acute abdominal pain in children, acute appendicitis, Acute non-specific abdominal pain, necrotizing enterocolitis)
4. Congenital malformations (esophageal atresia, Congenital diaphragmatic hernia, Intestinal atresia, Gastroschisis, Exomphalos, Biliary atresia, Hirschsprung's disease, Anorectal malformations.)



PLASTIC SURGERY

PLASTIC AND RECONSTRUCTIVE SURGERY

- a. Anatomy and physiology of tissues used in reconstruction
- b. Types of skin grafts and their use in surgery
- c. Types of flaps and their use in surgery
- d. Use of plastic surgery to manage difficult and complex tissue loss

OPHTHALMOLOGY

1. ADNEXA & ORBIT

- a. Thyroid eye disease & orbital cellulitis

2. LACRIMAL APPARATUS

- b. Epiphora and lacrimation, Acute and chronic dacryocystitis,

3. LIDS

- a. Entropion, ectropion blepharitis, stye, chalazion, ptosis.

4. CONJUNCTIVA

- a. Dry eyes, infective and allergic conjunctivitis, and pterygium.

5. CORNEA

- a. Keratitis, corneal ulcers
- b. Contact lenses
- c. Photorefractive Surgery

6. UVEAL TRACT

- a. Uveitis, and its differential diagnosis from other causes of the red-eye.

7. PUPIL

- a. Pupil reaction – Normal and abnormal

8. LENS

- a. Cataract and its management

9. GLAUCOMA

- a. Diagnosis, and general principles of management.

10. RETINA AND VITREOUS

- a. Diabetic retinopathy and its management
- b. Retinal detachment
- c. Retinopathy of prematurity

11. SQUINT

- a. Paralytic and non-paralytic squint

12. NEURO-OPHTHALMOLOGY

- a. Papilledema, optic atrophy, 3rd, 4th, 6th, and 7th cranial nerve palsies.

13. OCULAR TRAUMA

- a. Principles of management

14. SYSTEMIC DISEASES

- a. Vitamin A deficiency, Diabetes, hypertension, collagen vascular disorders and thyroid eye disease.

15. OPHTHALMIC THERAPEUTICS

- a. Antibiotics, antiviral, antifungal, local an aethetics, antiglaucoma, fluorescein dye, mydriatic- cycloplegic and steroids

16. ONCOLOGY

- a. Retinoblastoma
b. Squamous cell carcinoma

17. DIAGNOSTICS

- a. Visual fields
b. FFA
c. OCT
d. Corneal topography



OTORHINOLARYNGOLOGY (ENT)

SURGICAL ANATOMY AND PHYSIOLOGY OF AUDITORY AND VESTIBULAR SYSTEM

DISORDERS OF EXTERNAL EAR

1. CONGENITAL DISORDERS

- a. Anotia.
- b. Microtia.
- c. Atresia of external auditory canal.
- d. Pre-auricular sinus.

2. INFLAMMATORY CONDITIONS OF EXTERNAL EAR

a. Bacterial:

- 1) Acute otitis externa.
- 2) Diffuse otitis externa.
- 3) Malignant otitis externa.

b. Fungal:

- 1) Otomycosis.

c. Viral:

- 1) Herpes zoster oticus.

3. TRAUMATIC CONDITIONS OF EXTERNAL EAR

- a. Frost bite
- b. Haematoma auris.

4. IMPACTED WAX AND METHODS OF ITS REMOVAL

5. FOREIGN BODIES IN EAR AND THEIR MANAGEMENT

DISORDERS OF MIDDLE EAR

6. INFLAMMATORY DISORDERS:

- a. Acute otitis media.
- b. Chronic otitis media.
- c. Glue ear/ otitis media with effusion.

DISORDERS OF INNER EAR

7. CONGENITAL

- a. Pre-lingual sensorineural hearing loss, causes and management.

8. ACQUIRED VESTIBULAR DISORDERS:

Vertigo

- a. Benign paroxysmal positional vertigo.
- b. Vestibular neuritis.
- c. Meniere's disease.

9. HEARING LOSS

- a. Presbycusis.
- b. Noise induced hearing loss.
- c. Ototoxicity.

10. FACIAL NERVE:

- a. Surgical anatomy.
- b. Causes of Facial paralysis.
- c. Bell's palsy
- d. Ramsay –Hunt syndrome
- e. Management of facial paralysis in acute and chronic otitis media.

11. NOSE AND PARA-NASAL SINUSES

- a. Surgical anatomy and physiology of nose and paranasal sinuses.

12. DISEASES OF EXTERNAL NOSE AND NASAL VESTIBULE

13. CONGENITAL DISORDERS

- a. Dermoid cyst.
- b. Glioma.
- c. Meningocele /meningoencephalocele.

14. RHINITIS

- a. Allergic rhinitis.
- b. Vasomotor rhinitis.

15. EPISTAXIS:

- a. Causes and management.
- b. Types of foreign bodies in nose and their management.
- c. Rhinolith and its management.

16. INFLAMMATORY CONDITIONS

- a. Acute and chronic rhinosinusitis and their management.
- b. Ethmoidal polypi and its management.
- c. Antrochoanal polypi and its management.

17. DISORDER OF THE SEPTUM

- a. Deviated nasal septum.
- b. Septal perforation
- c. Septal hematoma/ abscess

18. GRANULOMATOUS DISORDERS

- a. **Bacterial:**

- 1) Tuberculosis
- 2) Leprosy

b. Fungal:

- 1) Invasive aspergillosis
- 2) Mucormycotic

c. Autoimmune:

- 1) Wegener's granulomatosis
- 2) Systemic lupus erythematosus
- 3) Sarcoidosis

19. SINO NASAL NEOPLASM

- a. Inverted papilloma
- b. Transitional cell carcinoma

20. PHARYNX

- a. Surgical anatomy and physiology of nasopharynx, oropharynx, hypopharynx.

21. INFLAMMATORY CONDITIONS OF OROPHARYNX

- a. Acute and chronic pharyngitis.
- b. Acute and chronic tonsillitis and its management.
- c. Peritonsillar abscess.

22. NEOPLASMS

- a. Squamous cell carcinoma and its management.
- b. Lymphoma and its management.

23. INFLAMMATORY CONDITIONS OF NASOPHARYNX

- a. Adenoid Hyperplasia, its complications and management.

24. NEOPLASMS OF NASOPHARYNX

- a. Juvenile Nasopharyngeal Angiofibroma.
- b. Nasopharyngeal carcinoma.

25. HYPOPHARYNX

- a. Plummer-vinson syndrome.
- b. Hypopharyngeal carcinoma.

26. CONGENITAL CONDITIONS

- a. Laryngomalacia
- b. Juvenile recurrent laryngeal papillomatosis

27. LARYNX

ACUTE INFLAMMATION OF LARYNX

- a. Acute laryngitis
- b. Chronic laryngitis

- c. Vocal nodule
- d. Acute epiglottitis
- e. Acute laryngo-tracheobronchitis.
- f. Vocal polyp
- g. Tracheostomy (indications, steps of procedure and complications)
- h. Management of Foreign bodies of upper aerodigestive tract.

27. TUMORS

- a. Carcinoma larynx/ management and voice rehabilitation.
- b. Malignant Otitis Externa should be Necrotising OE
- c. Otosclerosis
- d. Audiological tests
- e. Tinnitus
- f. Acoustic neuroma
- g. Hearing rehabilitation
- h. Allergic fungal sinusitis
- i. Facial trauma & fractures
- j. Complications of sinusitis
- k. Oral cavity anatomy
- l. Oral cavity ulcers and non-neoplastic conditions
- m. Tumors of oral cavity
- n. Salivary gland tumors
- o. Head and neck space infections
- p. Foreign body of air passages
- q. Disorders of upper esophagus and dysphagia
- r. Recent advances



GYNAECOLOGY AND OBSTETRICS

ETHICAL ISSUES IN OBSTETRICS & GYNAECOLOGY

1. Contraception

- a. Principles of contraception counseling
- b. Reversible methods of contraception
- c. Complications associated with reversible methods
- d. Emergency contraception
- e. Permanent methods of sterilization in male and female

2. Fertility Problems (both male and female)

- a. Causes of male and female infertility
- b. Investigations of male and female infertility
- c. Principles of management of an infertile couple

3. Puberty

- a. Normal Pubertal Development
- b. Delayed puberty and associated endocrine problems
- c. Precocious Puberty and associated endocrine problems

4. Normal Pregnancy

- a. Prenatal diagnosis; introduction and importance
- b. Physiological Changes in Pregnancy
- c. Antenatal Care
- d. Pre pregnancy counseling

5. Labor

- a. Mechanism of labor
- b. Diameters of fetal skull and female pelvis
- c. Stages of labor and their management
- d. Analgesia during labor
- e. Postnatal depression

6. Abnormal Labor

- a. Abnormalities of 1st stage of labor (Prolonged Labor)
- b. Abnormalities of 2nd stage of labor (Instrumental delivery)
- c. Abnormalities in 3rd stage of labor (Placental retention, Inversion of Uterus)
- d. Malposition and malpresentation

7. Problems in Pregnancy

- a. Diagnosis, etiology and principles of management in pregnancy including fetal and maternal complications arising in:
 - Diabetes mellitus
 - Hypertension
 - Thyroid disease
 - Heart disease

- Liver Disease
- Renal disease
- Autoimmune diseases
- Infections

8. Bleeding in Early Pregnancy

- Miscarriage – Etiology, diagnosis and management
- Ectopic pregnancy – Etiology, diagnosis and management
- Molar pregnancy – Etiology, diagnosis and management

9. Puerperium

- Etiology and Management of Puerperal Pyrexia,
- Deep vein thrombosis
- Problems in Lactation

10. Etiology of Bleeding in Pregnancy and 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. Menopause & HRT(introduction)

15. Ethical issues in Obs & Gynae

16. Etiology, Pathophysiology, Complications and Management of Endometriosis

17. Etiology, Pathophysiology, Complications and Management of Fibroids

18. Etiology, Pathophysiology and Management of Pelvic Inflammatory Disease

19. Etiology of Premalignant Diseases of the Uterus

20. Principles of Diagnosis and Management of Carcinoma of Uterus

21. Benign Disease of Cervix

22. Principles of Cervical Cytology and Colposcopy

23. Etiology, Diagnosis and Management of Benign Ovarian Cysts

24. Principles of Diagnosis and Management of Malignant ovarian neoplasms

25. Differential Diagnosis, Diagnosis and Management of Pelvic Mass

26. Principles of Diagnosis and Management of Vulval Lesions and Lumps

27. Causes, Diagnosis and Options for Management of Utero-Vaginal Prolapse

28. Micturition

SURGERY AND ALLIED

1. NUTRITION, FLUID, ELECTROLYTE AND ACID-BASE BALANCE

- a. Causes and consequences of malnutrition in the surgical patient
- b. 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
- c. 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.
- d. Common acid base balance disorders (Diagnosis and management) (Metabolic acidosis, respiratory acidosis, metabolic alkalosis, respiratory alkalosis).

2. ARTERIAL DISORDERS

- a. Arterial anatomy
- b. Signs, symptoms, investigations, and treatment of acute arterial limb ischemia
- c. Signs, symptoms, investigation and treatment of chronic arterial limb ischemia
- d. Signs, symptoms, investigation and treatment of different types of arterial gangrene (dry gangrene, wet gangrene, diabetic gangrene)

3. VENOUS DISORDERS

- a. Venous anatomy of lower limb
- b. Pathophysiology of veins of lower limb
- c. Clinical features of venous hypertension of the leg
- d. Signs, symptoms, classification, investigations and treatment of varicose vein
- e. Signs, symptoms, investigation and treatment of venous ulcers
- f. Signs, symptoms, investigation and treatment of Venous thromboembolism

4. PRINCIPLES OF LAPAROSCOPIC AND ROBOTIC SURGERY

- a. Principles of laparoscopic and robotic surgery
- b. Advantages and disadvantages of laparoscopic and robotic surgery
- c. Safety issues and indications for laparoscopic and robotic surgery
- d. The principles of postoperative care for laparoscopic and robotic surgery

5. SYSTEMIC DISEASES

Head, Face and Neck

- a. Developmental abnormalities of face, palate, lips (Pathology, classification, Clinical features & investigations and treatment)
- b. Pre malignant diseases (Pathology, classification, Clinical features & investigations and treatment)
- c. Oral cavity malignancies (Pathology, classification, Clinical features & investigations and treatment)
- d. Benign and malignant Diseases of salivary glands (Parotid, submandibular and sublingual glands) (Pathology, classification, Clinical features & investigations and treatment)
- e. Tongue ulcer (etiology, Pathology, Clinical features & investigations and treatment)

Breast

- a. Surgical anatomy of breast
- b. Clinical features and investigations of breast lumps
- c. Triple assessment of breast lump
- d. Diseases of nipple and areola (Signs, symptoms, investigations, and treatment)
- e. Benign breast diseases (Signs, symptoms, investigations, and treatment)
- f. Malignant breast diseases (Signs, symptoms, Staging, prognosis, and treatment)
- g. Breast reconstructions
- h. Male breast carcinoma (Signs, symptoms, Staging, prognosis, and treatment)

Thyroid Gland

- a. Embryology & surgical anatomy
- b. Physiology of thyroid functions
- c. Thyroid imaging
- d. Thyroid enlargement
- e. Hyperthyroidism
- f. Hypothyroidism
- g. Thyroiditis
- h. Neoplasms of the thyroid (Signs, symptoms, investigation, Staging, prognosis, and treatment)
- i. Thyroid surgery

Parathyroid Gland

- a. Embryology, anatomy, physiology, functions of parathyroid glands
- b. Primary hyperparathyroidism
- c. Secondary hyperparathyroidism
- d. Tertiary hyperparathyroidism
- e. Investigations for parathyroid gland
- f. Hypoparathyroidism
- g. Multiple Endocrine Neoplasia syndrome
- h. Parathyroid carcinoma (Signs, symptoms, Staging, prognosis, and treatment)
- i. Parathyroid surgery

Adrenal Gland

- a. Embryology, anatomy, physiology, functions of adrenal glands
- b. Diseases of the adrenal cortex and their management (Incidentaloma, Primary hyperaldosteronism – Conn's syndrome, Cushing's syndrome, Adrenocortical carcinoma, Congenital adrenal hyperplasia, Adrenal insufficiency)
- c. Diseases of the adrenal medulla and neural crest derived tissue and their management (Pheochromocytoma and paraganglioma, Neuroblastoma, Ganglioneuroma)

Thorax

- a. The anatomy and physiology of the thorax
- b. Investigation of thoracic diseases
- c. Benign diseases of lungs (Signs, symptoms, investigations, diagnosis, and treatment)
- d. Benign tumors of thorax (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)
- e. Malignant tumors of thorax (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)
- f. Surgical approach to lung cancer resection

- g. Complications of lung resection
- h. Management of Lung metastases

Peritoneum, Omentum, mesentery & Retroperitoneum

- a. Anatomy and physiology of the peritoneum, omentum, mesentery & retroperitoneum
- b. Peritonitis, Investigations, and management of peritonitis
- c. Prognosis and complications
- d. Special forms of peritonitis
- e. Intraperitoneal abscess
- f. Ascites
- g. Adhesions
- h. Torsion of the omentum
- i. Mesenteric injury
- j. Mesenteric ischemia
- k. Mesenteric adenitis
- l. Mesenteric cysts
- m. Retroperitoneal fibrosis
- n. Retroperitoneal (psoas) abscess
- o. Tumors of the peritoneum
- p. Retroperitoneal tumors

Hernias, Umbilicus & Abdominal wall

- a. Basic anatomy and function related to pathology
- b. Pathophysiology of hernia formation
- c. Common principles in abdominal hernia
- d. Clinical history and diagnosis in hernia cases
- e. Examination for hernia
- f. Investigations for hernia
- g. Management principles
- h. Surgical approaches to hernia
- i. Inguinal hernia
- j. Femoral hernia
- k. Ventral hernias
- l. Parastomal hernia
- m. Traumatic hernias
- n. Abdominal compartment syndrome

Esophagus

- a. Anatomy and physiology of the esophagus
- b. Symptoms of esophageal diseases
- c. Investigations for esophageal disorders
- d. Esophageal motility disorders
- e. Premalignant conditions of esophagus
- f. Esophageal perforations and their treatment
- g. Paraesophageal hernias
- h. The clinical features, investigations, prognosis and treatment of benign diseases
- i. The clinical features, investigations, prognosis, and treatment of malignant diseases

Stomach and duodenum

- a. Anatomy and physiology of the stomach and duodenum
- b. Gastric mucus and the gastric mucosal barrier
- c. Helicobacter pylori infection
- d. Gastritis
- e. Peptic ulcer (Duodenal & Gastric)
- f. Hematemesis and melaena
- g. Stress ulceration
- h. Gastric erosions
- i. Mallory–Weiss tear
- j. Gastric outlet obstruction
- k. Acute gastric dilatation
- l. Trichobezoar and phytobezoar
- m. Gastric volvulus
- n. Gastric cancer
- o. Gastrointestinal stromal tumors
- p. Gastric Lymphomas
- q. Duodenal obstruction
- r. Zollinger–Ellison syndrome
- s. Benign and malignant duodenal tumors

Pancreas

- a. The anatomy and physiology of the pancreas
- b. Investigations of the pancreas
- c. Congenital abnormalities of the pancreas
- d. Assessment and management of acute pancreatitis
- e. Assessment and management of chronic pancreatitis
- f. Pancreatic cancer (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)

Spleen

- a. Embryology, anatomy, physiology, functions of spleen
- b. Investigations of spleen
- c. Congenital anomalies of spleen
- d. Splenic artery aneurysm
- e. Splenic infarction
- f. Splenic rupture
- g. Splenic abscess
- h. Splenomegaly and hypersplenism
- i. Causes of splenic enlargement
- j. Haemolytic anaemias
- k. Neoplasms of spleen (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)
- l. Splenectomy and complications

Gallbladder and bile ducts

- a. Anatomy and physiology of the gallbladder and bile ducts
- b. Pathophysiology and management of gallstones
- c. Obstructive jaundice diagnosis and its management
- d. Unusual disorders of the biliary tree

- e. Management of bile duct injuries
- f. Benign and malignant tumors of the biliary tree (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)

Liver

- a. The Pathology, classification, Clinical features & investigations Cystic liver disease
- b. The Pathology, classification, Clinical features & investigations Liver infections
- c. The Pathology, classification, Clinical features & investigations of liver abscess
- d. The Pathology, classification, Clinical features & investigations, and management of hydatid disease
- e. Benign and malignant tumors of the liver (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)

Small intestine

- a. Anatomy and Physiology of the small intestine
- b. Inflammatory bowel disease
- c. Tuberculosis of the intestine
- d. Intestinal diverticula
- e. Mesenteric ischemia
- f. Stomas and their complications
- g. Enterocutaneous fistula
- h. Short bowel syndrome
- i. Benign and malignant tumors of the small intestine (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)

Large intestine

- a. Anatomy and physiology of the large intestine
- b. Ulcerative colitis
- c. Diverticular disease of the colon
- d. Angiodysplasia
- e. Ischemic colitis
- f. Irritable bowel syndrome
- g. Benign and malignant tumors of the large intestine (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)

Appendix

- a. Etiology and surgical anatomy of acute appendicitis
- b. Signs, symptoms, investigations, diagnosis and differential diagnoses of acute appendicitis
- c. Complications of acute appendicitis and their management
- d. Management of acute and chronic appendicitis
- e. Benign and malignant Tumors of the appendix (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)

Intestinal obstruction

- a. Classification and Pathophysiology
- b. Special types of mechanical intestinal obstruction
- c. Clinical features of intestinal obstruction
- d. Clinical features of strangulation
- e. Investigations for intestinal obstruction

- f. Treatment of acute intestinal obstruction
- g. Paralytic ileus
- h. Pseudo obstruction

Rectum

- a. Surgical anatomy
- b. clinical features of rectal disease
- c. Injuries of the rectum and their management
- d. Rectal prolapse and its management
- e. Rectal evacuation disorder
- f. Rectal intussusception
- g. Solitary rectal ulcer syndrome (SRUS)
- h. Proctitis and its types and management
- i. Rectal polyps
- j. Benign and malignant Rectal tumors (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)

Anal canal

- a. Surgical anatomy of anal canal
- b. Digital examination of the anal canal
- c. Proctoscopy and sigmoidoscopy and their indications
- d. Congenital anomalies of anal canal
- e. Pilonidal sinus disease, Perianal abscess, anal fissure, perianal fistula, Hemorrhoids (Signs, symptoms, investigations, diagnosis, and treatment)
- f. Benign and Malignant tumors of the anal canal (Signs, symptoms, investigations, diagnosis, Staging, prognosis, and treatment)

6. SURGICAL ETHICS, HUMAN FACTORS, PATIENT SAFETY, QUALITY IMPROVEMENT

- a. **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)
- b. **Human factors** (understanding of human factors, what they are, and their importance in understanding and rectifying error and working together as teams)
- c. **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)
- d. **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)

**Registrar
PM&DC**