Khyber Girls Medical College

CURRICULUM OF MBBS

Department of Medical Education

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Curriculum of the MBBS Program

Khyber Girls Medical College



Khyber Medical University Vision

Khyber Medical University will be the global leader in health sciences academics and research for efficient and compassionate health care.

Khyber Girls Medical College Vision

Excellence in healthcare, research, teaching, and training in the service of humanity.

Khyber Girls Medical College Mission

The mission of KGMC is to promote compassionate and professional healthcare leaders who are knowledgeable, skillful, and community-oriented lifelong learners serving humanity through evidence-based practices.

Khyber Girls Medical College

In Khyber Pakhtunkhwa, due to social and cultural reasons, there is great reluctance on the part of society to get medical help for their female family members from male doctors. Moreover, those people who can afford it are a bit hesitant to send their daughters and sisters to the medical colleges with co-education. In light of this, the KGMC will fulfill all the above social and cultural need of the population of Khyber Pakhtunkhwa.

Curricular Outcomes of the MBBS Program for a Graduating Doctor

Knowledgeable
Knowledgeable about the diseases and health conditions prevalent in the population of Pakistan and use Evidence-based medicine to provide best possible cost-effective care.

Skillful
Skilled in History taking and Physical examination to compassionately care for patients.

Community health promoter
Take appropriate decisions and actions for protecting and promoting the health of their community.

Critical Thinker
Evaluate critically the patient data to effectively deal with the complexity of medical decisions for the best possible outcomes using evidence-based practices in the service of humanity.

Professional
Display professional values (honesty, accountability, cultural and religious sensitivity), attitudes, and behaviors (empathy, ethics, good communication skills, and lifelong learner) that embody good medical practice.

Researcher
Exhibit a spirit of inquisitiveness, inventiveness, and ethical conduct while carrying out research in accordance with the prescribed guidelines.

Leader and Role Model
Demonstrate exemplary conduct and leadership in advancing healthcare, enhancing medical education, and enhancing the trust of the public in the medical profession by being exceptional role models

Alignment of curricular outcomes with the mission statement of the institute

KGMC Mission

The mission of KGMC is to promote compassionate and professional healthcare leaders who are knowledgeable, skillful and community-oriented lifelong learners serving humanity through evidence-based practices.

Mission Component	Curricular outcome in alignment with the mission component
Compassionate	Skillful in History taking and Physical examination to compassionately deal with a patient
Professional	Display professional values (honesty, accountability, cultural and religious sensitivity) that embody good medical practice.
Healthcare leaders	Demonstrate exemplary conduct and leadership in Advancing healthcare, enhancing medical education, and enhancing the trust of the public in the medical profession by being exceptional role models
Knowledgeable	Knowledgeable about the diseases and health conditions prevalent in the population of Pakistan.
Skilful	Skillful in History taking and Physical examination.
Community-oriented	Take appropriate decisions and actions for protecting and promoting the health of their community.
Lifelong learners	Display professional values, attitudes and behaviors (empathy, ethics, good communication skills and lifelong learner) that embody good medical practice
Serving humanity	Evaluate critically the patient data to effectively deal with complexity of medical decisions for the best possible outcomes using evidence-based practices in service of humanity.
Evidence-based practices	use Evidence-based medicine to provide best possible cost-effective care

Alignment of curricular outcomes with the University vision

KMU Vision

Khyber Medical University will be the global leader in health sciences academics and research for efficient and compassionate health care.

Vision Component	Curricular outcome in alignment with the vision component
Leader in Health sciences academics	Demonstrate exemplary conduct and leadership in Advancing healthcare and enhancing medical education. Knowledgeable about the diseases and health conditions prevalent in the population of Pakistan. Display professional values (honesty, accountability, cultural and religious sensitivity), attitudes and behaviors (empathy, ethics, good communication skills and lifelong learner) that embody good medical practice.
Research	Exhibit a spirit of inquisitiveness, inventiveness, and ethical conduct while carrying out research in accordance with the prescribed guidelines.
Efficient and compassionate health care	Skillful in History taking and Physical examination to compassionately deal with a patient. use Evidence-based medicine to provide best possible cost-effective care

Alignment of curricular outcomes with the Institutes vision

KGMC Vision

Excellence in healthcare, research, teaching, and training in the service of humanity.

Vision Component	Curricular outcome in alignment with the vision component
Excellence in healthcare	Knowledgeable about the diseases and health conditions prevalent in the population of Pakistan. Skillful in History taking and Physical examination to compassionately deal with a patient Display professional values (honesty, accountability, cultural and religious sensitivity), attitudes and behaviors (empathy, ethics, good communication skills and lifelong learner) that embody good medical practice. Demonstrate exemplary conduct and leadership in Advancing healthcare, enhancing medical education, and Enhancing the trust of the public in the medical profession by being exceptional role models
Research	Exhibit a spirit of inquisitiveness, inventiveness, and ethical conduct while carrying out research in accordance with the prescribed guidelines.
Teaching and training	Demonstrate exemplary conduct and leadership in Advancing healthcare, enhancing medical education, and Enhancing the trust of the public in the medical profession by being exceptional role models
service of humanity	Evaluate critically the patient data to effectively deal with complexity of medical decisions for the best possible outcomes using evidence-based practices in service of humanity.

MBBS Five-Year Plan

First Year MBBS													
Foundation I	Viva	Blood I	Block A Exam	MSK I	Viva	MSK I	Block B Exam	CVS I	Viva	RS I	Block C Exam	Preps	KMU Professional Examination
6 weeks		5 weeks		9 weeks				5 weeks		4 weeks		4 weeks	
PRIME: Professionalism, patient safety, Research, Identity, Management and Leadership, Ethics, Effective communication													

Second Year MBBS													
NS IA	Viva	NS IB	Block D Exam	GIT I	Viva	Renal I	Block E Exam	Endo I	Viva	Rep I	Block F Exam	Preps	KMU Professional Examination
6 weeks		5 weeks		9 weeks		3 weeks		4 weeks		3 weeks		4 weeks	
PRIME: Professionalism, patient safety, Research, Identity, Management and Leadership, Ethics, Effective communication													

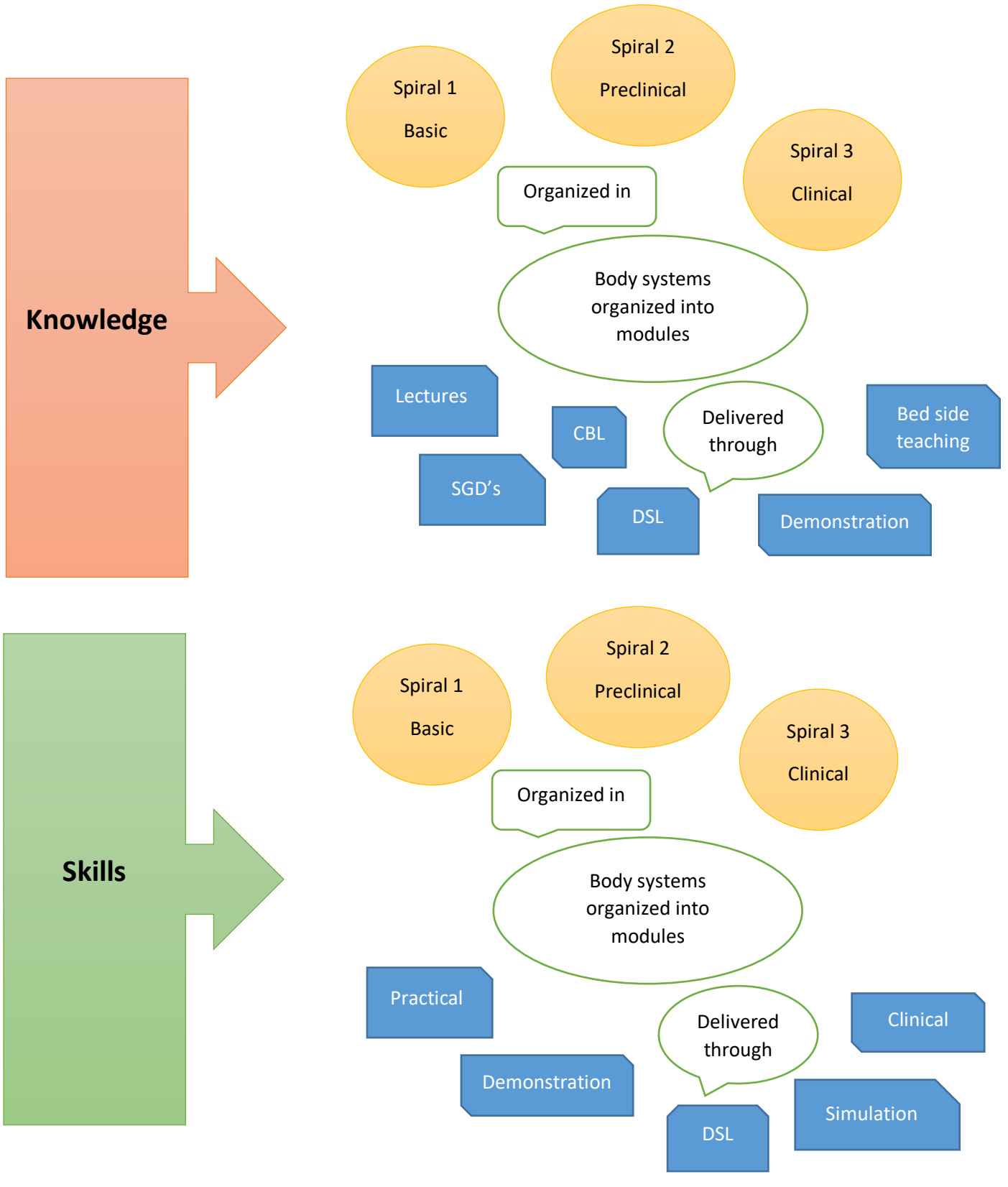
Third Year MBBS													
Foundation II	Viva	Infection and inflammation	Block G Exam	Blood II & MS	Viva	MSK II	Block H Exam	CVS II	Viva	RS II	Block I Exam	Preps	KMU Professional Examination
5 weeks		6 weeks		3 + 4 weeks		5 weeks		4 weeks		3 weeks		4 weeks	
PRIME: Professionalism, patient safety, Research, Identity, Management and Leadership, Ethics, Effective communication													

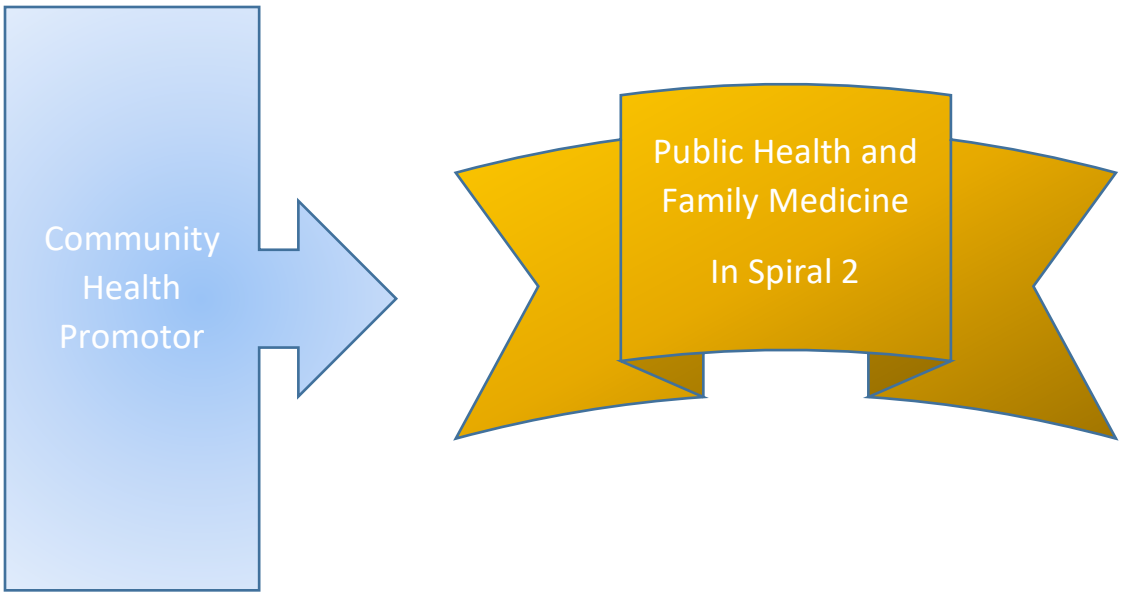
Fourth Year MBBS													
NS II	Viva	NS II	Block J Exam	GIT II & Hepatobiliary	Viva	GIT II & Hepatobiliary	Block K Exam	Renal II	Viva	Endo + Rep II	Block L Exam	Preps	KMU Professional Examination
10 weeks				8 weeks				3 weeks		9 weeks		4 weeks	
PRIME: Professionalism, patient safety, Research, Identity, Management and Leadership, Ethics, Effective communication													
Eye and ENT modules would be covered throughout the year and assessed under the Block exams of M1 and M2													

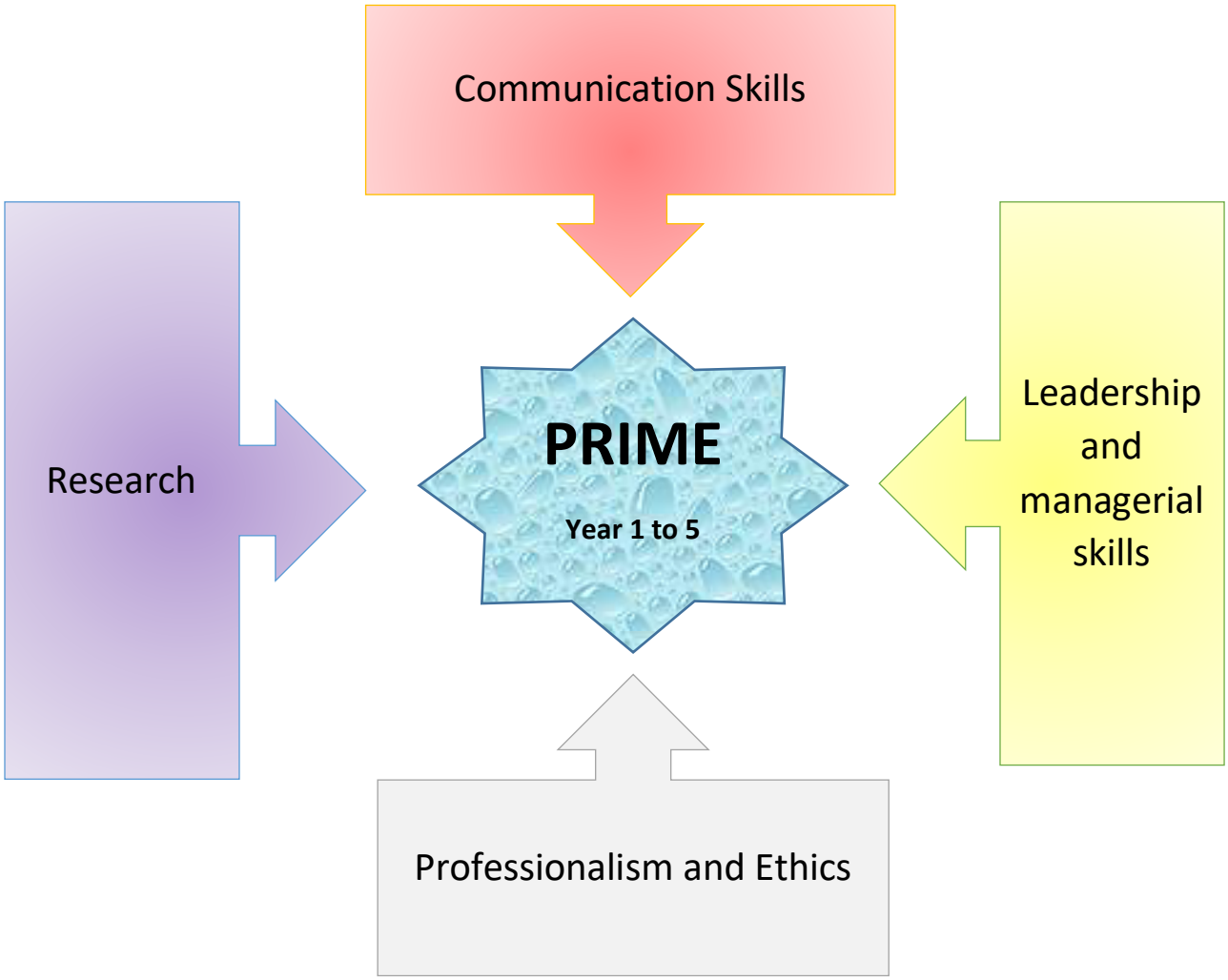
Final Year MBBS								
Medicine and Allied Rotation	End of rotation Exam	Surgery and Allied Rotation	End of rotation Exam	Gyne & Obs + Pediatrics Rotations	End of rotation Exam	Block Exams of N, O, P, Q	Preps	KMU Professional Examination
11 weeks		11 weeks		5.5 + 5.5 weeks			8 weeks	
PRIME: Professionalism, patient safety, Research, Identity, Management and Leadership, Ethics, Effective communication								

Curricular Map

Program Outcomes	Content




Community Health Promotor
Public Health and Family Medicine
In Spiral 2


Communication Skills
Research
PRIME
Year 1 to 5
Leadership and managerial skills
Professionalism and Ethics

First Year MBBS Academic Calendar

Module / Activity		**Duration**
Foundation I Module	**PRIME.** Professionalism, patient safety, Research, Identity, Management and Leadership, Ethics, Effective communication	6 weeks
Viva		
Blood I Module		5 weeks
Block A Exam		
Musculoskeletal System I		9 weeks
Viva		
Musculoskeletal System I		
Block B Exam		
Cardiovascular System I		5 weeks
Viva		
Respiratory System I		4 weeks
Block C Exam		
Preps		4 weeks
KMU Professional Examination		

FIRST YEAR MBBS, BLOCK A: FOUNDATION MODULE

SNO	Theme	Duration
1	Orientation	1 week
2	Cell	1 week
3	Growth & Development of Human Body	2 weeks
4	Human Body tissues, bones & joints	2 weeks

General Learning Outcomes

By the end of this module the students would be able to;

Knowledge

1. Familiarize with the MBBS system-based curriculum
2. Recognize the role of different disciplines in studying human body and its diseases.
3. Describe the structure, function and biochemical composition of cell.
4. Describe the cell division, its types and genetic material along with its clinical correlation.
5. Describe the basic organization of human body.
6. Explain the maintenance of homeostatic mechanism.
7. Describe the various stages of pre embryonic human development and correlate them with various malformations.
8. Describe the importance of buffer and PH system.
9. Describe various cellular adaptations during cell growth, differentiation and cell injury.

Skills

1. Describe the basic laboratory techniques and use of microscope.
2. Follow the basic laboratory protocols.
3. Perform biochemical analysis of carbohydrates.

Attitude

1. Follow the basic laboratory protocols.

2. Participate in class and practical work efficiently.
3. Maintain discipline of the college.
4. Follow the norms of the college properly.
5. Communicate effectively in a team with colleagues and teachers.
6. Demonstrate professionalism and ethical values in dealing with patients, cadavers, colleagues and teachers.
7. Communicate effectively in a team with colleagues and teachers.
8. Demonstrate the ability to reflect on the performance.

Foundation Module: Specific Learning Objectives

By the end of this module the students of first year MBBS should be able to:

THEME–I: Orientation

SNO	Topic	Learning Outcomes
ANATOMY		
1	Anatomy and its subbranches	Define anatomy and its branches Describe purpose of study of anatomy and its branches
PHYSIOLOGY		
2	Physiology and its subbranches	Enumerate the branches of physiology
BIOCHEMISTRY		
3	Introduction to biochemistry and its implication in medicine	Define biochemistry Discuss the role of biochemistry in medicine.
PATHOLOGY		
4	Introduction to pathology and its implication in medicine	Define pathology Enumerate the different branches of pathology. Identify different sampling and processing techniques in different branches of pathology.
PHARMACOLOGY		
5	Introduction to pharmacology and its role in modern medicine	Define pharmacology and role of pharmacology in medicine. Define the pharmaco dynamics and pharmacokinetics
COMMUNITY MEDICINE		
6	Introduction to community Medicine and its implication	Describe Role of community medicine/public health in health care system.
FORENSIC MEDICINE		
7	Introduction to Forensic Medicine and Toxicology	Define Forensic Medicine, forensic pathology and state Medicine. Identify the Branches of Forensic Medicine. Describe the History of Forensic Medicine. Discuss the scope of Forensic Medicine. Identify the essential facilities for medico legal investigation. Define Medical Jurisprudence (not included for assessment in foundation module first year MBBS)
8	Pakistan Medical Commission, Consent.	Describe the structure and functions of Pakistan Medical Commission.
MEDICAL EDUCATION		
9	Curriculum structure Teaching learning strategies	Discuss the curriculum and modules. Describe the use of study guides. (not to be assessed) Differentiate between various teaching & learning strategies. Enlist various assessment tools & assessment policy. (Not to be assessed).
IT Skills		
10	Importance of IT skills	Define IT and its importance
11	MS word skills	Prepare the assignment on MS word

	PowerPoint skills Excel sheet	Prepare the presentation on power point Use the excel sheet
Library		
12	Literature search and library resources	Literature search skills

THEME–II: CELL		
SNO.	Topic	Learning Outcomes
ANATOMY		
13	Cell structure and its Organelles	Describe the cell as a living unit of body Describe the structure of cell and its organelles. Describe the structure of cytoplasmic organelles of the cell & correlate it with their functions.
14	Nuclear structure & components	Describe the structure of the nucleus, nucleolus & chromosome and their functions in cell integrity.
15	Cell division Mitosis	Explain the process of cell division. Describe mitotic cell division with its stages.
16	Meiosis	Explain the process of Meiosis Describe karyotyping. Explain the non-disjunction of chromosomes. Correlate the process of non-disjunction with chromosomal abnormalities
PHYSIOLOGY		
17	Cell membrane physiology	Explain Intra cellular and extra cellular environment. Correlate cytoplasmic organelles with their functions.
18	Homeostasis	Define homeostasis. Describe the Homeostatic mechanism of major functional systems. Describe the characteristics of control systems with examples
19	Membrane potential	Define membrane potential Describe ionic conc. differences across cell membrane Explain the Nernst equation. Explain origin of normal resting membrane potential
20	Movements of cell	Explain the amoeboid movement of cells. Describe the ciliary movements
21	Depolarization & Repolarization	Explain the role of voltage gated Na+ and K+ channels in action potentials. Discuss the changes in conductance of Na and K channels with changes in membrane potentials
BIOCHEMISTRY		
22	Biochemical structure of cell Biochemical structure of Mitochondria	Explain the Bio-chemical composition of cell organelles and cytoplasm Describe the chemical structure of mitochondrial membrane. Explain the biochemical importance of mitochondrial membrane.
23	Nuclear membrane	Describe Bio-chemical structure of nuclear membrane and its functions.
24		Define and explain nucleotides and nucleosides.

	RNA & DNA	Describe the components of nucleotides Describe the functions of Nucleotides Describe the types of nucleic acids Differentiate between RNA and DNA..
25		
26	Buffer	Define Buffer and its role in maintenance of body PH Define colloidal state and Henderson Hasselbalch equation. Define adsorption and how it occurs. Explain ion exchange resin
27	Cellular membrane transport mechanism	Explain membrane transport. Discuss passive diffusion, active transport, and facilitated transport via a channel or carrier. Describe and evaluate the role of ion gradients, co transporters, and ATP in active transport mechanisms.
PATHOLOGY		
28	Cell injury	Describe the various causes of cell injury. Describe the response of a normal cell to stimuli. Describe the mechanisms of cell injury. Describe the different types of cellular adaptations.
PHARMACOLOGY		
29	Routes of administration of drugs	Enlist the route of administration of a drug.
30	Transmembrane drug transport	Explain how drugs are transported across cell membrane and factors affecting it
31	Receptor and cellular basis	Enlist the types of drug receptors
LAB WORK		
32	The Microscope	Identify parts of microscope. Demonstrate operation of microscope. Describe the method of focusing slide at different magnifications. Follow the specified norms of lab work.
33	Lab Equipment	Introduction to lab techniques Identify the equipment used in lab work
34	PH and buffer solutions	Define normal solution Define standard solution. Prepare 0.1N solution of NaOH. Prepare 0.1N solution of HCL. Measure the PH of given solution (practical).

THEME–III: GROWTH & DEVELOPMENT OF HUMAN BODY		
SNO	Topic	Learning Outcome
35	Introduction to Embryology	Describe the developmental stages. Describe the embryologic terminology. Explain significance of embryology.
36	Spermato-Genesis	Describe the process of spermatogenesis. Differentiate between spermiogenesis and spermatogenesis. Describe the morphological changes during maturation of gametes.
37	Oogenesis	Describe oogenesis and its correlation with meiosis. Compare the male and female gametes.
38	Transport Of Gametes	Explain the transport of gametes. Describe the transport of sperms. Describe the oocyte transport. Explain the maturation of sperms.
39	Female reproductive cycle	Describe the ovarian cycle. Discuss the process of follicular development Explain the process of ovulation. Correlate ovulation with the phases of menstrual cycle.
40	Fertilization –Events	Define fertilization. Describe the process of fertilization. Explain assisted reproductive technologies like In-vitro fertilization (IVF), assisted IVF and intra cytoplasmic sperm injection (ICSI).
41	Fertilization –Clinical Correlates Cleavage & Blastocyst Formation	Discuss the clinical correlation of the fertilization. Describe the process of cleavage of zygote. Discuss the formation of blastocyst. Summarize the events of first week of development.
42	Implantation & Its Abnormalities	Describe the process of implantation. Enumerate the sites of implantation. Explain the clinical correlations of the implantation process.
43	Amniotic cavity	Describe the formation of amniotic cavity Describe the development of embryonic disc Describe the development of umbilical vesicle. Explain the development of Chorionic sac.
44	Events Of 2nd Week of Development	Summarize the events of second week of development. Explain the clinical correlates of the second week of development.
45	Formation of Notocord	Explain the process of formation of Notocord
46	Events of 3rd Week of Development	Describe the process of gastrulation. Explain the process of Neurulation. Explain the development of somites. Describe the development of intra-embryonic coelom.

47	Derivatives of germ layers	Describe briefly derivatives of germ layers Ectoderm Mesoderm Endoderm
48	Further development of Trophoblast and Neuralation	Describe the process of development of Trophoblast and neurulation
50	Fetal membranes	Describe the formation of fetal membranes
51	4th week: Folding of embryo	Describe the process and types of folding of embryo
52	Highlights of 4-8 weeks	Enlist the events occurring in 4-8 weeks of development
BIOCHEMISTRY		
47	Chemistry of Acids and Bases	Define acids, bases Describe strong acids and weak acids. Describe strong bases and weak bases. List different types and sources of acids and bases in our body Describe the mechanism of their normal balance and biochemical importance
48	Importance of surface tension and viscosity in our body	Explain surface tension, viscosity, vapor pressure, normal boiling point and capillary action
49	Carbohydrates -I	Describe carbohydrates and give their Bio-chemical importance. Classify Carbohydrates Explain carbohydrate and its Bio-chemical structure. Describe the different isomers of monosaccharides. e.g. Galactose, mannose, fructose, dextrose. Describe the role of dextrose in I/V infusion. Describe the role of mannitol in cerebral edema.
50	Carbohydrates -II	Describe the structure of disaccharides and oligosaccharides.
51	Carbohydrates -III	Relate the structure of polysaccharides with its clinical importance. List the functions of carbohydrates in cell membrane, energy provision and nutrition supply to different parts of body.
COMMUNITY MEDICINE		
52	Determinants of health	Define health Describe the Determinants of Health
53		Describe Spectrum of Disease

	Disease causation	Explain Natural History of Disease Explain Theories of Disease Causation. Differentiate between Disease Elimination and Eradication.
54	Chain of infection	Describe reservoirs of infection & chain of infection
55	Levels of prevention	Discuss /describe Levels of Prevention
LAB WORK		
56	Sterilization	Explain the process of sterilization Enumerate the different methods of sterilization Observe the process of autoclaving in the laboratory
57	Capillary Blood Sampling	Obtain capillary blood sample for hematological investigations through prick method Identify the sites for obtaining blood sample with different methods and list the indications for their use.
58	Detection of Monosaccharide's	Define Monosaccharide's Discuss structure and types Perform the sequence of tests to identify the monosaccharides in a given solution.
59	Detecting of Reducing and non-reducing Sugars	Define reducing sugars, types. Discuss structure and types of reducing sugars Perform Benedicts test
60	Detection of Polysaccharides in a given Solution	Define Polysaccharides. Discuss structures and types of Polysaccharides Perform the sequence of tests to identify the polysaccharides in a given solution.

THEME–IV: HUMAN BODY TISSUES, BONES & JOINTS		
SN0	Topic	Learning Outcome
ANATOMY		
61	Organization of human body	Describe the levels of organization of human body
62	Anatomical terms	Describe the anatomical terms for planes, position and movements
63	Classification of Bones	Describe the structure and function of bone Classify bones on the basis of length and shape. Identify the markings on bone
64	Cartilage	Describe cartilage Classify the types of cartilage Describe the types of cartilages
65	Introduction to Joints	Classify joints on the basis of structure. Describe the mechanism of movements of joint
66	Muscles	Describe various muscle types along with structure.
67	Skin / Integumentary system Skin (dermis & epidermis) Skin creases, Nails, Hairs, Glands (Sebaceous & sweat)	Discuss the anatomical structures of Skin / Integumentary system
68	Lymphatic system	Describe the lymphatic system.

		Explain the functions of lymphatic system Describe the organization of lymphatic system Explain the mechanisms for the movement of lymph in the body.
69	Nervous system Divisions (central & peripheral and somatic & autonomic)	Define the organization of nervous system Describe the divisions of nervous system Describe the formation of spinal nerve and concept of dermatome and myotome Describe the formation of nerve plexus.
70	Autonomic Nervous system Sympathetic. parasympathetic nervous system	Describe the organization of autonomic nervous system Differentiate between sympathetic and parasympathetic nervous system on the basis of structure.
71	Membranes: Mucous membranes, Serous membranes	Describe the structure of membranes of human body
72	Fascia, ligaments and raphe	Describe the anatomy and significance of fascia, ligaments and raphe.
73	Radiological anatomy	Identify various anatomical landmarks on radiography. Describe commonly used radiographs. Describe various view used for obtaining radiographs.
HISTOLOGY		
74	Basic Body tissue Definition of tissue Epithelial tissue Connective tissue Muscular tissue Nervous tissue	Define tissue Describe the basic tissues in human body
75	Epithelial tissues Classification of epithelium General characteristics and Functions of epithelium	Classify epithelium describe the general features of epithelium explain the specialized functions of different types of epithelial cells Describe the structure of main types of cell junctions
76	Glandular Epithelium	Enlist glandular epithelia Classify them on the basis of morphology, nature of secretion and mode of secretion Differentiate between exocrine & endocrine glands on the basis of structure and function.
77	Epithelial Cell Surface Specialization	Describe the surface specialization of epithelia Correlate their structure, with their location and function
78	Structure & Function of Basement Membrane	Describe the structure of basement membrane & correlate it with its function.
79	Connective tissue	Define connective tissue. Classify connective tissues. Explain the different types of Connective tissues
Physiology		
80	Autonomic Nervous system	Describe the functions of the autonomic nervous system.

		Compare and contrast the functions of sympathetic and para sympathetic nervous system. Classify autonomic receptors.
Biochemistry		
81	structure and function of GAGS	Describe the structure and function of GAGS and its clinical importance
PATHOLOGY		
82	Necrosis	Discuss the Process of necrosis Explain the process of apoptosis Differentiate between apoptosis and necrosis
83	Inflammation	Describe acute inflammation Describe events of acute inflammation Describe chronic inflammation Differentiate between acute and chronic inflammation.
FORENSIC MEDICINE		
84	Death	Define death. Describe stages of death. Describe medico legal importance of stages of death.
LAB WORK		
85	Tissue Processing	Describe the process of tissue processing for histo-pathological examination.
86	Anatomical terms	Demonstrate anatomical terms for planes, position and movements. Demonstrate standard anatomical position and its application.
87	H& E staining	Perform H & E staining of tissue slides under supervision in the laboratory
88	Simple Epithelia	Identify and describe simple epithelia under M/S.
89	Stratified Epithelia	Identify and describe stratified epithelia under M/S.
90	Glands	Identify different types of glands under M/S.
91	Smear preparation	Prepare a blood smear.

FIRST YEAR, BLOCK A: BLOOD MODULE

SNO	Theme	Duration
1	Pallor and swelling	2 weeks
2	Fever (Infection and Immunity)	2 weeks
3	Excessive bleeding & Transfusion Reaction	1 week

General Learning Outcomes

By the end of this module, first-year MBBS students shall be able:

COGNITIVE DOMAIN

1. Identify & describe the various cellular and non-cellular components of blood in relation to its Anatomy, Physiology & Biochemistry
2. Describe structure, synthesis and degradation of Hemoglobin
3. Describe the regulatory mechanisms of normal hemostasis and coagulation
4. Describe the conditions associated with dysfunction of cellular and non-cellular components of blood
5. Describe the basic characteristics of immune system.
6. Discuss the structure, functions and biochemical aspects of the Lympho-reticular system.
7. Explain the principles and clinical significance of ABO/RH blood grouping system
8. Explain the pathophysiology of various bleeding disorders
9. Identify the role of pharmacology in anemia and bleeding disorders.

PSYCHOMOTOR DOMAIN

10. Carry out practical work as instructed in an organized and safe manner
11. Make and record observations accurately.
12. Identify the slide of the Lymph node, thymus, tonsils and spleen under microscope
13. Identify slide of Gut associated lymphoid tissue
14. Determine percentage of formed blood elements.
15. Identify RBC and should be able to do its counting on counting chamber and to know normal values. And also classify Anemia morphologically.
16. Determine the Hemoglobin with the apparatus and have knowledge of normal and abnormal value.
17. Identify WBC morphology and its different types, should be able to count them on counting chamber and to know the normal values. Diagnostic importance of each WBC.
18. Identify Platelets and should be able to do its counting on counting chamber and to know normal values. Its diagnostic importance in relation to bleeding disorders
19. Perform bleeding time and clotting time and to know normal values and its diagnostic importance in relation to bleeding disorders.
20. Perform Blood groups typing and Rh factor.
21. Perform ESR and to know its normal value and prognostic importance.
22. Detect blood, bile pigments & bile salts in the given sample of urine

ATTITUDE AND BEHAVIOUR

23. Demonstrate ability to give and receive feedback, respect for self and peers.
24. Demonstrate empathy and care to patients.
25. Develop respect for the individuality and values of others - (including having respect for oneself) patients, colleagues and other health professionals
26. Organize& distribute tasks

27. Exchange opinion & knowledge

28. Develop communication skills and etiquette with sense of responsibility.

29. To equip themselves for teamwork

30. Regularly attend the classes

31. Demonstrate good laboratory practices

Blood Module: Specific Learning Objectives

By the end of this module the students of first year MBBS should be able to:

THEME –I: Pallor and Swelling

SNO	Topic	Learning Outcomes
ANATOMY		
1	Introduction to hematopoietic system	1. Describe various components of hematopoietic system including their locations and their functions 2. Describe surface anatomy and applied anatomy of main organs of hematopoietic system 3. Define and classify lymphoid organs and lymphoid tissues
PHYSIOLOGY		
2	Introduction to Blood	4. Describe the composition and functions of blood 5. Define Hematocrit 6. Enlist the components of plasma 7. Explain the difference between Serum and plasma
3	Red Blood Cells	8. Describe the structure, function, life span and normal count of Red Blood Cells. 9. Define Haemopoiesis 10. Classify haematopoitic stem cells 11. Summarize the erythropoiesis sites during pre-natal and post-natal periods.
4	Red Blood Cells Genesis Erythropoiesis	12. Illustrate the stages of RBC development from pluripotent hematopoietic stem cells to a mature RBC. 13. Describe the erythropoiesis and factors regulating erythropoiesis 14. Describe the role of Vitamin B12 and Folic acid in RBC maturation. 15. Describe the effects of deficiency of Vita- min B12 and Folic acid on RBC maturation.
5	Erythropoitin	16. Describe source, control / regulation and functions of Erythropoitin

		17. Explain the role of Erythropoietin in RBC production. 18. Describe the effects of high altitude and exercise on RBC production.
6	Anemia	19. Define and describe the different types of anemia 20. Define hemolysis 21. Describe the various red cell indices 22. Interpret the diagnosis of anemia by using red cell indices 23. Describe the effects of anemia on functions of circulatory system / human body
7	Polycythemia	24. Define and classify polycythemia 25. Differentiate between primary and secondary Polycythemia
BIOCHEMISTRY		
8	Introduction of Porphyrins	26. Define Porphyrins 27. Describe Chemistry of Porphyrins 28. Enlist the types, metabolic causes and clinical presentation of different types of Porphyrias.
9	Iron metabolism	29. Describe the iron metabolism
10	Introduction to heme synthesis and degradation	30. Define heme and describe its structure and functions 31. Describe the biochemical features of the hemoglobin molecules 32. Describe Heme Synthesis on cellular and molecular level 33. Describe Heme Degradation 34. Describe the Regulation of Heme Synthesis. 35. Describe the concept of Oxygen binding with hemoglobin 36. Describe the normal picture of blood chemistry.
11	Hemoglobinopathies	37. Define Hemoglobinopathies and enlist the variants of hemoglobin 38. Describe causes of Hemoglobinopathies 39. Describe two major categories of hemoglobinopathies 40. Describe the amino acid substitution in sickle cell disease. 41. Define and Classify thalassemias. 42. Explain the genetic defects in α and β thalassemias.

		43. Enlist the clinical features of α and β thalassemias
12	Water soluble vitamins	44. Discuss water soluble vitamins including Vitamin B complex Vitamin C Folic Acid
PATHOLOGY		
13	Anemia's of diminished erythropoiesis	45. define anemia 46. List the factors for regulation of erythropoiesis 47. Enlist the types of anemia
14	Hemolytic anemia's	48. Define hemolytic anemia. 49. Enlist types of hemolytic anemia.
PHARMACOLOGY		
15	Drug treatment of anemia's	50. Enlist the drugs used in the treatment of iron deficiency & Megaloblastic anemia 51. Describe the pharmacological basis/ role of iron in iron deficiency anemia (hypochromic normocytic anemia) 52. Describe the pharmacological basis/ role of vit B12 and folic acid in megaloblastic anemia 53. Describe the role of Erythropoietin in the treatment of Anemia (normochromic normocytic anemia)
COMMUNITY MEDICINE		
16	Epidemiology of blood borne diseases	54. Describe Epidemiology of Iron Deficiency Anemia 55. Describe prevention of different types of anemia's in community

LAB WORK		
ANATOMY PRACTICAL (HISTOLOGY)		
17	Histology	56. Identify and describe the microscopic anatomy of lymph node, thymus, bone marrow and spleen under microscope 57. Compare the histological features of lymph node, thymus and spleen

PHYSIOLOGY PRACTICAL		
18	Hemoglobin determination	58. Assist in phlebotomy while practicing aseptic procedure. 59. Determine the hemoglobin (Hb) concentration in the given sample 60. Estimation of hemoglobin by Sahli's method 61. Determination of packed cell volume
19	Blood cells	62. Identify and describe various blood cells under microscope.
20	RBC count	63. Determine the red blood cell (RBC) count in the given sample and calculate RBC indices
THEME –II: Fever (Infection and Immunology)		
SNO.	Topic	Learning Outcomes
ANATOMY		
23	Gross anatomy of hematopoietic system	64. Locate, identify and describe the main gross external features of spleen, lymph node, thymus and tonsils 65. Describe neurovascular supply of the mentioned structures 66. Outline the surface anatomy of main lymph nodes, spleen, thymus and tonsils 67. Enlist the causes of splenic injuries
24	Histology of lymphoid tissues	68. Describe the overview of lymphatic tissue including MALT 69. Identify and describe the histological features and functions of Lymph node 70. Identify and describe the histological features and functions of Thymus 71. Identify the locations of tonsils and describe the histological features and functions of Tonsils 72. Describe the histological features and functions of spleen.
25	Embryology/ Developmental Anatomy of lymphoid tissue	73. Describe the development of lymphoid organs including lymph nodes, tonsils, thymus and spleen
PHYSIOLOGY		
26	White Blood Cells	74. Classify white blood cells 75. Describe the structure, function, life span and normal count of White Blood Cells

		76. Describe the stages of differentiation of white blood cells (leukopoiesis) 77. Describe the characteristics of WBCs (phagocytosis / chemotaxis, diapedesis)
27	Reticulo-endothelial (Monocyte-Macrophage) system	78. Describe the components of reticulo-endothelial system (monocyte-macrophage system) 79. Describe the role of monocyte macrophage system in immunity 80. Explain the role of neutrophils, macrophages, basophils, eosinophils and monocytes in providing immunity against infections (immune system)
28	Inflammation	81. Define inflammation 82. Describe characteristics of inflammation (hallmark of inflammation) 83. Describe the causes, sequence of events and cardinal signs of inflammation
29	Abnormal leukocyte counts/ Leukemia	84. Define Leukopenia and Leukocytosis and Leukemia
30	Introduction to immunity	85. Define and classify immunity 86. Define antigen 87. Define pathogen 88. Enlist the tissues that contribute to immunity and explain their function 89. Describe the functions of immune system 90. Describe the structure and function of lymphatic system
31	Immune system	91. Enlist the three lines of defenses and outline their properties 92. Describe the characteristics, origin and functions of cells of immune system 93. Describe the types of immunity 94. Enlist the innate defenses 95. List the substances and cells that participate in adaptive immunity 96. Compare the characteristics innate and acquired immunity 97. Compare the active and passive immunity mechanism
32	Immune response	98. Differentiate between primary and secondary immune response

		99. Describe the roles of cytokines, chemokines, and colony-stimulating factors in the immune response
33	Humoral and cell mediated immunity	100. Describe the role of T and B lymphocytes in immunity 101. Describe the role of B lymphocytes in humoral immunity 102. Describe cell mediated and humoral immunity 103. Explain how helper T cells regulate the immune system 104. Explain the function of cytotoxic T cells 105. Describe the role of helper T cells 106. Differentiate between humoral and cell mediated immunity
34	Complement system	107. Describe the complement system 108. Explain how the complement system elicits the inflammatory response, lyses foreign cells, and increases phagocytosis 109. Describe the two pathways that activate the complement system 110. compare Classic and alternate pathways pathways of complement activation
35	Immunity: extremes of ages	111. Compare the active and passive immunity 112. Explain the transfer of passive immunity from mother to fetus and from mother to infant during breast-feeding 113. Describe changes in immune response that occurs with aging
36	Allergy & Hypersensitivity	114. Define allergy and allergen 115. Describe the pathophysiology of allergy and hypersensitivity 116. Define and classify the hypersensitivity reaction 117. Compare the immediate and delayed hypersensitivity reactions 118. List the diseases associated with hypersensitivity reactions
Biochemistry		
37	Immunoglobulin's / Antibodies	119. Define Immunoglobulin's 120. DESCRIBE Types of Immunoglobulin's 121. Describe Structure of Immunoglobulin's 122. Describe the mechanism of action of antibodies 123. Explain biochemical role of each immunoglobulin in immunity
COMMUNIUTY MEDICINE		

38	Vaccinology	146. Define vaccine and immunization 147. Explain the expanded program of immunization (EPI) in Pakistan
LAB WORK		
PHYSIOLOGY PRACTICAL		
39	TLC determination	148. Determine the total leukocyte count (TLC) in the given sample
40	DLC determination	149. Determine the differential leukocyte count (DLC) in the given sample

THEME –III: Excessive Bleeding		
PHYSIOLOGY		
SNO	Topic	Learning Outcome
41	Introduction to hemostasis	150. Describe the structure, function, life span and normal count of Platelets. 151. Define hemostasis 152. Describe the role of platelets in hemostasis 153. Outline the sequence of processes involved in hemostasis.
42	Blood Coagulation	154. Enlist the clotting factors 155. Explain the role of calcium in coagulation 156. Explain how clotting is prevented in the normal vascular system 157. Outline the sequence of processes during blood coagulation 158. Describe with the help of a flow diagram (or draw) intrinsic pathway of coagulation cascade 159. Describe with the help of a flow diagram (or draw) extrinsic pathway of coagulation cascade 160. Explain how the mechanism of clot dissolution.
43	Bleeding disorders	161. describe the role of Vit K in clotting 162. Describe the following bleeding disorders - Vitamin K deficiency - Thrombocytopenia

		- Hemophilia 163. Define Von Willebrand disease
44	Thrombotic disorders	164. Describe the effects of low platelet count on Hemostasis 165. Define thrombus/thrombi 166. Define emboli/embolus 167. Enlist the causes of thromboembolic conditions 168. Describe Femoral venous thrombosis and pulmonary embolism
Pharmacology		
45	Coagulation modifying drug	169. Identify the site of action of following drugs in coagulation cascade • Aspirin, • Heparin, • Tranexamic acid • Vit K
LAB WORK		
46	Clotting time determination	170. Determine the clotting time
47	Bleeding time determination	171. Determine the bleeding time
48	Prothrombin time determination	172. Determine the Prothrombin time (PT) in the given sample

THEME –IV: Transfusion Reaction		
SN0	Topic	Learning Outcome
PHYSIOLOGY		
49	Blood Grouping	173. Describe different types of blood groups 174. Describe the genotype-phenotype relationships in blood groups. 175. Interpret the plausible blood groups (A-B-O) in children of parents with known blood groups. 176. Describe the role of agglutinogens and agglutinins in blood grouping

		177. Describe the antigens and antibodies of the O-A-B blood types/ Interpret the types of agglutinins present in individuals with a specific blood group 178. Describe the process of agglutination
50	transfusion reactions	179. Describe the antigens and antibodies of the Rh system 180. Describe the principles of blood typing 181. Explain universal donor and universal recipient blood groups 182. Enlist the manifestations of transfusion reaction
51	Erythroblastosis fetalis	183. Define Rhesus incompatibility 184. Describe erythroblastosis fetalis 185. Describe the transfusion reactions resulting from mismatched O-A-B and Rh blood types
52	Major histocompatibility complex	186. Define autoimmunity 187. Explain how immune reaction to self-antigens is avoided 188. Define and classify Major Histocompatibility complex (MHC) Characterize the significance and function of major histocompatibility complex molecules
Forensic Medicine		
53	Medico-legal importance of blood groups	189. Describe the Medico-legal importance of blood groups in forensic work that is (a) Personal Identity (b) inheritance claims (c) DNA profiling (d) Disputed paternity and maternity
COMMUNITY MEDICINE		
54	epidemiology of blood borne diseases	190. Identify important blood borne pathogens and how they are spread 191. Discuss the epidemiology of blood borne disease transmission and the potential for HIV, HBV and HCV transmission. 192. Identify routes of transmission of blood borne pathogens 193. Discuss the best practices to perform safe blood transfusion. 194. Identify potential exposure risks 195. List important safeguards against blood borne pathogen disease
LAB WORK (Physiology Practical)		
55	Blood grouping	196. Determine the O-A-B and Rh blood group in the given sample
56	Blood smear preparation	197. Prepare blood smear by thumb prick method.
70	Blood Bank	198. Observe the process of blood donation, blood product separation, screening and storage and observe the process of blood transfusion.

ASSESSMENT BLUEPRINT of BLOCK A

BLOCK A Paper: MCQs Distribution

Subject	Foundation module	Blood module	Total MCQs
Gross Anatomy	12	1	13
Histology	10	4	14
Embryology	15	0	15
Physiology	10	22	32
Biochemistry	14	12	26
PRIME including Research	5	3	8
Pharmacology	1	1	2
Pathology	2	4	6
Community medicine	1	2	3
Forensic medicine	0	1	1
Total	**70**	**50**	**120**

BLOCK A OSPE Outline

Subject	Foundation module	Viva stations	Blood module	Viva stations	Total OSPE stations (for final exam*)
Gross Anatomy	0	1	0	1	4
Histology	7		2		
Embryology			0		
Physiology	1	1	7	1	4
Biochemistry	4	1	2	1	4
Total	14	3	11	3	12+6 (viva)=18

*out of total of 25 OSPE stations, 12 will be allocated for final exam plus 6 viva stations. A minimum of 18 stations will be used in final exams.

FIRST YEAR, BLOCK B: MUSCULOSKELETAL SYSTEM

The Musculoskeletal system Module is designed to provide guidance on introduction to the basics of human musculoskeletal system. Moreover, the module is aligned to the general outcomes required at the exit level, and includes introductory sessions on preventive medicine, communication skills, professionalism, self- management, and developing scholarly skills. The module committee will facilitate the students with any issues that they have, while settling down in the new environment. You will also learn the skills required for practical implications in the field of medicine. Moreover, working within teams will enhance your co-operative and approachable working style

SNO	Theme	Duration
1	Orientation and shoulder pain	2 weeks
2	Weak grip and painful hand	1 week
3	Pain lower limb/limping	2 weeks
4	Bony arches and fracture of foot	1 week
5	Backache	1 week
6	Muscle weakness and fatigue	1 week

General Learning Outcomes

By the end of this module the students should be able to;

Knowledge

By the end of this module, students should be able to:

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

8. Describe the types, formation, stability, function & clinical significance of joints of the upper and lower limb.
9. Describe the basic histology of muscle fibers including its molecular structure (Sarcomere).
10. Explain the mechanism of excitation and contraction of skeletal and smooth muscles.
11. Describe the basis for the use of therapeutic agents to modulate neuromuscular transmission.
12. Describe the general principles of MSK pain management.
13. Describe ergonomics and its principles. Prevention of different MSK disorders.
14. Interpret the mechanism of post-mortem rigidity. (spiral II)
15. Give an overview of pathology of bones, muscles and joints.
16. Explain the role of different minerals, hormones and specific metabolic products related to the musculoskeletal system and correlate them with their relevant clinical metabolic disorders.
17. Interpret the relevant laboratory investigations for diagnosis of common musculoskeletal disorders. (Spiral two)
18. To develop the critical thinking and analysis in the context of various case scenarios pertaining to locomotors system.

Skills

By the end of this module, it is a core objective that students should have acquired the following skills:

1. Demonstrate the anatomical structures of the limbs in a dissected cadaver/Model/prosecuted specimen & X-ray.
2. Demonstrate the provision of first aid measures in case of a limb fracture.
3. Communicate effectively in a team with colleagues and teachers.

Attitude

While not necessarily taught explicitly, students are expected to develop following attitudes throughout the course:

1. Demonstrate respect and care for the cadaver and prosected parts.
2. Demonstrate humbleness and use socially acceptable language during academic and social interactions with colleagues and teachers.
3. Make ethically competent decisions when confronted with an ethical, social or moral problem related to MSKS in professional or personal life.
4. Discuss ethical issues social and preventive aspect of health care in the context of MSK system.
5. To create awareness about the ethical, social and preventive aspect of health care in the context of locomotor system.

Theme I: Orientation and shoulder pain		
SNO	Topic	Learning Outcomes
ANATOMY		
1	Introduction	Define osseous tissue Classify the skeletal system (axial and appendicular) Name and locate different bones of axial and appendicular skeleton Classify bones Describe general features of bones Describe Nerve/blood supply of bone Describe bone marrow and its types Describe ossification and its types Describe surface markings of bones Define fracture, osteoporosis, rickets, osteomalacia Introduction to muscular system Classify the muscles according to the directions of fibers Classify the skeletal muscles according to their action. Types of skeletal muscle fibers(Type1 ,2,3) Describe the nomenclature of skeletal muscles Describe the principle of innervations and nerve supply of muscles Define paralysis, hyperplasia, hypertrophy, mysthena gravis
2	Introduction to locomotion and upper limb	Identify the extent of the upper limb. Identify various regions of upper limb. Describe the division of the regions into compartments. State the contents of compartments of arm, forearm & hand Describe the joints of upper limb. Describe the clinical anatomy of upper limb
3	Osteology of clavicle	Recognize the bone Identify the site of bone State the bony land marks of clavicle: like borders, surfaces & land mark used for bone determination Describe & demonstrate the attachments of muscles. Describe the common fractures of the bone. Identify and describe the salient features of the bones scapula and clavicle Describe the surface anatomy clavicle Describe the radiological anatomy clavicle Describe the applied anatomy clavicle

4	Osteology of scapula	Recognize the bone. Identify the site of bone. State the bony landmarks of scapula: like borders, surfaces & land mark used for bone determination. Demonstrate the attachment of muscles on scapula Describe the common fractures of the bone. Identify and describe the salient features of the bones scapula. Identify the attachments to scapula Describe the surface anatomy scapula Describe the radiological anatomy scapula. Describe the applied anatomy scapula.
5	Osteology of humerus	Recognize the bone. Identify the site of bone. State the bony landmarks of humerus: like borders, surfaces & land mark used for bone determination. Demonstrate the attachment of muscles & ligaments. Describe the common fractures of the bone. Identify and describe the salient features of the humerus Identify the attachments to humerus Describe the surface anatomy humerus Describe the radiological anatomy humerus Describe the applied anatomy humerus

6	Muscles of the pectoral girdle	Recognize the role of muscles of pectoral region in stabilizing the pectoral girdle. List the muscle of pectoral girdle. Describe & Demonstrate the attachments of muscle of pectoral girdle, nerve supply and actions. Describe the structural organization of the clavi-pectoral fascia. Identify the triangle of auscultation. Describe the nerves and blood vessels of this region
7	Muscles of the shoulder region	Recognize the extent of shoulder region. Describe the muscle of shoulder region. List the muscles of shoulder region. State the detailed structures of each muscle with respect to Origin, Insertion, Nerve supply and Action of muscles with any characteristic features.
8	The shoulder joint & its movements	Classify the type of shoulder joint. Describe the structure of shoulder joint. Name the muscles acting on the joint/rotator cuff muscles. Explain the range of mobility. Describe the movements of shoulder joint. Explain the clinical anatomy of the joint
9	Brachial plexus	Mention the formation of brachial plexus (roots, trunk, division, and cords). Describe the relation of brachial plexus also in connection to clavicle (Supra, retro, infra clavicular parts). State the branches arising the different cords. Draw the brachial plexus. Describe the clinical correlates of the brachial plexus. Erb duchane palsy Klumpke palsy Saturday night palsy

10	Nerves of upper limb	Describe the course and branches of nerves of upper limbs. Axillary nerve Musculocutaneous nerve Radial Nerve Ulnar Nerve Median Nerve Explain the injuries associated with these nerves. Identify the causes and motor and sensory loss associated with nerve injuries of upper limb. Apply knowledge of gross anatomy to identify the deformities associated with these nerves.
	Axilla	Describe the position, shape of axilla. Describe the boundaries and content of axilla Describe the boundaries and muscle forming the boundaries of axilla. Describe the formation, course and relations of axillary vessels. Describe arrangement and groups axillary lymph nod
11	Arm	Describe the compartments of arm and how they are formed. Identify and explain the muscles and their actions found in the arm. Describe the nerve supply of arm. Describe the course of the nerves Identify the branches of the nerves Relate & integrate with the clinical correlations Describe cutaneous supply of arm.
12	Brachial vessels	Describe the extension, relation and branches of the Brachial artery. Describe the course of the Basilic and cephalic veins Describe and explain the formation and purpose of the scapular anastomosis.

13	Elbow joint	Identify the type of the joint. State and Identify the muscles acting on the elbow joint. Describe the neurovascular supply of the joint. Describe the carrying angle and applied aspect of the joint. Describe the anastomosis and collateral circulation. Describe formation of anastomosis around elbow joint
14	Osteology of ulna	Recognize the bone. Determine the side of bone. Identify the features of bone. Identify the muscles attached to bone. Describe the common fractures of the bone. Describe and Identify the salient features of the ulna Identify the attachments to ulna Describe the surface anatomy ulna and the radiological anatomy ulna Describe the applied anatomy ulna
15	Superficial veins, lymphatic's and lymph nodes of upper limb	Describe the normal anatomy of veins of upper limb. Differentiate between superficial and deep veins. Describe the features of individual superficial veins of upper limb. Correlate the applied anatomy with the gross anatomy of superficial Veins of upper limb. Describe the structure of a lymph node. Identify the groups of lymph nodes. Describe groups and area of drainage of each group of lymph nodes. Describe the commencement, course and termination of superficial lymphatic vessels. Describe the clinical conditions related to lymphatic channels of upper

16	Cubital fossa	Describe the boundaries, the contents and the relationship among structures of Cubital fossa. Demonstrate the surface anatomy of the Cubital fossa. Explain the clinical importance of the Cubital fossa.
17	Anterior compartment of forearm	List the muscles of forearm. State the nerve supply of these muscles. Explain actions of the muscles of anterior compartment of forearm. Describe attachment and functions of flexor retinaculum Identify/Describe muscles of the anterior compartment of the arm (origin, insertion, nerve supply, blood supply, and action)
18	Posterior compartment of forearm	Explain the organization of muscles of posterior compartment of forearm Identify/Describe muscles of the posterior compartment of the arm (origin, insertion, nerve supply, blood supply, and action) State the nerve supply of these muscles. Explain the actions of the muscles of posterior compartment of forearm. Describe the structural organization of the Extensor Retinaculum
19	Blood vessels & nerves of the forearm	Describe the different vessels & nerves in forearm. Describe the location, destination, course & relations of radial and ulnar arteries & their branches in forearm. Describe the deep veins of forearm and their tributaries. Describe the location, destination, course & relations of ulnar, radial and median nerves & their branch.
20	Radio-ulnar joint	Recognize the details of Radio-ulnar joint. Describe and explain the movements occurring on Radio-ulnar joint. Name the muscles acting in pronation and supination. Describe the nerve supply and blood supply of Radio-ulnar joint. Describe clinical problems related to Radio-ulnar joints.
21	Surface anatomy of upper limb	Demonstrate the surface markings for various arteries of upper limb
Embryology		

22	Somitogenesis	Define the process of gastrulation. Describe the development of mesoderm. Describe the process of somitogenesis. Describe the formation of cartilage
23	Development of bone , cartilage and joints	Describe histogenesis of Bone Describe the Intramembranous Ossification Describe the Endochondral Ossification Describe the Ossification of limb bones Describe the development of joints Describe the development of cartilage Describe developmental events of fibrous joints Describe developmental events of cartilaginous joint Describe developmental events of synovial joints Describe important congenital correlates
24	Development of upper limb	Describe the early stages of upper limb development Describe the development of upper limb buds Describe the final stages of upper limb development Describe and explain the anomalies of the upper limb
25	Development of muscles	Describe the development of skeletal muscle. Describe the development of Myotomes and derivatives of epaxial divisions of myotomes and derivatives of hypaxial divisions of myotomes
HISTOLOGY		

26	Bone histology	Define and identify compact and spongy bone Describe and identify bone matrix (organic and inorganic component) Describe and identify cells of boney tissue i.e. (osteoprogenitor, osteoblasts, osteoclast, and osteocytes) Describe and identify periosteum and endosteum Describe and identify the microscopic structure of bone i.e. (primary bone, secondary bone and haversian system) Describe Functions of various bone cells Describe important Functions and its role in calcium metabolism
27	Classification & histology of cartilage	Describe the General properties of cartilage Describe the Different types of cartilage Describe the Hyaline, Elastic and Fibrocartilage Explain the growth of cartilage
28	Histology of cartilage	Identify types of cartilages on microscopy, including distinctive features of each. Describe the structural basis. Classify and distinguish three types of cartilages Describe the microscopic structure of hyaline cartilage Describe the microscopic structure of Elastic cartilage Describe the microscopic structure of fibrous cartilage Describe important functional correlates of three types of cartilages
29	Classification & histology of bone	Recognize bone and its functions and ncomposition. Differentiate between woven bone and lamellar bone. Differentiate between compact bone and spongy bone. Describe the applied aspect of bone
30	Histology of bone	Identify three types of bone on microscopy, including distinctive features of each. Describe the structural basis of classification.

31	Histology of muscles	Identify three types of muscles on microscopy, including distinctive features of each muscle fiber. Describe the structural basis of muscle striations. Recognize the structural elements that produces muscle contraction and brings the movement of a body part. Recognize the function and organization of the connective tissue in muscle. Classify and distinguish three types of muscles Describe the microscopic structure of skeletal muscle Describe important functional correlates of skeletal, smooth Describe the microscopic structure of smooth muscle Identify/Describe the microscopic structure of cardiac muscle fiber Describe important functional correlates of cardiac muscle fiber
Physiology		
32	Skeletal vs smooth muscle	Differentiate between skeletal muscle and smooth muscle.
33	Mechanism of muscle contraction	Describe the general mechanism of muscle contraction. Describe the molecular mechanism of muscle contraction
34	Energetics of muscle contraction	Describe the energetics of muscle contraction.
35	Terms related to MSK	Describe the following terms related to MSK • Excitable tissue • Stimulus • Threshold • Depolarization • Hyperpolarization • Presynaptic potential • Post synaptic potential • Goldmann Equation • Nernst Equation
Biochemistry		
36	Connective tissues	Explain in detail the biochemistry of connective tissues.
37	Glycosaminoglycan	Discus the role of glycosaminoglycan (GAG) in the formation of the connective tissues, cartilage, skin, blood vessels and tendons
38	Collagen	Describe the chemical structures of cellular matrix of collagen and elastin

39	Chemistry of Amino acids and Proteins	Describe structure of amino acids & Proteins Classify proteins Describe different types of Plasma proteins
Biochemistry Practical		
40	Detection of Sulphur containing amino acids	Define Sulphur containing amino acids their structure and types Lead Sulphate test

Theme II: Weak grip and painful hand		
SNO	Topic	Learning Outcomes
ANATOMY		
1	Osteology of radius & hand	Recognize the bones of forearm & hand Determine side of bones. Identify the features of bones. Identify the muscles attached to bones. Describe the ossification of bones Explain the clinical significance of bones. Describe the common fractures of the bone. Describe and Identify the salient features of the radius Identify the attachments to radius Describe the surface anatomy radius and the radiological anatomy radius Describe the applied anatomy radius Describe and Identify the salient features bones of hand Identify the attachments to bones of hand Describe the surface anatomy main bones of hand and the radiological anatomy of main bones • Describe the applied anatomy main bones of hand including carpal tunnel and fractures
2	Muscles of hand	Recall the structure and functions of palmar aponeurosis. Describe the attachments, nerve supply & actions of muscles of hand.

		Describe the thenar Muscles. Correlate the movements of thumb with hand anatomy. Identify the anatomical snuffbox. Relate applied with gross anatomy of few structures of hand Enumerate, describe and identify the small muscles of the hand Describe Surface anatomy of important muscles of hand Identify structures on transverse MRI hand taken at various levels Describe relevant clinical anatomy of important muscles Identify/Describe joints of the hand and fingers (intercarpal joints, carpometacarpal and intermetacarpal joints, carpometacarpal joint of the thumb, and metacarpophalangeal joints Describe surface , radiological and clinical anatomy of important joints
3	Vessels & nerves of the hand	Identify different vessels in hand. Describe the location, destination course relations of radial and ulnar arteries in hand. State the branches of radial and ulnar arteries in hand. Describe the formation of superficial and deep palmar arch, veins of hand and their tributaries. Describe the nervous supply of the hand.
4	Wrist joint	Recognize the details of wrist joints. Describe and explain the movements occurring on wrist joints. Name the muscles acting in pronation and supination. Describe the nerve supply and blood supply of wrist joints. Describe wrist joint, nerve supply and blood supply. Describe clinical problems related to Wrist joints.
5	Spaces of the palm	Identify the different spaces of the hand on both palmar and dorsal aspects. Describe the clinical importance of these spaces
	Physiology	
10	Describe the important	Describe the following Motor unit

	terms	Summation Tetanization Staircase effect Skeletal muscle tone Muscle fatigue Agonist Antagonists Coactivation of agonist and antagonis
11	Excitation contraction coupling in skeletal muscles	Discuss the process of excitation contraction coupling in skeletal muscles. Explain Transverse tubule-sarcoplasmic reticulum system Describe Release of Calcium ions by sarcoplasmic reticulum Explain Role of Calcium pump Describe Excitatory pulse of Ca+
12	Muscle action potential	Describe the muscle action potential.
13	Excitation contraction coupling	Describe excitation contraction coupling of skeletal muscle.
BIOCHEMISTRY		
14	Role of calcium and phosphorus	Explain the role of calcium and phosphorous in formation of cellular matrix and bone
15	Vitamins	Vitamins and their role Define vitamins Classify vitamins Differentiate between Fats and water-soluble vitamins Describe role of Vitamin A Explain the role of Vitamin D Describe the role of Vitamin E Describe the role of water-soluble vitamins
16	Introduction to minerals	Define Minerals, Define major and minor minerals Describe classification of minerals
	Biochemistry Practical's	
17	Detection of Cyclic amino Acids	Define Cyclic amino Acids Understand their structure and types Xanthoproteic Test

THEME III: Pain lower limb/limping		
SNO	Topic	Learning Outcome
1	Introduction to lower limb	Recognize different parts of lower limb.

		Describe regions of lower limb. List the bones of lower limb. Describe the vessels and nerves of lower limb. Identify different land marks in different regions of lower limb
2	Hip bone	Identify the different parts of the bone. Describe side determination. Describe muscle attachments. Describe ligamentous attachments. Describe the different bones articulating with the hip bone Identify the different parts of the bone. Describe the common fractures of the bone. Identify and describe the salient features of the bones of hip bone Identify the attachments of hip bone Describe the surface anatomy of hip bone Describe the radiological anatomy of hip bone Describe the applied anatomy of hip bone.
3	The hip joint and movements	Describe the characteristics features of synovial joint Describe the Articular surfaces of hip joint Identify the capsule of hip joint Describe the synovial membrane, cavity & fluid of hip joint Enumerate the ligaments of hip joint & describe their attachments Describe the movements possible at hip joint Describe the clinical correlates of the hip joint Describe surface and radiological anatomy (X-rays and MRI) and clinical of hip joints
4	Gluteal region	Describe the boundaries of gluteal

		region Describe bones and ligaments of gluteal region Describe the different structures entering and leaving gluteal region Describe muscles of the gluteal region. Describe Vessels of the gluteal region. Describe nerves of the gluteal region. Describe about certain clinical correlates regarding gluteal region Describe Surface anatomy of important muscles Identify structures on transverse MRI of gluteal region taken at various levels Describe clinical anatomy of important muscles
5	Femur	Identify different parts of the femur Determine the side of the bone Identify the surfaces and borders of the bone Describe the common fractures of the bone. Describe the attachments of the different muscles and ligaments on the bone Describe the arterial supply of the bone Relate to the general idea about fractures of femur and other clinical conditions Identify and describe the salient features of the bones of hip bone Describe the surface anatomy of femur Describe the radiological anatomy of femur Describe the applied anatomy of femur
6	Nerves of lower limb and their injuries	Identify the names of nerves and their main branches innervating lower limb Identify the nerves closely related to a bone or other structure of lower limb Recognize the main nerves commonly vulnerable to injury

		Identify the main area and loss of function if particular nerve is injured Define and understand terms neuritis, anesthesia, par aesthesia, paralysis, neuralgia, sciatica
7	Superficial vessels and lymphatic's of lower limb	Enumerate and describe the superficial arteries of lower limb Name and Describe superficial veins of lower limb List and Describe the superficial lymphatic vessels and lymph nodes of lower limb
8	Deep fascia of thigh, iliotibialtract and superficial vessels	Describe the arrangement of deep fascia in thigh Describe how the iliotibial tract participates in walking and running Describe the location of saphenous opening and its relations Describe the great saphenous vein. Describe clinical correlates of saphenous vein
9	Muscles of the anterior fascial compartment of thigh	Describe the muscles of anterior compartment of thigh. Describe the nerve supply of anterior Compartment. Describe the action of these muscles
10	Nerves and vessels of anterior compartment of thigh	Describe the nerve supply of the anterior compartment of thigh. Describe the blood supply and the venous drainage of anterior compartment of thigh Describe the action of these muscles
11	The medial compartment of thigh	Describe the muscles of medial compartment of the thigh. Describe the nerve supply of these muscles. Describe the actions of the muscles of medial compartment of thigh Describe the vessels of medial compartment of the thigh
12	Posterior compartment of thigh	Describe the muscles of posterior compartment of thigh Describe the arterial supply of posterior compartment of thigh Discuss the trochanteric and cruciate anastomosis at the back of thigh Describe the venous drainage of this region Describe the nerve supply of posterior compartment of thigh and

		Relate to the clinical conditions effecting the region
13	Popliteal fossa	Describe the boundaries of popliteal fossa. Describe the contents of the popliteal fossa. Describe some clinical correlates regarding popliteal fossa
14	Femoral triangle and its contents	Describe the boundaries of femoral triangle List the contents of femoral triangle Describe the femoral sheath & canal Describe the clinical correlates of the Femoral triangle. Describe the location, boundaries and contents of adductor canal
15	Tibia bone	Describe the division of tibia bone in 3 parts Identify the surfaces and borders of tibia Describe the attachments of muscles on the tibia bone Describe the ossification of tibia and its primary and secondary ossification centers Describe the common fractures of the bone. Identify and describe the salient features of the bone of leg Identify the attachments to the bone of the leg Describe the surface anatomy of leg Describe the radiological anatomy of leg Describe the applied anatomy of leg
16	Fibula & bones of foot	Determine the side of bone. Describe the bony features along with its different attachments on the fibula.

		Name and describe the tarsal bones and their arrangement Name and describe the metatarsal bones and phalangeal bones. Describe the common fractures of the bone. Describe the muscles of the sole of the foot (origin, insertion, nerve supply, blood supply, and action) Describe the muscles of the dorsum of the foot (origin, insertion, nerve supply, blood supply, and action) Describe Surface anatomy of important muscles Identify structures on transverse MRI of foot taken at various levels Describe clinical anatomy of important muscles
17	Anterior and lateral compartment of leg	identify the boundaries of the compartments of leg State the muscles of anterior and lateral compartment of leg Describe the vessels of anterior and lateral compartment of leg Describe the nerves of lateral and anterior compartment of leg Describe action of these muscles
18	Posterior compartment of leg	Explain the muscles of posterior Compartment of leg. Describe nerve supply of these muscles. Explain the actions of the muscles of posterior compartment of leg
19	Knee joint	Describe the type of knee joint Describe the articular surfaces of this joint Describe the articular capsule Describe the synovial membrane and the synovial cavity Enumerate the ligaments of knee joint Describe the bursa around the knee joint Describe the blood and nerve supply of the knee joint Describe the mechanism of locking and unlocking of knee joint.

		Describe surface and radiological anatomy (Xrays and MRI) and clinical of knee joints
20	Surface anatomy of lower limb	Demonstrate the surface anatomy of arteries of lower limb. Demonstrate the surface anatomy of superficial & deep veins lower limb. Demonstrate the surface anatomy of nerves of lower limb
Embryology		
21	Development of lower limb	Describe the early stages of lower limb development Describe the development of lower limb buds Describe the final stages of lower limb development Describe and explain the anomalies of the lower limb
Biochemistry		
22	Sodium, potassium and chlorine in biology	Discuss RDA, serum Levels Enlist sources of Sodium, Potassium and chlorine, Describe functions Discuss absorption excretion, Describe disorders related to increase and decrease in amount of Sodium, Potassium and chlorine
Biochemistry Practical's		
23	Salt Saturation Test	Perform Salt Saturation Test

THEME IV: Bony arches and fracture of foot		
SN0	Topic	Learning Outcome
ANATOMY		
1	Muscles and neurovascular supply of the foot	Describe the dorsal muscles of foot. Describe the origin and insertion of planter muscles of foot. Describe their nerve supply and actions. Describe vascular and nervous supply of sole and dorsum of foot Describe their course through foot Describe relationships Identify and describe the salient features of the bone of foot Identify the attachments to the bone of the foot Describe the surface anatomy of foot

		Describe the radiological anatomy of foot Describe the applied anatomy of foot
2	Arches of foot	Describe the arches of foot Describe the factors responsible for their maintenance of the arches of the foot Recognize the injury when it occurs and be able to evaluate plantar fasciitis. Describe about counselling regarding the rehabilitation for plantar fasciitis
Biochemistry		
3	Role of vitamin c & D	Describe the role of Vitamin C and Vitamin D in the formation of connective tissues and bones.
4	Iodine in Biology	Discuss RDA, serum Levels Iodine Enlist sources of Describe functions Discuss absorption excretion, Describe disorders related to increase and decrease in amount of Iodine
PATHOLOGY		
5	introduction to Bone pathology	Define and differentiate osteopenia, osteoporosis, osteomalacia Define osteomyelitis Enlist various forms of arthriti
Forensic Medicine		
6	Injury	Define injury on medico legal basis. Classify injury. Define mechanical injury Classify mechanical injury Describe mechanisms of injury. Interpret the nature (manner) of injury.
7	Wound	Define wound. Define hurt. Identify factors affecting appearance of wound

THEME V: Backache		
SN0	Topic	Learning Outcome
ANATOMY		
1	Typical spinal nerve	Define a spinal nerve. Recognize the spinal nerve as a part of PNS. Enumerate the spinal nerves in different regions Identify their location and site of emergence. Identify various components of a typical spinal nerve. Recall the fate of rami. Associate the rami communicans with typical spinal nerve Recall the distribution of gray rami
2	Vertebral column	Describe the muscles of back (origin, insertion, nerve supply, blood supply, and action) Describe Surface anatomy of important muscles Identify structures on CT/MRI of vertebral column taken at various levels Describe clinical anatomy of important muscles
3	Lumbo sacral plexus, cutaneous nerves	Describe the formation of lumbar Plexus. List the branches of lumber plexus with their root values. Describe relation of the nerves with Psoas major muscle. List the structures supplied by lumbar plexus. Describe the formation of sacral plexus. Describe the composition and relations of sacral plexus. List the branches of this plexus
Biochemistry		
4	Phosphorus and Magnesium in biology	Discuss RDA, serum Levels Enlist sources of Phosphorus and Magnesium Describe functions

		Discuss absorption excretion, Describe disorders related to increase and decrease in amount of Phosphorus and Magnesium
5	Sulphur in biology	Discuss RDA, serum Levels Enlist sources of Sulphur Describe functions Discuss absorption excretion, Describe disorders related to increase and decrease in amount of sulphur
6	Copper and cobalt in biology	Discuss RDA, serum Levels Copper and cobalt Enlist sources of Describe functions Discuss absorption excretion, Describe disorders related to increase and decrease in amount of Copper and cobalt
Community Medicine		
7	Back pain	Explain the causes of low back pain z Describe the prevention of low back pain z Describe the causes & prevention of MSD related to child labor

THEME VI: Muscle weakness and fatigue		
SN0	Topic	Learning Outcome
Physiology		
1	Physiologic anatomy of the skeletal muscle fiber	Explain the physiologic anatomy of the skeletal muscle fiber. Skeletal muscle fiber Sarcolemma Myofibrils I band A band Z disk

		M line Sarcomere Titin microfilament molecules Sarcoplasm Sarcoplasmic reticulum
2	Characteristics of whole muscle contraction	Identify the characteristics of whole muscle contraction. Compare isotonic and isometric exercises. Compare and contrast slow and fast muscle fibers. Describe the mechanics of skeletal muscle contraction. Describe muscle tone and muscle fatigue. Describe lever systems of the body and positioning of a body part. Describe remodeling of muscle to match function.
3	Neuromuscular junction	Describe the transmission of impulses from nerve endings to skeletal muscle fibers. Explain the physiologic anatomy of the neuromuscular junction
4	Neuromuscular Transmission	Explain the mechanism of transmission of impulses from nerve endings to muscle fibers Explain Formation and Secretion of acetylcholine at nerve terminals Describe Action of acetylcholine at postsynaptic membrane Describe Degradation/Destruction of released acetylcholine Describe End plate potential Describe Fatigue of junction
5	Neuromuscular drugs	Describe the physiologic basis of the drugs used in the neuromuscular disorders (Drugs that enhance or block the transmission at neuromuscular junction) Enlist the excitatory and inhibitory transmitter substances secreted at the smooth muscle neuromuscular junction Drugs that stimulate the muscle fiber by acetylcholine like action Drugs that stimulate neuromuscular junction by inactivating acetylcholinesterase Drugs that block transmission at the neuromuscular junction

		Enlist the excitatory and inhibitory transmitter substances secreted at the smooth muscle neuromuscular junction
6	Myasthenia gravis	Describe the pathophysiology of myasthenia gravis
7	Smooth muscle	Classify smooth muscles Describe the physiologic anatomy of the smooth muscle neuromuscular junction
8	Skeletal Muscle fiber	Discuss in detail types of muscles and arrangement of skeletal muscle fibers.
9	Contraction of smooth muscle	Describe the contractile mechanisms in smooth muscles Describe excitation and contraction of smooth muscle. Identify the types of smooth muscles. Describe the chemical and physical basis for smooth muscle contraction. Compare smooth and skeletal muscle contraction. Chemical basis of smooth muscle contraction Physical basis of smooth muscle contraction Explain how the calcium ions regulate the contraction. Regulation of smooth muscle contraction by the calcium ions Enlist the excitatory and inhibitory transmitter substances secreted at the smooth muscle neuromuscular junction
10	Nervous and hormonal control of smooth muscle contraction	Describe the nervous and hormonal control of smooth muscle contraction
11	Resting Membrane Potential	Enumerate the intracellular and extracellular concentrations of sodium, potassium, chloride and calcium ions in a resting/normal cell. Describe the characteristics of major membrane ion channels and their role in the membrane potential Describe the resting membrane potential in a cell/nerve fiber
12	Muscle Remodeling	Describe following Muscle hypertrophy Muscle atrophy Muscle hyperplasia Rigor mortis Muscle dystrophy Recovery of muscle contraction in poliomyelitis
13	Membrane potentials and action potentials in smooth muscles	Describe the membrane potentials and action potentials in smooth muscles. Describe Spike potentials

		Describe Action potentials with plateaus Describe Role of calcium channels in generating the smooth muscle action potential Describe Slow wave potentials Describe Excitation of visceral smooth muscle by muscle stretch Describe Depolarization of multi-unit smooth muscle without action potentials
14	Control of smooth muscle contraction	Describe the mechanism nervous, hormonal and local control of smooth muscle contraction.
15	Smooth muscle and skeletal muscle contraction	Compare the smooth muscle contraction and skeletal muscle contraction
16	Skeletal muscle contraction	Describe the three sources of energy for muscle contraction Compare isometric and isotonic contractions Compare characteristics of fast and slow muscle fibers. Sources of energy for muscle contraction Compare isometric and isotonic contractions Compare characteristics of fast and slow muscle fibers
Biochemistry		
17	Hormonal regulation	Explain the hormonal regulation of calcium and phosphorous to maintain musculoskeletal system
18	Sodium, potassium and chlorine in biology	Discuss RDA, serum Levels Enlist sources of Sodium, Potassium and chlorine, Describe functions Discuss absorption excretion, Describe disorders related to increase and decrease in amount of Sodium, Potassium and chlorine
19	Calcium in Biology	Discuss RDA, serum Levels Enlist sources of Calcium Describe functions Discuss absorption excretion, Describe disorders related to increase and decrease in amount of Calcium
20	Fluoride and Lithium in biology	Discuss RDA, serum Levels Fluoride Enlist sources of Describe functions Discuss absorption excretion,

		Describe disorders related to increase and decrease in amount of Fluoride Brief description on role of lithium in biology
21	Molybdenum, Selenium, Zinc, chromium,manganese,silicon, vanadium in biology	Enlist sources of Describe functions Discuss absorption excretion, Describe disorders related to increase and decrease of the said elements
22	Toxic element Aluminum , Arsenic, Antimony, Boron, Bromine, Cadmium, Cesium, Germanium, Lead, Mercury, Silver, Strontium	Discuss different effects of toxic elements
Pharmacology		
23	Drug used in MSK	Define & classify NSAIDS Classify neuromuscular blocking agents. Enlist more most comomly used analgesia aspirin , iburrofen , diclofenac, paracetamol, COX-2 Salicox Classify corticosteroids
Community Medicine		
24	MSK diseases	Explain the risk factors for different types of msd's Describe the preventive measures for different types of risk factors for msd's
25	Epidemiology and prevention of MSD	Describe work related msd's Identify risk factors of msd at workplace. Describe prevention of exposure to risk factors related to workplace. Describe the preventive strategies and safety guidelines in order to reduce the incidence of msds related to work place. Describe the burden /epidemiology of work related msd's Describe application of ergonomics in the prevention of work related msd's

ASSESSMENT BLUEPRINT of BLOCK B

BLOCK B Paper: MCQs Distribution

Subject	No. of MCQs
Gross Anatomy	71
Histology	8
Embryology	4
Physiology	16
Biochemistry	16
PRIME including Research	1
Pharmacology	1
Pathology	2
Community medicine	1
Total	**120**

BLOCK B OSPE Outline

Subject	MSK module	Viva stations	Total OSPE stations (for final exam*)
Gross Anatomy	9	2	8
Histology	4		
Embryology	0		
Physiology	2	2	2
Biochemistry	3	2	2
Total	18	6	12+6 (viva)=18

*out of total of 18 OSPE stations, 12 will be allocated for final exam plus 6 viva stations. A minimum of 18 stations will be used in final exams.

FIRST YEAR, BLOCK C: Cardiovascular System (CVS)

Themes of the CVS module

THEME I	**Chest pain**	**(1 week)**
THEME II	**Breathlessness and ankle swelling**	**(2 weeks)**
THEME III	**Blood Pressure**	**(1 week)**
THEME IV	**Palpitations**	**(1 week)**

General Learning Outcomes

At the end of this module, the students will be able to;

1) Describe the structure and surface markings of the heart, valves and great vessels
2) Describe the steps of development of the heart
3) Describe the steps of development of arterial, venous and lymphatic system
4) Describe the conduction system of the heart
5) Describe the anatomy of valves of the heart
6) Describe the microscopic structure of myocardium, and blood vessels
7) Describe the cardiac cycle
8) Discuss cardiac output, and venous return
9) Discuss blood pressure and its regulation
10) Discuss coronary circulation and diseases associated with it
11) Describe the mechanisms and types of circulatory shock and associated compensatory mechanisms
12) Describe the anatomy and common pericardial diseases
13) Describe the cardiac enzymes
14) Discuss the hyperlipidemias and the roles lipoproteins and cholesterol in the development of atherogenesis
15) Describe the mechanisms of impulse generation, conduction and excitation of myocardium
16) Discuss normal ECG and common ECG abnormalities
17) Enlist the drugs used in ischemic heart disease and hyperlipidemias
18) Describe preventive strategies of cardiovascular diseases

Specific learning objectives (theme-based)

THEME I: Chest Pain			
Subject	Topic	S. No	Learning objectives
Anatomy	Surface anatomy	1	Describe the surface marking of the heart
		2	Describe the surface marking of the heart valves
		3	Illustrate the surface marking of the aorta on models / x-rays
		4	Describe the surface marking of the superior vena cava
		5	Describe the surface marking of the inferior vena cava
		6	Describe the gross structure of the heart
	Coronary circulation	7	Describe the coronary arteries
		8	Enlist the branches of each main artery
		9	Describe the anastomosis of coronaries
		10	Identify the area of the heart supplied by a coronary artery and its branches
		11	Describe the venous drainage of the heart
		12	Describe the lymphatic drainage of the heart
	Pericardium	12	Define pericardium
		14	Describe different reflections of pericardium
		15	Identify entry & exit of vessels of heart via pericardium
		16	Define the following clinical condition; pericarditis pericardial effusion cardiac Tamponade
Histology	Histology of heart muscles	17	Explain the characteristics of cardiac muscle cell
		18	Explain the Structure of Intercalated disc
		19	Define the junctional specializations making up the intercalated disk
		20	Describe identification of different microscopic views of Cardiac muscle and its ultra-structures

		21	Differentiate histologically between cardiac and skeletal muscle and smooth muscles
		22	Enumerate histological layers of heart wall
Physiology	Cardiac muscles	23	Explain the physiologic anatomy of the cardiac muscle
		24	Describe the properties of the cardiac muscle
	Coronary circulation	25	Describe the physiologic basis coronary circulation
		26	Describe the steps of coronary thrombosis
		27	Describe the etiology of coronary thrombosis
Biochemistry	Cardiac enzymes	28	Identify the enzymes that increase in myocardial infarction
	Lipids and cholesterol	29	Describe the Chemical Structure and function of cholesterol
		30	Describe the fate of cholesterol in the body
		31	Define and Classify lipids
		33	Describe the functions of lipids in the body
		34	Classify lipoproteins and their functions
		42	Describe Cardiac enzymes and their pattern of elevation in ischemic heart diseases
		47	Describe the role of Na, K, Ca and Mg in cardiac muscles contractility and their biochemical abnormalities
		48	Describe the cardiac manifestations of vitamin B1 deficiency
Pharmacology		49	Enlist the groups of drugs used in the treatment of CAD (angina and MI)
		50	Enlist the groups of lipids lowering drugs
Pathology		51	Describe the risk factors, and lab. Diagnosis of CAD
		52	Define and Enlist the stages of atherosclerosis
Forensic medicine		53	Describe the medicolegal aspects of sudden death due to cardiovascular diseases
Community Medicine	Prevention of CVD	54	Describe primordial, primary, secondary and tertiary prevention of CV diseases in community
THEME II: Breathlessness and ankle swelling			
Embryology	Fetal circulation	55	Describe the physiological changes in circulation after birth

	Cardiac developmental anomalies	56	Enlist the developmental anomalies of heart
		57	Describe the congenital anomalies of the heart. ASD VSD PDA Tetralogy of Fallot transposition of the great vessels Hemangiomas and Telangiectasia
Physiology	Cardiac cycle	58	Describe the Cardiac cycle
		59	Describe the concept of systole and diastole,
		60	Describe the role of atria and ventricles as pumps,
		61	Describe the functions of heart valves,
		62	Correlate the cardiac cycle events with ECG
		63	Describe the mechanism of production of normal and abnormal heart sounds
		64	Relate heart sounds with cardiac cycle,
		65	Describe the metabolism and oxygen utilization of cardiac muscle
		66	Describe the regulation of cardiac cycle
	Cardiac output	67	Describe pressure volume loop (end-systolic volume / end-diastolic volume / ejection fraction / systolic volume / systolic work output)
		68	Explain the Frank-Starling mechanism of the heart for the control of cardiac output by venous return
		69	Describe the methods for measuring of cardiac output
		70	Describe normal cardiac output and venous return during rest and during activity
		71	Enlist the causes of abnormally high and abnormally low cardiac output

		72	Explain the mechanisms of normal cardiac contractility and the role of calcium ion/ ATPase pumps
		73	Explain cardiac output (regulation/measurement) and peripheral resistance and its regulation
		74	Explain the factors regulating cardiac output and venous return.
	Blood flow	75	Describe the Biophysics and Interrelationships of Pressure, Flow, and Resistance in terms of Ohm's law and Poiseuille's Law
		76	Describe starling forces
		77	Describe regulation of blood flow
		78	Define basal tone.
		79	List several substances potentially involved in local metabolic control of vascular tone.
		80	State the local metabolic vasodilator hypothesis.
		81	Describe physiological Vasodilators and Vasoconstrictors and their mechanisms
		82	Describe the factors affecting the local blood flow including auto-regulation.
		83	Describe the function of capillaries
		84	Describe circulatory changes during exercise
		85	Describe blood flow to different organs like brain, heart, liver and skin during exercise
	Functions of heart valves	86	Describe the functions of mitral, tricuspid, aortic and pulmonic valves
		87	Describe the hemodynamics and sequel related to stenosis and regurgitation of heart valves
	Lymphatic system	88	Describe the function of lymphatic system in the maintenance of interstitial fluid volume.
		89	Describe the effects of Interstitial Fluid Pressure on Lymph Flow.

		90	Describe how changes in capillary hydrostatic pressure, plasma oncotic pressure, capillary permeability, and lymphatic function can lead to tissue edema
Medicine	Heart failure	91	Define Heart failure
		92	Differentiate between right-sided Heart failure and left-sided heart failure
THEME III: Blood Pressure			
Anatomy	Histology of blood vessels	93	Describe the histological composition of vessel
		94	Describe the microscopic structure of artery and vein
		95	Differentiate histologically between artery and vein under light microscope
		96	Describe the histological composition of lymphatic channels
Embryology	Development of arteries and veins	97	Describe the development of arterial system
		98	Describe the development of venous system
		99	Describe the congenital abnormalities in in the vessels. - Coarctation of Aorta
Physiology	Blood Pressure	100	Define blood pressure
		101	Describe the causes of High / low BP
		102	Discuss the mechanisms for rapid and long term control of blood pressure (including Renin Angiotensin system)
		103	Describe the effects of sympathetic and parasympathetic stimulation on the heart and circulation
	Circulatory Shock	104	Define Circulatory Shock
		105	Explain the physiologic causes of circulatory shock
		106	Explain the stages of circulatory shock
		107	Describe cardiogenic shock
		108	Describe Hemorrhagic Shock
		109	Describe of Neurogenic Shock
		110	Describe Anaphylactic Shock
		111	Describe Septic Shock

		112	Explain the physiology of treatment in Shock
Pharmacology		113	Describe the mechanisms of drugs used in the treatment of Hypertension
Community medicine		114	Describe the preventive strategies of hypertension
THEME IV: Palpitations			
Anatomy	Conduction system of the heart	115	Describe the different components of conduction system • SA Node • AV Node • Bundle of His • Purkenje Fibers • Bundle branches
		116	Describe the sympathetic innervation of heart
		117	Describe the parasympathetic innervation of the heart
Physiology	Excitation and contraction of cardiac muscles	118	Describe the excitation–contraction process in cardiac muscle. Describe Chronotropic, Inotropic and Dromotropic Effects
		119	Describe Chronotropic, Inotropic and Dromotropic Effects
		120	Differentiate excitation–contraction process in cardiac and skeletal muscle cells
		121	Describe gap junctions and the significance of functional syncytium
		122	Explain phases of cardiac muscle action potential
		123	Describe the characteristics of cardiac action potentials and the role of "slow calcium" channels in causing plateau and its significance
		124	Describe the significance of AV nodal Delay
		125	Define Pacemaker and explain why SA node is the normal pacemaker of the heart
		126	Define Ectopic Pacemaker and describe its causes
		127	Describe the effects of sympathetic and parasympathetic stimulation on the heart rate and conduction of cardiac action potentials
		128	Define various types of refractory periods

		129	Differentiate the refractory period of cardiac muscle with that of skeletal muscle
		130	Describe the significance of prolonged action potential in cardiac muscle
		131	Describe the physiological anatomy of the sinus node
		132	Define automaticity and rhythmicity and conductivity
		133	Describe the specialized excitatory and conductive pathway of the cardiac muscle tissue
	ECG	134	Describe the characteristics of normal ECG, time duration of waves, segments and voltages
		135	Explain how to record ECG
		136	Describe the AV nodal, ventricular impulse conduction
		137	Interpret ECG paper and its calibration
Community Medicine	CVD prevention	138	Identify the major risk factors which contribute to common diseases of the cardiovascular system
		139	Enumerate modifiable and non-modifiable risk factors of CV diseases
		140	Apply primordial, primary, secondary and tertiary prevention of CV diseases in community

Psychomotor domain		
Chest Pain	Anatomy	1- Identify the heart & its coverings in the model / dissected specimen 2- Identify the heart and major blood vessels in cadaver/dissected specimen 3- Identify the chambers of the heart. 4- Identify the internal structures of various chambers of the heart. 5- Identify the Cardiac Muscle under the microscope
	Physiology	6- Perform basic life support.

Blood Pressure		7- Identify salient features of a medium sized artery & vein in a cross-section under microscope. 8- Identify the histological differences between medium size artery & vein under microscope. 9- Describe the histological differences between large size artery & vein.
Breathlessness and ankle swelling	Clinical	10- Identify normal cardiac shadow, borders and cardiomegaly on chest radiographs. 11- Identify the position of borders and valves of the heart by surface marking on model / simulator 12- Palpate and find apex beat, and auscultatory areas in the chest of the subject provided and describe their significance. 13- Demonstrate the use of Stethoscope for Auscultation. 14- Differentiate between normal and displaced apex beat
	Physiology	15- Measure the blood pressure. 16- Measure the effect of posture and exercise on blood pressure. 17- Examine the arterial pulses. 18- Auscultate the heart sounds.
Palpitations		19- Perform systematic analysis of ECG
Affective domain		
PRIME		20- Demonstrate ability to give and receive feedback, respect for self and peers. 21- Carry out practical work as instructed in an organized and safe manner 22- Demonstrate empathy and care to patients. 23- Develop respect for the individuality and values of others - (including having respect for oneself) patients, colleagues and other health professionals 24- Organize& distribute tasks 25- Exchange opinion & knowledge 26- Develop communication skills and etiquette with sense of responsibility. 27- To equip themselves for teamwork 28- Regularly attend the classes 29- Role play for the counseling of patients with risk factors for coronary heart diseases on modification of life style 30- Role play for the counseling of patients with risk factors for coronary heart diseases on modification of life style

FIRST YEAR, BLOCK C: Respiratory System (RS)

Themes of the RS module

THEME I	**Chest wall injury**	**(1 week)**
THEME II	**Cough and Hemoptysis**	**(1 weeks)**
THEME III	**Breathlessness**	**(2 week)**

General Learning Outcomes

By the end of this module, the students will be able to;

1- Describe the anatomy and abnormalities of thoracic cage
2- Describe the development and gross anatomy of the diaphragm
3- Describe the contents of mediastinum and their relations
4- Describe the anatomy of pleura and its reflections
5- Describe the gross and microscopic structure, development, nerve supply and blood supply of trachea, bronchi and lungs
6- Describe the epithelia and connective tissues lining the respiratory passageways.
7- Describe pulmonary ventilation
8- Discuss the mechanisms of gaseous exchange between alveoli, and blood and blood and tissues
9- Elaborate the transport of gases in the blood
10- Describe the mechanisms of regulation of respiration
11- Define hypoxia, and cyanosis
12- Describe the effect of aging on respiratory system
13- Describe the biochemical structure and functions of enzymes
14- Describe the mechanisms of O2 and CO2 transport in the blood
15- Classify anti-asthmatic and anti-tuberculous drugs
16- Describe the types and signs of asphyxia
17- Enlist the causes and signs of pneumonias, bronchial asthma, tuberculosis, Acute Respiratory Distress Syndrome (ARDS), and pulmonary edema

18- Describe the parameters of Pulmonary Function Tests (PFTs)

Specific learning objectives (theme-based)

THEME I: Chest wall injuries			
Subject	Topic	SNo	Learning objectives
Anatomy	Gross anatomy of thorax	1	Describe main features of thoracic wall
		2	Describe the location and shape of the sternum
		3	Describe the parts of the sternum
		4	Describe the articulations and muscle attachments
		5	Describe the gross features of the thoracic vertebrae a. Vertebral body b. Intervertebral disc c. Laminae d. Pedicles e. Intervertebral foramina f. Processes g. Ligaments
		6	Differentiate between typical and atypical ribs.
		7	Describe different joints of thorax
		8	Discuss Intercostal muscles
		9	Discuss the contents of intercostal spaces
		10	Describe the origin of intercostal arteries
		11	Describe the origin, course and distribution of intercostal nerves
		12	Discuss branches and course of internal thoracic artery
	Abnormalities of thoracic wall	13	Describe thoracic wall abnormalities and its clinical correlation
	Diaphragm	14	Describe the origin and insertion of the diaphragm
		15	Describe the openings of the diaphragm
		16	Describe the nerve supply of diaphragm and its clinical significance

	Mediastinum	17	Describe the contents of the superior mediastinum
		18	Describe the contents of the Anterior & Posterior Mediastinum
		19	Describe the relations of different contents in mediastinum
		20	Identify various anatomical landmarks on chest X-Rays, CT and MRI
Embryology	Development of Diaphragm	21	Describe development of diaphragm
		22	Describe diaphragmatic hernias and clinical significance
	Development of Ribs	23	Describe the development of ribs from costal elements of primitive vertebrae
Physiology	Mechanics of Respiration	24	Describe the mechanics of respiration
		25	Describe the pressures that cause the movements of the air in and out of the lungs
	Lung compliance	26	Define compliance of the lung and elastic recoil
		27	Identify two common clinical conditions in which lung compliance is higher or lower than normal.
	Lung volumes and capacities	28	Describe changes in the lung volume, alveolar pressure, pleural pressure, and trans-pulmonary pressure during normal breathing
		29	Draw a normal pulmonary pressure-volume (compliance) curve (starting from residual volume to total lung capacity and back to residual volume), labeling the inflation and deflation limbs. Explain the cause and significance of the hysteresis in the curves.
		30	Draw the pressure-volume (compliance) curves for the lungs, chest wall, and respiratory system on the same set of axes. Show and explain the significance of the resting positions for each of these three structures.
Surgery		31	Describe pneumothorax
		32	Define Hydro pneumothorax

THEME II: Cough and Hemoptysis			
Anatomy	Introduction	33	Describe the major components of the (upper and lower) respiratory system and describe their functions
	Trachea, bronchi and lungs	34	Describe trachea and bronchi with relations plus subdivisions
		35	Describe the neurovascular supply of trachea and bronchi
		36	Describe the surfaces anatomy of trachea and bronchi
		37	Describe the lungs with their lobes and fissures, relations with surroundings and surfaces and compare between right and left lungs.
		38	Describe Broncho-pulmonary segments and their clinical importance
		39	Describe innervations, blood supply and lymphatic drainage of the lungs.
Embryology	Development of Respiratory system	40	Describe development of trachea, bronchial tree, pleura, lungs
		41	Recognize the cephalo-caudal and transverse folding of embryonic disc
		42	Describe the extent of intra embryonic coelom after folding and its divisions into three serous cavities
		43	State the derivatives of visceral and parietal layers of mesoderm
		44	State the pericardio-peritoneal canals and their final fate
		45	Discuss the formation of Lung Bud
Histology	Respiratory epithelium and connective tissues	46	Classify the types of epithelia lining the various parts of respiratory system
		47	Differentiate between the histological differences among various parts of respiratory system
		48	Describe the structure of trachea and its layer

		49	Discuss the microscopic picture of respiratory bronchiole, alveolar ducts, alveolar sacs and alveoli.
		50	Describe the different types of cells found in alveoli
Physiology	Functions of respiratory passageways	51	Describe the respiratory and non-respiratory functions of the respiratory passageways
		52	Identify the mechanism by which particles are cleared from the airways.
Pharmacology	Anti-Asthmatic drugs	53	Enlist Anti-asthmatic drugs
	Anti-Tuberculous drugs	54	Classify Anti-tuberculous drugs
Pathology	Pneumonias	55	Define pneumonia and enlist the causative pathogens of pneumonia
	Pulmonary Tuberculosis	56	Define primary and secondary Tuberculosis and state its etiology
	Bronchial Asthma	57	Describe the etiology, pathogenesis and clinical features of asthma
	Pulmonary Edema	58	Define pulmonary edema and classify it according to underlying causes
Community Medicine	Prevention of Respiratory disorders	59	Discuss preventive strategies of different problems related to respiratory system
		60	Discuss the relationship of smoking with lung Diseases
		61	Describe preventive strategies for smoking
THEME III: Breathlessness			
Anatomy	Mechanics of respiration	62	Describe briefly mechanics of respiration
	Pleura	63	Describe the gross features of pleura
		64	Describe the pleural cavity and the pleural reflections
		65	Describe the surface anatomy related to pleural reflections
Embryology		66	Describe the development of pleural cavity

Histology		67	Discuss surfactant, alveolar septum, alveolar pores and alveolar macrophages
Physiology	Pulmonary ventilation	68	Define respiration
		69	Compare between the internal and external respiration
		70	Enlist the steps of external respiration accomplished by the respiratory system and those carried out by the circulatory system
		71	State the functions of Type I alveolar cells, Type II alveolar cells, and alveolar macrophages
		72	Describe the forces that keep the alveoli open and those that promote alveolar collapse.
		73	Define the following terms: anatomic dead space, physiologic dead space, wasted (dead space) ventilation, total minute ventilation and alveolar minute ventilation.
		74	Compare anatomic and physiologic dead space
		75	Describe the basic concept of measurement of dead space
		76	Enlist the factors that changes the dead space
		77	Define the following terms: hypoventilation, hyperventilation, hypercapnea, eupnea, hypopnea, and hyperpnea.
		78	Define surface tension, surfactants, atelectasis
		79	Describe the role of surfactants on the lung compliance.
		80	Describe the composition of the pulmonary surfactants and its role
		81	Describe the pathophysiology of respiratory distress syndrome of the newborn
		82	Discuss the work of breathing
	Pulmonary circulation	83	Explain the physiologic anatomy of the pulmonary circulatory system
		84	Describe the pressures in the pulmonary circulatory system
		85	Describe blood volume of the lungs

		86	Describe blood flow through the lungs and its distribution
		87	Compare the systemic and pulmonary circulations with respect to pressures, resistance to blood flow, and response to hypoxia.
		88	Describe the regional differences in pulmonary blood flow in an erect position.
		89	Describe the consequence of hypoxic pulmonary vasoconstriction on the distribution of pulmonary blood flow.
		90	Describe the pulmonary capillary dynamics
		91	Describe the development of pulmonary edema
	Gas exchange	92	List the normal airway, alveolar, arterial, and mixed venous PO2 and PCO2 values.
		93	List the normal arterial and mixed venous values for O2 saturation, [HCO3-]
		94	List the factors that affect diffusive transport of a gas between alveolar gas and pulmonary capillary blood.
		95	Describe respiratory unit
		96	Describe the physiologic anatomy of the respiratory membrane and its significance
		97	Describe the factors that affect the rate of gaseous diffusion through the respiratory membrane
		98	Describe the diffusing capacity of respiratory membrane for O2 and CO2 at rest and exercise.
		99	Describe the effect of ventilation/perfusion (V/Q) ratio on alveolar gas concentrations.
		100	Identify the average V/Q ratio in a normal lung.
		101	Explain the concept of physiologic shunt and physiologic dead space
		102	Describe the abnormalities of ventilation perfusion ratio in normal lung and chronic obstructive lung disease.
		103	Enlist common causes of hypoxemia

	Transport of O2 and CO2 in the blood	104	Define oxygen partial pressure (tension), oxygen content, and percent hemoglobin saturation as they pertain to blood.
		105	Describe Oxyhemoglobin dissociation curve (hemoglobin oxygen equilibrium curve) showing the relationships between oxygen partial pressure, hemoglobin saturation, and blood oxygen content.
		106	Describe the relative amounts of O2 carried bound to hemoglobin with that carried in the dissolved form.
		107	State Henry's Law (the relationship between PO2 and dissolved plasma O2 content)
		108	Describe how the shape of the oxyhemoglobin dissociation curve influences the uptake and delivery of oxygen.
		109	Define P50.
		110	Describe how the oxyhemoglobin dissociation curve is affected by changes in blood temperature, pH, PCO2, and 2,3-DPG.
		111	Describe how anemia and carbon monoxide poisoning affect the shape of the oxyhemoglobin dissociation curve, PaO2, and SaO2.
		112	List the forms in which carbon dioxide is carried in the blood.
		113	Describe the percentage of total CO2 transported as each form.
		114	Describe the chloride shift and its importance in the transport of CO2 by the blood.
		115	Describe the enzyme that is essential to normal carbon dioxide transport by the blood and its location.
		116	Describe the carbon dioxide dissociation curves for oxy- and deoxyhemoglobin.
		117	Describe the interplay between CO2 and O2 binding on hemoglobin that causes the Haldane effect.

	Regulation of Respiration	118	Describe the regions in the central nervous system that play important roles in the generation and control of cyclic breathing.
		119	Give three examples of reflexes involving pulmonary receptors that influence breathing frequency and tidal volume. Describe the receptors and neural pathways involved.
		120	List the anatomical locations of chemoreceptors sensitive to changes in arterial PO2, PCO2, and pH that participate in the control of ventilation. Identify the relative importance of each in sensing alterations in blood gases.
		121	Describe how changes in arterial PO2 and PCO2 alter alveolar ventilation, including the synergistic effects when PO2 and PCO2 both change.
		122	Describe the significance of the feedforward control of ventilation (central command) during exercise, and the effects of exercise on arterial and mixed venous PCO2, PO2, and pH.
		123	Describe voluntary control of respiration
		124	Describe the effect of irritant receptors, J-receptors, brain edema and anesthesia on breathing.
	Common Respiratory abnormalities	125	Describe periodic breathing and basic mechanism of Cheyne-Stokes breathing
		126	Define sleep apnea
		127	Describe the pathophysiology of Obstructive sleep apnea and central sleep apnea.
		128	Describe the pathophysiology of specific pulmonary abnormalities:
		129	Describe hypoxia
		130	Describe cyanosis
		131	Describe the effect of aging on lung volumes, lung and chest wall compliance, blood gases, and respiratory control.

Biochemistry		132	Define Enzymes
		133	Define activation energy
		134	Define Gibbs Free energy
		135	Explain the general structure of enzymes
		136	Define co-factors
		137	Explain the function of co-factors
		138	Enlist different types of co-factors
		139	Define different parts and forms of enzymes
		140	Describe the factors involved in structure of enzymes
		141	Describe the mechanism of Enzyme activity
		142	Define catalysis
		143	Explain different mechanism of catalysis
		144	Explain the Principals for Nomenclature of enzymes
		145	Classify Enzymes on the basis of functions
		146	Enlist the factors affecting the activity of enzymes
		147	Describe roles of factors affecting enzyme activity
		148	Define enzyme kinetics
		149	Explain different areas of enzyme kinetics
		150	Describe the role of Km in Enzyme kinetics
		151	Define Isoenzymes (Isozymes)
		152	Explain Factors affecting the properties of isozymes
		153	Explain the role of enzymes as a diagnostic tool
Forensic Medicines	Asphyxia	154	Define Asphyxia
		155	Describe different types of Asphyxia
		156	Identify classical signs of asphyxia
Medicine	Introduction to Respiratory symptomatology	157	Enumerate the various symptoms of respiratory disorders
	PFT`s	158	Interpret the Pulmonary Function Tests
	ARDS	159	Discuss acute lung injury and its correlation Acute Respiratory Distress Syndrome

		160	Describe the causes of Acute Respiratory Distress Syndrome
		161	Discuss the morphology of Acute Respiratory Distress Syndrome
Psychomotor and Affective domain			
Breathlessness	Physiology	162	Draw a normal spirogram, labeling the four lung volumes and four capacities.
		163	List the volumes that comprise each of the four capacities.
		164	Identify which volume and capacities cannot be measured by spirometry.
		165	Define the factors that determine total lung capacity, functional residual capacity, and residual volume.
		166	Describe the mechanisms responsible for the changes in those volumes that occur in patients with emphysema and pulmonary fibrosis.
		167	Differentiate between the two broad categories of restrictive and obstructive lung disease, including the spirometric abnormalities associated with each category.
		168	Examine the chest of the subject
		169	Calculate the respiratory rate of the subject
		170	Determine the peak expiratory flow (PEF) by peak flow meter
		171	Describe the use of inhaler
		172	Demonstrate the use of inhaler to the subject
Cough and Hemoptysis	Histology	173	Identify the various microscopic tissue types in the Respiratory system • Epithelium of the respiratory system • Trachea • Bronchi • Bronchioles • Alveoli

ASSESSMENT BLUEPRINT of BLOCK C

BLOCK C Paper: MCQs Distribution

Subject	CVS module	Respiratory module	Total MCQs
Gross Anatomy	9	12	21
Histology	4	4	8
Embryology	5	3	8
Physiology	34	20	54
Biochemistry	14	8	22
Pharmacology	1	0	1
Pathology	1	1	2
Community medicine	1	1	2
Forensic medicine	1	1	2
Total	**70**	**50**	**120**

BLOCK C OSPE Outline

Subject	CVS module	Viva stations	Respiratory module	Viva stations	Total OSPE stations (for final exam*)
Gross Anatomy	4	1	1	1	5
Histology	3		3		
Embryology	0		0		
Physiology	7	1	3	1	5
Biochemistry	2	1	0	1	2
Total	16	3	7	3	12+6 (viva)=18

*out of total of 23 OSPE stations, 12 will be allocated for final exam plus 6 viva stations. A minimum of 18 stations will be used in final exams.

2nd Year MBBS Block D: Neurosciences-1A Module

SR.No	Themes	Duration
1	Numbness and tingling	1 week
2	Paraplegia	1 week
3	Syncope	1 week
4	Hemiplegia / Aphasia	1 week
5	Tremors	1 week
6	Headache	1 week

General learning outcomes

At the end of this module, the 2nd year MBBS students will be able to:

Knowledge

1) Explain the gross and microscopic structural and functional features of peripheral nerves, spinal cord and brain.
2) Describe the development of forebrain, midbrain and hindbrain
3) Describe the basic functions of synapses, neurotransmitters and mechanisms of electrical events during neuronal excitation
4) Explain the structure and functions of different receptors during neuronal excitation
5) Describe the mechanisms and pathways of sensory inputs in the nervous system
6) Explain the organization, structure, functions, and neurotransmitters of autonomic nervous system
7) Describe the blood supply and venous drainage of brain and spinal cord
8) Describe the organization, structure and functions of motor system of the brain and spinal cord
9) Explain the organization, structure and functions of cerebellum and basal ganglia
10) Explain the structure, formation and drainage of cerebrospinal fluid in the brain and spinal cord
11) Describe the functions of limbic system and reticular activating system
12) Describe the pathophysiology and prevention of common diseases like stroke, epilepsy, hydrocephalus and brain injuries

Skill

13) Identify the microscopic structure of spinal cord, cerebral and cerebellar cortex
14) Examine nervous system of a standardized patient (sensations, motor functions, and higher cortical functions and tendon reflexes)

Attitude

Neurosciences-1A Module: Specific Learning Objectives: By the end of this module, students of 2nd year MBBS will be able to		
Theme-1 (numbness and tingling)		
SNO	**Topic**	**Learning Outcomes**
ANATOMY		
1	Overview of nervous system	Describe the general features of neurons and its classification
		Differentiate between central and peripheral nervous system
		Describe the general features of brain (forebrain, midbrain and hindbrain)
		Describe the general features of spinal cord including its enlargements at different levels
		Describe the general features of cranial and spinal nerves
		Differentiate between the anatomical aspects of sympathetic and parasympathetic system
EMBRYOLOGY		
2	Forebrain, midbrain and hindbrain	Describe the development of primary and secondary brain vesicles
		Enlist the derivatives of the brain vesicles
		Describe the development of prosencephalon, mesencepahalon and rhombencephalon
		Discuss congenital anomalies associated with each region of brain
PHYSIOLOGY		
3	Organization of the Nervous System	Describe general design of the nervous system
		Describe various divisions of the nervous system.
		Describe structural and functional unit of CNS.
		Describe Functional components of Neuron.

		Describe Functional and Structural classification of Neurons
		Describe major levels of central nervous system function
		Describe Glial cells and their functions.
		Compare nervous system to a computer
4	Basic Functions of Synapses	Define and classify synapses
		Explain physiological structure of synapse
		Describe Mechanism by Which an Action Potential Causes Transmitter Release from the Presynaptic Terminals
		Describe synaptic transmission and explain properties of synaptic transmission.
		Describe mechanism of action of neurotransmitter on the post synaptic membrane.
		Describe Second messenger system in the post synaptic neuron
5	Functions of Neurotransmitters	Define the characteristics of a neurotransmitter
		Enumerate the neurotransmitters involved in central nervous system.
		Classify neurotransmitters and describe the actions of some common neurotransmitters in central nervous system.
6	Electrical Events during Neuronal Excitation and Inhibition	Describe resting membrane potential of the neuronal soma.
		Describe Effect of Synaptic Excitation on the Postsynaptic Membrane—Excitatory Postsynaptic Potential.

		Describe Effect of Inhibitory Synapses on the Postsynaptic Membrane—Inhibitory Postsynaptic Potential.
		Describe Generation of Action Potentials in the Initial Segment of the Axon Leaving the Neuron—Threshold for Excitation
7	Sensory Receptors	Define and classify receptors.
		Classify receptors according to their location in the body.
		Describe specific functions of receptors.
		Describe Receptor or generation potential
		Discuss mechanism of action of sensory transduction.
8	Coding of Sensory Information	Describe Doctrine of specific nerve energies
		Describe Modality of Sensation—The "Labeled Line Principle"
		Define and discuss law of projection
		Discuss properties of stimulus; modality, Stimulus location Stimulus intensity Stimulus duration
		Describe Frequency of action potentials with threshold level of receptor potential
9	Transmission and Processing of Signals in CNS	Describe Relaying of signals through Neuronal pools; Divergence, Convergence, Prolongation of Signals
10	Types of nerve fibers, its regeneration and degeneration	Describe the mechanism of degeneration & regeneration.
		Describe the duration required for regeneration inside & out of CNS.

		Enumerate the causes of degeneration.
		Discuss Wallerian degeneration
		Identify the microscopic appearance of degenerating neurons
11	Somatic Sensations	Describe Tactile receptors in the skin and their functions: Pacinian corpuscles, Meissner's corpuscles, Ruffini endings, Merkle cell, A-delta and C free nerve endings
12	Transmission in the Dorsal column–medial Lemniscal system	Describe ascending pathways and enumerate the differences between the two.
		Describe Transmission in the Dorsal column–medial Lemniscal system
		Describe Spatial Orientation of the Nerve Fibers in the Dorsal Column–Medial Lemniscal System
		Describe two-point discrimination
13	Somatosensory Cortex	Identify the diagrammatic representation of different areas of the body in the somatosensory cortex I
		Identify Broadman's areas of cerebral cortex and correlate each one of them with their respective functions.
		Describe the functions of somatosensory area I.
		Describe layers of the somatosensory cortex and their function.
		Describe the functions of somatosensory association area
14	Transmission of Sensory signals in the Anterolateral pathway	Differentiate the submodalities of nondiscriminative touch, temperature and nociception based on receptor transduction mechanism, localization within the spinal gray matter, and central termination of the pathways.

		Describe functional organization at all levels and sub-modalities served by the anterolateral system and the equivalent components of the spinal trigeminal system.
BIOCHEMISTRY		
15	Neurotransmitters	Explain the biosynthesis of different neurotransmitters
16	Brain and nervous tissues metabolism	Describe the metabolism of brain and nervous tissues
GENERAL MEDICINE		
17	Peripheral neuropathies	Describe the etiology and types of peripheral neuropathies
		Discuss the clinical presentation and complications of diabetic neuropathies
LAB WORK		
18	Transverse section of spinal cord (cervical level) -1	Identify the slide of transverse section of cervical spinal cord under the microscope
19	Examination of sensations	Examine the sensations (tactile, position, pain, thermal, vibration) of lower limb on a standardized patient.

Theme-2 (Paraplegia)		
SNO	Topic	Learning Outcomes
ANATOMY		
1	Externals features of Spinal Cord	Describe the shape, grooves and sulci and extension of spinal cord
		Enlist the segments of spinal cord
		Differentiate between white and grey matter of spinal cord
		Describe the meningeal covering of spinal cord
		Describe the blood supply of spinal cord
2	Grey Matter of Spinal Cord	Describe the distribution of spinal cord into horns
		Differentiate between anterior, lateral and posterior horns
		Describe the distribution of sensory and motor neuron within the grey matter
		Explain formation of Rexed lamina of spinal cord
3	White matter of spinal cord	Enumerate the ascending tracts
		Explain the origin, pathway and termination of dorsal column medial lemniscal system Explain the origin, pathway
		and termination of anterolateral spinothalamic tract.
		Enumerate the descending tracts
		Explain the origin, pathway and termination of pyramidal tracts
		Explain the origin, pathway and termination of extrapyramidal tracts
		Differentiate between pyramidal and extrapyramidal tracts

EMBRYOLOGY		
4	Spinal cord	Discuss the development of alar and basal plate and its derivatives
HISTOLOGY		
5	Spinal cord	Identify the light microscopic transverse section of spinal cord at cervical, thoracic, lumbar and sacral regions
		Draw and label the transverse section of spinal cord at different levels
PHYSIOLOGY		
	Introduction to Motor Nervous System (General Principles)	Describe organization of the spinal cord for motor functions
		Give an overview of the components of nervous system involved in motor control
		Identify and differentiate upper and lower motor neurons
		Describe the types of anterior horn cells
		Describe the concept of Final Common Path
		Describe broad types of motor activities
	Motor functions of Spinal cord I: Stretch Reflex	Describe structural organization of the muscle spindle
		Define a reflex action and enlist components of reflex arc.
		Describe types of reflexes and their level of integration.
		Describe Stretch Reflex

		Differentiate between Static (Tonic) and Dynamic (Phasic) stretch reflex
		Describe Functions of muscle spindle
		Discuss physiological significance of these reflexes.
		Describe Functions of Gamma efferent system
		Describe the role of the muscle spindle in voluntary motor activity
	Motor functions of Spinal cord II: Golgi Tendon Reflex, Withdrawal Reflexes	Describe Golgi Tendon Reflex
		Differentiate between muscle spindle and Golgi tendon organ.
		Describe types of polysynaptic reflexes and their level of integration.
		Discuss physiological significance of these reflexes.
		Describe reciprocal inhibition and reciprocal innervation
	Support of the body against gravity, Reflexes of Posture And Locomotion	Describe Positive Supportive Reaction
		Describe Cord "Righting" Reflexes.
		Describe stepping and walking movements
		Describe Excitatory-Inhibitory Antagonism Between Pontine and Medullary Reticular Nuclei

	Vestibular Sensations and Maintenance of Equilibrium	Describe the physiologic anatomy of vestibular apparatus
		Describe function of the utricle and saccule in the maintenance of static equilibrium
		Describe function of semicircular ducts
		Describe Neuronal Connections of the Vestibular Apparatus
		Describe Vestibular mechanism for stabilizing the eyes
	Lesions of the Spinal Cord: Upper and Lower Motor Neuron lesion	Define muscle tone and describe its significance.
		Explain the sequence of events during development of muscle tone.
		Discuss spinal shock
		Differentiate between signs of the upper and lower motor neurons.
GENERAL MEDICINE		
	Hemi-section of spinal cord	Describe the clinical features of Brown Sequard syndrome
		Describe the etiology, clinical features, investigations and management of a patient with paraplegia
LAB WORK		
	(HISTOLOGY) Transverse section of thoracic segment of spinal cord-2	Identify the slide of transverse section of thoracic segments of spinal cord under the microscope

	(PHYSIOLOGY) Examination of deep tendon reflexes-1	Examine a standardized patient for deep tendon reflexes of lower limbs

Theme-3 (Syncope)		
S.No	Topic	Learning Outcomes
ANATOMY		
	Medulla	Enlist the components of brain stem
		Describe the external features of brainstem
		Describe the transverse section of medulla at the level of sensory decussation, motor decussation and inferior Olivary nuclei
		Enumerate the cranial nerves nuclei present within the medulla
	Pons	Describe the transverse section of pons at the level of cranial and caudal parts
		Enumerate the cranial nerves nuclei present within the pons
	Midbrain	Describe the transverse section of pons at the level of superior colliculus and inferior colliculus
		Enumerate the cranial nerves nuclei present within the midbrain
PHYSIOLOGY		
	Involuntary function of brain	Describe the involuntary functions of the brain
	Functions of reticular activating system	Describe the structure and functions of RAS
	Coma and brain death	Define coma and describe brain death

	The Autonomic Nervous System 1	Describe the differences in the locations, level and organization of sympathetic and parasympathetic nervous system.
		Identify the target organs of sympathetic and parasympathetic nervous system.
		Describe the distribution of afferent and efferent sympathetic and parasympathetic fibers to their respective target organs.
		Contrast the sympathetic and parasympathetic branches of the autonomic nervous system based on: spinal cord division of origin, length of preganglionic and postganglionic neurons, neurotransmitters and receptors at the ganglionic and target organ synapse.
	The Autonomic Nervous System 2	Discuss basic characteristics of sympathetic and parasympathetic functions
		Describe receptors on the effector organs
		Describe function of the adrenal medullae
		Describe sympathetic and parasympathetic "tone"
		Describe "alarm" or "stress" response of the sympathetic nervous system
PHARMACOLOGY		
	Drugs acting on sympathetic nervous system	Enlist the drugs acting on SNS and describe their mechanism of actions
	Drugs acting on parasympathetic nervous system	Enlist the drugs acting on PNS and describe their mechanism of action
FORENSIC MEDICINE		
	Brain death	Certify brain death

		Describe the medicolegal importance of brain death
LAB WORK		
	(Histology) Transverse section of lumbar spinal cord-3	Identify the slide of transverse section of Lumbar segment of spinal cord under the microscope
	(Physiology) Examination of deep tendon reflexes-2	Examine a standardized patient for upper limbs tendon reflexes

Theme-4 (Hemiplegia)		
ANATOMY		
	Cerebrum • Grey matter of cerebrum • White matter of • cerebrum	Division of cerebrum into different lobes, its surfaces, sulci and gyri
		Distribution of grey matter in cerebral hemispheres
		Enumerate the types of white matter fibers
		Differentiate between association, projection and commissural fibers
		Detailed account of corpus callosum
	Diencephalon	Structure and important nuclei of Thalamus and Hypothalamus

	Blood supply of brain	Describe the formation of circle of Willis
HISTOLOGY		
	Cerebral cortex	Identify the cerebral cortex on light microscope
		Enlist the different histological layers of cerebral cortex
PHYSIOLOGY		
	Cortical Control of Motor Functions	Describe Motor Functions of Specific Cortical Areas
		Describe transmission of signal from the motor cortex to the muscles. (Pyramidal and extrapyramidal).
		Explain the excitation of the spinal cord motor control areas by the primary motor cortex and red nucleus.
	Functions of Descending Tracts	Describe the functions of Descending Tracts
		Describe Decerebrate and Decorticate Rigidity
COMMUNITY MEDICINE		
	Risk factors of cerebrovascular diseases	Describe risk factors for the development of cerebrovascular diseases
		Explain the strategies to prevent cerebrovascular diseases
GENERAL MEDICINE		
	Stroke	Differentiate between hemorrhagic and ischemic stroke

		Describe the etiology, clinical features, investigations and prevention of stroke
LAB WORK		
	(HISTOLGOY) Cerebral cortex	Identify the histological layers of cerebral cortex under the microscope
	(PHYSIOLOGY) Examination of motor functions of the brain and spinal cord	Examine a standardized patient for power, tone and movements of upper and lower limbs, speech, memory and other higher cortical functions

Theme- 5 (Tremors)		
ANATOMY		
	Basal nuclei	Enumerate the components of basal nuclei Describe the structure and relation of corpus striatum, red nucleus and substantia nigra
	Cerebellum	Describe the general features of cerebellum
		Name the lobes of cerebellum and discuss its anatomical and physiological classification
		Enumerate the intracerebellar nuclei of cerebellum
		Describe the input and output of cerebellum
HISTOLOGY		
	Histology of cerebellum	Identify the cerebellar cortex on light microscope

		Enlist the different histological layers of cerebellar cortex
PHYSIOLOGY		
	Cerebellum I: Basic Circuit and Connections	Describe the divisions of cerebellum into 3 lobes and their connections.
		Describe Interconnections of neurons of cerebellar cortex
		Describe Cerebellar afferent fibers
		Describe Cerebellar efferent fibers
		Describe the functional circuits of cerebellum
	Cerebellum II: Functions and Disorders	Explain the functional differences between vermis and cerebellar hemispheres.
		Describe Functions of vestibulocerebellum
		Describe Functions of spinocerebellum
		Describe Functions of cerebrocerebellum
		Describe the clinical abnormalities of cerebellum
	Basal Ganglia I: Pathways and connections	Describe the anatomical and physiological classification of basal ganglia.
		Describe the functional circuits of basal ganglia.

		Describe connections of putamen circuit.
		Describe connections of caudate circuit.
		Enlist the differences between direct and indirect pathways
	Basal Ganglia II: Functions and Diseases	Describe functions of putamen circuit.
		Describe functions of caudate circuit.
		Explain the clinical problems related to basal ganglia
BIOCHEMISTRY		
	Phosphosphingolipids	Describe the metabolism of phosphosphingolipids
PHARMACOLOGY		
	Drugs used in Parkinson's disease	Describe the groups of drugs used in Parkinson`s disease and their mechanism of actions
GENERAL MEDICINE		
	Parkinson`s disease	Describe the pathology, clinical features and treatment of Parkinson`s disease
		Differentiate between cerebellar and parkinsonian tremors
LAB WORK		
	(Histology) Cerebellar cortex	Identify the histological layers of cerebellar cortex under the microscope
	(Physiology) Examination of cerebellum	Illicit cerebellar signs in a standardized patient

Theme-6 (Headache)		
ANATOMY		
	Dural venous sinus	Differentiate between paired and unpaired venous sinuses Discuss the structure and drainage of individual venous sinuses
	CSF in ventricular system	Discuss the structure of choroidal plexus and the formation of CSF in ventricles
PHYSIOLOGY		
	Pain Sensation Pathways	Describe pain receptors and type of stimuli causing pain.
		Describe types of pain.
		Explain in detail the pathway for pain.
	Pain suppression (analgesia) System in the brain and Spinal cord	Define analgesia
		Explain pain suppression system in the brain and spinal cord.
		Describe Gate control theory and Brain Opiate system
		Describe clinical abnormalities of pain: Primary and Secondary Hyperalgesia
	Headache, Referred Pain	Define referred pain and describe its mechanism.
		Describe the clinical significance of referred pain with examples.

		Enumerate the causes of referred pain.
		Enlist the causes of intra-cranial and extra-cranial headache and correlate with the underlying mechanism of pain.
	Thermal Sensations	Describe thermal receptors and their excitation
		Describe mechanism of stimulation of thermal receptors
		Describe transmission of thermal signals in the nervous system
	Functions of Specific Cortical Areas (Concept of Dominant Hemisphere)	Name the association areas of brain. Briefly describe their location and function?
		Draw the diagram of cerebral cortex to show the different functional areas
	Language and Speech	Define and classify speech
		Describe how the brain performs the function of speech.
		Describe Broca's area in the brain, and its function.
		Describe wernicke's area in the brain, and its function.
		Describe the speech pathways for perceiving a heard word and then speaking the same word & perceiving a written word and repeating it and correlate it with their clinical significance
		Describe the effects of damage to Broca's area and Wernicke's area
		Describe disorders related to speech.
	Learning and Memory	Define and classify memory and explain its basic mechanism.

		Describe the mechanism of synaptic facilitation and synaptic inhibition
		Describe consolidation of memory, and briefly describe one of its most important features.
		Describe Codifying of new memories
		Role of specific parts of the brain in the memory process
		Explain disorders related to memory.
	Activating-Driving Systems of the Brain	Describe bulboreticular facilitatory area. Explain continuous stimulation from lower brain by four neurohormonal systems.
		Explain continuous stimulation from lower brain by four neurohormonal systems.
	Limbic System	Describe the principal components of the limbic system: hippocampus, amygdala, prefrontal cortex, and nucleus accumbens), the pathways connecting them and their functions.
		Discuss the anatomy of memory and emotion in relation to the limbic system
		Describe Functions of limbic system
		Describe the connection of hypothalamus with different areas of brain.
		Describe the vegetative and endocrine functions of hypothalamus.
		Describe the behavioral functions of hypothalamus.
	Brain Waves and Sleep	Describe brain waves.
		Describe the clinical significance of EEG.

		Define sleep. Describe its various types and characteristics.
		Describe basic theories of sleep.
		Describe genesis of n-REM and REM sleep.
		Enumerate the neurotransmitters involved in sleep.
		Describe various sleep disorders.
	Seizures and Epilepsy	Define seizure and epilepsy.
		Classify seizures & epilepsies
		Enumerate causes of seizure and epilepsy.
		Discuss the clinical features of patient presents with epilepsy.
		Discuss the significance of electrophysiologic studies imaging and other investigations in epilepsy.
		Describe briefly about pharmacologic treatment.
	CSF formation, circulation and functions	Describe regulation of cerebral blood flow
		Describe formation, flow, and absorption of cerebrospinal fluid
		Describe Blood–Cerebrospinal Fluid and Blood-Brain Barriers

BIOCHEMISTRY		
	CSF	Describe the biochemical composition of CSF
	Prostaglandins and pain	Define Prostaglandins
		Describe the role of Prostaglandins in initiation of pain
PATHOLOGY		
	Alzheimer's disease	Explain the pathogenesis and microscopic findings of Alzheimer`s disease and its types
	Inflammation of brain	Describe the inflammatory processes related to meninges and brain parenchyma
		Describe the pathogenic mechanisms of meningitis and encephalitis
GENERAL MEDICINE		
	Epilepsy	Explain the types of epilepsy
		Describe the investigations and enlist anti-epileptic drugs
	Hydrocephalus	Describe the etiology, pathogenesis and clinical features of hydrocephalus
RADIOLOGY		
	Neuroradiology- CT scans	Describe relevant CT scan findings of intracerebral bleeds, hematomas and subarachnoid hemorrhage
		Describe relevant CT scan findings of ischemic strokes
	Neuroradiology- MRI scans	Describe relevant MR scan findings of intracerebral bleeds, hematomas

		Describe relevant MR scan findings of ischemic strokes
NEUROSURGERY		
	Brain injuries	Describe the types, clinical presentations and investigations of a patient with head injury
	Brain and spinal tumors	Explain the types, clinical features and investigations of brain and spinal tumors
LAB WORK		
	(Histology) Slides of sacral segments and overview of nervous tissues	Identify the slides of different neural structures under the microscope
	(Physiology) Neurological examination of upper and lower limbs	Examine a standardized patient for neurological system of upper and lower limbs

2nd Year MBBS Block D: Neurosciences-1B Module

SR.No	Themes	Duration
1	Facial palsy (face, 5th and 7th cranial nerves)	1 week
2	Neck swelling (thyroid, larynx, neck, muscles etc.)	1 week
3	Cleft palate (palate, tongue, pharynx)	1 week
4	Anosmia	
5	Diplopia / blindness (2nd, 3rd, 4th, 6th cranial nerve / eye ball / orbit)	1 week
6	Deafness (ear / 8th nerve)	1 week

General Learning Outcomes

At the end of this module, the 2nd year students will be able to:

Knowledge

1) Describe the structure of vertebrae, skull bones palate, pharynx, larynx, facial bones and base of the skull
2) Describe the contents walls and boundaries of anterior and posterior triangles of the neck
3) Describe the structure, relation, blood supply and venous drainage of thyroid
4) Describe the arteries, veins and nerves of the neck including cervical plexuses
5) Describe the nuclei, course, relations, and structures supplies by all cranial nerves
6) Describe the origin, course, relations and structures supplies by the arteries, veins and lymphatics of head and neck
7) Describe the anatomy of all the muscles of facial expression and head and neck
8) Describe the structure and functions of eye, ears, nose and paranasal sinuses
9) Describe the development of different structures of organs of the head and neck

Skill

10) Identify the microscopic structure of salivary glands and tongue
11) Examine a standardized patient`s cranial nerves
12) Demonstrate Perimetry and Audiometry

Attitude

Neurosciences-1B Module: Specific Learning Objectives: By the end of this module, students of 2nd year MBBS will be able to		
Theme-1 Facial Palsy		
SNO	Topic	Learning Outcomes
Anatomy		
	Osteology of mandible	Describe the gross features of adult mandible.
		Describe the bony features of mandible
		Name the joints formed by mandible
		Name the attachment of muscles and ligaments on mandible
	Norma frontalis	Describe the bony features of frontal view of skull
	Norma basalis	Name the bones forming the base of skull
		Identify the different foramina and name the structures passing through these foramina
		Describe the attachment and relation of base of skull
		Describe the clinical importance
	Norma lateralis	Name the boundaries of temporal fossa
		Enumerate the contents of temporal fossa
		Describe the relations of temporal fossa
		Name the boundaries of infratemporal fossa
		Enlist the contents of fossa

		Describe the relations of Infratemporal fossa
		Name the layers of scalp
	Scalp and muscles of facial expression	Describe the muscles of scalp
		Name the neurovascular supply of scalp
		Describe the lymphatic drainage of scalp
		Name the fascial muscles along with attachments, nerve supply and actions
	Muscles of mastication	Enumerate the muscles od mastication along with their attachments, nerve supply and actions
	Blood supply and lymphatic drainage of face	Describe the blood supply and lymphatic drainage of face portion
	Temporomandibular joint (TMJ)	Name the type of TMJ
		Name the ligaments related with TMJ
		Describe the relations of TMJ
		Name the muscles causing movements of TMJ
		Name the neurovascular supply of TMJ
	Extra cranial course of CN VII	Describe the extra cranial course of CN VII along with its clinical importance

EMBRYOLOGY		
	Face development	Discuss the five facial primordia
		Describe the inter-maxillary segment
		Describe the embryological defects of face
HISTOLOGY		
	Parotid glands	Identify the variety of gland according to nature of its acinus
		Discuss the capsular structure and its extensions in the gland
		Differentiate between the stroma and parenchyma of parotid gland
		Describe the ductal system of the gland and its lining epithelium
		Differentiate between the intercalated and striated ducts in intralobular parts of gland
		Describe the detailed structure of serous acinus
		Discuss the location of stenson,s duct and its structure
		Discuss clinical conditions related with parotid gland
BIOCHEMISTRY		
	Biotechnology	Describe the indications and procedure of Polymerase Chain

		Reaction (PCR), Cloning and Restriction fragment length polymorphism (RFLP)
	Purine Nucleotide synthesis and degradation	Describe the process of nucleotide synthesis and degradation
	Hyperuricemia-Gout	Describe the normal levels of serum Uric acid in the blood
		Describe the mechanism of synthesis of Uric acid from Purines
		Describe the etiology, pathogenesis and clinical features of Gout
	Pyrimidine Nucleotide synthesis and degradation	Describe the mechanisms of Pyrimidines synthesis and degradation
	Salvage pathway of nucleotide synthesis	Explain the salvage pathway of Nucleotide synthesis
	The structural basis of cellular information	Explain the structural basis of cellular information
	DNA, chromosomes, discovery and organization in genome	Explain the structure, organization and functions of Chromosomes, DNA and genes
	DNA replication	Describe the process of DNA replication
	Transcription	Describe the mechanism of transcription

	Protein synthesis	Explain the mechanisms of protein synthesis
	Mutation	Define mutation
	DNA, damage and repairs	Explain the mechanisms of DNA damage and repair
	Bell`s palsy	Describe the clinical features and management of Bell`s palsy
LAB WORK		
	(Histology) Submandibular and Sublingual Salivary Gland	Identify the slide of submandibular and sublingual salivary glands under the microscope
	(Physiology) Examination of Cranial nerves, V, VII	Examine the cranial nerves V & VII on a standardized patient

Theme-2 Neck Swelling		
SN o.	Topic	Learning Outcomes
Anatomy		
	Typical cervical vertebra	Describe the bony features of typical cervical vertebrae
		Name the joints formed by typical vertebrae

		Describe the attachments
	Atypical cervical vertebra	Describe the bony features of atypical cervical vertebrae
		Name the joints formed by atypical vertebrae
		Describe the attachments
	Hyoid bone	Describe the bony features of hyoid bone
		Describe the attachments of muscles and ligaments with hyoid bone
	Pterygopalatine fossa	Name the boundaries of pterygopalatine fossa
		Enumerate the contents of pterygopalatine fossa
		Describe the relations of pterygopalatine fossa
	Deep fascia of neck	Enumerate the layers of deep cervical fascia
		Draw and labelled diagram of transverse section of neck showing deep cervical fascia
		Describe the layers of deep cervical fascia along with its clinical importance
	Larynx	Name the paired and unpaired cartilages of larynx
		Enumerate the ligaments and membrane of larynx
		Describe the sensory and blood supply of larynx
		Enumerate the intrinsic and extrinsic muscle of larynx along with its actions and

		nerve supply
		Describe the pyriform fossa
	Ant. triangle of neck	Enlist the subdivisions of anterior triangle of neck
		Describe the boundaries and contents of submental triangle
		Describe the boundaries and contents of carotid triangle Describe the boundaries and contents of digastric triangle Describe the boundaries and contents of muscular triangle
	Post triangle of neck	Enlist the subdivisions of posterior triangle of neck
		Describe the boundaries and contents of occipital triangle
		Describe the boundaries and contents of supraclavicular triangle
	Arteries of neck	Describe the course, Distribution and branches of main arteries of neck
	Veins of neck	Describe the course, Draining and tributaries of main veins of neck
	Cervical plexus and nerves of neck	Describe the cervical plexus along with its branches and distribution
Embryology		
	Pharyngeal apparatus	Describe the components of pharyngeal apparatus.
		Describe the development of pharyngeal apparatus
		Enlist the derivatives of the first pharyngeal arch

		Define the terms pharyngeal arch, pouch, cleft and membrane
		Enumerate the derivatives of the second pharyngeal arch
		Enumerate the derivatives of the 3rd pharyngeal arch
		Enumerate the derivatives of the 4th pharyngeal arch
		Enlist the derivatives of 1st ,2nd, 3rd and 4th pharyngeal pouches
		Describe the derivatives of pharyngeal, grooves, and membranes
		Discuss the arterial supply and innervation of the pharyngeal arches
		Describe the pharyngeal membranes
		Discuss the branchial cyst, sinuses, and fistula
		Describe the 1st arch developmental defects
Histology		
	Thyroid gland	Discuss the structural unit of thyroid gland
		Identify the lining epithelium of follicular cells
		Discuss the formation and storage of colloid in the lumen of follicular cells
		Describe the location and structure of parafollicular cells
		Discuss the interfollicular connective tissue
ENT		

	Lump in neck	Approach to a patient with lump in the neck
LAB WORK		
	(Histology) Thyroid gland	Identify the slide of thyroid gland under the microscope
	(Physiology) Examination of Cranial nerves XI, XII	Examine a standardized patient for Cranial nerves XI, XII

Theme-3 (Anosmia)

Theme-3 Anosmia		
SNo	Topic	Learning Outcomes
Anatomy		
	Nose and paranasal sinuses	Describe the external features of nose
		Describe the relations of nose with other structures
		Describe the nasal septum
		Describe the lateral wall of nose
		Name the neurovascular supply of nose
		Describe the olfactory nerve
		Describe the paranasal sinuses along with its clinical importance
EMBRYOLOGY		

	Development of nose	Describe the development of nasal cavities and paranasal air sinuses.
		Describe the development of nasolacrimal groove, duct, and sac
		Enlist developmental defects of nose
PHYSIOLOGY		
	Sense of Smell	Describe olfactory membrane
		Explain mechanism of excitation of the olfactory cells.
		Discuss Rapid Adaptation of Olfactory Sensations.
		Define threshold for smell
		Describe transmission of smell signals into the central nervous system
		Describe primitive and newer olfactory pathways into the central nervous system
		Describe centrifugal control of activity in the olfactory bulb by the central nervous system.
ENT		
	Sinusitis	Describe the causes and clinical features of acute and chronic sinusitis
ANATOMY		
	Tongue	Describe the mucosa and muscles of tongue along with its attachments, nerve supply and actions
	Salivary glands	Name the salivary glands
		Describe the location of each gland
		Describe the relations of each gland
		Name the nerve supply
		Describe the drainage of salivary glands along with its importance
	Palate	Name the bones forming the hard palate
		Describe the soft palate along with its muscles,

		attachments and nerve supply
		Describe the relations of palate
		Name the neurovascular supply of palate
	Pharynx	Enumerate the division of pharynx
		Describe the nasopharynx with its clinical significance
		Describe the oropharynx with its clinical significance
		Describe the laryngopharynx with its clinical significance
		Enlist the muscles of pharynx with its nerve supply and actions
	Extra-cranial course of CN IX, XXI, XII	Describe the extra cranial course of CN IX, X, XI and XII
EMBRYOLOGY		
	Tongue	Describe the development of anterior 2/3 of the tongue
		Discuss the role of the third pharyngeal arch in tongue development.
		Discuss the innervation, blood vessels, and muscles of tongue.
		Describe the development of papillae, taste buds and salivary glands.
		Describe the developmental anomalies of tongue.
	Palate	Describe the development of primary and secondary palate.
		Discuss the developmental defects of lip and primary, secondary palate
		Describe the development of anterior 2/3 of the tongue
		Discuss the role of the third pharyngeal arch in tongue development.

		Discuss the innervation, blood vessels, and muscles of tongue.
		Describe the development of papillae, taste buds and salivary glands.
		Describe the developmental anomalies of tongue.
		Describe the development of primary and secondary palate.
		Discuss the developmental defects of lip and primary, secondary palate
HISTOLOGY		
	Submandibular glands	Identify the variety of gland according to nature of its acinus.
		Discuss the capsular structure and its extensions in the gland
		Differentiate between the stroma and parenchyma of submandibular gland
		Describe the ductal system of the gland and its differences with parotid gland
		Describe the detailed structure of serous and mucous acinus
		Discuss the formation of serous demilune
		Discuss the opening of Wharton,s duct
		Discuss different pathological conditions of the gland
	Sublingual glands	Identify the variety of gland according to its nature of acinus
		Differentiate between the stroma and parenchyma of sublingual gland
		Describe the ductal system of the gland and its lining epithelium

		Describe the detailed structure of its acinus
		Discuss the opening of Bartholin ducts
		Discuss different pathological conditions of the gland
PHYSIOLOGY		
	Sense of Taste	Discuss primary sensations of taste
		Explain threshold for taste
		Describe the taste bud and its function
		Describe mechanism of stimulation of taste buds
		Describe transmission of taste signals into the central nervous system
PEDIATRIC SURGERY		
	Cleft palate	Describe the pathogenesis, clinical features and management of a patient with cleft palate
LAB WORK		
	(Histology) Tongue	Identify the slide of tongue under the microscope
	(Physiology) Examination of Cranial nerves I, IX, X	Examine a standardized patient for cranial nerve I, IX, X examination (sense of smell, taste, gag reflex)

Theme-4 (Diplopia)		
S.NO	Topic	Learning Outcomes
ANATOMY		
	Bony orbit	Name the bones forming the bony orbit
		Identify the foramina, fissures, and fossae associated with the orbit and what are the structures transmitted through these openings**.**
		Name the contents of orbit
	Eye ball	Name the layers of eyeball
		Describe the fibrous layer of eyeball
		Describe the pigmented layers of eyeball
		Describe the inner nervous layer of eyeball
		Describe the chambers and of eyeball
		Describe the secretion and drainage of aqueous humor and vitrous humor
		Describe the neurovascular supply of eye
		Describe the intra and extraoccualr muscles with their attachment, actions and nerve supply
	Extra cranial course of CN III, IV, VI	Describe the course of optic, oculomotor, trochlear and abducent nerve with clinical importance
EMBRYOLOGY		
	Development of eye	Define lens placode and formation of retina.
		Describe the development of ciliary body, iris, lens and choroid.
		Discuss the formation of sclera, cornea, sphincter and

		dilator pupillae
		Discuss the development of virtreous body and optic nerve
		Describe developmental anomalies of eye
HISTOLOGY		
	Eye	Enlist different histological layers of the eye
		Discuss retinal pigment epithelium(RPE) in detail
		Describe the structural details of rods
		and cones and the supporting cells
		Discuss structure of macula densa
		Describe the histological layers of cornea and retina
PHYSIOLOGY		
	Physical Principles of Optics	Describe refraction at interface between two media.
		Describe the physical principles of optics.
		Apply refractive principles to lenses
		Describe Focal Length of a Lens
		Explain formation of image by convex lenses
		Explain how to measure refractive power of a lens
	Optics of The Eye	Explain lens system of the eye.
		Describe the concept of “Reduced” Eye.
		Explain accommodation reflex.
		Explain presbyopia
		Describe that “depth of focus” of the lens system increases with decreasing pupillary diameter
		Define visual acuity.
		Explain the determination of distance of an object from the eye- —“DEPTH PERCEPTION”
		Describe errors of refraction
	Fluid System of The Eye—Intraocular Fluid	Describe the formation of aqueous humor by the ciliary body

		Describe the outflow of aqueous humor from the eye
		Describe Regulation of Intraocular Pressure and Glaucoma
	Anatomy and Function of The Structural Elements of The Retina	Describe foveal region of the retina and its importance in acute vision.
		Discuss the functional parts of the Rods and Cones.
		Describe blood supply of the retina—the central retinal artery and the choroid
	Photochemistry of Vision	Explain rhodopsin-retinal visual cycle and excitation of the rods
		Explain the role of vitamin A for formation of rhodopsin.
		Describe excitation of the rod when rhodopsin is activated by light
		Describe receptor potential, and logarithmic relation of the receptor potential to light intensity
		Describe mechanism by which rhodopsin decomposition decreases membrane sodium conductance—the excitation "cascade."
		Explain dark and light adaptation.
	Color Vision	Describe photochemistry of color vision by the cones
		Explain tricolor mechanism of color detection
		Explain Young-Helmholtz theory of color vision.
		Explain color blindness.
	Neural Function of The Retina	Describe different neuronal cell types and their functions
		Describe the visual pathway from the cones to the ganglion cells
		Discuss the retinal neurotransmitters.
		Discuss retinal ganglion cells and their respective fields
		Describe lateral inhibition.

		Explain excitation of ganglion cells.
		Discuss on and off response of ganglion cells.
	Visual Pathways	Discuss the function of the dorsal lateral geniculate nucleus of the thalamus.
		Describe organization and function of the visual cortex
		Describe primary visual cortex.
		Describe secondary visual areas of the cortex.
		Describe two major pathways for analysis of visual information: (1) the fast "position" and "motion" pathway and (2) the accurate color pathway
		Describe neuronal patterns of stimulation during analysis of the visual image
		Discuss detection of color
	Eye Movements and Their Control	Describe muscular control of eye movements.
		Describe neural pathways for control of eye movements.
		Describe fixation movements of the eyes
		Explain mechanism of involuntary locking fixation—role of the superior colliculi.
		Explain "Fusion" of the visual images from the two eyes
		Describe neural mechanism of stereopsis for judging distances of visual objects
	Autonomic control of Accommodation and pupillary aperture	Describe autonomic nerves to the eyes
		Describe control of accommodation
		Describe control of pupillary diameter
		Discuss Pupillary reflexes or reactions in central nervous system disease.

COMMUNITY MEDICINE		
	Prevention of blindness	Describe the causative agents and prevention of community blindness
MEDICINE		
	Ocular nerves palsies	Describe the clinical features and etiology of 3, 4 and 6th nerve palsies
OPHTHALMOLOGY		
	blindness	Approach a patient with unilateral and bilateral blindness
LAB WORK		
	(Histology) Parotid Gland	Identify the histological layers of parotid gland under the microscope
	(Physiology) Visual Acuity	Examine a standardized patient for visual acuity and errors of refraction
	(Physiology) Perimetry	Examine a standardized patient for visual field function

Theme-6 (Deafness)		
SNo	Topic	Learning Outcomes
ANATOMY		
	External and middle ear	Describe the auricle
		Describe the external auditory meatus with clinical importance
		Name the neurovascular supply of external ear
		Name the boundaries of middle ear
		Describe the contents of middle ear
		Describe the auditory tube along with its clinical importance
	Inner ear	Describe the bony labyrinth
		Describe the membranous labyrinth
		Describe the course of CN VIII along with its clinical importance
EMBRYOLOGY		
	Development of ears	Describe the development of external and middle ear
		Explain the origin of internal ear along the relationship of saccule, utricle, semi-circular canals
		Describe the development of cochlear duct and organ of corti
		Enlist the developmental anomalies of external

		middle and internal ear
PHYSIOLOGY		
	Tympanic Membrane and The Ossicular system	Explain conduction of sound from the tympanic membrane to the cochlea.
		Describe "Impedance Matching" by the Ossicular System.
		Describe attenuation of sound by contraction of the tensor tympani and stapedius muscles.
		Describe transmission of sound through bone.
	Cochlea	Describe functional anatomy of the cochlea
		Describe basilar membrane and resonance in the cochlea.
		Describe transmission of sound waves in the cochlea—"traveling wave"
		Describe pattern of vibration of the basilar membrane for different sound frequencies.
		Describe amplitude pattern of vibration of the basilar membrane.
		Describe function of the organ of corti
		Describe Excitation of the Hair Cells
		Discuss the "place" principle
		Describe detection of changes in loudness—the power law.
		Describe threshold for hearing sound at different frequencies.
	Auditory Nervous Pathways	Describe auditory pathway.
		Explain the function of the cerebral cortex in hearing.
		Describe how to determine the direction from which

		sounds come.
		Describe transmission of centrifugal signals from CNS to lower auditory centres
		Describe different types of deafness.
	Vestibular Sensations and Maintenance of Equilibrium	Describe the physiologic anatomy of vestibular apparatus
		Describe function of the utricle and saccule in the maintenance of static equilibrium
		Describe function of semi-circular ducts
		Describe Neuronal Connections of the Vestibular Apparatus
		Describe Vestibular mechanism for stabilizing the eyes
ENT		
	Hearing loss	Describe different clinical tests for hearing loss
		Describe the etiology and management of conduction and sensorineural hearing loss
LAB WORK		
	(Physiology) Examination of Cranial Nerves III, IV and VI	Examine a standardized patient for oculomotor, Abducens and Trochlear nerves with an ophthalmoscope
	(Physiology) Tuning fork test	Examine a standardized patient for hearing loss with tuning fork (Weber and Rinne`s test)
	(Physiology) Audiometry	Examine a standardized patient for functions of inner ear

BLOCK D Paper

FINAL DISTRIBUTION OF MCQs FOR 2nd YEAR NEUROSCIENCES MODULE

Subject	NS-1A	NS-1B	Total MCQs
Gross Anatomy	21	17	38
Histology	6	5	11
Embryology	3	5	8
Physiology	27	18	45
Biochemistry	2	3	5
PRIME including Research	3	2	5
Medicine	1	1	2
Pharmacology	1	0	1
Pathology	1	0	1
Forensic medicine	1	0	1
EYE	0	1	1
ENT	0	1	1
Pediatric surgery	0	1	1
Total	**66**	**54**	**120**

Block D OSPE Blueprint

Specialty	Practical's	# stations	total
Neuroscience 1A Anatomy	Osteology Nerve and Muscles Surface anatomy Embryology models Radiology	2	4
	Histology	1	
	Viva stations	1	
Neuroscience 1A Physiology	Superficial reflexes Deep tendon reflexes Descending Tracts Sensations	3	4
	Viva stations	1	
Neuroscience 1A Biochemistry	Viva stations	1	11

			1
Neuroscience 1B Anatomy	Osteology Nerve and Muscles Surface anatomy Radiology	2	4
	Histology	1	
	Viva stations	1	
Neuroscience 1B Physiology	Ophthalmoscopy Visual acuity/ Perimetry Perimetry Tuning fork test Audiometry	3	4
	Viva stations	1	
Neuroscience 1B Biochemistry	Viva stations	1	1
Total		18	18

Block E

Duration of Module: Nine Weeks

S.No	Themes	Duration
1	Painful swallowing	1 week
2	Abdominal pain	2 weeks
3	Jaundice	1 week
4	Diarrhea and Constipation	1 week
5	Bleeding Per Rectum	1 week
6	Hyperglycemia (Carbohydrate Metabolism)	1 week
7	Obesity (Lipid Metabolism)	4 days
8	Wasting (Protein Metabolism)	8 days

General learning outcomes

At the end of this 6 weeks` module, the 2nd year students will be able to:

Knowledge:

1) Describe the anatomy of oral cavity with respect to GI functions
2) Elaborate the structure and functions of salivary glands
3) Describe the structure and development of esophagus, stomach, small intestine and large intestine
4) Describe the anatomy of peritoneum and mesentery
5) Explain the movements, functions and regulations of gastrointestinal functions
6) Describe the structure, development and functions of hepatobiliary system and pancreas
7) Discuss the mechanisms of digestion and absorptions of carbohydrates, proteins, fats and other nutrients
8) Describe different physiological reflexes occurring upon stimulation of gastrointestinal organs
9) Discuss the chemistry and functions of gastrointestinal hormones
10) Describe common pathological conditions like peptic ulcers, viral hepatitis, obstructive jaundice, carcinoma of esophagus and colorectal cancers
11) Explain the metabolic processes related to carbohydrates, fats and protein metabolism

Skills:

Attitude:

12) Describe the components of medical ethics
13) Explain research ethics, research misconduct and plagiarism
14) Explain the psychosocial aspects of common psychiatric and functional bowel disorders

2nd Year MBBS Block E: Renal Module Specific Learning Outcomes		
Theme 1: Painful swallowing		
S. No	**Topic**	**Learning objectives**
ANATOMY		
	Oral cavity	Describe the musculature of tongue Describe the nerve supply of tongue
	Salivary glands	Describe the gross anatomy of parotid, submandibular and sublingual salivary gland
	Esophagus	Describe the extent, course, relations and gross structure of esophagus.
EMBRYOLOGY		
	Development of tongue	Describe the developmental events of tongue Enlist various anomalies of tongue development
	Development of esophagus	Describe the development of Esophagus
	Development of salivary glands	Describe the development of salivary glands
HISTOLOGY		
	Oral cavity	Describe the microscopic structure of lips
		Describe the histological features of tooth in longitudinal and transverse section
		Explain the histology of tongue.
		Differentiate between the microscopic picture of anterior 2/3rds and posterior 1/3rds of the tongue
	Esophagus	Identify the epithelium of esophagus and esophageal glands in mucosa
		Differentiate between musculature in different parts of

		the esophagus
PHYSIOLOGY		
	General principles of gastrointestinal motility	Describe electrical activity of gastrointestinal smooth muscle
		Describe the mechanism of excitation of smooth muscle of gastrointestinal
		Differentiate between slow wave and spike potential
	Neural control of GIT function (Enteric Nervous system)	Differentiate between mesenteric and submucosal plexus.
		Classify the following enteric nervous system neurotransmitters as excitatory or inhibitory: norepinephrine, acetylcholine, CCK, VIP, histamine, and somatostatin
		Describe the role of autonomic nervous system in regulation of GIT's function
		Differentiate between sympathetic and parasympathetic modulation of the enteric nervous system and the effector organs of the GI tract
		Describe three types of gastrointestinal reflexes
	Hormonal control of Gastrointestinal motility	Describe gastrointestinal hormone actions, stimuli for secretion, and site of secretion
	Functional types of movements in the gastrointestinal tract	Describe the functional types of movements in the gastrointestinal tract
		Describe law of gut.

		Describe blood flow through the villus and its significance
	Gastrointestinal blood flow— Splanchnic circulation	Describe anatomy of the gastrointestinal blood supply
		Describe the effect of gut activity and metabolic factors on gastrointestinal blood flow
		Describe nervous control of gastrointestinal blood flow
	Ingestion of food	Describe the mechanics of ingestion of food
		Describe chewing and mastication
		Describe different stages of swallowing.
		Describe the effects of the pharyngeal stage of swallowing on respiration
	General principles of alimentary tract secretion	Describe basic mechanisms of stimulation of the alimentary tract glands
		Describe dual effect of sympathetic stimulation on alimentary tract glandular secretion
	Role of mucus and saliva	Describe the secretion of saliva and its nervous regulation
		Describe the plasma and saliva concentrations of Na+, Cl-, and HCO3- at low secretion rates and at high secretion rates and the principal cell types involved in each secretion rate.
		State the substrates and digestion products of salivary amylase (ptyalin).

		Identify the stimuli and cell types involved in GI secretion of mucous, and identify the function of salivary mucus.
		Describe three types of stimuli that increase salivary secretion.
		State the components of the saliva important in oral hygiene, and identify the role of salivary secretions in eliminating heavy metals
	Disorders of swallowing and esophagus	Describe the clinical abnormalities of swallowing mechanism
		Describe Achalasia and Megaesophagus
BIOCHEMISTRY		
	Saliva	Describe the composition of salivary secretions
		Describe the formation and characteristics of salivary secretions
		Elaborate the functions of saliva
PATHOLOGY		
	Carcinoma of Esophagus	Describe the histological types and presentation of esophageal carcinoma
ENT		
	Oral ulceration	Enlist the causes of oral ulcerations
		Describe Aphthous ulcers and its treatment
		Describe the clinical features and drugs used to treat esophageal candidiasis

Theme 2: Pain Epigastrium		
ANATOMY		
	Anterior abdominal wall	Describe the origin, insertion, nerve supply and actions of anterolateral abdominal wall muscles
		Describe the formation of rectus sheath
		Describe the contents of rectus sheath
		Describe the surface anatomy of anterior abdominal wall Describe the structures related to transpyloric plane
		Enlist various types of abdominal hernias
	Inguinal canal	Describe the boundaries of inguinal canal
		Enlist the contents of inguinal canal in males and females
		Differentiate between direct and indirect inguinal hernia
	Peritoneum	Describe greater and lesser omentum
		Describe the nerve supply of peritoneum
		Describe the anatomy of lesser sac.
		Describe the boundaries of epiploiec foramen
		Describe the various peritoneal pouches, recesses and ligaments
	Stomach	Describe the gross structure of stomach
		Describe the blood supply and lymphatic drainage of stomach
		Describe the anatomy of stomach bed
	Duodenum	Describe the gross structure and blood supply of duodenum
		Write the relations of various parts of duodenum

	Pancreas	Describe the gross structure of pancreas and its ductal system
HISTOLOGY		
	Stomach	Enumerate the different layers of the stomach wall
		Write a note on gastric glands.
		Differentiate between fundic and pyloric mucosa
	Duodenum	Discuss histological features of duodenum and describe duodenal glands.
	Pancreas	Describe the histology of pancreas
		Differentiate histologically between exocrine and endocrine portions of pancreas
EMBRYOLOGY		
	Development of foregut	Describe the development of stomach
		Describe the development of duodenum
		Enlist various developmental anomalies of stomach
		Enlist various developmental anomalies of duodenum
	Pancreas	Describe the development of pancreas
		Enlist various anomalies of pancreas
PHYSIOLOGY		
	Motor function of Stomach	Describe the motor function of stomach.
		Describe basic electrical rhythm of the stomach wall
		Describe Pyloric pump
		Describe role of the pylorus in controlling

		stomach emptying
		Describe the regulation of gastric emptying
	Gastric secretion	Describe characteristics of the gastric secretions
		Describe the mechanism of secretion of different gastric glands
		Describe the phases and regulation of gastric secretion.
		Enlist the hormones that inhibit and increase gastric secretions.
		Enumerate the reflexes that inhibit and increase gastric secretions
BIOCHEMISTRY		
	Gastric secretions	Describe the chemical composition of gastric secretions
		Describe the functions of HCl and other constituents of gastric secretions
		Discuss the mechanism of synthesis and secretion of HCl from gastric mucosa
		Discuss the mechanism of secretion and role of Intrinsic factor from gastric parietal cells
PATHOLOGY		
	Peptic ulcer disease	Describe the mechanism of formation of peptic ulcers, its stages and complications
		Describe the etiology, pathology and clinical presentation of gastric cancer
		Describe the mechanism of development, presentation and complications of acute

		pancreatitis
PHARMACOLOGY		
	Drugs used in Peptic ulcer	Classify the drugs used in Peptic ulcer disease
		Describe the mechanism of action of drugs used in Peptic ulcer
FORENSIC MEDICINE		
	Poisons identification through gastric lavage	Enlist indications and contraindications for gastric lavage Describe the sampling technique of gastric lavage fluid
MEDICINE		
	GERD and Peptic ulcer	Describe the etiology, clinical features, complications and drug treatment of GERD and peptic ulcer disease
SURGERY		
	Peptic ulcer	Describe the complications of long-term peptic ulcer disease and its surgical management
	Lump in the abdomen	Describe common causes of lump in abdomen and enlist the common surgical procedures for treatment of hernia.
	Acute pancreatitis	Describe the etiology, clinical features, complications and management of acute pancreatitis

Theme 3: Jaundice		
S.No	Topic	Learning Outcomes
ANATOMY		
	Liver	Describe the borders and surfaces of liver

		Describe the visceral surface of liver
		Describe the peritoneal reflections and associated ligaments of liver
		Describe the lobes and segments of liver
		Describe the blood supply of liver
		Describe the hepato renal pouch of morrison and its clinical significance
	Extra hepatic billiary apparatus	Describe the gross anatomy of gall bladder
		Describe calot's triangle
		Describe the gross anatomy of extra hepatic billiary tree
	Spleen	Describe the gross anatomy of spleen and blood supply of spleen
	Hepatic portal venous system	Describe the formation and tributaries / branches of hepatic portal venous system
		Explain the clinical significance of hepatic portal system
EMBRYOLOGY		
	Development of distal fore gut	Describe the development of liver
		Describe the development of gall bladder and billiary tree
		Describe the developmental anomalies of liver and biliary tree
HISTOLOGY		
	Liver	Discuss the histological features of liver
		Describe liver parenchyma and general structural plan of the liver
		Describe the histological features of the structures

		present in the portal triad
	Spleen	Discuss the histological features of spleen
		Differentiate between red pulp and white pulp
PHYSIOLOGY		
	Pancreatic secretion	Describe the role of pancreatic secretions in digestion.
		Describe the phases and regulation of pancreatic secretion
	Physiology of liver	Describe Physiological Anatomy of the Liver
		Describe blood flow through the liver
		Describe metabolic functions of liver
		Describe Regulation of Liver Mass—Regeneration
		Describe Bilirubin formation and excretion
	Secretion of bile by liver	Describe the mechanism of secretion of bile by the liver
		Describe the function of bile salts in fat digestion and absorption
		Describe functions of the biliary tree in digestion
BIOCHEMISTRY		
	Bile	Describe the constituents of bile
		Describe the functions of bile
		Describe the mechanism of gall stone formation
PATHOLOGY		
	Acute/ chronic viral hepatitis	Describe the different viruses causing acute and chronic hepatitis

		Describe the pathogenesis, stages and clinical presentation of liver cirrhosis
PHARMACOLOGY		
	First pass hepatic metabolism of drugs	Describe the mechanism of drugs detoxification and metabolism in the liver
	Hepatotoxic drugs	Enlist some of the commonly used hepatotoxic drugs and their toxicities
FORENSIC MEDICINE		
	Hepatotoxic poisons	Enlist the poisons which cause hepatotoxicity Diagnose poisoning through routine toxicological sampling
COMMUNITY MEDICINE		
	Hepatitis B and C virus infection	Describe the epidemiology of hepatitis B and C virus infection and its control measures
		Describe water borne hepatitis (Hepatitis A and E) viruses and its control measures
MEDICINE		
	Liver cirrhosis	Describe the etiology, clinical features, complications and treatment options of liver cirrhosis
SURGERY		
	Obstructive jaundice	Describe the etiology, clinical features, biochemical investigations and treatment options of obstructive jaundice

Theme 4: Diarrhoea and Constipation		
S.No	Topic	Learning Outcomes
ANATOMY		
	Jejunum and ileum	Describe the gross features of jejunum and ileum
		Tabulate differences in gross features and blood supply of jejunum and ileum
	Mesenteries	Describe the mesentery of small intestine
	Appendix	Describe the gross features, blood supply and mesentery of appendix
		Describe the clinical correlates of appendix
	Abdominal aorta	Enumerate the branches of abdominal aorta.
		Describe the course and distribution of celiac trunk
		Describe the course and distribution of superior mesenteric artery
		Describe the course and distribution of inferior mesenteric artery
	Inferior vena cava	Describe the origin, course, tributaries and relations of inferior vena cava
	Lymphatic drainage	Describe the origin, course and relations of Cisterna chili
		Describe the lymphatic drainage of abdominal organs
EMBRYOLOGY		
	Development of midgut	Describe the formation and rotation of midgut loop
		Describe the physiological herniation of midgut

		loop
		Enlist the derivatives of mid gut loop
		Describe the development of mesenteries
		Describe the various anomalies of midgut development
HISTOLOGY		
	Jejunum and ileum	Discuss histological features of jejunum and describe plica circulares.
		Discuss histological features of ileum and describe Payers patches.
		Discuss the various structural specializations meant for increasing the surface area of small intestine (plica circulares, crypts of Lieberkühn, villi and microvilli)
	Appendix	Discuss histological features of appendix.
PHYSIOLOGY		
	Movements of the small intestine	Describe different types of movements of small intestine.
		Describe the control of peristalsis by nervous and hormonal signals
	Secretion of small intestine	Describe secretion of mucus by Brunner's glands in the duodenum
	Pancreatic enzymes	Describe the chemistry, secretion, functions and regulation of pancreatic enzymes
	Intestinal digestive enzymes	Describe the chemistry, secretion, functions and regulation of small intestinal digestive enzymes
		Describe secretion of intestinal digestive juices by

		the crypts of lieberkühn
	Gastrointestinal hormones	Describe the secretion, structure, functions and regulation of Gastrin, Secretin, Cholecystokinin and other GI hormones
	Disorders of small intestine	Describe abnormal digestion of food in the small intestine in pancreatic failure
		Describe malabsorption by the small intestinal mucosa in Sprue
BIOCHEMISTRY		
	Pancreatic secretions	Describe the composition of pancreatic secretions
		Describe the mechanism of secretion and actions of pancreatic enzymes
		Describe the mechanism of synthesis of Bicarbonates
	Digestion and absorption	Describe the mechanism of digestion and absorption of fats in the intestines
		Describe the mechanism of digestion and absorption of proteins in the intestines
		Describe the mechanism of digestion and absorption of carbohydrates in the intestines
		Describe the mechanism of absorption of Iron, Vitamin-B12 and Folate in the intestines
	Energy requirement of human body	Discuss the daily energy requirement of a human body in health and disease
		Define BMR
		Enlist the causes of high and low BMR
		Describe the daily requirements of common vitamins, Iron, Calcium, Iodine and other minerals

	Nutritional disorders	Define Protein energy malnutrition and its associated clinical conditions
	Adipose tissues	Discuss adipose tissue homeostasis
PHARMACOLOGY		
	Anti-diarrheal drugs	Classify anti-diarrheal drugs and their mechanism of action
	Drugs for constipation	Classify drugs used in constipation, and their mechanism of action
COMMUNITY MEDICINE		
	Food borne infection	Describe the epidemiology of food borne infections and their control measures
PAEDIATRICS		
	Acute gastroenteritis	Describe the aetiology, clinical features, complications and treatment of acute gastroenteritis

Theme 5: Bleeding Per Rectum		
S.No	**Topic**	**Learning Outcomes**
ANATOMY		
	Large intestine	Describe the gross features of cecum, ascending, transverse and descending and sigmoid colon
		Describe the mesentery of large intestine
		Describe the gross anatomy of rectum
		Describe the gross anatomy of anal canal

		Describe the blood supply of anal canal and its clinical correlates.
		Describe the boundaries and contents of Ischiorectal (anal) fossa
EMBRYOLOGY		
	Development of hind gut	Describe the partitioning of cloaca
		Enlist the derivatives of hind gut
		Enlist the developmental anomalies of hindgut
HISTOLOGY		
	Colon	Discuss the histological features of colon
		Describe the characteristic features of intestinal glands
	Rectum	Describe the histological features of Rectum
PHYSIOLOGY		
	Movements of the Colon	Describe different types of movements of colon
		Describe gastro-colic reflex and duodeno-colic reflexes
		Describe the mechanism of defecation reflex
	Secretion of Large Intestine	Describe secretion of mucus by the large intestine
	Disorders of Large intestine	Describe constipation, megacolon
		Explain mechanism of diarrhea and its causes.
		Explain paralysis of defection in spinal cord injuries
	General Disorders of the gastrointestinal tract	Describe the mechanisms of Vomiting and Nausea
		Describe Vomiting Act

		Describe Gastrointestinal Obstruction
		Describe gases in the gastrointestinal tract (flatus)
BIOCHEMISTRY		
	Intestinal juices	Describe the composition of intestinal juices
PATHOLOGY		
	Carcinoma of colon and Rectum	Describe the etiology, histological findings, clinical presentation and staging of carcinoma of colorectal carcinoma
SURGERY		
	Colorectal malignancies	Describe the etiology, clinical features, investigations and management of colorectal cancers

Metabolism

Theme-6: Glucose control (Carbohydrate metabolism)		
BIOCHEMISTRY		
	Oxidative Phosphorylation	Describe the generation of proton gradient & the resultant motive force across the inner mitochondrial membrane by transport of electrons through ETC which in turn produces ATP by oxidative phosphorylation
		Describe the structure of ATP synthase enzyme(complex-V) & explain how it works as a rotary motor to synthesize ATP from ADP & Pi
	Respiratory Chain Inhibitors & Uncouples	Describe the control of the rate of respiration, oxidation of reducing equivalents via ETC & its tightly coupling with oxidative phosphorylation in mitochondria
		Discuss certain common poisons which block respiration or oxidative phosphorylation & identify their site of action
		Explain how uncouplers act as poisons by dissociating oxidation from oxidative phosphorylation via ETC but at the same time they may have a physiological role in generating body heat
	Glycolysis	Define Glycolysis
		Describe the entry of glucose into different kinds of cells through various GLUT transporters
		Describe the reactions of glycolysis
		Describe the transportation of NADH to Mitochondria via various Shuttles
		Describe the energetics of glycolysis
		Describe the fates of pyruvate

		Describe the types of glycolysis especially the anaerobic glycolysis
		Describe the key enzymes and regulation of glycolysis
		Discuss the glycolysis in RBC
		Describe the biomedical Significance and clinical disorders of glycolysis
		Discuss glycolysis in cancer cells
	Oxidation of Pyruvate	Describe the conversion of pyruvate into acetyl CoA
		Enumerate the enzymes & coenzymes of PDH complex
		Describe the sequence of reactions catalyzed by PDH complex.
		Describe the regulation of PDH complex
		Discuss the clinical aspects of PDH complex especially the congenital lactic acidosis
	Tricarboxylic Acid Cycle	Define citric acid cycle
		Describe the sources of acetyl CoA in mitochondria
		Describe the reactions of TCA
		Discuss the energetics of TCA
		Discuss the energy yield of one molecule of glucose when it is converted into carbon dioxide and water
		Name the vitamins that play key role in TCA
		Describe the amphibolic nature of TCA
		Discuss the regulation of TCA
		Enumerate the inhibitors of TCA and their sites of inhibition
	Gluconeogenesis	Define Gluconeogenesis
		Name the organs and sub cellular location where

		Gluconeogenesis occurs
		Describe the substrates or precursors of Gluconeogenesis
		Describe the three bypass reactions
		Describe the Gluconeogenesis from Fatty Acids
		Discuss the Cori's cycle
		Discuss the regulation of Gluconeogenesis
		Name the key enzymes of Gluconeogenesis
	Hexose Mono Phosphate shunt	Discuss the Role of Pentose Phosphate Pathway
		Name the tissues where Hexose Mono Phosphate shunt occurs
		Describe the reactions of the two parts of Hexose Mono Phosphate shunt
		Describe the Role of thiamine in Hexose Mono Phosphate shunt
		Enumerate the Similarities & differences b/w glycolysis and HMP shunt pathway
		Discuss the functions of NADPH (produced in Hexose Mono Phosphate shunt) in various tissues and cells
		Discuss G6PD deficiency and its effects in various tissues and cells
		Describe the regulation of HMP shunt pathway
	Uronic Acid Pathway	Enumerate the products of Uronic acid pathway and their importance
		Discuss why ascorbic acid is vitamin for humans
	Galactose Metabolism	Describe the uses & requirements of galactose in the body
		Discuss the various reactions with enzymes involved
		Describe the Genetic Deficiencies of Enzymes in

		Galactose Metabolism and their effects
	Fructose Metabolism	Describe the Main source of Fructose
		Discuss the various reactions with enzymes involved
		Discuss the Fructose formation in Seminal fluid
		Describe the mechanism of formation of diabetic cataract
		Discuss the Defects in Fructose Metabolism and their effects
	Glycogen Metabolism	Describe the structure and functions of the glycogen especially the significance of its polymer nature
		Describe the Difference between Liver & muscle glycogen
		Describe the synthesis of glycogen by two mechanisms with its enzymes
		Discuss the breakdown of glycogen with its enzymes
		Describe the Regulation of Glycogen metabolisms
		Discuss the glycogen storage diseases with deficient enzymes and cardinal clinical features

Theme 7: Obesity (Fat metabolism)		
S.No	Topic	Learning Outcomes
BIOCHEMISTRY		
	Fatty acid (FA) synthesis (*De Novo*)	Enumerate the organs where fatty acid synthesis occurs with sub cellular sites
		Discuss the source of Acetyl CoA that will be used for FA synthesis with reason
		Discuss how acetyl CoA comes out of mitochondria for the synthesis of FA

		Describe the steps of FA synthesis with enzymes
		Describe the FA synthase enzyme with its structure and components
		Describe the product of FA synthase and the subsequent fate of this product
		Discuss the regulation of FA synthesis
		Discuss why animals cannot convert fatty acids into glucose
		Describe the further elongation and desaturation of FA and its regulation
	Mobilization of stored fats (oxidation of FA)	Describe how fats are mobilized from adipose tissues to the organs where they will be used for oxidation
		Enumerate the various methods of oxidation of FA
		Discuss the stages of beta oxidation with its reactions
		Calculate the no. of ATP obtained when one molecule of palmitic acid is oxidized completely
		Describe the genetic deficiencies of FA oxidation i.e. MCAD & CAT deficiencies with their hallmarks
		Discuss the oxidation of odd-chain FA
		Compare the processes of FA synthesis with FA oxidation
	Metabolism of Ketone bodies	Enumerate the ketone bodies
		Define ketogenesis
		Describe the steps of ketogenesis
		Discuss the energy yield during ketogenesis in liver
		Enumerate the conditions in which there is increased ketogenesis
		Discuss utilization of ketone bodies

		Discuss the energy yield in ketone bodies utilization in extra hepatic tissues
		Describe the regulation of ketogenesis in well-fed healthy conditions, during early stages of starvation & in prolonged starvation
		Discuss the ketoacidosis in diabetes
	Complex Lipid metabolism	Describe the synthesis of triacylglycerol by two mechanisms
		Describe the synthesis of phosphatidic acid
		Enumerate the substances formed from phosphatidic acid
		Describe the synthesis of glycerophospholipids
		Discuss the degredation of glycerophospholipids
		Describe the synthesis of ceramide and sphingophospholipids (shingomyelin)
		Discuss the degradation of shingomyelin
		Discuss Niemann-Pick disease with its cardinal clinical features
		Discuss Farber disease with its cardinal clinical features
		Describe the synthesis of glycosphingolipids
		Describe the degradation of glycosphingolipids
		Describe the abnormalities of phospholipid metabolism i.e. true demyelinating diseases and sphingolipidosis
	Eicosanoid metabolism	Define eicosanoids and describe their two classes
		Describe the synthesis of prostanoids by cyco-oxygenase pathway
		Enumerate the two isomers of cyclo-oxygenase with their inhibition
		Discuss why low dose aspirin therapy is used in strokes

		and heart attacks
		Describe biochemical reason for the adverse effects of NSAIDs & steroids
		Describe the catabolism of the prostanoids
		Describe the lipoxygenase pathway for synthesis of Leukotrienes and lipoxins
		Describe the synthesis of leuktriene biosynthesis inhibition
		Enumerate the leukotriene receptor antagonists
	Metabolism of cholesterol	Describe the major sites of cholesterol synthesis as well as sub cellular sites
		Describe the source of cholesterol synthesis
		Describe the various steps of cholesterol synthesis
		Discuss the regulation of cholesterol synthesis
		Enumerate the inhibitors of HMG CoA reductase inhibitors
		Describes the degradation and excretion of cholesterol with synthesis of bile acids, their conjugation, bile salt formation and micelle formation in lumen of the intestine
		Discuss the enterohepatic circulation of bile salts
		Discuss the role of bile acid sequestrants i.e. cholestyramine and dietary fibre
		Discuss the regulation of bile acid synthesis
	Metabolism of lipoproteins	Describe the structure of a typical lipoprotein particle
		Enumerate the various classes of LP
		Enumerate the functions of apolipoproteins
		Describe the steps of chylomicrons' metabolism
		Describe the metabolism of VLDL

		Describe the metabolism of LDL
		Describe the metabolism of HDL
	Disturbances of Lipid metabolism	Differentiate between hyperlipidemias and dyslipidaemia
		Describe the Classification of hyperlipidemias with enzyme deficiency
MEDICINE		
	Hyperlipidemias	Describe the epidemiology, preventive strategies and diseases associated with hyperlipidemias

Theme 8: Wasting (Protein metabolism)		
S.No	**Topic**	**Learning Outcomes**
BIOCHEMISTRY		
	Amino acid pool & chemical processes for dissimilation of proteins	Discuss how amino acid pool is formed
		Discuss the chemical processes responsible for dissimilation of proteins: transamination, deamination and transdeamination
		Discuss the clinical importance of transaminases
	Ammonia transport and effects of ammonia toxicity on brain	Discuss how ammonia is formed in various tissues and transported to liver Discuss the effects of ammonia toxicity in brain
	Urea cycle & its associated inherited disorders	Describe the Krebs-Henselet Cycle of Urea Formation in Liver
		Describe the clinical significance of various enzymes involved in urea formation
	Metabolism of aromatic	Discuss biosynthesis, fate, metabolic functions and

	amino acids	related inherited disorders of aromatic amino acids
	Metabolism of sulphur containing amino acids	Discuss biosynthesis, fate, metabolic functions and related inherited disorders of sulphur containing amino acids
	Metabolism of individual amino acids	Discuss biosynthesis, fate, metabolic functions and related inherited disorders of Glycine, serine, and alanine
		Discuss biosynthesis, fate, metabolic functions and related inherited disorders of acidic amino acids
		Discuss biosynthesis, fate, metabolic functions and related inherited disorders of branched chain amino acids

LAB WORK		
S.NO	TOPIC	LEARNING OUTCOMES
	Lips and tongue	Identify the histological features of lips and tongue under the microscope

	Esophagus	Identify the histological features of Esophagus under the microscope
	Stomach	Identify the histological features of stomach under the microscope
	Duodenum	Identify the histological features of duodenum under the microscope
	Liver	Identify the histological features of liver under the microscope
	Gall bladder	Identify the histological features of gall bladder under the microscope
	Jejunum and Ilium	Identify the histological features of Jejunum and Ilium under the microscope
	Appendix	Identify the histological features of Appendix under the microscope
	Colon and Rectum	Identify the histological features of Colon and Rectum under the microscope
PHYSIOLOGY		

	Examination of abdomen	Examine a standardized patient`s abdomen
BIOCHEMISTRY		
	Determination of plasma proteins	Estimate the plasma proteins in a given blood sample
	Determination of free, total and combined acidity of the Gastric juice	Estimate free, total and combined acidity of gastric juice
	Determination of serum Bilirubin	Estimate serum Bilirubin in a given blood sample
	Determination of Titrable acidity of urine	Estimate the Titrable acidity of urine
	Determination of serum cholesterol	Estimate serum Cholesterol in a given blood sample

2nd Year MBBS Block E:

Renal Module

SR.No	Themes	Duration
1	Flank Pain /Loin Pain	1 week
2	Scanty Urine /Urinary retention and Edema	1 week
3	Urinary Incontinence	1 week

General Learning Outcomes???

2nd Year MBBS Block E: Renal Module Specific Learning Outcomes		
Theme-1 Loin pain/ Flank Pain		
S.No	**Topic**	**Learning Outcomes**
ANATOMY		
	1.Overview of the urinary system	1. List and describe the main components of the urinary system
	2. Kidneys	2. Discuss the location, anatomical structure, and relations of right and left kidneys to other abdominal organs 3. Discuss the gross morphological composition of kidneys • Capsule • Pericapsular adipose tissue • Cortex • Medulla • Pelvis • Hilum • Vascular system within kidneys

		• Arterial supply • Venous drainage • Lymphatic's • Innervation 4. Enumerate the various coverings of the kidney 5. Explain the clinical significance of coverings of the kidneys 6. Describe the structures entering and leaving the hilum of kidney and their relations
	3.Posterior abdominal wall	7. Describe the general features of lumbar vertebrae
		8. Describe the special features of lumbar vertebrae
		9. Enlist the muscles of posterior abdominal wall. Describe their origin, insertion, nerve supply and actions
		10. Explain the course and relations of Abdominal Aorta
		11. Enumerate and elaborate the paired branches of abdominal aorta
		12. Discuss the formation of inferior vena cava
EMBRYOLOGY		
	4.Development of the urinary system	13. Trace the embryological origins and development of the urinary system
	5.Congenital anomalies of the urinary system	14. List and describe the common congenital anomalies of kidney and ureter.
HISTOLOGY		

	6.Kidney	15. Describe the parenchyma of kidney 16. Enlist different components of uriniferous tubules 17. Describe Histological features of the various components of Nephron 18. Describe the histological features of renal corpuscle 19. Describe filtration barrier 20. Describe the parts of collecting tubules 21. Describe the microscopic anatomy of collecting duct Enlist the components of juxtaglomerular apparatus
PHYSIOLOGY		
	7.Physiological Anatomy Of the kidneys and Overview of its Functions	23. States major functions of the kidneys & brief physiological anatomy of kidney.
		24. Define the components of the nephron and their interrelationships: renal corpuscle, glomerulus, nephron, and collecting-duct system.
		25. Draw the relationship between glomerulus, Bowman's capsule, and the proximal tubule.
		26. Describe the 3 layers separating the lumen of the glomerular capillaries and Bowman's space; defines podocytes, foot processes, and slit diaphragms. location within the glomerulus. Detail of renal vessels & Pressure within them. Describe, in general terms, the differences among superficial cortical, midcortical, and juxtamedullary nephrons.
		28. List the individual tubular segments in order; states the segments that comprise the proximal tubule, Henle's loop, and the collecting-duct system; defines principal cells and intercalated cells.
		29. Define juxtaglomerular apparatus and describes its 3 cell types; states the function of the granular cells.

		30. Define the basic renal processes: glomerular filtration, tubular reabsorption, and tubular secretion
	8.Glomerular Filtration: Determinants and Equation	31. Describe how molecular size and electrical charge determine filterability of plasma solutes; states how protein binding of a lowmolecular-weight substance influences its filterability.
		32. State the formula for the determinants of glomerular filtration rate, and states, in qualitative terms why the net filtration pressure is positive.
		33. Define filtration coefficient and states how mesangial cells might alter the filtration coefficient; states the reason glomerular filtration rate is so large relative to filtration across other capillaries in the body.
		34. Describe how arterial pressure, afferent arteriolar resistance, and efferent arteriolar resistance influence glomerular capillary pressure.
		35. Describe how changes in renal plasma flow influence average glomerular capillary oncotic pressure.
		36. State the Starling forces involved in capillary filtration.
		37. State how changes in each Starling force affect glomerular filtration rate
	9.Nervous & Hormonal Control of Renal Circulation	38. Define renal blood flow, renal plasma flow, glomerular filtration rate, and filtration fraction, and gives normal values.
		39. State the formula relating flow, pressure, and resistance in an organ.
		40. Describe sympathetic nerve supply of renal vessels & hormones affecting renal vessels
		41. Describe the effects of changes in afferent and efferent arteriolar resistances on renal blood flow
	10.Auto regulation of GFR and renal blood flow	42. Define auto regulation of renal blood flow and glomerular filtration rate
		43. Describe the myogenic and tubuloglomerular feedback mechanisms of auto regulation.
	11.Review of Transport Mechanisms across the Cell Membrane(Active	44. Define and state the major characteristics of diffusion, facilitated diffusion, primary active transport, secondary active transport (including symport and antiport) and endocytosis.

	and Passive transport)	
		45. Define osmolality and osmolarity, and states why osmolarity is commonly used to approximate osmolality.
		46. Describe what is meant by the expression "water follows the osmoles."
		47. Describe qualitatively the forces that determine movement of reabsorbed fluid from the interstitium into peritubular capillaries.
		48. Compare the Starling forces governing glomerular filtration with those governing peritubular capillary absorption.
		49. Compare and contrasts the concepts of T_m and gradient-limited transport.
		50. Describe 3 processes that can produce bidirectional transport of a substance in a single tubular segment; states the consequences of pump-leak systems.
		51. Contrast "tight" and "leaky" epithelia.
BIOCHEMISTRY		
	12.Acid-base balance & imbalance	52. Study the sources of Hydrogen Ion, pH & Anion Gap
		53. Describe Buffer Systems operating in the Body 54. Carbonic acid,protein,and phosphate buffer 55. Transporting acid and mitigating pH changes
		56. Describe Respiratory Regulation of Acid Base Balance
		57. Describe Renal Regulation of Acid Base Balance
		58. Describe Disorders of Acid Base Balance: their causes, mechanisms and compensations of Respiratory Acidosis & Alkalosis and Metabolic Acidosis & Alkalosis
PATHOLOGY		
	13.Smoky urine	59. List the common kidney symptoms 60. Discuss the pathophysiology of renal infections 61. Describe Symptoms associated with renal pathology 62. Classify renal diseases

		63. Explain Pathophysiology of renal infections 64. Describe Treatment of chronic pyelonephritis
	14.Renal disorders	65. Define the terms Nephrotic syndrome, nephritic syndrome, Azotemia. 66. Enlist the Causes types of renal stones.
		67. Enlist the causes and describe the pathogenesis of urinary tract infection.
	15.Systemic disease affecting kidneys	68. Explain how systemic diseases can affect renal function 69. Systemic diseases affecting renal function - Diabetes -Cardiovascular disorders (hypertension, CHF) -Immunological disorders (SLE, glomerulonephritis) -Cancers (myeloma) -Hematological disorders (sickle cell anemia, HUS)

LAB WORK		
ANATOMY		
	Surface anatomy of the urinary system and radiology	70. Identify the gross anatomic features the kidneys, renal pelvis, ureter, urinary bladder and urethra 71. Locate renal angle 72. Perform renal punch and its clinical significance 73. Develop Understanding of KUB 74. Identify different parts of urinary system on IVU
BIOCHEMISTRY		
	Titrable acidity of urine	Find out PH of urine

Theme-2 Edema and Urinary retention/ Scanty Urine		
S.No	Topic	Learning Outcomes
ANATOMY		
	18.Ureters	76. Describe the gross anatomy of ureters
		77. Describe the relations of right ureter in males and females
		78. Describe the relations of left ureter in males and females

		79. Highlight the clinical significance of relations of right and left ureters in both sexes
		80. Discuss constrictions in ureter and their clinical relevance.
	19.Urinary bladder	81. Describe the gross structure of urinary bladder 82. Discuss the Ligaments/supports.
		83. Discuss the blood supply and nerve supply of urinary bladder
		84. Discuss the relations of urinary bladder in males
		85. Discuss the relations of urinary bladder in females
	20.Prostate gland	86. Describe the structure of prostate gland 87. Describe Lobes, capsule, relations and structures within prostate.
		88. Discuss the common problems resulting from abnormal growth of the prostate. Relate the symptoms to structures
	21.Urethra	89. Describe the gross anatomy of urethra
		90. Enlist the differences between male and female urethra
EMBRYOLOGY		
	22.Development of the urinary system (Kidney and Ureter)	91. Enlist the stages of development of kidneys
		92. Describe the formation of pronephric, mesonephric and metanephric kidneys
		93. Enumerate the derivatives of metanephricblastema and describe their development
		94. Enumerate the derivatives of metanephric diverticulum/ureteric bud
		95. Describe the changes in position and blood supply of kidneys during development
		96. Enlist the various types of developmental anomalies of kidneys along with their embryological causes
		97. Enlist the various types of developmental anomalies of ureters along with their embryological causes
	23.(Bladder and urethra)	98. Describe the development of bladder 99. Discuss the developmental anomalies of bladder 100. Describe the development of male urethra 101. Describe the development of prostate and

		bulbourethral glands 102. Describe the development of female urethra 103. Discuss the developmental anomalies of male and female urethra
	24. Prostate gland	104. Describe Embryological development of prostate gland
	25. Congenital anomalies of the urinary system	105. List and describe the common congenital anomalies of of bladder and urethra.
HISTOLOGY		
	26. Ureter	106. Describe the microscopic anatomy of ureter
	27. Bladder	107. Describe the histological features of urinary bladder
	28. Prostate	108. Describe the microscopic structure of prostate
	29. Urethra	109. Discuss the microscopic structure of male and female urethra
PHYSIOLOGY		
	30. Body fluid compartments	110. List the body fluid compartments 111. Recall the volumes of body fluid compartments 112. Discuss the interplay in fluid volumes between different fluid compartments 113. Describes principles of osmosis and osmotic pressure 114. Discuss the interplay between various pressures 115. Discuss principles of edema • Intracellular fluid compartment • Extracellular fluid compartment • Intravascular fluids • Blood • Plasma • Interstitial fluid • Constituents of intra- and extracellular fluid compartments • Calculating fluid volumes • Osmosis and osmotic fluid regulation
	31. Reabsorption /Secretion along Different Parts of the Nephron	116. List approximate percentages of sodium reabsorbed in major tubular segments. 117. List approximate percentages of water reabsorbed in major tubular segments. 118. Define the term *iso-osmotic volume* reabsorption. 119. Describe proximal tubule sodium

		reabsorption, including the functions of the apical membrane sodium entry mechanisms and the basolateral sodium-potassium-adenosine triphosphatase. 120. Explain why chloride reabsorption is coupled with sodium reabsorption, and lists the major pathways of proximal tubule chloride reabsorption. 121. State the maximum and minimum values of urine osmolality. 122. Define osmotic diuresis and water diuresis. 123. Explain why there is an obligatory water loss. 124. Describe the handling of sodium by the descending and ascending limbs, distal tubule, and collecting-duct system. 125. Describe the role of sodium-potassium-2 chloride symporters in the thick ascending limb. 126. Describe the handling of water by descending and ascending limbs, distal tubule, and collecting duct system
	32.mechanisms of regulation of tubular reabsorption	127. Discuss the mechanisms of regulation of tubular reabsorption •Reabsorption and secretion by the renal tubules •Active and passive transport mechanisms •Mechanism of reabsorption of specific substances (eg. •Water, electrolytes) •Reabsorption and secretion in different parts of the tubules •Glomerular balance •Peritubular and renal interstitial fluid physical forces •Effect of arterial pressure on urine output •Hormonal control of tubular reabsorption •Aldosterone •Angiotensin-II •ADH •Parathyroid hormone •Nervous regulation of tubular reabsorption
	33.Concept Of Renal Clearance	128. Define the terms clearance and metabolic clearance rate, and differentiates between general clearance and renal clearance. 129. List the information required for clearance calculation 130. State the criteria that must be met for a substance so that its clearance can be used as a

		measure of glomerular filtration rate; states which substances are used to measure glomerular filtration rate and effective renal plasma flow. 131. Predict whether a substance undergoes net reabsorption or net secretion by comparing its clearance with that of inulin or by comparing its rate of filtration with its rate of excretion. 132. Calculate net rate of reabsorption or secretion for any substance. 133. Calculate fractional excretion of any substance. 134. Describe how to estimate glomerular filtration rate from C_{Cr} and describes the limitations. 135. Describe how to use plasma concentrations of urea and creatinine as indicators of changes in glomerular filtration rate.
	34.Mechanism of diluted urine formation	136. Describe the process of "separating salt from water" and how this permits excretion of either concentrated or dilute urine. 137. Describe how antidiuretic hormone affects water reabsorption. 138. Describe the characteristics of the medullary osmotic gradient. 139. Explain the role of the thick ascending limb, urea recycling, and medullary blood flow in generating the medullary osmotic gradient. 140. State why the medullary osmotic gradient is partially "washed out" during a water diuresis 141. Describe the origin of antidiuretic hormone and the 2 major reflex controls of its secretion; define diabetes insipidus; state the effect of antidiuretic hormone on arterioles. 142. Distinguish between the reflex changes that occur when an individual has suffered iso-osmotic fluid loss because of diarrhoea as opposed to a pure water loss
	(ie, solute-water loss as opposed to purewater loss).	143. Describe the control of thirst. 144. Describe the pathways by which sodium and water excretion are altered in response to sweating, diarrhoea, haemorrhage, high-salt diet, and low-salt diet.
	35.Mechanism of	145. Discuss the mechanism of concentrated

	concentrated urine formation	urine formation.
	36. Renal regulation of Potassium	146. State the normal balance and distribution of potassium within different body compartments, including cells and extracellular fluid. 147. Describe how potassium moves between cells and the extracellular fluid, and how, on a short-term basis, the movement protects the extracellular fluid from large changes in potassium concentration. 148. Describe how plasma levels of potassium do not always reflect the status of total-body potassium. 149. State generalizations about renal potassium handling for persons on high- or low-potassium diets. 150. State the relative amounts of potassium reabsorbed by the proximal tubule and thick ascending limb of Henle's loop regardless of the state of potassium intake. 151. Describe how the cortical collecting duct can manifest net secretion or reabsorption; describes the role of principal cells and intercalated cells in these processes. 152. List the 3 inputs that control the rate of potassium secretion by the cortical collecting duct. 153. Describe the mechanism by which changes in potassium balance influence aldosterone secretion. 154. State the effects of most diuretic drugs and osmotic diuretics on potassium excretion. 155. Describe the association between perturbations in acid-base status and the plasma potassium level
	37.The prostate	156. Discuss the physiological functions of the prostate
	38.Physiochemical aspects	157. Discuss the physiochemical aspects (Diffusion, Adsorption, Viscosity, Colloid Osmotic pressure and role of Albumin in regulation of Osmotic pressure)
	39.Regulation of extracellular fluid osmolality and sodium concentration	158. Discuss the homeostatic function of the kidneys 159. Explain the mechanism by which kidneys are able to form diluted or concentrated urine 160. Describe Mechanism of formation of dilute

		urine 161. Describe Mechanism of formation of concentrated urine 162. Describe requirements for excreting a concentrated urine 163. Describe the counter-current mechanism 164. Describe Role of distal tubules and collecting ducts 165. Describe Quantifying urine concentration and dilution 166. Describe Disorders of urine concentration ability
	40.Regulation of extracellular fluid osmolarity and sodium concentration-2	167. Discuss the homeostatic function of the kidneys 168. Discuss the principles of osmoregulation by the kidneys 169. Explain how the body regulated the osmolarity of fluid comparts 170. Describe Control of extracellular fluid osmolarity and sodium concentration 171. Describe Osmoreceptor-ADH feedback system 172. Describe Role of thirst in controlling extracellular fluid osmolarity and concentration 173. Describe Salt-appetite mechanism and Integrated response to sodium intake
	41.Regulation of concentration of potassium, calcium, phosphate and magnesium	174. Discuss the mechanisms of regulation of concentrations of various ions in the body 175. Describe the processes occurring at cellular level to maintain/excrete various ions in the kidneys -Regulation of potassium --Regulation of calcium -Regulation of phosphate -Regulation of magnesium
	42.Short and Long term control of Blood pressure by Kidneys	176. Describe the 3 temporal domains of blood pressure control and the major mechanisms associated with them. 177. Describe the relationship between renin and angiotensin II. 178. Describe the 3 detectors that can alter renin secretion.

		179. Define pressure natriuresis and diuresis. 180. Define tubuloglomerular feedback and describe the mechanism for tubuloglomerular feedback and auto regulation of glomerular filtration rate
BIOCHEMISTRY		
	43.Renal control of Calcium & Phosphorus	181. State the normal total plasma calcium concentration and the fraction that is free.
		182. Describe the distribution of calcium between bone and extracellular fluid and the role of bone in regulating extracellular calcium.
		183. Describe and compare osteocytes osteolysis and bone remodelling.
		184. Describe renal handling of phosphate.
		185. Describe how parathyroid hormone changes renal phosphate excretion.
	44.constituents of urine	186. Describe the normal and abnormal constituents of urine
GENERAL SURGERY/UROLOGY		
	45.Urinary retention	187. Describe the etiology, and management of urinary retention
		188. Describe the etiology, clinical features and treatment of Benign prostatic hyperplasia
PATHOLOGY		
	46.Renal failure	189. Enlist the causes of Renal failure/ uraemia and abnormalities related to micturition including incontinence 190. Discuss the causes and pathophysiology of Chronic Renal failure
	47.Urinary stones	191. Describe the pathophysiology of Urinary stones
	48.Glomerular diseases	192. Describe the etiology and pathogenesis of glomerulonephritis
	49.Classification of kidney disorders	193. Classify kidney disorders according to etiology, site of dysfunction and type of dysfunction - Acute/ chronic
		-Infectious -Immunological -Neoplastic -Vascular/interstitial /parenchymal - Primary/systemic

	50.Nephrotic syndrome	194. Describe Nephrotic syndrome and its etiology
PHARMACOLOGY		
	51.Nephrotoxic drugs	195. Describe the mechanism of drug excretion
		196. Enlist nephrotoxic drugs
		197. Describe the mechanism of action of diuretic drugs
	52.Drugs acting on the renal system (in NW module it's in theme of Scanty Urine)	198. Classify diuretics
COMMUNITY MEDICINE/PUBLIC HEALTH		
	53.Quality of life in problems of prostate	199. Discuss quality of life issues in patients with prostate problems 200. Overview of the concept of quality of life (QoL) 201. Discuss the significance of quality of life in disease and treatment settings 202. Discuss quality of life issues in geriatric population
LAB WORK		
PHYSIOLOGY		
	54.Intake output chart maintenance in bed ridden patients	203. Maintain Intake output chart maintenance in bed ridden patients
	55.Catheter insertion	204. Preform insertion of catheter on dummy
BIOCHEMISTRY		
	56.Urine analysis	205. Determine the normal/abnormal constituents in the urine -Urine sugar

		-Amino acids - Proteins -Hemoglobin -Uric acid -Urea -Creatinine and chloride -Calcium and phosphate -Ammonia -Ketone bodies -Benzidine test for blood in urine

Theme-3 Urinary incontinence		
SNo	**Topic**	**Learning Outcomes**
ANATOMY		
	57.The Perineum	206. Define the pelvis and the perineum Discuss the openings in the pelvis and what passes through them 207. List and describe the contents of the urogenital triangle -Contents of the male urogenital triangle -Urethral injuries 208. Injury to the perineum in childhood
PHYSIOLOGY		
	58.Urinary bladder and micturition	209. Describe the functional anatomy of urinary bladder 210. Explain the mechanism of micturition 211. Explain the micturition reflex and relate structures of the bladder with function 212. Explain basal cystometrogram 213. Describe the nervous control of bladder functions
	59.Urinary incontinence	214. Discuss the causes, symptoms and management of patients with urinary incontinence, urgency, frequency, burning micturition etc 215. Causes of urinary incontinence, urgency, frequency, burning micturition 216. Terms related to urinary obstruction and incontinence 217. Describe Clinical presentation of

		continence disorders Explain General management of incontinence
BIOCHEMISTRY		
	60.Water balance/metabolism	219. Mechanism & regulation of Water balance 220. Disorders of water balance, such as dehydration & over hydration 221. Electrolytes (intracellular & extracellular cations) & its metabolism 222. Disorders of electrolyte metabolism
RADIOLOGY		
	Radiological diagnosis of urinary pathologies	223. Identify and describe the various anatomic landmarks of the renal system on radiographs 224. Discuss special radiological tests to determine renal function and pathologies 225. Describe normal radiographs of abdomen and pelvis 226. Describe special radiological tests to show renal pathology and function 227. Abdominal ultrasound
CLINICAL (NEPHROLOGY/ MEDICINE)		
	Dialysis	228. Describe the types, indications and the process of dialysis for kidney disease 229. Describe Types of dialysis -Peritoneal dialysis -Hemodialysis -Hemofiltration -Haemodiafiltration -Intestinal dialysis -indications for dialysis 230. Discuss disorders of acid-base balance, electrolyte abnormalities uremia or fluid overload resulting from acute and chronic renal failure, and intoxication 231. Describe The process of hemodialysis and peritoneal dialysis 232. Describe Dialyzable substances
	Patient with excessive urination	233. Discuss the disorders associated with urine concentrating ability 234. Plan a line of investigation and management in renal disorders
		Disorders of renal concentration ability

		Comparison of excessive urine volume with increased frequency of micturition Describe the mechanism of secretion and action of ADH Describe Urine concentrating ability of the various parts of the nephron Proximal convoluted tubule o Descending limb of loop of Henle o Ascending limb of loop of Henle Collecting system
	Patient with continuous dribbling of urine	Discuss the causes of urinary incontinence Discuss the significance of radiological investigations in cases of urinary incontinence in children Define and describe Enuresis, its causes and treatment Describe Causes of urinary incontinence Describe the micturition reflex Discuss Tests for investigating urinary incontinence
PATHOLOGY		
	Common pathologies of perineal region	List and define the common pathologies of the perineal region Describe Urethral infection
Lab Work		
ANATOMY		
	Surface anatomy of the perineum and radiology	247. Identification of the various structures forming the perineum on models 248. Identify the radiographic landmarks of the perineum
	Histologic examination urinary system	Identify the characteristic microscopic features of the urinary system -Kidney -Ureter -Urinary bladder -Urethra
BIOCHEMISTRY		
	Creatinine in urine	Estimation of creatinine in 24 hour urine sample
PHYSIOLOGY		

	Arterial blood-gas analysis	Arterial blood sampling Analysis and interpretation of arterial blood gases

OSPE Blueprint Block E

SUBJECT	GIT	RENAL	VIVA STATIONS	TOTAL STATIONS
Anatomy	**4**	**3**	**2**	**9**
Histology				
Embryology				
Physiology	**0**	**1**	**2**	**3**
Biochemistry	**3**	**1**	**2**	**6**
TOTAL	**7**	**5**	**6**	**18**

PAPER Blueprint

Subject	GIT	Renal	Total
Anatomy	16	7	23
Embryology	4	3	7
Histology	9	4	13
Physiology	15	14	29
Biochemistry	22	8	30
PRIME	3	2	5
Pathology	3	1	4
Pharmacology	1	1	2
Community Medicine	1	0	1
Forensic Medicine	1	0	1
Medicine	1	1	2
Surgery	2	1	3
TOTAL	78	42	**120**

Block F

2nd Year MBBS Block F:

Endocrine Module

TOTAL WEEKS-4

S.No	Themes	Duration in weeks
1	Tall stature	1 week
2	Neck swelling with bulging eyes / tetany	1 week
3	Increased thirst and urination	1 week
4	Moon face	3 days

General Learning objectives

At the end of this module, the 2nd year students will be able to:

Knowledge

1) Development, structure, hormones and regulation of pituitary gland, thyroid gland, parathyroid gland, endocrine pancreas, and adrenal glands
2) Describe the etiology, pathophysiology, relevant clinical features and common investigations of disorders of these glands

Skills

3) Describe the steps of writing a research proposal

Attitude

4) Describe the basic concepts and components of medical professionalism

2nd Year MBBS Block F: Endocrine Module **Specific Learning Outcomes**		
Theme-1 (Tall stature)		
S.No	Topic	Learning outcomes
EMBRYOLOGY		
	Pituitary gland	Describe the development of Anterior and posterior pituitary gland
HISTOLOGY		
	Pituitary gland	Enlist the histological differences between anterior and posterior pituitary glands
PHYSIOLOGY		
	Introduction to endocrinology	Describe the chemical messengers in the body
		Describe the classification of hormones
		Describe mechanisms of synthesis of hormones
		Describe mechanisms of hormone Secretion, Transport and Clearance from the Blood
	Mechanisms of Action of Hormones	Explain mechanisms of Action of Hormones
		Describe second messenger mechanisms for mediating intracellular hormonal functions
		Describe measurement of Hormone Concentrations in the Blood
	Pituitary gland Physiological anatomy and its control	Describe physiological anatomy of pituitary gland
		Describe hypothalamus Control of Pituitary Secretion

	Physiological Functions of Growth Hormone	Describe Growth hormone's effect on growth and metabolism
		Explain the structure, mechanism of action and physiological effects of Insulin-Like Growth Factors
		Describe regulation of Growth Hormone
	Physiological Functions of Posterior Pituitary hormones	Describe formation and physiological functions of Oxytocin
		Describe formation and physiological functions of ADH
BIOCHEMISTRY		
	Hormones Introduction	Define hormones and differentiate between the terms- endocrine, paracrine & autocrine
		Classify hormones on various basis
		Discuss the mechanisms of action of hormones
		Define 2nd messengers and their roles
	Anterior Pituitary hormones	Enumerate the hormones of anterior pituitary gland
		Describe the chemistry, secretion, mechanism of action, regulation and metabolic effects of Growth hormone with its related clinical disorders
	Posterior Pituitary hormones	Enumerate the hormones of the posterior pituitary gland
		Describe the chemistry, secretion, mechanism of action, regulation and metabolic effects of the hormones of the posterior pituitary gland with its related clinical disorders
MEDICINE		
	Acromegaly	Describe the pathophysiology, clinical features and investigations of patient with Acromegaly and Gigantism
		Describe the etiology, clinical features and investigations of a patient with diabetes insipidus
NEUROSURGERY		
	Tumors of pituitary gland	Explain the types, clinical features, CT and MRI findings and management of pituitary tumors

PEDIATRICS		
	Growth charts	Describe the fundamentals of growth charts in pediatric practices

Theme-2 (Neck swelling with bulging eyes and Tetany)		
ANATOMY		
	Thyroid gland	Describe the gross structure, lobes, relations, bold supply, venous drainage, nerve supply and lymphatic drainage of thyroid gland
EMBRYOLOGY		
	Thyroid gland	Describe the developmental events and anomalies of thyroid gland
	Parathyroid gland	Describe the developmental events of parathyroid gland and its anomalies
HISTOLOGY		
	Thyroid gland	Describe the microscopic structure of thyroid gland
PHYSIOLOGY		
	Introduction of thyroid hormones	Describe formation, Secretion and transport of thyroid hormones

		Explain mechanism of action of thyroid hormones
		Explain the actions of thyroid hormones on cellular metabolism
	Physiological functions &regulation of thyroid hormone	Describe Physiological effects of Thyroid Hormone on Growth, metabolism and body systems
		Describe Regulation of Thyroid Hormone Secretion
	Physiological functions and Control of the Parathyroid hormone	Explain Mechanism of action PTH
		Describe Effect of Parathyroid Hormone on Calcium and Phosphate concentrations
		Describe Control of Parathyroid Secretion
	Physiological role of VIT D and Calcitonin in Calcium metabolism	Explain Role of Vit. D in Calcium and phosphorus metabolism
		Explain physiological functions of calcitonin
BIOCHEMISTRY		
	Thyroid gland	Enumerate the hormones secreted from thyroid gland
		Describe the chemistry, biosynthesis, secretion, mechanism of action, regulation and metabolic effects of thyroid hormone and calcitonin with its related clinical disorders
	Parathyroid gland	Enumerate the hormones secreted from parathyroid gland
		Describe the chemistry, biosynthesis, secretion, mechanism of action, regulation and metabolic effects of parathyroid hormone with its related clinical disorders
MEDICINE		
	Thyroid disorders	Explain the clinical features of hyperthyroidism
		Explain the clinical features of hypothyroidism
PHARMACOLOGY		
	Antithyroid drugs	Describe the types and mechanism of action of Antithyroid drugs

COMMUNITY MEDICINE		
	Diabetes mellitus	Describe the epidemiology, risk factors and prevention of Diabetes Mellitus

Theme-3 (Increased thirst and urination)		
HISTOLOGY		
	Pancreas	Describe the histological features of pancreas and differentiate between exocrine and endocrine parts of pancreas
PHYSIOLOGY		
	Mechanism of action of insulin &its control	Explain Mechanism of action of insulin
		Describe the Control of Insulin Secretion
	Physiological Effects of insulin on carbohydrates, protein, and Fats	Describe the effects of insulin on carbohydrates, proteins and Fats metabolism
	Physiology of Glucagon	Describe regulation of glucagon and its effects
		Describe the physiological actions of Somatostatins
	Physiological effects of Diabetes Mellitus	Describe Effects of hyperglycaemia /hypoglycaemia on body functions
		Explain Insulin resistance
BIOCHEMISTRY		
	Pancreas	Enumerate the hormones secreted by pancreas
		Describe the chemistry, biosynthesis, secretion, mechanism of action, regulation and metabolic effects of Insulin & Glucagon with its related clinical disorders
PHARMACOLOGY		
	Antidiabetic drugs	Explain the mechanism of action of oral antidiabetic drugs
		Explain the mechanism of action and complications of Insulin therapy
MEDICINE		
	Diabetes Mellitus	Explain the short-term and long-term complications of Diabetes Mellitus
		Describe the pathophysiology, clinical features and

		treatment of Diabetes Mellitus

Theme-4 (Moon face)		
S.No	**Topic**	**Learning Outcomes**
ANATOMY		
	Adrenal gland	Describe the gross anatomy and relations of adrenal glands on both sides
EMBRYOLOGY		
	Adrenal gland	Describe the development of adrenal gland
HISTOLOGY		
	Adrenal gland	Describe the microscopic picture of adrenal gland and differentiate between the various histological zones of adrenal gland
PHYSIOLOGY		
	Physiological functions of Aldosterone	Describe Types, Mechanisms and regulation of mineralocorticoids
		Describe the physiological Effects of Aldosterone (Renal, Circulatory and others)
	Physiological Functions of the Glucocorticoids	Describe Types and Mechanisms of Glucocorticoids actions
		Describe Effects of Cortisol on Carbohydrate, Proteins and Fat Metabolism
		Describe role of Cortisol in Stress, Inflammation and Allergy
	Physiological functions Adrenocorticotropic Hormone ACTH	Describe ACTH Secretion & mechanism of Action
BIOCHEMISTRY		
	Adrenal cortical	Enumerate the hormones secreted from adrenal cortex

	hormones	
		Describe biosynthesis, secretion, mechanism of action, regulation and metabolic effects of Adrenal cortical hormones with its related clinical disorders
	Adrenal medullary hormones	Enumerate the hormones secreted from adrenal medulla
		Describe biosynthesis, secretion, mechanism of action, regulation and metabolic effects of Adrenal medullary hormones with its related clinical disorders
		Describe the structure and functions of Melanocyte-Stimulating Hormone, Lipotropin, and Endorphins
MEDICINE		
	Cushing`s syndrome	Describe the clinical features and complications of Cushing`s syndrome
	Addison`s disease	Describe the clinical features and complications of Addison`s disease
LAB WORK		
BIOCHEMISTRY		
	Urinary glucose	Detect glucose in urine
	Blood glucose	Detect glucose in blood
	Glucose tolerance test	Perform and interpret Glucose tolerance test
HISTOLOGY		
	Pituitary glands	Identify the structure of pituitary gland under microscope
	Thyroid gland	Identify the structure of thyroid gland under microscope
	Adrenal gland	Identify the structure of adrenal gland under microscope

2nd Year MBBS Block F:

Reproduction Module

S. No	Themes	Weeks
1	Pregnancy and child birth	02
2	Infertility	01

General learning outcomes

Knowledge

1) Describe the development, structure and functions of bony pelvis, uterus, ovaries and perineum
2) Describe the development, structure and functions of mammary glands
3) Explain the contents and mechanism of formation of milk
4) Describe the development, structure and functions of male genital organs
5) Explain the synthesis, mechanism of action, physiological effects and regulation of sex hormones in males and females and hormones released from placenta
6) Describe the physiology of gestation and parturition

Skills

7) Describe basic statistical tests and their significance

Attitude

8) Describe the concept of empathy as part of professionalism
9) Explain the steps of research evaluation, its validity and reliability

2nd Year MBBS Block F: Reproduction Module Specific Learning Outcomes		
Theme-1 (Pregnancy and child birth)		
S.No	**Topic**	**Learning Outcomes**
ANATOMY		
	Bony pelvis Uterus	Describe the general features of bony pelvis
		Differentiate between male and female pelvis
		Classify the differences between true and false pelvis
		Describe the gross structure, location and relations of uterus
		Describe the blood supply of uterus
		describe the boundaries of pouch of Douglas/recto-uterine pouch and its clinical significance
		Describe the gross structure, location and relations of Fallopian tubes
		Describe the blood supply of Fallopian tubes
		Enlist various support mechanisms of uterus
		Describe the formation and components of broad ligament
		Discuss the clinical correlates of uterus and fallopian tubes
	Ovary	Describe the gross structure, location and relations of ovaries.
		Describe the blood supply of ovaries
		Name ligaments supporting the ovaries
	Pelvic floor	Describe the general features of sacrum
		Describe the special features of sacrum
		Name the muscles making the pelvic floor
		Describe their origin, insertion, nerve supply and actions of muscles of pelvic floor
		Describe the boundaries and contents of superficial perineal pouch
		Describe deep perineal pouch
		List the boundaries and contents of ischio-rectal (anal) fossa
		Give the clinical significance of ischi-orectal fossa
EMBRYOLOGY		
	Uterus	Describe the development of uterus
		Enlist the various developmental Anomalies of uterus

		Describe the remnants of mesonephric and Parmesonephric ducts in females
	Ovaries	Describe the development of ovaries
	Mammary gland	Describe the development of mammary gland
		Enlist various developmental anomalies of mammary gland along with embryological reasons
HISTOLOGY		
	Uterus	Describe the microscopic structure of uterus
		Discuss the microscopic features of endometrium in different phases of menstrual cycle
	Ovary	Describe the microscopic structure of ovary
		Elaborate the different stages of ovarian follicle
	Mammary gland	Describe the microscopic features of inactive mammary gland
		Describe the microscopic features of mammary gland during pregnancy and lactation
PHYSIOLOGY		
	Overview of Reproductive System	Describe the spermatogenesis
		Explain the function of prostate gland
		Describe the composition of semen
	Functions of Testosterone	Relate the functions of testosterone with its secretion and metabolism
		Describe the intracellular mechanism of action of testosterone
		Relate the control of secretion of testosterone with its congenital and acquired abnormalities
	Hormonal cyclical changes of Female reproductive system	Describe the monthly ovarian cycle
		Describe the effects of gonadotropic hormones on the ovaries.
		Describe the functions of estrogens
		Describe the functions of progesterone
		Explain monthly endometrial cycle
		Describe the role of hypothalamic and Pituitary ovarian system in controlling the female hormones
		Define puberty, menarche and menopause.
		Enumerate the changes produced in puberty
	Physiological changes	Describe the transport of fertilization ovum in the

	in Pregnancy	fallopian in the uterus.
		Explain the effects of HCG in causing persistence in pregnancy
		Describe the secretion of estrogen and progesterone by placenta
		Describe the functions of HCS
		Describe the maternal changes in pregnancy
		Describe the changes in maternal circulatory system during pregnancy.
		Describe the development of breast during pregnancy
	Parturition	Explain the process of parturition and involution of the uterus after parturition
	Milk production	Explain the functions of prolactin
		Describe the ejection or "let down" of milk.
		Explain the composition of milk
	Problems of prematurity	Describe Growth and Functional Development of the Fetus
		Describe adjustments of the newborn to Extra Uterine Life
		Discuss Special Functional Problems in the Neonates
		Discuss Special Problems of Prematurity
FORENSIC MEDICINE		
	Abortion	Define abortion
		Describe the type of abortion
		Discuss criminal abortion and its complications
		Explain the findings of abortion in victims
		Describe the indications of therapeutic abortion
	Diagnosis and medicolegal aspects of pregnancy	Describe the steps of diagnosis of pregnancy
		Explain the medicolegal aspects of pregnancy
COMMUNITY MEDICINE		
	Safe motherhood and its components	Describe the steps of antenatal and postnatal care, family planning and emergency obstetric care
	Maternal mortality	Describe the causes, impact and prevention of maternal mortality in Pakistan
	Breast feeding	Explain the importance of breast feeding
GENERAL SURGERY		
	Carcinoma of breast	Describe the etiology, pathological types and clinical presentation of carcinoma of breast

Theme-2: Infertility		
SNo	Topic	**Learning Outcomes**
ANATOMY		
	Scrotum, Testes and male genitalia	Describe the anatomy of scrotum
		Discuss the gross anatomy of testes
		Describe the coverings and contents of spermatic cord
		Describe epididymis, ductus deferens and seminal vesicles
		Describe the clinical correlates of male genital system
	Female external genitalia and vaginal canal	Give the gross Anatomy of female external genitalia and vagina
EMBRYOLOGY		
	Genitalia	Describe the development of external genitalia in males
		Describe the development of external genitalia in females
		Discuss the developmental anomalies of male and female genitalia
	Gonads and genital ducts	Describe the development of testis
		Name the factors responsible for decent of testis
		Discuss the decent of testis
		Describe the developmental anomalies of testes
		Discuss the development of epididymis, vas deferens and seminal vesical
		Describe the development of vagina
		describe the remnants of mesonephric and paramesonephric ducts in males
HISTOLOGY		
	Testes	Discuss general microscopic structure of testes
		Discuss seminiferous tubules
		Discuss different cells of seminiferous epithelium
		Define blood testes barrier
	Male genital ducts	Describe the microscopic structure of epididymis, ductus deferens and seminal vesicle
	Fallopian tube	Describe the microscopic structure of fallopian tube
PHYSIOLOGY		

	Male sex hormones	Describe the structure, secretion, mechanism of action, physiological actions and regulation of Testosterone
		Describe the hormonal changes occurring in puberty in males and females
	Female sex hormones	Describe the structure, secretion, mechanism of action, physiological actions and regulation of Estrogen and Progesterone
		Describe the mechanism of Ovulation
BIOCHEMISTRY		
	Sex Hormones • Testosterone • Estrogen • Progesterone	Discuss the chemistry of these hormones
		Describe the synthesis of these hormones
		Discuss the enzyme deficiencies and their manifestations
		Describe the diagnostic role of 17-ketosteroids' excretion in urine
		Describe the mechanism of action of these hormones and their receptors
		Describe the classical and non-classical target organs of these hormones
		Describe the metabolic functions of these hormones
		Describe the regulation of these hormones especially by FSH & LH
		Discuss the manifestations of deficiency and excess of these hormones
		Discuss the andropause and menopause
		Discuss the role of LHRH Agonists and antagonists as well as anti-androgens
		Discuss the role of 5a-Reductase Inhibitors
PHARMACOLOGY		
	Oral contraceptives	Describe the types, mechanism of action and physiological effects of Estrogens and Progesterone containing oral contraceptives
COMMUNITY MEDICINE		
	Sexually transmitted	Describe the types of STDs

	diseases	
		Describe the guidelines for the prevention and management of STDs
GYNAECOLOGY		
	Female infertility	Describe the causes, and investigations of female infertility
GENERAL MEDICINE		
	Male infertility	Describe the etiology and investigations of male infertility
		Describe normal semen analysis
		Define oligo/azoospermia

LAB WORK		
PHYSIOLOGY		
	Pregnancy test	Perform pregnancy test
HISTOLOGY		
	Ovaries	Describe the microscopic structure of ovaries under microscope
	Fallopian tubes	Describe the microscopic structure of fallopian tubes under microscope
	Uterus	Describe the microscopic structure of uterus under microscope
	Mammary glands	Describe the microscopic structure of mammary glands under microscope
	Testes and Epididymis	Describe the microscopic structure of Testes and Epididymis under microscope

KMU MBBS 2nd YEAR (ENDORCINE AND REPRODUCTION MODULES)

THEORY BLUEPRINT BLOCK F

	ENDOCRINE SYSTEM	REPRODUCTION	BLOCK TOTAL MCQs
GROSS ANATOMY	1	12	13
EMBRYO	2	7	9
HISTO	5	6	11
PHYSIOLOGY	34	14	48
BIOCHEMISTRY	20	6	26
PRIME	3	0	3
MEDICINE	4	0	4
PHARMACOLOGY	2	0	2
COMMUNITY MEDICINE	1	2	3
FORENSIC MED	0	1	1
	72	48	120

OSPE BLUEPRINT BLOCK F

Subject	Endocrine module	Viva stations	Reproduction module	Viva stations	Total OSPE stations
Gross Anatomy	0	1	2	1	10
Histology	3		3		
Embryology	0		0		
Physiology	0	1	1	1	3
Biochemistry	3	1	0	1	5
Total	6	3	6	3	12 + 6 (viva) =18

THIRD YEAR BLOCK G: FOUNDATION II MODULE

S.No	Themes	Duration
1	Molecules, bacteria and cell injury	3 weeks
2	Ageing and death	2 weeks

General Learning Objectives

By the end of Foundation-2 Module, 3rd year MBBS students will be able to:

Knowledge:

1) Define pathology, its different branches and enumerate clinically important bacteria.
2) Describe the structure of bacterial cell and mechanisms by which they cause the disease.
3) Describe methods used to identify different microbes in laboratory and explain the interventions employed to prevent infections including vaccines.
4) Describe cell injury, its different mechanisms and sub cellular responses to cell injury.
5) Describe necrosis, apoptosis and adaptive changes seen in clinical settings and its identification in surgical specimens.
6) Define common terms related to Pharmacology.
7) Describe the basic principles of pharmacokinetics and pharmacodynamics and apply these principles to clinical practice as they relate to drug absorption, distribution, metabolism, excretion, mechanism of action, clinical action and toxicity.
8) Describe the cellular and biochemical sites where drugs bind to act.
9) Describe the general principles of drug interactions in relation to clinical practice.
10) Describe the process of new drug development.
11) Identify different dosage forms of drugs.
12) Demonstrate searching accurate information quickly in a formulary.
13) Demonstrate administration of a drug through intramuscular and intravenous routes.
14) Write down the basic format of drug prescription and describe the general principles of prescribing drugs.
15) Write correctly medical abbreviations used in clinical practice.
16) Identify commonly used equipments in pharmacy.

17) Describe Forensic medicine, its different branches and importance.
18) Describe law and its various components.
19) Explain medicolegal system and legal procedure for a doctor.
20) Describe the contents of medical jurisprudence.
21) Describe the diagnosis of death and WHO death certificate.
22) Describe different refractive errors and its management.
23) Explain causes of watery eyes in both infants and elders and its management.
24) Describe the basic concept of health, disease and primary health care.

Skills:

25) Demonstrate different pathological laboratory procedures and identify gross and microscopic features in the given specimens.

Attitude:

26) Demonstrate professionalism, respect, honesty and compassion by behaving in a courteous manner with colleagues and teachers during course activities like long lectures, SGDs and Practicals.
27) Describe the PMC code of Ethics
28) Describe the steps of process of developing a research protocol

Foundation-II Module 3rd Year MBBS

By the end of this module the students of first year MBBS should be able to:

Theme-1 (Molecules and Bacteria)

S.No	Topic	Learning Outcomes
PHARMACOLOGY		
	Introduction to the subject	Define basic terms like Pharmacology, Clinical Pharmacology, Therapeutics, drug, medicine, pro-drugs, prototype drugs, Materia medica, pharmacopoeia, formulary, national formulary, poisons, toxins, pharmacokinetics, pharmacodynamics, excipient, compounding and dispensing.

		Describe the branches of Pharmacology like Pharmacy, Pharmacognosy, pharmacogenetics, pharmacogenomics, toxicology and posology.
		Define prescription drugs, OTC drugs, WHO essential drugs and Orphan drugs with examples.
	Nomenclature of drugs	Describe how drugs are named, i.e. chemical, generic, approved, official and trade names of drugs with examples.
	Sources of drugs	Enlist various sources of drugs.
		Give examples of drugs obtained from plants, animals, mineral and synthetic sources.
		Describe the genetic engineering source of drugs with examples.
	Active principles of crude drugs	Enlist important principles of crude drugs with examples.
	Routes of drug administration	Enlist various routes of drug administration.
		Describe the merits and demerits of oral, sublingual, rectal, intramuscular, subcutaneous, intravenous, intra-arterial, inhalational, spinal, topical and transdermal routes of drug administration.
		Give examples of drugs given through oral, sublingual, rectal, intramuscular, subcutaneous, intradermal, intravenous, intra-arterial, inhalational, spinal, topical and transdermal routes of drug administration.
		Describe the difference between topical and transdermal routes of drug administration.
		Describe the difference between subcutaneous and intradermal routes of drug administration.
	Absorption of drugs	Define drug absorption.
		Describe various mechanisms of drug absorption like simple diffusion, facilitated diffusion, active transport, ion-pair transport, endocytosis and filtration with examples.

		Describe the concept of ionization of drug molecules and clinical significance of ion trapping.
		Describe factors affecting drug absorption.
	Bioavailability and Bioequivalence	Define bioavailability, bioequivalence and pharmaceutical equivalence.
		Explain Time-Concentration curve.
		Describe AUC (Area Under the Curve).
		Describe the factors affecting bioavailability.
	Hepatic firstpass effect (Pre-systemic elimination)	Describe hepatic first-pass effect (Pre-systemic elimination) and its clinical significance.
	Enterohepatic circulation	Define enterohepatic circulation.
		Describe enterohepatic circulation with examples and its clinical significance.
	Distribution of drugs	Define distribution of drugs.
		Define redistribution of drugs with example.
		Describe plasma protein binding and its clinical significance in diseased conditions.
		Describe factors affecting drug distribution.
	Volume of distribution	Define volume of distribution.
		Enlist drugs with small volume of distribution.

		Enlist drugs with large volume of distribution.
		Apply formula for calculating volume of distribution.
		Describe volume of distribution with reference to its clinical significance.
	Loading dose	Define loading dose of a drug.
		Enlist some drugs whereby loading dose is administered.
		Apply formula for calculating loading dose.
	Physiological barriers to transport of drugs	Enlist important physiological barriers to transport of drugs.
		Describe important physiological barriers to transport of drugs like bloodbrain barrier and placental barrier with reference to their clinical significance.
	Biotransformation (metabolism) of drugs	Define biotransformation.
		Define xenobiotics.
		Describe the objectives of biotransformation and fate of drugs after biotransformation.
		Name major sites of biotransformation.
		Describe major drug metabolizing enzymes i.e. microsomal (P450) and non-microsomal enzymes.
		Describe the phases and reactions of biotransformation.
		Describe the factors affecting drug biotransformation.

	Genetic influence on biotransformation of drugs	Define pharmacogenetics and pharmacogenomics.
		Define idiosyncrasy with examples.
		Describe the genetic factors influencing biotransformation of drugs with examples.
	Enzyme induction	Define enzyme induction.
		Enlist enzyme inducers.
		Describe enzyme induction and its clinical significance.
	Enzyme inhibition	Define enzyme inhibition.
		Enlist enzyme inhibitors.
		Describe enzyme inhibition and its clinical significance.
		Describe suicide inhibition (mechanism-based inhibition) with examples of drugs.
	Excretion of drugs and drug clearance	Define drug excretion and drug clearance.
		Enlist major and minor routes of drug excretion.
		Differentiate between excretion, elimination and clearance.
		Apply the formula for calculating drug clearance.
	Maintenance dose	Define maintenance dose of a drug.

		Apply the formula for calculating the maintenance dose.
		Apply Young's formula, Dilling's formula and Clark's formula for calculating doses of drugs.
	Plasma half life	Define plasma half-life.
		Enlist drugs with short half-life.
		Enlist drugs with long half-life.
		Apply the formula for calculating plasma half life.
		Explain the clinical significance of half life.
	Steady-state concentration of drugs	Define steady-state concentration of drugs.
		Describe the time to reach steady-state concentration of drugs.
		Describes the importance of steady-state concentration in clinical practice.
	First- and zero-order kinetics	Define first- and zero-order kinetics.
		Differentiate between first- and zero-order kinetics with examples.
		Explain the clinical significance of first- and zero-order kinetics
		Define bioassay and standardization.
	Bioassay and standardization	Describe the relative importance of bioassay compared with physical or chemical assays.

		Describe the most common type of bioassay, i.e. three-point assay.
	Pharmacodynamics	Define pharmacodynamics.
		Define agonist, antagonist, partial agonist and inverse agonist with examples.
		Describe receptors.
		Define orphan receptors, serpentine receptors and spare receptors.
		Describe the biochemical and cellular sites of drug targets.
		Describe intracellular Second-messenger system and enlist some important Second-messengers.
		Describe up regulation and down regulation of receptors with examples.
		Define drug selectivity and specificity.
	Dose-response curves (Graded and Quantal)	Define dose response curve, graded dose-response curve and quantal doseresponse curve.
		Describe graded dose-response curve and quantal dose-response curve.
		Describe the limitations of graded dose-response curve and its remedy in a quantal dose-response curve.
		Describe the significance of constructing dose-response curves.
		Explain the advantages of taking log dose values on the dose axis.
	Therapeutic index	Define therapeutic index.
		Describe therapeutic index with reference to its clinical importance.

		Apply formula for calculating therapeutic index
		Define median lethal dose, median toxic dose and median effective dose.
		Enlist some drugs with narrow therapeutic index.
		Enlist some drugs with broad therapeutic index.
	Protective index	Define protective index.
		Differentiate between therapeutic index and protective index.
	Therapeutic window	Define therapeutic window.
		Describe therapeutic window with reference to its clinical importance.
	Potency and efficacy	Define potency and efficacy.
		Describe potency and efficacy with examples.
		Describe the clinical importance of efficacy compared to potency.
	Drug antagonism	Define drug antagonism.
		Enlist types of antagonism.
		Describe chemical, physiological (functional) and pharmacological (competitive/surmountable and non-competitive) antagonisms with examples.
	Drug interactions	Define drug interaction.

		Define drug incompatibilities with examples.
		Describe pharmacokinetic drug interactions with examples and its clinical significance.
		Describe pharmacodynamics drug interactions with examples and its clinical significance.
		Describe drug-food interactions and drug-disease interactions with examples.
		Define summation, synergism and potentiation with examples.
	Tolerance and Tachyphylaxis	Define Tolerance, cross tolerance, reverse tolerance (sensitization), innate tolerance, tachyphylaxis and drug resistance.
		Describe the mechanisms of development of tolerance and tachyphylaxis.
		Define drug holidays with example.
	Adverse drug reactions	Define adverse drug effect, secondary effect and intolerance to a drug.
		Classify adverse drug reactions.
		Describe dose-related adverse effects (side effects and toxic effects) with examples.
		Describe non-dose-related adverse effects (idiosyncrasy and drug allergy) with examples.
		Describe causes of adverse drug reactions.
		Enlist some drugs causing hepatotoxicity.
		Enlist some drugs causing renal toxicity.
		Enlist some cardio toxic drugs.

		Enlist some drugs causing adverse effects on reproduction.
	New drug development	Describe the processes involved in drug discovery and development.
		Define lead compound and drug screening.
		Describe pre-clinical and clinical studies.
		Define placebo, placebo response and nocebo response.
		Define no-effect dose and minimum lethal dose.
		Describe 04 phases of clinical trials.
		Define post-marketing surveillance.
		Define single-blind, double-blind, crossover and ADME studies.
		Describe the role of Food and Drug Administration (FDA) in the drug development process.
		Differentiate between IND (Investigational New Drug) and NDA (New Drug Application).
PATHOLOGY		
	Introduction to the subject	Define pathology, microbiology and list its major branches
		Describe essential characteristics of five major groups of microorganisms
		Differentiate between prokaryotes and eukaryotic cells based on their structure and complexity of their organization
	Introduction to cell	Define cell

		Describe structure of cell membrane
		Describe cell organelles
	Classification of Bacteria	Describe classification of bacteria based on oxygen requirement as aerobes and anaerobes with examples.
		Describe classification of bacteria based on staining characteristics, nature of cell wall, ability to grow in the presence of oxygen and ability to form spores.
	Structure of bacterial cell	Describe structure and function of each of various parts of the bacterial cell including cell wall, cytoplasmic membrane, Mesosome, ribosomes, granules and nucleoid
		Describe specialized structures outside the cell wall including capsule, flagella, pilli and glycocalyx
		List the differences between cell wall characteristics of Gram Positive and Gram Negative Bacteria
		Describe classification and important functions of plasmids.
		Describe functions and arrangement of transposons.
		Describe structure, functions and medical importance of bacterial spores with examples.
	Bacterial growth curve	Describe various phases of bacterial growth curve
	Normal Flora	Describe medically important members of normal flora and their anatomic location
	Bacterial genetics	Define mutation
		Describe the classification of various types of mutations and their common causes.
		Describe methods of transfer of DNA within bacterial cells including process of conjugation, transduction, recombination and transformation.

	Lab diagnosis of bacterial infections	Describe the bacteriologic approach to diagnosis of bacterial infections including blood, throat, stool, sputum, spinal fluid, urine, genital tract and wound cultures.
		Describe general principals of various immunologic and nucleic acid based methods for identification of an organism.
	Bacterial pathogenesis	Define the term pathogen, infection, virulence, communicable, endemic, epidemic and pandemic diseases, carrier, pathogens, opportunists, commensals and colonizers.
		Describe stages/determinants of bacterial pathogenesis.
		Describe colonization, invasion, toxins, immune-pathogenesis.
		Differentiate between exotoxins and endotoxins.
		Describe the various modes of action of endotoxins and endotoxins produced by gram positive and gram-negative bacteria.
		Describe the four stages of a typical infectious disease and Koch's postulates for establishing the causal role of an organism in the disease.
	Antibacterial Vaccines	Define immunization and vaccination.
		Describe role of immunization in inducing active and passive acquired immunity.
		Enlist the current bacterial vaccines and their indications.
		Describe various types of bacterial vaccines in terms of composition, preparation, indications, route of administration and common side effects.
FORENSIC MEDICINE		
	Introduction to the subject of Forensic Medicine	Describe forensic medicine and its various branches
		Describe pillars of forensic medicine

		Describe the various terminologies used in forensic medicine
	Introduction to medicolegal system	Discuss different prevailing medicolegal systems in the world
	Introduction to Law	Define law. Describe its various types.
	Legal proceedings	Describe court procedures for a doctor
	Chain of evidence	Describe evidence, its types and recording of evidence
	PPC and CrPC	Describe the relevant sections of Pakistan penal code and CrPC
	Medical jurisprudence	Describe the components of medical jurisprudence (consent, negligence, secrecy, professional misconduct and privileged communication)
		Describe code of medical ethics
		Describe the duties of a registered medical practitioner
ENT		
	Introduction to the subject	Describe common ENT symptoms.
		Name common diseases of ENT.
		Name recommended books that students must read.
OPHTHALMOLOGY		
	Introduction to the subject; Career in Ophthalmology	Define Ophthalmology and its branches

		Highlight the scope of field of Ophthalmology as a future career
	Refractory errors	Describe refractive error and its effect on vision.
		Describe the concept of myopia and its correction.
		Describe the concept of hypermetropia and its correction.
		Describe the concept of astigmatism & cylindrical lens.
		Describe the concept of presbyopia, its possible causes and correction.
		Describe aphakia and possible methods of its correction.
	Watery Eyes	Explain the structural details, development and functions of lacrimal system.
		Correlate the clinical presentation of watery eye with anatomical structures.
		Correlate the clinical features with a disease entity.
		Describe the causes, clinical features and treatment of congenital nasolacrimal duct obstruction.
		Assess the time of probing.
		Describe the causes, clinical presentation and treatment modalities.
		Differentiate between acute and chronic dacryocystitis.
COMMUNITY MEDICINE		
	Introduction to the subject	Define Community medicine and Public health
		Describe the role of teaching of public health in prevention of diseases

	Health system of Pakistan: Introduction	Define health care system of Pakistan using WHO Health system frame work
	Health and disease	Define community medicine, public health and preventive medicine.
		Discuss the history and philosophy of public health as well as its concepts and functions regionally & globally.
		Describe the stages in the natural history of a disease.
		Describe epidemiological triad, web of causation and multifactorial causation
		Describe the dimensions and determinants of health
		Describe the indicators of health and its characteristics
		Discuss the concept of disease control
		Discuss the different levels of prevention and their modes of interventions.
		Explain the natural history of disease.
		Describe the iceberg phenomenon
		Describe mode of intervention of diseases with emphasis on health education.
	Primary Health Care	Define Primary health care (PHC).
		Describe the elements of PHC, its principles and strategies for implementation of PHC.
		Describe Health for all by the year 2000.
		Enumerate the MDGS & SDGS related to health.

		Describe the history of development of PHC
		Describe comprehensive & selective PHC
		Describe reasons for failure of PHC
		Describe Health Systems before & after PHC
		Describe district health care system
		Enumerate indicators for assessing PHC
PRIME		
	Personal identity	Describe personal identity in the context of medical education
	Professional identity	Define professional identity and Describe the basic pre-requisites of professional identity formation
	Patient safety, clinical governance and quality improvement	Explain the concept of patient safety, clinical governance and quality improvement in primary healthcare
	Professionalism-Trust	Explain the dynamics of professionalism and trust in health professional patient relationship
		Adheres to principles of trust in day to day professional interactions
	Professional identity formation- Types and Multiple identities	Define professional identity formation and explain the Students' roles in terms of professional identity
	Motivation	Explain motivational skills for team members for clinical tasks

Theme-II (Aging and Death)		
S.No	**Topics**	**Learning Outcomes**
PATHOLOGY		
	Cellular injury, cell death	Define the following terms: Pathology, disease, etiology, pathogenesis, morphology, cell injury and homeostasis.
		Describe the causes of cell injury from gross physical trauma to single gene defect.
		Describe the nature and severity of cell injury with cellular responses.
		Enumerate different classes of pathology.
		Describe the following basic mechanisms of cell injury: General Biochemical mechanisms, Ischemic and hypoxic injury, Ischemic/reperfusion injury, Free radical induced cell injury and chemical injury.
		Differentiate between reversible and irreversible cell injury.
		Describe the mechanism, morphological and biochemical changes and functional alterations in reversible and irreversible cell injury.
		Define phagocytosis, endocytosis, pinocytosis, autophagy and heterophagy.
		Describe the subcellular responses to injury including lysosomal catabolism, heterophagy and autophagy.
	Cellular adaptation	Describe types of cellular adaptations.
		Differentiate between physiologic and pathologic adaptation.
		Define hypertrophy, hyperplasia, atrophy and metaplasia.
		Describe the causes and mechanism of hypertrophy, hyperplasia, atrophy and metaplasia.
		Describe hypertrophy of the smooth endoplasmic reticulum with examples and mitochondrial alterations.
		Describe cytoskeletal abnormalities in pathological states with examples.
	Necrosis	Define necrosis.
		Describe types of necrosis with examples.
		Describe the mechanism and morphology of necrosis.
	Apoptosis	Define apoptosis.
		Describe physiological and pathological causes of apoptosis with examples.
		Describe morphology with alterations in cell structure.
		Describe the biochemical features of apoptosis altering the cell structure.

		Describe the intrinsic and extrinsic pathways of apoptosis.
		Differentiate between necrosis and apoptosis.
		Describe role of apoptosis in health and disease.
		Describe the mechanism and causes of cellular ageing including genetic & environmental factors, structural & biochemical changes.
		Describe adaptive changes in clinical settings.
	Steatosis	Describe causes and mechanism of steatosis.
		Explain the morphology and consequences of steatosis.
	Intracellular accumulations	Describe three general pathways for abnormal intracellular accumulations.
		Define steatosis.
		Describe causes, mechanism, morphology and consequences of lipid accumulation.
		Describe causes, mechanism, morphology, consequences of protein and glycogen accumulation
		Describe types of pigments
		Differentiate between endogenous and exogenous pigments.
	Pathologic calcification	Define Pathologic calcification
		Describe types, morphology and functional alterations of pathologic calcification with examples.
		Differentiate between dystrophic and metastatic calcification.
FORENSIC MEDICINE		
	Introduction to Thanatology	Define death and describe its phases.
		Describe criteria of diagnosis of death.
		Enlist the importance of diagnosis of death
	Death	Describe the medicolegal aspects of brain stem death and suspended animation
		Define cause, mode, manner and mechanism of death
		Enlist various methods of disposal of dead body
	Death certificate	Define cause of death
		Describe the WHO format of death certificate
OPHTHALMOLOGY		
	Cataracts	Define cataract
		Describe the types of cataracts
		Describe the pathogenesis and complications of cataracts

		Describe the management of cataracts
PRIME /RESEARCH		
	Research Protocol	Describe the steps of developing a research protocol
	Health system research	Define research and health system research.
		List types of research.
		Describe characteristics of health system research.
		Describe building blocks of health system.
		Discuss key areas of concern in health system.
		Discuss briefly research methodology.
		Define and categorize types of health research
	Purpose and process of health research	Explain the purpose of health research
FAMILY MEDICINE		
	History and current structure of general practice	Describe the historical perspectives of general practice
		Explain the structure of general practice nationally and internationally
	Models of healthcare	Describe the models of healthcare
	Essential health service package (levels of health services in KP)	Describe the levels of health services in the province of KP.
LAB WORK		
PHARMACOLOGY		
	Lab protocols; Introduction to Pharmacy; Apparatus used in Pharmacy	Identify and name common apparatus used in pharmacy laboratory.
		Identify and label common apparatus used in the field of Pharmacy.
	Metrology & Medical abbreviations	Define metrology.

		Describe metric and imperial systems of measurements.
		Calculate the equivalency of metric system with imperial system.
		Describe the common medical abbreviations.
		Apply these abbreviations correctly in medical documentations.
	Dosage forms of drugs	Define dosage form.
		Enlist the types of dosage forms.
		Describe the characteristic properties of each dosage form.
		Identify dosage forms administered through different routes.
	Searching information in a formulary	Define formulary.
		Describe National Formulary.
		Demonstrate searching accurate information quickly in a formulary.
		Describe the general protocols for IM and IV injection of a drug.
	To demonstrate IM and IV injection of drugs on a dummy (manikin)	Demonstrate standard protocols during administration of a drug through Intramuscular route.
		Demonstrate standard protocols during administration of an IV drug through Intravenous route.
	Prescription writing	Define a medical prescription.
		Describe the components of a prescription.
		Describe how to reduce medication errors.
		Define compliance to the prescribed treatment.
		Write down the basic format of drug prescription.
PATHOLOGY		
	Biosafety procedures/ Precautions in Microbiology Lab	Define sterilization and disinfection.
		Demonstrate steps of hand washing.
		Enlist various physical and chemical methods of sterilization

		and disinfection.
		Define biosafety and biosecurity.
	Tissue processing	Describe steps involved in tissue processing.
		Identify various tools/instruments involved in tissue processing and their indications.
		Demonstrate slide focusing.
	Gram staining	Describe principal and significance of Gram staining.
		Enlist steps of Gram staining.
		Demonstrate Gram staining procedure.
		Identify Gram positive and Gram-negative bacteria morphologically under the microscope.
	ZN staining	Describe principal and significance of ZN staining.
		Enlist steps of ZN staining.
		Demonstrate ZN staining procedure.
		Identify AFB and inflammatory cells microscopically.
	Culture media	Define terms like culture, bacterial colony, media, aerobe, anaerobe, agar, selective and differential.
		Describe classification of culture media.
		Describe basic and enriched media, transport media, selective media and differential media.
		Describe preparation/ inoculation of culture media.
		Enlist ingredients, indications, important properties and organisms grown on various culture media.
	Bacterial motility	Enumerate motile bacteria
		Identify motile bacteria under the microscope
	Hyperplasia (BPH)	Define hypertrophy and hyperplasia.
		Differentiate between hypertrophy and hyperplasia.
		Describe gross and microscopic morphology of BPH.
		Identify the slide of BPH.
	Atrophy (Testicular atrophy	Define atrophy
		Describe gross and microscopic features of atrophy over a slide of testicular atrophy as an example
	Pathologic calcification	Describe causes and various types of calcification.
		Identify the slide.
FORENSIC MEDICINE		
	Death certificate	Formulate death certificate based on WHO criteria

	Legal procedure	Doctor in a witness box- role play
	Recording of evidence	Recording of dying declaration
	Consent form	Take written informed consent for various procedures

THIRD YEAR MBBS, BLOCK G: INFECTION AND INFLAMMATION MODULE

Theme and Duration Table???

General Learning Objectives

- At the end of this module, the 3rd year students would be able to:

Knowledge

1. Describe the process of acute & chronic inflammation with their outcomes
2. Relate different aspects of healing and repair
3. Differentiate common pathogenic bacteria based on morphology, pathogenesis & lab diagnosis.
4. Relate bacterial pathogenic factors to clinical manifestations of common infectious diseases.
5. Describe the pharmacological details of anti-inflammatory drugs
6. Apply/relate the pharmacokinetics & pharmacodynamics of chemotherapeutic agents to their use in infectious diseases
7. Describe medico legal aspects of HIV patient.
8. Describe mechanism of wound causation.
9. Describe medico legal aspects of parameters used for personal identification in real life situation
10. Apply parameters of a person's identification in a simulated environment
11. Describe the epidemiology of common infectious diseases.
12. Explain the preventive and control measures for infectious diseases.
13. Explain the control & preventive measures for nosocomial infections.
14. Describe the risks associated with hospital waste and its management.

Skills

15. Construct / Write prescriptions for various inflammatory and infectious diseases

Attitude

3rd Year MBBS Block G: Infection and Inflammation Module		
Theme-1 (Pain and Fatigue)		
S.No	**Topic**	**Learning Outcomes**
PHARMACOLOGY		
	Overview to anti-inflammatory drugs	-Classify anti-inflammatory drugs -Describe the role of DMARDs and glucocorticoids as anti-inflammatory agents.
	NSAIDs (Non-selective cox inhibitors: Aspirin & commonly used NSAIDs)	-Classify NSAIDS -Differentiate between non-selective COX inhibitors and selective COX-2 inhibitors based on
		mechanism of action.
		-Name the prototype non-selective COX inhibitor.
		-Describe the pharmacokinetics of Aspirin
		-Describe the mechanism of action of aspirin as
		anti-platelet, analgesic, antipyretic
		inflammatory agent.
		-Give the dose of Aspirin as anti-platelet,
		analgesic/antipyretic and as anti-inflammatory
		drug.
		-Describe clinical uses of NSAIDs.
		-Describe the adverse effects of NSAIDs. -Describe the drug treatment of Aspirin poisoning
		Describe the pharmacokinetics with emphasis on dosage, duration of action and elimination of Diclofenac, Ibuprofen, Indomethacin, Mefanamic acid and Piroxicam in contrast to Aspirin -Relate pharmacokinetics and pharmacodynamics of NSAIDs to their clinical applications
	Selective COX 2 inhibitors	Describe the mechanism of action of selective COX-2 inhibitors. Describe the clinical uses of selective COX-2 inhibitors

		Describe the adverse effects of selective COX-2 inhibitors Describe the merits and demerits of selective COX-2 inhibitors and non-selective COX inhibitors.
	Paracetamol (Acetaminophen)	Describe the pharmacokinetics of Paracetamol Describe the mechanism of action of Paracetamol. Describe the clinical uses of Paracetamol. Describe the adverse effects of Paracetamol. Give therapeutic and fatal doses of Paracetamol. Describe the drug treatment of Paracetamol poisoning
	Anti-histamines	Classify anti-histamines Differentiate between first and second generation anti-histamines Describe the pharmacologic effects of H1- receptor antagonists. Describe the clinical uses of H1-receptor antagonists. Enlist the adverse effects of H1-receptor antagonists. Describe the drug interactions of H1-receptor antagonists.
	Serotonin agonist and antagonist	Enlist serotonin agonists Classify serotonin antagonists Describe the mechanism of action of serotonin Describe the organ system effects of serotonin. Describe the clinical uses of serotonin agonists and antagonists Describe the pharmacological basis of ondansetron in chemotherapy

		induced vomiting
PATHOLOGY		
	Cells of Inflammation	Describe different cells of inflammation Describe the functions of various cells of inflammation - Enumerate different causes of leukopenia and leucocytosis(each neutrophil, lymphocyte, monocyte, eosinophil, basophil seperately)
	Overview to Acute Inflammation and vascular phase	Define acute inflammation Describe causes of acute inflammation Describe the vascular events of acute inflammation
	Recognition of microbes	Describe various molecular patterns and appropriate receptors used by the inflammatory cells to identify microbes -Relate the recognition of microbes to the initiation of inflammation
	Cellular phase of acute inflammation	Describe the sequence of events and cellular changes involved in cellular phase of acute inflammation
	Plasma Derived Mediators	Enumerate plasma derived mediators Enlist the functions of each mediator Describe the different cascades involved in the generation of mediators
	Cell Derived Mediators	Enumerate cell derived mediators Enlist the functions of each mediator
	Morphological patterns, outcomes, defects of inflammation	Enumerate the different morphological patterns of inflammation Describe the histological changes in each pattern Enlist the outcomes of inflammation Enumerate the various defects of inflammation Describe the consequences of the defects of inflammation
	Overview to chronic inflammation	Define chronic inflammation Differentiate chronic from acute inflammation Describe the causes and morphological features of chronic inflammation
	Granulomatous inflammation	Define granulomatous inflammation

		Describe the morphological features and mediators involved in granulomatous inflammation
	Cells and mediators of chronic inflammation	Enlist the cells of chronic inflammation Enumerate the mediators of chronic inflammation Describe the function of the mediators Relate the functions of mediators to the morphological changes seen in chronic inflammation
	Systemic effects of inflammation	-Enumerate the systemic effects of inflammation -Describe the pathophysiology of the systemic effects of inflammation
FORENSIC MEDICINE		
	Antidotes	Define and classify antidotes Describe the mechanism of action of different antidotes
	Steps of management in a case of poisoning	Describe general steps of management in a case of poisoning
COMMUNITY MEDICINE		
	Infectious disease epidemiology	Define incubation period Explain the principles of disease eradication and control Define serial intervals Define infectivity period
	Infection control	Define the basic definition related to infectious disease epidemiology Review the role of susceptible host for successful parasitism, modes of transmission and the host defense system List and explain the various classifications of communicable diseases with special reference to the scope and purpose of the International classification of Disease (ICD -10). Enlist the common infectious diseases affecting the

		population of Pakistan as per National institute of Health Pakistan. Explain the effect of climate change and seasonal variation on specific diseases globally and in Pakistan. Explain the role of personal hygiene & PPE in infection control.
	Disease careers Reservoirs of infection Disinfection Communicable disease control measure (aimed at agent, host, others, administrative measures and vector control measures	Define disease careers Explain the reservoirs of infection Differentiate between sterilization and disinfection Explain the types and procedures of disinfection Discuss Communicable disease control measure (aimed at agent, host, others, administrative measures and vector control measures

Theme (Trauma and repair)		
S.no	**Topic**	**Learning Outcomes**
PATHOLOGY		
	Prostaglandins	Enlist various prostaglandins- Describe the mechanism of action of Prostaglandins. - Describe the organ system effects of Prostaglandins. Describe the clinical uses of Prostaglandins.
	Overview to tissue healing and repair	-Differentiate between regeneration and repair -Describe various steps involved in the

		process of tissue healing and repair
	Tissue regeneration	-Define regeneration -Enlist organs capable of regeneration -Describe the process and mediators involved in regeneration
	Cell Cycle and its role in repair	Define cell cycle -Describe the initiation, various phases and proteins involved in the cell cycle -Discuss cells capable of entering the cell cycle -Describe proliferative capabilities of various cells
	Repair by scarring	Describe the various steps involved in process of repair by scarring -Describe the various mediators involved in the steps of scarring
	Growth factors and receptors	-Enumerate various growth factors and their receptors -Describe the most common pathways by which growth factors affect tissue repair and regeneration
	ECM	Classify various components of ECM -Describe the role and importance of ECM in tissue repair
	Factors affecting wound healing/abnormal scarring	Enlist the various factors that influence wound healing -Describe the mechanism by which these factors affect wound healing -Describe the abnormalities of repair and their consequences
FORENSIC MEDICINE		
	Overview to medico-legal aspects of trauma (Wound causation)	Describe mechanism of wound causation
	Toxicity by analgesics	Describe the medico legal aspects of toxicity by aspirin and paracetamol
COMMUNITY MEDICINE		
	Nosocomial infection & its control	Describe the prevalence of the nosocomial infections globally and Specifically in

		Pakistan. Identify the cause of nosocomial infections in Pakistan. Enlist common nosocomial infections. Describe the importance of different modes of transmission for causation of the nosocomial infections. Explain the control & preventive measures for nosocomial infections

Theme (Fever and Infection)		
S.No	**Topic**	**Learning Outcomes**
PHARMACOLOGY		
	Introduction to Chemotherapy	• Define basic terms like chemotherapy, antibiotic, antimicrobial, MIC, MBC, chemoprophylaxis, empirical therapy and post-antibiotic effect, bacteriostatic and bactericidal antimicrobials. • Explain advantages of drug combinations. • Describe various mechanisms of bacterial resistance against antibiotics. • Differentiate between concentration and time dependent killing with examples. • Classify antimicrobials on the basis of mechanism of action (MOA)
	Penicillins	• Classify beta-lactam antibiotics

		• Enlist narrow and broad spectrum Penicillins. • Enlist anti-pseudomonal, anti- staphylococcal/ beta lactamase resistant Penicillin. • Enlist long- and short-acting Penicillins • Describe anti-bacterial spectrum of Penicillins. • • Describe pharmacokinetics in respect of emphasis on route of administration and excretion of Penicillins • Describe mechanism of action of Penicillins • Describe clinical uses of Penecillins • Describe adverse effects of Penicillins, • Describe contraindications of Penicillins. • Describe principal mechanism of bacterial resistance to Penicillins • Describe drug interactions of Penicillins • Apply formula for interconversion of milligrams and units of Penicillin G. • Relate pharmacokinetics and pharmacodynamics of Penicillin with their clinical applications / uses.
	Cephalosporins	• Classify Cephalosporins • Describe anti-bacterial spectrum of Cephalosporins. • Describe pharmacokinetics of Cephalosporins with special emphasis on route of administration and excretion. • Describe clinical uses of Cephalosporins • Describe the adverse effects of Cephalosporins.

		• Describe drug interactions of Cephalosporins with Ethanol. • Describe the principal bacterial mechanism of resistance to Cephalosporins. • Relate pharmacokinetics and pharmacodynamics of Cephalosporin with their clinical applications / uses.
	Beta lactamase inhibitors	• Enlist beta-lactamase inhibitors • Explain the rationale for using beta lactamase inhibitors in combination with β-lactam antibiotics.
	Monobactams & Carbapanem	• Describe the antibacterial spectrum of Monobactams and Carbapanem • Describe the clinical uses of Monobactams and Carbapanem
	Vancomycin	• Describe the MOA of Vancomycin. • Describe clinical uses of Vancomycin • Describe the use of vancomycin in MRSA (Methicillin-resistant Staph aureus). • Describe adverse effects of Vancomycin • Describe "Red man/Red neck" syndrome.
	Fosfomycin Bacitracin & Cycloserine	Enlist clinical uses of Fosfomycin, Bacitracin & Cycloserine
	Protein synthesis inhibitors	• Classify bacterial protein synthesis inhibitors
	Tetracyclines	• Classify Tetracyclines. • Describe anti-bacterial spectrum ofTetracyclines. • Describe the pharmacokinetics of Tetracycline with special emphasis on absorption of Tetracyclines. • Describe mechanism of action of Tetracyclines. • Describe the principal mechanism of resistance to Tetracyclines. • Describe clinical uses of Tetracyclines. • Describe adverse effects of Tetracyclines • Describe Black Bone disease.

		• Describe the teratogenic effects of Tetracyclines. • Describe drug interactions of Tetracyclines. • Describe the adverse effect related to the use of outdated (expired) Tetracycline products. • Relate pharmacokinetics and • Pharmacodynamics of Tetracycline with their clinical applications / uses.
PATHOLOGY		
	Bacteria: Pyrogenic Bacteria	• Define boil and furuncle • Enlist organisms responsible for pyrogenic infections • Describe important properties, pathophysiology, lab diagnosis of GPC & GNC
	Bacteria: Rickettsia	• Define Rickettsia • Describe the important properties, pathophysiology, lab diagnosis of diseases caused by Rickettsia
	Spore forming GP rods	• Enumerate spore forming GP rods- Describe the important properties, pathophysiology, clinical features and lab diagnosis of spore forming GP rods
	Non Spore forming GP rods	• Enumerate non spore forming GP rods • Describe the important properties, pathophysiology, clinical features and lab diagnosis of non-spore forming GP rods
	Chlamydia	• Describe the important properties, pathophysiology, clinical features and lab diagnosis of chlamydia.
	Miscellaneous: Sepsis and Septic Shock	• Define sepsis and septic shock • Enlist organisms capable of causing sepsis and inducing septic shock • Describe the pathophysiology and clinical features of

		septic shock
	Zoonotic Infections	• Enlist organisms causing zoonotic infections • -Describe the important properties, pathophysiology, clinical features and lab diagnosis of different zoonotic diseases
	General outlines of identification	Describe methods and parameters of identification
	Fetal age determination	Write important physical developmental stages of fetus for age estimation
	Age determination by skeletal study	Write important skeletal points of age estimation
	Age estimation by dental study	Write important dental points for age estimation
	Ages of medico legal significance	Enlist important ages of legal significance

Theme (Fever and Infection)		
S.No	**Topic**	**Learning Outcomes**
PHARMACOLOGY		
	Aminoglycosides	• Enlist Aminoglycosides. • Describe anti-bacterial spectrum of Aminoglycosides. • Describe the pharmacokinetics of Aminoglycosides with special emphasis on route of administration, concentration- dependent killing and post-antibiotic effect. • Describe mechanism of action of Aminoglycosides. • Describe the principal mechanism of resistance to Aminoglycosides. • Describe clinical uses of Aminoglycosides. • Describe adverse effects of Aminoglycosides. • Describe the drug interactions of Aminoglycosides. • Relate pharmacokinetics and pharmacodynamics of Aminoglycosides with their clinical applications / uses.
	Macrolides & other related drugs	• Enlist Macrolides. • Describe anti-microbial spectrum of Macrolides • • Describe pharmacokinetics of Macrolides

		• Describe the mechanism of action of Macrolides • Describe the principal mechanism of resistance to Macrolides • Describe clinical uses of Macrolides • Describe adverse effects of Macrolides. • Describe drug interactions of Macrolides • Differentiate the salient features of Erythromycin, Clarithromycin and Azithromycin in respect of dosing and clinical use. • Relate pharmacokinetics and pharmacodynamics of Macrolides with their clinical applications / uses.
	Linezolid	• Describe mechanism of action of Linezolid • Describe clinical uses of Linezolid with special emphasis on methicillin resistant staphylococci and vancomycin-resistant enterococci
	Clindamycin	• Describe mechanism of action of Clindamycin. • Enumerate clinical uses of Clindamycin. • Describe antibiotic-associated • (pseudomembranous) colitis.
	Streptogramins	• Enumerate Streptogramins. • Describe clinical use of Quinupristin- • Dalfopristin in VRE (Vancomycin- resistant enterococci).
	Chloramphenicol	• Describe anti-microbial spectrum of Chloramphenicol • Describe mechanism of action of Chloramphenicol • • Enlist clinical uses of Chloramphenicol • Describe the reason for obsoleting the systemic use of Chloramphenicol • Enlist adverse effects of Chloramphenicol • Describe Gray baby syndrome.
	Quinolones	• Classify Quinolones. • Describe the pharmacokinetics of Fluroquinolones with special emphasis on halflife of Moxifloxacin

		• Enlist respiratory Quinolones • Describe anti-microbial spectrum of Fluoroquinolones. • Describe mechanism of action of Fluoroquinolones. • Describe the principal mechanism of resistance to Fluroquinolones, • Describe clinical uses of Fluroquinolones • Describe adverse effects of Fluroquinolones • Describe drug interactions of Fluroquinolones • Relate pharmacokinetics and pharmacodynamics of Fluoroquinolones with their clinical applications / use.
	Sulfonamides Trimethoprim	• Classify Sulfonamides • Describe anti-microbial spectrum of Sulfonamides • Describe mechanism of action of Sulfonamides and Trimethoprim
		• Describe mechanism of resistance to Sulfonamides
		• Describe clinical uses of Sulfonamides and Trimethoprim
		• Describe adverse effects of Sulfonamides and Trimethoprim
		• Describe the advantages of combining sulfamethoxazole with trimethoprim (Co- • Trimoxazole)
		• Describe the drug interaction of
		• Sulphonamides with Phenytoin.
PATHOLOGY		
	Parasites: Hydatid Cyst	• Describe the life cycle and important properties of Echinococcus
		• Relate the pathogenesis to the clinical features and lab work up of Echinococcus
		• Identify cysts of Echinococcus in the lab
	Leishmania	• Describe the life cycle, and important properties of Leishmania
		• Relate the pathogenesis to the clinical features and lab work up of Leishmania
	Toxoplasma	• Describe the life cycle and important properties of Toxoplasma • Relate the pathogenesis to the clinical features and lab work up of Toxoplasma
	Malaria	• Describe the life cycle and important properties of Malarial parasite • Relate the pathogenesis to the clinical features and lab work up of Malaria
	Tenia	• Describe the life cycle, important properties, of Tenia saginata and

		solium • Relate pathogenesis to the clinical features and lab work up of Tenia saginata and solium
FORENSIC MEDICINE		
	Sex determination	Describe parameters of sex determination
	Race determination	Describe parameters of race determination
	Examination of hair	Describe medico legal aspects of hair
	Forensic odontology	Write the application of odontology in forensic medicine
	Forensic Anthropometry	Describe medico legal aspects of forensic anthropometry
COMMUNITY MEDICINE		
	• Epidemiology and control of vector borne diseases • Malaria • Dengue and other Viral haemorrhagic fevers and • Arboviral infections • Plague • Filariasis	• Describe the epidemiological determinants, frequency and distribution of Malaria • Compare the prevalence/incidence of malaria in different provinces of Pakistan. • Explain the preventive and control measures of Malaria • Describe the scope/function of Malaria control program. • Explain the types, risk factors, complications and control measures of viral hemorrhagic fevers including Dengue fever
	Epidemiology & control of Leishmaniasis	• Describe the epidemiological determinants, frequency and distribution of Leishmaniasis • Explain the preventive and control measures of Leishmaniasis
	Zoonotic and direct contagious diseases • Rabies • Anthrax • Plague • Brucellosis	• Explain the pre and post exposure prophylaxis of Rabies • Explain the epidemiology, types of Anthrax and its preventive measures • Discuss the history, types and prevention of Plague

	• Tetanus • Scabies	• Explain the etiology, risk factors, clinical features and prevention of Brucellosis • Explain the preventive measures of Scabies • Discuss the etiology, risk factors, clinical features and prophylaxis of pre and post exposure of Tetanus
	Leprosy Trachoma	Explain the etiology, risk factors, stages and preventive measures of Leprosy Explain the etiology, risk factors, complications and preventive measures of Trachoma
FAMILY MEDICINE		
	Malaria & Hepatitis control program teams	• Explain the etiology, clinical features, types, investigations and management of Malaria in family practice
		• Describe the red-flags in a patient with Malaria for referral to specialty care
		• Identify at risk patients of hepatitis and Malaria and offer them screening

Theme (Fever and Infection)

S.No	Topic	Learning Outcomes
PHARMACOLOGY		
	Antimalarials	• Describe terms like chemoprophylaxis, causal prophylaxis, terminal prophylaxis and radical cure with examples of drugs.
		• Classify antimalarial drugs.
		• Enlist drugs used for chemoprophylaxis of malaria.
		• Enlist drugs used for radical cure of malaria.
		• Describe the pharmacokinetics of Chloroquine with special emphasis on volume of distribution and dosing
		• Describe mechanism of action of Chloroquine, Quinine, Mefloquine, Halofantrine, Primaquine, Pyrimethamine and Artemisinins.
		• Describe adverse effects of antimalarial drugs
		• Describe Cinchonism and Blackwater fever.
		• Enlist the antimalarial drugs relatively safe in pregnancy.
		• Describe the antimalarial drugs contraindicated in G6PD deficiency.
		• Relate pharmacokinetics and pharmacodynamics of antimalarial drugs with their clinical applications / use.
	Antifungal drugs	• Classify Antifungal drugs.

		• Describe the pharmacokinetics of Amphotericin B and Ketoconazole
		• Describe the advantages of liposomal preparation of Amphotericin B
		• Describe mechanism of action of Azoles, Amphotericin B, Griseofulvin, Turbinafine, and Nystatin.
		• Describe clinical uses of Azoles, Amphotericin B, Griseofulvin, Turbinafine, and Nystatin.
		• Describe adverse effects of Azoles, Amphotericin B, Griseofulvin, Turbinafine, and Nystatin.
		• Describe drug interactions of Ketoconazole and Amphotericin B
	Antivirals	• Classify antiviral drugs
	Anti-herpes	• Enlist anti- Herpes drugs
		• Describe the pharmacokinetics of Acyclovir
		• Describe mechanism of action of Acyclovir
		• Describe clinical uses of Acyclovir.
		• Describe adverse effects of Acyclovir Describe the role of Ganciclovir in CMV retinitis.
	Anti-HIV drugs	• Classify anti-HIV drugs. • Describe the role of entry inhibitors, integrase inhibitors, protease inhibitors, NRTIs and NNRTIs in HIV treatment • • Describe adverse effects of Zidovudine and Indinavir • Describe the rationale of HAART therapy
PATHOLOGY		
	Viruses: Corona	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of Corona Virus
	Viruses: HIV	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of HIV
	Viruses: Herpesviruses	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of Herpesviruses
	Viruses: Tumor Viruses	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of Tumor viruses
	Viruses: MMR	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of MMR viruses
	Fungi: Aspergillus	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of Aspergillus
	Fungi: Candida	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of Candida
	Tenia	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of Tenia
FORENSIC MEDICINE		
	Medico legal issues related to	Describe legal issues related to HIV patient

	HIV patient	
	Dactylography	Describe medico legal aspects of dactylography
	DNA finger printing	• Define DNA finger printing • Write its application in forensic practice • Write methods of collection of samples and dispatch to laboratory
	Tattoos, scar marks, Superimposition	• Describe medico legal aspects of tattoo marks, Describe medico legal aspects of scar tissue, • Describe medico legal aspects of superimposition
	and facial reconstruction	• Describe medico legal aspects of facial reconstruction
	Polygraph	• Describe medico legal aspects of polygraph
	Narcoanalysis	• Describe medico legal aspects of arcoanalysis
FAMILY MEDICINE		
	TORCH infections	• Define TORCH infection
		• Describe the steps of investigations for TORCH infections
		• Describe the preventive strategies for TORCH infections and their complications
COMMUNITY MEDICINE		
	Epidemiology & control of airborne diseases	Describe the epidemiological distribution, determinants, frequency of measles, mumps, rubella, chickenpox Diphtheria, Pertussis and meningitis
		Explain the preventive and control measures of measles, mumps & rubella with reference to Pakistani context.
	Epidemiology & control of Corona virus infection	Describe the epidemiological determinants, frequency and distribution of corona Compare the prevalence/incidence of corona in different parts of the world.
		Describe the preventive and control measures of corona Describe the role of Pakistani government in corona control program.
	Epidemiology and prevention of water borne diseases: • Cholera • Typhoid • AcuteDiarrhea	
		• Enumerate common water borne diseases • Explain the epidemiology and prevention measures of these diseases describe the current situation of these diseases on Pakistan and worldwide

	and Dysentery • Polio • Hepatitis A and E • Food poisoning	
	• Amebiasis and • Giardiasis	
	• Brucellosis	
	• Leptospirosis	
	• Worm • infestations	
LAB WORK		
	WEEK 1	
PATHOLOGY		
	Cell of inflammation	• Identify Cells of inflammation in the microscope
	Acute Appendicitis	• Identify the histopathological changes in acute appendicitis
FORENSIC MEDICINE		
	Gastric Lavage	• Demonstrate the steps of gastric lavage
	WEEK 2	
PATHOLOGY		
	Chronic cholecystitis	Identify the morphological changes occurring in chronic cholecystitis
	Granuloma	Identify the various cells and their arrangement in a granuloma
	WEEK 3	
PATHOLOGY		
	Granulation Tissue	Identify the histological features of granulation tissue
	WEEK 4	
PATHOLOGY		
	Catalase test	Perform and interpret the result of catalase test by tube and slide method
	Coagulase test	Perform and interpret the result of coagulase test by tube method
	Oxidase test	Perform and interpret the result of coagulase test
	Culture media	Identify blood agar, Mannitol salt agar, Chocolate media, CaryBlair transport media in the lab Identify different types of haemolysis on blood agar
PHARMACOLOGY		
		Prescription Writing

	Acute Tonsillitis	Construct a prescription for a patient with acute tonsillitis.
FORENSIC MEDICINE		
	Sex determination through bones	Identify human sex through bones
	Hair, Fibre	Identify human hair through microscopy Differentiate between hair and fibre
WEEK 5		
PHARMACOLOGY		
		Prescription Writing
	Malaria	Construct a prescription for a patient with Malaria
WEEK 6		
PATHOLOGY		
	Hydatid Cyst	Identify cysts and ova of Echinococcus in the lab
	Leishmania	Identify leishmania in slides of bone marrow/ skin biopsies
	Malaria	Identify Malarial parasite trophozoites and gametocytes under microscope
	Taenia saginata/solium	Identify ova of Taenia in the lab
COMMUNITY MEDICINE		
	Communicable diseases models	Identify the models related to the communicable diseases
		Explain the complication, preventive measures and the identification signs of concerned disease

ASSESSMENT BLUEPRINT of BLOCK G

BLOCK G Paper: MCQs Distribution

Subject	Foundation 2 module	Infection and Inflammation module	Total MCQs
Pharmacology	19	20	39
Pathology	12	23	35
Forensic medicine	6	08	14
Community medicine	5	10	15
ENT	1	03	04
Eye	3	02	05
PRIME including Research	1+2 (3)	0	03
Medicine	0	01	01
Surgery	0	02	02
Gynaecology	0	01	01
Pediatrics	0	01	01
Total	**49**	**71**	**120**

BLOCK G OSPE Outline

Subject	OSPE/OSCE	Viva stations	Total *
Pharmacology	2	2	4
Pathology	5	2	7
Forensic medicine	2	2	4
Community medicine	1	2	3
Medicine (history and physical examination)	1	0	1
Surgery (history and physical examination)	1	0	1
Total	12	8	20

* A minimum of 20 stations will be used in final exams. Total marks will be 120 (6 marks for each station)

Block H Multisystem Module

3RD YEAR BLOCK H: MULTISYSTEM MODULE

S. No	Themes	Duration
1	Vomiting and blurred vision	1 week
2	Palpitation, fainting and death	1 week
3	Heredity and Cancers	2 Weeks

General Learning Objectives

By the end of this module 3rd year MBBS students will be able to

Knowledge

1) Explain the functional organization of Autonomic Nervous system (ANS)
2) Describe the basic and clinical pharmacology of drugs acting on the ANS
3) Describe anticancer drugs
4) Describe the basic and clinical pharmacology of Eicosanoids.
5) Describe the basic and clinical pharmacology of drugs used for common skin problems.
6) Describe the clinical uses of some popular herbal medications.
7) Describe single Gene Disorders, cytogenetic disorders and different mutations
8) Describe the molecular Genetics Diagnosis
9) Define neoplasia and nomenclature of tumors
10) Describe characteristics of benign and malignant tumors
11) Describe epidemiology of cancer
12) Describe carcinogens, their types and clinical aspects of neoplasia
13) Describe diagnosis of cancer, grading and staging of tumors 14) Describe pathways for tumor spread and tumor immunity 15) Describe the protocols and procedures of autopsy.
16) Describe Thanatology and its medicolegal implications.
17) Describe general principles of Toxicology and their role in medicolegal sciences.
18) Describe the fundamentals of Research Ethics

3rd Year MBBS Block H: Multisystem Module

Theme-1 (Vomiting and blurred vision)

S.No	Topic	Learning Outcomes
PHYSIOLOGY		
	Functional organization of ANS- and overview	Describe the functional organization of ANS and its related neurotransmitters and receptors
PHARMACOLOGY		
	Introduction to the pharmacology of Autonomic Nervous System (ANS)	Enlist major autonomic neurotransmitters.
		Enlist various types of cholinergic, adrenergic and dopaminergic receptors discovered so far.
		Describe the organ system distribution of autonomic receptors.
		Describe presynaptic receptors (autoreceptors and heteroreceptors).
		Describe inotropy, chronotropy and dromotropy.
	Cholinomimetic drugs (Parasympatho- mimetic drugs)	Classify cholinomimetic drugs.
		Enlist the naturally-occurring cholinomimetic alkaloids.
		Enlist major organophosphate compounds.
		Enlist the organophosphates used as "Nerve gases".
		Describe the pharmacokinetics of cholinomimetics with emphasis on metabolism and duration of action.
		Describe the mechanism of action of directly-acting and indirectly- acting cholinomimetics.
		Describe the organ system effects of directly-acting and indirectly- acting cholinomimetics with special reference to their effects on receptors.
		Describe the clinical uses of cholinomimetics.
		Describe the cholinomimetics used in glaucoma and

		Alzheimer's disease.
		Describe the use of Edrophonium to differentiate between cholinergic crisis and Myasthenic crises.
		Describe the adverse effects of cholinomimetics.
		Describe the clinical manifestations of organophosphate poisoning.
		Describe the clinical manifestations of mushroom poisoning.
		Explain the pharmacological rationale of prophylactic use of Pyridostigmine in situations where chemical warfare with nerve gases is anticipated.
		Enlist the contraindications of cholinomimetics.
	Anticholinergic drugs (Parasympatholytics)	Classify anticholinergic drugs (Parasympatholytics/Cholinoceptor -blocking drugs).
		Describe belladonna alkaloids with reference to their natural sources.
		Describe the pharmacokinetics of antimuscarinic drugs with emphasis on metabolism and duration of action
		Describe the mechanism of action of antimuscarinic drugs.
		Describe the organ system effects of antimuscarinic drugs with special reference to their effects on receptors.
		Describe the clinical uses of antimuscarinic drugs.
		Describe the drug treatment of organophosphate poisoning.
		Enlist cholinesterase regenerating compounds.
		Describe "aging" of the phosphorylated enzyme complex and its clinical importance regarding the management of organophosphate poisoning.
		Describe the drug treatment of mushroom poisoning.
		Describe the adverse effects of antimuscarinic drugs.
		Describe atropine fever.
		Name the antidote for atropine poisoning.
		Describe the contraindications of antimuscarinic drugs.
	Ganglion-blocking drugs	Enlist major ganglion-blocking drugs.
		Describe the mechanism of action of ganglion-blocking drugs.
		Describe the organ system effects of ganglion-blocking drugs.
		Enlist the clinical uses of ganglion- blocking drugs.
		Enlist the adverse effects of ganglion-blocking drugs.

FORENSIC MEDICINE		
	Poison & related laws	Define a poison
		Describe laws related to poisoning or drug use.
	Legal duties of a Registered Medical Practitioner in a case of poisoning	Explain legal, ethical, and moral duties of Registered Medical Practitioner in a case of poisoning.
	Fate of Poison	Enumerate different routes of administration of poisons.
		Describe Biotransformation.
		Enlist the route of excretion of Poisons
	Diagnosis of poisoning in living and dead	Describe the protocols of diagnosing poisoning in living and dead
	Antidotes	Define and classify antidotes
		Describe the mechanism of action of different antidotes
	Steps of management in a case of poisoning	Describe general steps of management in a case of poisoning
	Organophosphate group	Describe the mechanism of action of commonly used organophosphate poisons.
		Describe the characteristics finding for organophosphate group in postmortem examination.
		describe different signs and symptoms for organophosphate group.
		Describe the medico-legal importance for organophosphate group.
		Explain fatal dose, fatal period, and treatment for organophosphate poisons.
COMMUNITY MEDICINE		
	Smoking	Describe the global distribution and increase of smoking
		Discuss the causes of smoking
		Discuss the effects of smoking on Health
		Describe preventive and control Measures
	International Health	Describe International health regulations and their importance
		Describe preventive measures for travelers visiting disease endemic areas

	Role of international health agencies in public health	Enumerate international health agencies working in health sector
		Discuss structure and function of WHO & UNICEF
		Explain the roles of WHO & UNICEF in Pakistan
PRIME/ RESEARCH		
	Research Ethics	Define ethics in research
		Discuss importance of research Ethics
		Discuss principles of ethics
		Describe the theories of ethics
		Discuss research misconduct
	Referencing	Differentiate between references, citation & bibliography
		List different styles of referencing
		Select appropriate referencing style for a research project
Theme-2: (Palpitation, fainting and death)		
S.No	**Topic**	**Learning Outcomes**
PHARMACOLOGY		
	Sympathomimetic drugs	Classify sympathomimetic drugs according to the spectrum of adrenoceptors they affect and on the basis of their mode of action (directly-acting and indirectly-acting).
		Define Catecholamines with examples.
		Describe the pharmacokinetics of sympathomimetic drugs with emphasis on their metabolism.
		Describe the mechanism of action of sympathomimetics.
		Describe the organ system effects of sympathomimetics with special reference to their effects on receptors.
		Compare the effects of Adrenaline, Noradrenaline, Phenylephrine and Isoprenaline on heart rate and blood pressure.
		Describe the clinical uses of sympathomimetics.
		Describe the drug treatment of Anaphylactic shock.
		Describe the dose-dependent effects of Dopamine and its

		clinical importance.
		Describe the sympathomimetic drugs used in the management of glaucoma.
		Describe the role of mannitol and acetazolamide in the treatment of Glaucoma
		Describe the adverse effects of sympathomimetics.
		Describe hypertensive cheese Reaction
		Enlist the foods with high Tyramine content.
		Describe the drug interactions of sympathomimetics with Monoamine oxidase inhibiting drugs.
		Describe the treatment of accidental overdose of adrenaline.
	Sympatholytic drugs (Adrenoceptor antagonists)	Classify sympatholytic drugs (adrenoceptor antagonists) on the basis of spectrum of adrenoceptors they affect.
		Name the prototype α-blocker.
		Name the α-blocker having more specificity for prostate muscle.
		Describe the mechanism of action of α-blockers.
		Describe the organ system effects of α-blockers with special reference to their effects on receptors.
		Describe the phenomenon of epinephrine reversal.
		Describe the clinical uses of α- blockers.
		Describe the adverse effects of α- blockers.
		Name the prototype β-blocker.
		Enlist the β-blockers with intrinsic sympathomimetic activity (partial agonist activity).
		Enlist the β-blockers with membrane stabilizing activity (Na channel-blocking activity).
		Enlist the β-blockers which have proved to be inverse agonists.
		Enlist the β-blockers which are relatively safe in chronic stable heart failure.
		Enlist the β-blockers which are relatively safe in asthmatic patients.
		Describe the pharmacokinetics of propranolol.
		Describe the mechanism of action of β-blockers.
		Describe the organ system effects of β-blockers with special reference to their effects on receptors.
		Describe the clinical uses of β- blockers.
		Describe β-blockers used in the management of glaucoma.

		Describe stage fright and name the β-blocker used for its management.
		Describe the adverse effects of β- blockers.
		Name the antidote for β-blockers' toxicity.
		Enlist the contraindications of β- blockers.
		Describe the limitations of beta- blockers in patients with Diabetes Mellitus, Hyperlipidemias, Bronchial Asthma and peripheral arterial disease.
		Enlist mixed adrenoceptor antagonists (Labetalol and Carvedilol).
		Describe the clinical uses of mixed adrenoceptor antagonists.
FORENSIC MEDICINE		
	Thanatology/Death	Describe death.
		Describe phases of death.
		Define brain death.
		Describe the criteria of brain death.
		Describe the role of EEG/ECG in death.
		Explain apparent death.
		Describe human tissue act.
		Describe medicolegal importance of death.
	Postmortem changes	Define Post Mortem changes.
		Classify Post-mortem changes.
		Describe immediate, early and late changes of post-mortem.
		Describe Post-mortem lividity.
		Describe the steps to report changes due to post-mortem Lividity
	Rigor mortis	Define Rigor Mortis.
		Describe the mechanism of formation of Rigor mortis
		Describe the special features of Rigor Mortis.
		Describe time consumed to develop Rigor mortis.
		Describe chemical basis of Rigor Mortis.
		Describe factors affecting Rigor Mortis.
		Describe the conditions that simulate Rigor Mortis.
		Describe procedure of its confirmation.
		Describe medico legal importance of Rigor Mortis.
	Cooling of dead body	Define Algor Mortis?

	(Algor Mortis)	
		Describe different methods of recording the temperature of dead body.
		Describe the PM body cooling curve?
		Describe the formula/calculation used for time since death.
	Late P.M. changes & putrefaction	Define putrefaction?
		Describe the process of Putrefaction
		Describe stages of putrefaction.
		Describe order of progression in putrefaction.
		Describe factors affecting Putrefaction.
		Describe Casper dictum.
		Describe medicolegal importance of putrefaction.
	Maceration	Define maceration.
		Describe features of maceration.
		Discuss differentiation point for maceration
		Discuss medicolegal importance of maceration.
	Adipocere formation (Saponification)	Define Adipocere formation.
		Describe features of Adipocere formation.
		Discuss medicolegal importance of Adipocere formation.
	Mummification	Define Mummification.
		Describe features of Mummification.
		Discuss medicolegal importance of Mummification.
	Introduction to autopsy	Define Autopsy.
		Describe the modified continental system and compare it with other medicolegal systems in the world.
		Classify types of Autopsy.
		Describe the role of Autopsy in Criminal offences.
		Describe section 174 and 176 of the Criminal Procedure Code (CrPC), 1973
	Modern autopsy suite	Describe the components of modern autopsy suite
		Describe the precautions taken while working in modern autopsy suites
		Explain the hazards encountered in modern autopsy suites
	Autopsy Protocol	Describe pre-examination in Autopsy.

		Describe the protocol of examination of clothes, and external examination in autopsy.
		Classify and describe different autopsy incisions.
		Describe internal examination in an autopsy.
		Describe the procedure to collect different autopsy samples.
		Describe the chain of custody.
		Describe the steps of writing an autopsy report
		Describe autopsy procedure for death due to heat and cold.
	Exhumation	Define exhumation.
		Describe authorisation of autopsy surgeon for exhumation.
		Describe protocol of exhumation.
		Describe time limit for exhumation.
		Describe the precautions for exhumations.
		Describe the procedure to collect samples.
		Describe the limitations of exhumations.
		Describe the scope of exhumation.
	Skeletonized body	Describe the steps of examination of a skeletonized body to assess its race, age, sex and stature
		Describe the protocol for autopsy of a skeletonized body
		Describe cause of death in such cases.
		Describe nature of injury and type of weapon used in such cases.
		Describe time since death in such cases.
	Negative autopsy	Define negative autopsy.
		Describe causes of the negative autopsy.
		Describe concealed trauma.
	Autopsy artifacts and hazards	Describe autopsy artefacts.
		Describe the importance of forensic artefacts.
		Describe effect of artefacts on the opinion of post-mortem report.
	Infanticide	Describe infanticide and its related law.
		Describe the Age of viability and its medico legal significance.
		Describe the concept of live birth and separate existence.
		Describe the Hydrostatic test and its importance.
		Explain Cause of death, i.e. acts of commission and acts

		of omission
		Describe sudden infant death syndrome (SIDS)
	Autopsy of an infected body	Describe the protocols for autopsy of the infected dead body.
		Describe the precautions required for autopsy of an infected person.
		Enlist the diseases transferred from during autopsy infected dead body
	Autopsy of fragmentary remains	Describe autopsy of a fragmentary remains and mutilated body.
		Discuss the protocols adopted for autopsy of fragmentary remains
		Describe the samples needed for autopsy of fragmentary remains.
	Embalming	Define Embalming.
		Enlist the chemical used for Embalming.
		Describe the procedure for Embalming.
		Describe the used of Embalming.
COMMUNITY MEDICINE		
	Child labor and Child Abuse	Define child labor
		Describe different types of child labor and its effects
		Describe statistics of child labor
		Describe governments` actions against child labor
		Define IPEC 2011 (international program on elimination of child Labor
		Define child abuse
		Describe different forms of child abuse and its effects
		Describe statistics of child abuse
		Describe the preventive strategies regarding child abuse

Theme-3: (Heredity and Cancers)

S.No	Topic	Learning Outcomes
PATHOLOGY		
	Genetics	Define the term mutation, hereditary, congenital, genotype, phenotype, codon, Mendelian Disorder
	Mutations	Describe various types of mutations

		Describe trinucleotide-repeat Mutations
		Enlist few examples of trinucleotide-Repeat Disorders
		Describe mutations in mitochondrial genes
	Transmission pattern of single Gene disorders	Enumerate transmission patterns of single gene disorders
		Describe biochemical and molecular basis of Autosomal Dominant Disorders
		Enlist few examples of Autosomal Dominant Disorders
		Describe biochemical and molecular basis of Autosomal Recessive disorder
		Enlist few Examples of Autosomal Recessive Disorders
		Describe mechanism of transmission of X-Linked disorders
		Enumerate examples of X-Linked Disorders
	Biochemical and molecular basis of single gene disorders	Discuss enzyme defects and their consequences
		Describe defects in receptors and transport system
		Describe alterations in structure, functions or quantity of non- enzyme proteins
		Describe genetically determined adverse reactions to drugs
	Complex multigeneic disorders	Describe multigeneic disorders with Examples
	Cytogenetic Disorders involving Autosomes	Discuss Trisomy 21 and its molecular basis
		Describe diagnostic clinical features of Trisomy 21
	Molecular genetic diagnosis	Describe the basic principles of various molecular techniques including PCR, FISH and Southern/Western blotting
		Enumerate indications of these techniques.
	Introduction to Neoplasia	Define the terms: neoplasia, neoplasm, oncology, tumor, benign tumor, malignant tumor, anaplasia, metaplasia, differentiation and dysplasia.
	Nomenclature of Tumors	Describe the basic principle of nomenclature of tumors with respect to tissue of origin, benign and malignant nature

	Characteristics of Benign and Malignant Tumors	Describe characteristics of benign and malignant tumors
		Differentiate between benign and malignant tumors
		Describe characteristics of benign and malignant neoplasms in terms of differentiation, anaplasia, rate of growth, local invasion and Metastasis
	Epidemiology of Cancer	Describe the epidemiology of cancer with respect to overall incidence of cancer and various host factors (age and hereditary) that predisposes to cancer
		Discuss the epidemiology of cancer with respect to geographical and environmental factors that predispose to cancer
	Molecular Basis of Cancer	Describe the molecular/genetic basis of carcinogenesis
		Describe genetic lesions in cancer
		Define oncogene, proto-oncogene and Oncoproteins.
	Carcinogenesis	Enumerate carcinogens
		Describe the process of carcinogenesis
		Describe the hallmarks of cancer cells and process involved
		Describe the role of p53
	Types of Carcinogens	Discuss properties of chemical Carcinogens
		Describe direct and indirect chemical carcinogens and their mechanism of action
		Describe the mechanism of radiation carcinogenesis
		Enumerate viral and bacterial Carcinogens
		Describe mechanism of carcinogenesis by viral and microbial oncogenes
	Clinical Aspects of neoplasia	Define cachexia
		Describe the clinical features of neoplasia including effects of tumor on host cancer cachexia
		Describe the clinical significance of paraneoplastic syndromes
		Describe clinical syndromes with respect to its causal mechanism and major forms of underlying Cancer
	Diagnosis of Cancer	Describe morphologic, biochemical and molecular methods employed for diagnosis of cancer

	Pathways for tumor spread	Describe the pathways for spread of tumors like local invasion and metastasis
	Grading and Staging of tumors	Describe grading and staging of Tumors
	Tumor immunity	Discuss host defenses against Tumors
		Describe tumor antigens and anti- tumor effect mechanisms
		Describe tumor surveillance and Immune evasion by the tumors
PHARMACOLOGY		
	Anticancer drugs	Describe terms like cell cycle- specific drugs and cell cycle- nonspecific drugs.
		Describe the role of P-glycoprotein in relation to the development of resistance to cytotoxic drugs.
		Classify anticancer drugs.
		Describe general adverse effects of anticancer drugs.
		Describe the mechanism of action of alkylating agents.
		Describe the clinical uses and adverse effects of Busulfan and Cyclophosphamide.
		Describe the mechanism of action, clinical uses and adverse effects of Cisplatin.
		Describe in general the mechanism of action of antimetabolites.
		Describe the mechanism of action, clinical uses, adverse effects and contraindications of Methotrexate, Azathioprine, 6-Mercaptopurine and 5-Fluorouracil.
		Describe the drug interaction of Azathioprine and 6-Mercaptopurine with Allopurinol.
		Describe the natural source of plant alkaloids Vinblastine and Vincristine.
		Describe the mechanism of action, clinical uses and adverse effects of Vinblastine and Vincristine.
		Describe the mechanism of action, clinical uses and adverse effects of Doxorubicin, Daunorubicin, Dactinomycin and Bleomycin.
		Enlist the anticancer mechanism of action and uses of hormonal agents like Tamoxifen, Flutamide, Goserelin and Aminoglutethimide.
		Enlist the drugs of choice for ALL, AML, CLL, CML, Hodgkin's disease, Non-Hodgkin's

		lymphoma, Ca breast, Ca lung, Ca prostate and Ca stomach.
		Describe cancer treatment modalities (primary induction, adjuvant, neo-adjuvant and maintenance chemotherapy)
		Describe the antidotes of Methotrexate, Cyclophosphamide and Doxorubicin toxicity.
	Eicosanoids- Prostaglandins	Classify eicosanoids.
		Describe the mechanism of action of Prostaglandins.
		Describe the organ system effects of Prostaglandins.
		Describe the clinical uses of Prostaglandins.
		Describe the prostaglandins used in the management of glaucoma.
		Describe the pharmacologic effects of Thromboxane's2.
	Dermatologic preparations	Describe dermatologic formulations like creams, ointments, gels, lotions, pastes, powders, tinctures and wet dressings.
		Describe the choice of dermatologic formulation with reference to the nature of the lesion.
	Drug treatment of scabies	Enlist the drugs used for the treatment of Scabies
		Describe the method of application of Permethrin, Crotamiton and Benzyl benzoate for treating scabies.
	Drug treatment of Acne vulgaris	Enlist the drugs used for treating Acne (including antibiotics and hormonal agents).
		Describe the mechanism of action and adverse effects of Benzoyl peroxide, Tretinoin and Isotretinoin.
		Describe the teratogenicity of Isotretinoin.
	Drug treatment of Psoriasis	Enlist the drugs used for treating Psoriasis.
		Describe the teratogenicity of Acitretin.
	Herbal medications	Describe the terms like herbal medications, botanicals and nutritional supplements with special reference to drug regulatory factors.
		Describe the pharmacologic effects and intended uses of Garlic (Allium sativum).
		Describe the drug interactions of Garlic with Warfarin and Aspirin.
		Describe the possible medicinal use of Kalonji (Nigella sativa).
		Describe the pharmacologic effects and intended uses of Ginseng.
		Describe the drug interactions of Ginseng with antipsychotic and hypoglycemic medications.

		Describe the intended clinical uses of Coenzyme Q10.
		Describe the drug interactions of Coenzyme Q10 with Warfarin.
COMMUNITY MEDICINE		
	Cancers	Enlist the common cancers prevalent in Pakistan
		Describe the burden and epidemiology of common cancers prevalent globally and in Pakistan
		Describe the prevention and control of cancers
		Describe various governmental programs and strategies for the prevention of cancers
FAMILY MEDICINE		
	Cancer screening	Identify red-flags in patient which need referral for cancer screening
		Explain the psychosocial impact of disease on patient and their families
		Describe the indications, rationale and common diseases which require routine cancer screening
LAB WORK		
PATHOLOGY		
	Lipoma	Identify the morphological changes occurring in lipoma
	Squamous cell carcinoma	Identify morphological changes of squamous cell carcinoma
	Fibro adenoma	Enlist points of identification of gross and microscopic features of fibro adenoma of breast
	Karyotyping	Demonstrate preparation of Karyogram
		Identify gender on the basis of Karyogram
		Identify common numerical chromosomal abnormalities on Karyogram
PHARMACOLOGY		
	Introduction to experimental Pharmacology (experiments on isolated piece of rabbit's Ileum)	Differentiate between Qualitative and Quantitative experiments.
		Recognize various parts of Tissue Organ Bath and describe their functions.
		Describe the ingredients and their quantities required for preparing the Tyrode's Solution.
		Describe the technique of slaughtering of rabbit and removal of a piece of ileum.

		Describe the fixation of piece of ileum in the inner organ bath.
		Enumerate the causes of tissue death.
	Ceiling effect for Parasympathomimetic drug (Acetylcholine)	Demonstrate ceiling effect for Acetylcholine on the isolated piece of rabbit's ileum by adding proper doses of the drug into the inner organ bath.
		Interpret the recording of acetylcholine-induced ileal activity on the revolving drum.
		Demonstrate washing of the inner organ bath for the subsequent doses of Acetylcholine.
		Construct tables and graphs for inference of the results
	Antagonism between acetylcholine and atropine	Demonstrate surmountable antagonism between acetylcholine and atropine on piece of rabbit's ileum by adding proper doses of the drugs into the inner organ bath.
		Interpret the recording of acetylcholine- and Atropine-induced ileal activity on the revolving drum.
		Construct tables and graphs for inference of the results.
	Ceiling effect for Histamine	Demonstrate ceiling effect for Histamine on the isolated piece of rabbit's ileum by adding proper doses of the drug into the inner organ bath.
		Interpret the recording of Histamine -induced ileal activity on the revolving drum.
		Demonstrate washing of the inner organ bath for the subsequent doses of Histamine.
		Construct tables and graphs for inference of the results.
	Antagonism between Histamine and antihistamine	Demonstrate surmountable antagonism between Histamine and antihistamine on piece of rabbit's ileum by adding proper doses of the drugs into the inner organ bath.
		Interpret the recording of Histamine- and antihistamine-induced ileal activity on the revolving drum.
		Construct tables and graphs for inference of the results.
	To identify an unknown drug on rabbit's ileum with the help of two known antagonists	Demonstrate ceiling effect for the known agonist drug (Acetylcholine or Histamine) on the isolated piece of rabbit's ileum by adding proper doses of the drug into the inner organ bath.
		Demonstrate surmountable antagonism between the agonist drug and the unknown antagonists (Atropine and antihistamine) on piece of rabbit's ileum by adding proper doses of the drugs into the inner organ bath.
		Interpret the recording of drug- induced ileal activity on the revolving drum.

		Construct tables and graphs for inference of the results.
	Introduction to experimental Pharmacology (effects of drugs on rabbit's Eye)	Demonstrate measuring the pupil size.
		Demonstrate corneal reflex.
		Demonstrate light reflex.
	Effects of Parasympathomimetic drug (e.g., Pilocarpine) on rabbit's eye	Demonstrate the effect of Pilocarpine on the size of the pupil in the test eye in comparison with the control eye.
		Demonstrate the effect of Pilocarpine on the colour of the conjunctiva in the test eye in comparison with the control eye.
		Demonstrate the effect of Pilocarpine on the corneal reflex in the test eye in comparison with the control eye.
		Demonstrate the effect of Pilocarpine on the light reflex in the test eye in comparison with the control eye.
	Effects of Sympathomimetic drug (e.g., Ephedrine) on rabbit's eye	Demonstrate the effect of Ephedrine on the size of the pupil in the test eye in comparison with the control eye.
		Demonstrate the effect of Ephedrine on the colour of the conjunctiva in the test eye in comparison with the control eye.
		Demonstrate the effect of Ephedrine on the corneal reflex in the test eye in comparison with the control eye.
		Demonstrate the effect of Ephedrine on the light reflex in the test eye in comparison with the control eye.
	Effects of Parasympatholytic drug (e.g.,Tropicamide) on rabbit's eye	Demonstrate the effect of Tropicamide on the size of the pupil in the test eye in comparison with the control eye
		Demonstrate the effect of Tropicamide on the colour of the conjunctiva in the test eye in comparison with the control eye.
		Demonstrate the effect of Tropicamide on the corneal reflex in the test eye in comparison with the control eye.
		Demonstrate the effect of Tropicamide on the light reflex in the test eye in

		comparison with the control eye.
	Effects of Local anaesthetic (e.g., Proparacaine) on rabbit's eye	Describe the mechanism of action of Proparacaine regarding its effects on the eye.
		Demonstrate the effect of Proparacaine on the size of the pupil in the test eye in comparison with the control eye.
		Demonstrate the effect of Proparacaine on the colour of the conjunctiva in the test eye in comparison with the control eye.
		Demonstrate the effect of Proparacaine on the corneal reflex in the test eye in comparison with the control eye.
		Demonstrate the effect of Proparacaine on the light reflex in the test eye in comparison with the control eye.
	To identify an unknown drug on rabbit's eye	Demonstrate the effect of the unknown drug on the size of the pupil in the test eye in comparison with the control eye.
		Demonstrate the effect of the unknown drug on the colour of the conjunctiva in the test eye in comparison with the control eye.
		Demonstrate the effect of the unknown drug on the corneal reflex in the test eye in comparison with the control eye.
		Demonstrate the effect of the unknown drug on the light reflex in the test eye in comparison with the control eye.
		Interpret the results.
		Identify the unknown drug.
FORENSIC MEDICINE		
	Autopsy report	Construct a full autopsy report including all components after thorough examination.
	Toxicology Sample collection	Explain the procedures, organ needed, and preservation used in sample collection.
	Toxicology Report Analysis	interpret the toxicology report received and then incorporate it in final opinion.
	Thanatology	Identify and describe various models of post-mortem changes
	Stomach wash	Perform stomach wash on a manikin

3rd Year MBBS Block H: Blood and Immunology - II Module

S.No	Theme	Duration
1	Pallor and Fatigue	1 week
2	Fever	1 week
3	Bleeding	1 week

General Learning Objectives

By the end of Blood & Immunology II Module, 3rd year MBBS students will be able to:

Knowledge

1. Describe the pathophysiology and diagnosis of different types of anemia.
2. Explain the pathogenesis of different hematological malignancies.
3. Discuss the diagnostic approach to malignant hematological disorders.
4. Discuss the pathophysiology and diagnosis of bleeding disorders.
5. Explain the immune system of the body and its components.
6. Describe the mechanism of defense from infection.
7. Explain hypersensitivity and allergy.
8. Discuss the rationale for immunomodulation and its impact on improving the therapeutic dynamics of autoimmune disorders and malignancies.
9. Describe the drugs for treating various types of anemia.
10. Write prescription for the prevention and treatment of iron-deficiency anemia.
11. Describe the application of blood groups in Forensic work
12. Describe the examination of blood stains
13. Describe the medico legal importance of blood as trace evidence
14. Describe the EPI schedule of Pakistan and the basic principles of Immunization.
15. Describe the most prevalent anemia's that affect the population of Pakistan, and the risk factors for vulnerable population.
16. Describe the most prevalent blood borne infections that affect the population of Pakistan, and the appropriate preventive strategies including safe blood practice.

Skills:

Attitude:

Theme 1: Pallor and Fatigue		
S.No	**Topic**	**Learning Outcomes**
PHYSIOLOGY		
	Red blood cells	Discuss the steps of erythropoiesis with correlation to red cell indices and its clinical implications.
PATHOLOGY		
	Anemia	Discuss physiologic basis of anemia.
		Classify anemia's according to underlying Mechanism
	Blood loss	Describe the pathogenesis of blood loss Anemia
	Hereditary Spherocytosis	Discuss the pathogenesis of Hereditary Spherocytosis
		Describe morphological changes in peripheral Smear of HS patient
		Explain how will you diagnose a case of HS?
	Sickle cell Anemia	Discuss the morphology of RBCS in Sickle cell Anemia
		Describe the etiology and pathogenesis in SA
		Explain how will you diagnose a case of SA?
	Thalassemia	Describe Thalassemia
		Discuss the conditions contributing to the Pathogenesis of beta- thalassemia
		Explain the genetics of thalassemia
		Describe the morphological changes physically And on peripheral smear
		Explain how will you diagnose a case of alpha Or beta thalassemia?
	Glucose 6 phosphate dehydrogenase deficiency	Classify G6PD
		Discuss the pathogenesis of G6PD with Reference to oxidative injury of RBCS
		Describe the morphology of rbcs in G6PD Explain how will you diagnose a case of G6PD Deficiency
	Paroxysmal Nocturnal Hemoglobinuria	Describe the pathophysiology of Paroxysmal Nocturnal Hemoglobinuria
		Explain the diagnosis of a case of PNH?

	Immune Hemolytic Anemia	Classify immune hemolytic anemia's
		Discuss the etiological mechanism of warm and cold antibody immune anemia's hemolytic anemia
		Explain the diagnostic workup of immune hemolytic anemia
	Iron deficiency anemia	Discuss the pathophysiological mechanism of Iron deficiency anemia
		Describe the clinical course and morphological changes in IDA
		Explain laboratory investigations for the diagnosis of IDA
	Megaloblastic Anemia	Describe Megaloblastic Anemia
		Describe the pathogenesis of MA with respect to Vitamin B12 and Folic acid
		Discuss the morphological changes in RBCs, WBCs and platelets in MA
		Explain how will you diagnose the cause of MA
	Aplastic Anemia	Enumerate causes of Aplastic anemia
		Describe the pathophysiology of aplastic anemia Diagnose a case of aplastic anemia
	Polycythemia Vera	Discuss the pathophysiology of polycythemia vera
		Describe the clinical course and morphological features of Polycythemia vera Explain how will you diagnose a case of polycythemia vera
PHARMACOLOGY		
	Drug Used In Anemia	Classify the drugs used in anemia
		Describe pharmacokinetics of Iron
		Describe various oral and parenteral formulations of Iron
		Describe the adverse effects of iron therapy
		Describe the drug treatment of Iron toxicity
		Describe the various oral and parenteral preparations of cyanocobalamin (Vit B12)
		Describe the clinical use of cyanocobalamin (Vit: B12)
		Describe the clinical use of Folic acid
		Describe the pharmacological rationale of combining cyanocobalamin with folic acid and iron
		Describe the role of granulocyte colony stimulating factors (Filgrastim) and granulocyte monocyte colony stimulating factors in the treatment of leucopenia.
		Describe the role of thrombocyte colony stimulating factor (Oprelvekin) in the treatment of thrombocytopenia.
FORENSIC MEDICINE		
	Forensic evidence	Describe trace evidence
		Classify trace evidence.

		Describe Locard's exchange principle.
		Describe composition of blood and characteristics of different blood cells.
		Describe basic genetic principles related to blood groups and blood groups as hereditary factors.
	Blood Group Systems	Describe different blood groups systems. ▪ Grouping based on red cell antigens ▪ Grouping based on blood proteins ▪ Grouping based on enzymes ▪ Grouping based on white cell antigens. ▪ Describe different methods for blood group determination. ▪ Direct agglutination ▪ Ring test ▪ Gel diffusion ▪ Immune-electrophoresis ▪ Indirect agglutination
		Describe the application of blood in forensic work. (medico legal importance) ▪ Inheritance claims ▪ Rh hazards ▪ Transfusion errors and adverse reactions ▪ DNA profiling ▪ Disputed paternity and maternity
COMMUNITY MEDICINE		
	Epidemiology of nutritional anemias	Classify nutritional anemias
		Describe the population at risk of nutritional anemia in Pakistan.
		Explain effective public health strategies for prevention of nutritional anemias in in Pakistan
		Describe risk factors for different nutritional anemia's.
		Describe effective public health strategies for prevention of different types of anemia's in Pakistan
PAEDIATRICS		
	Thalassemia	Describe Classification, Laboratory Investigation and management of Thalassemia
MEDICINE		
	Sickle Cell Anemia	Discuss the pathophysiology, investigations and management of Sickle Cell Anemia.

Theme 2: Fever

S.No	Topic	Learning Outcomes
PHYSIOLOGY		

	White blood cells	Classify the different types of white blood cells, Polymorph's, Lymphocytes and Plasma cells and their disorders.
PATHOLOGY		
	Acute myelogenous leukemia	Classify acute myelogenousleukemias according to FAB.
		Discuss the pathophysiology of AML.
		Describe the morphological features of AML.
		Explain how will you proceed for diagnosis of AML?
	Chronic myelogenous leukemia	Discuss the pathophysiology of CML.
		Describe the peripheral blood findings in CML
		Explain how will you proceed for diagnosis of CML?
	Myelodysplastic syndrome (mds)	Enlist types of MDS.
		Discuss causes, pathogenesis and Morphology.
		Interpret blood and bone marrow changes in patient with MDS.
		Discuss symptoms and diagnostic strategies for patient with MDS.
	Lymphoid neoplasms	Enumerate Lymphoid neoplasm
		Classify lymphoid neoplasms according to WHO classification.
	Acute lymphocytic leukemia	Discuss the pathophysiology of Acute lymphocytic leukemia
		Discuss the morphological features of ALL
		Explain how will you diagnose a case of ALL?
	Chronic lymphocytic leukemia	Discuss the pathophysiology of Chronic lymphocytic leukemia
		Describe the distinguishing morphological features of CLL
		Explain the diagnostic workup for a case of CLL
	Plasma cell disorder	Describe the pathogenesis of multiple myeloma
		Describe the molecular genetics involved in multiple myeloma
	Hodgekin' s lymphoma	Discuss the type of multiple myeloma
		Enlist the clinical features
		Classify Hodgkin's lymphoma
		Discuss the etiology and pathogenesis of Hodgkin's lymphoma
		Describe the morphological changes and clinical course of the disease in Hodgkin's Lymphoma
	Non-hodgekin' s	Enlist Non-Hodgkin's lymphoma

	lymphoma	
		Describe the basic pathologic classification of NHL (the WHO classification).
		Describe the predisposing factors to developing NHL, including infectious agents associated with development of specific lymphomas.
		Describe the morphologic features of lymph nodes involved in Non-Hodgkin Lymphoma
		Enlist the lab investigations required for diagnosis of NHL
	Immunity	Describe the functions and types of immunity.
		Enlist the three lines of defenses and outline their properties
		Describe the characteristics, origin and functions of cells of immune system
		Compare innate and acquired immunity
		Compare the mechanism of active and passive immunity
	Humeral immunity	Describe the role of T and B lymphocytes in immunity
		Describe the role of B lymphocytes in humeral immunity
		Describe humeral immunity
		Explain how helper T cells regulate the immune system
		Differentiate between humeral and cell mediated immunity
	Cell mediated immunity	Explain the Specificity of immune response
		Describe cell mediated components of Cell mediated immunity (CMI),
		Explain types of cells in CMI system
		Describe T-cell activation and diversity
		Illustrate Schematic representation of T cell activation and diversity
		Differentiate between Primary and secondary immune response
	Antibodies	Describe antigen and antibodies.
		Differentiate B/W Monoclonal and polyclonal antibodies.
		Classify immunoglobulin
		Illustrate structure (diagram) of immunoglobulin A.
		Describe important functions of immunoglobulin
		Explain How antibodies neutralize toxins, microbes and viruses
		Illustrate class switching of immunoglobulin
		Explain transfer of immunity from mother to fetus and from mother to infant during breast-feeding
	Allergy & hypersensitivity	Describe the pathophysiology of allergy and hypersensitivity with examples
		Compare immediate and delayed hypersensitivity reactions
		Enlist the diseases associated with hypersensitivity reactions
	Immune tolerance	Describe Immunotolerance.
		Describe Immunological unresponsiveness of the body

		especially to self-antigens.
		Explain the role of immune system in protecting the human body.
		Distinguishing between types of immunotolerance
		Explain the mechanism of graft rejection and graft vs host disease.
	Autoimmune diseases	Describe Autoimmunity.
		Discuss Pathogenesis of Autoimmune diseases.
		Explain the factors leading to Autoimmune Diseases.
	Immunodeficiency diseases	Describe immunodeficiency
		Differentiate between Autoimmune and immunodeficiency diseases.
		Classify Congenital and acquired Immunodeficiency diseases.
		Describe the pathogenesis of HIV.
	Complement	Describe complement.
		Describe components of the Complement System
		Describe the synthesis of complements
		Describe pathways of activation and inactivation of complement
		Describe important functions of each component of complement system
		Describe the diseases associated with deficiency of the complement proteins
PHARMACOLOGY		
	Immune modulator drugs	Classify immunomodulating drugs
		Describe the role of corticosteroids as immunosuppressant agents.
		Describe mechanism of action of immunophilin ligands.
		Describe clinical uses and adverse effects of immunophilin ligands.
		Describe mechanism of action of enzyme inhibitors.
		Describe clinical uses and adverse effects of enzyme inhibitors.
		Describe mechanism of action of cytotoxic agents as immunosuppressant
		Describe clinical uses and adverse effects of cytotoxic agents
		Describe mechanism of action of immunosuppressive antibodies used as immunosuppressant
		Describe clinical uses and adverse effects of immunosuppressive antibodies
		Describe mechanism of action of monoclonal antibodies
		Describe clinical uses and adverse effects of monoclonal

		antibodies
		Describe mechanism of action of immunostimulant drugs
		Describe clinical uses and adverse effects of immunostimulant drugs
		Describe the advantages and disadvantages of various combinations of Immunomodulating drugs
		Describe Forensic Lab Systems
PRIME/RESEARCH		
	Academic writing and plagiarism	Emphasize the role of academic writing in research
		Explain the role of "Grammarly" for use in academic writing
		Define plagiarism
		Enlist plagiarism detection software
FORENSIC MEDICINE		
	Forensic Lab Procedures	Describe Forensic Lab Procedures · Forensic histopathology · Naked eye examination · Histological examination · Forensic histochemistry · Steam distillation · Micro-diffusion analysis · Stas-Otto method · Colour reaction method · Chromatography · Spectroscopy · Electrophoresis · Radio-activation technique
		Detection of insecticide compounds
COMMUNITY MEDICINE		
	Immunization	Define immunity
		Explain the types of immunity
		Discuss immunizing agents
		Explain the hazards of immunization
		Explain the cold chain in the context of immunization
	Vaccination	Explain the importance of vaccination in the control of infectious diseases
		Describe the basic principles of vaccination
		List the main types of vaccine and illustrate them with examples
		Describe vaccines that are associated with adverse reactions
		Explain the difference between live attenuated and inactivated vaccines
		Describe the role of vaccines in preventing disease.
		Differentiate between vaccination and immunization
		Describe the strategies used from community medicine's perspective to promote vaccination in communities. (EPI)

		Explain various programs of vaccination in Pakistan with particular reference to EPI.
		Describe the factors responsible for success and failure of vaccination programs in Pakistan.
	Epidemiology of blood borne diseases/infections	List the important blood borne diseases in Pakistan as prioritized by the National Institute of health (NIH)
		Discuss the global burden of blood borne diseases & compare with Pakistan
		Describe important blood borne pathogens
		Explain the evidence based public health practices to reduce transmission of blood borne infectious disease
		Explain the evidence based best practices and procedures for safe blood transfusion and prevention of needle stick injury
MEDICINE		
	Myeloproliferative Disorders (MPN)	Classify myeloproliferative neoplasms.
		Discuss the investigations & management steps of CML.

Theme 3: Bleeding

S.No	Topic	Learning Outcomes
PHYSIOLOGY		
	Platelets	Enumerate the causes of thrombocytopenia.
		Explain the intrinsic and extrinsic pathways of Coagulation
PATHOLOGY		
	Thrombocytopenia & von willebrand disease	Enlist causes of Thrombocytopenia
		Describe the pathogenesis of immune thrombocytopenic purpura
		List thrombotic microangiopathies
		Explain the diagnostic plan for ITP
		Classify VWD
		Enlist investigations required for diagnosis of VWD
	Hemophilia	Discuss the pathogenesis of hemophilia A and B
		Describe the clinical course of the disease.
		Enlist the laboratory investigation for diagnosing a case of hemophilia
	Disseminated intravascular coagulopathy	Enlist major disorders associated with DIS
		Discuss the pathophysiology of DIC
		Explain the morphological changes in DIC
		Explain how will you diagnose DIC?
	Transfusion medicine	Describe various blood component preparation
		Identify indications for different blood components
		Describe transfusion reactions associated with blood

		transfusion
PHARMACOLOGY		
	Anti-plasmin (antifibrinolytic) drugs	Describe mechanism of action of Anti- plasmin (antifibrinolytic) drugs
		Describe clinical uses and adverse effects of Anti-plasmin (antifibrinolytic) drugs
	Drug treatment of Haemophilia	Describe the drug treatment for various types of Haemophilia
		Describe the role of Desmopressin in the treatment of haemophilia
FORENSIC MEDICINE		
	Blood stains	Describe examination of blood stains. · Physical examination · Chemical examination · Physicochemical examination · Micro chemical examination · Spectroscopic examination · Immunological and enzymological methods for species determination
		Describe the medico legal importance of blood stains.
	Collection And Preservation Of Biological Material	Describe the collection and preservation of biological material · Blood · Swabs and smears · Saliva . Semen
MEDICINE		
	Platelets (itp)	Describe Clinical features, investigations and management of a patient with Immune Thrombocytopenia (ITP).
PRIME/MEDICAL EDUCATION		
	Principles of medical ethics	Explain the pillars of medical ethics
		Explain the privacy and confidentiality of the patients and its medico-legal and cultural aspects
	Confidentiality	Exhibit Confidentiality of colleagues and patients
		Appropriately use of social media
LAB WORK		
S.No	Topic	Learning Outcomes
PATHOLOGY		
	Normal complete Blood	Differentiate between a normal blood cells of different

	count	lineages
	ABNORMAL PERIPHERAL SMEAR IN DIFFERENT ANEMIAS	Differentiate between a normal and an abnormal RBC
		Identify different shapes of RBCs.
		Identify the common types of Anemia on the basis of RBC morphology
PHARMACOLOGY		
	Iron- deficiency anemia	Write prescription for a patient at risk of developing iron-deficiency anemia
		Write Chart order for treating an in-door patient with iron-deficiency anemia
FIELD VISIT		
	Visit to blood bank of a tertiary care hospital	Explain safe blood transfusion practices
		List the common pathogens that cause blood borne infections which may be acquired from unsafe blood transfusion practices.
		List the most common transfusion reactions seen in a blood bank in a local teaching hospital in Pakistan
		Communicate with health care staff effectively
		Describe the standard operating procedures (SOP's) of blood transfusion
PATHOLOGY		
	Normal white cell smear	Describe causes of leukocytosis
		Differentiate different types of white blood cells under microscope
FORENSIC MEDICINE		
	Microscopic examinatio n of animal and human blood	Perform Microscopic examination of animal and human blood.
	Examinatio n of blood stains under ultraviolet light	Perform examination of blood stains under ultraviolet light.
	Different pattern of stains	Identify different pattern of stains.
FIELD VISIT		
	Visit to basic health care unit EPI Center	Observe administration of different vaccines as part of Expanded Program of immunization
		(EPI) schedule of Pakistan at the vaccination center.
		List and explain the route of administration and mechanism of storage and maintenance of cold chain of each vaccine in the EPI schedule (support with images where possible)

		List the different components of each vaccine in the EPI schedule including the adjuvants, preservatives and explain their relevance to the vaccine.
		Differentiate between live attenuated vaccines, conjugate vaccines, subunit vaccines, and toxoid vaccines in the EPI schedule and their mode of action
		Identify the contraindications for vaccination that may present an additional risk
		Describe the organ gram of EPI center
		Explain the role of EPI center.
		Observe the process of vaccination on a case.
PATHOLOGY		
	Coagulation tests	Interpret Prothrombin time and activated partial thromboplastin time
		Interpret bleeding time and clotting time

3rd Year MBBS Block H: MSK II Module

S.NO	Themes	Duration
1	Aching Bones	2 week (1st& 2nd Week)
2	Joint Stiffness	1 week (3rd Week)
3	Muscle weakness and Trauma	1 week (4th Week)
4	Skin Rash and Itching	1 week (5th Week)

General Learning Objectives

At the end of this module, students will be able to

Knowledge

Reinforcement

- Explain important anatomical and physiological characteristics of musculoskeletal system

Pathology

- Explain essential pathological concepts of diseases involving
  - Joints

- Bones
- Muscles
- Cartilages
- Soft tissues
- Skin

Pharmacology

- Describe the clinical applications of NSAIDs in the treatment of musculoskeletal disorders
- Describe the basic and clinical pharmacology of drugs affecting bone and Mineral Homeostasis
- Describe the basic and clinical pharmacology of drugs used to treat Gout and Rheumatoid Arthritis
- Describe the basic and clinical pharmacology of skeletal muscles relaxants
- Describe the drugs used for dermatological disorders.

Community medicine

- Classify accidents and injuries, burden of RTAs, prevention and control strategies of RTAs
- Define poliomyelitis and discuss the epidemiology, prevention, and control of poliomyelitis
- Define Ergonomics, Principles of Ergonomics, Epidemiology of MSK disorders and their prevention
- Discuss burden and prevention of Osteoporosis, Osteomalacia and Rickets

Forensic medicine

- Define and classify wounds
- Describe types of hurt according to Qisas and Diyat Act
- Describe firearm and explosives injuries
- Describe RTAs, Railway and Aircraft injuries
- Describe the Medico legal aspects of wounds

Medicine

- Describe Osteoporosis and Osteomalacia and develop its management plan
- Discuss Rheumatoid Arthritis and Ankylosing Spondylitis • Discuss Myopathies

Orthopedic

- Describe types of fracture and explain the open fractures
- Explain the emergency treatment of an injured limb.
- Identify and describe common benign and malignant bone tumours.
- Describe common ligamentous, tendon injuries and common spinal fractures

Dermatology

- Describe the pathological lesions of skin and their clinical presentation with differential diagnosis.

Radiology

- Interpret normal X-Rays and X-Rays showing structural deformities

Paediatrics

- Explain bone pains and aches in children

- Discuss Congenital/Hereditary Myopathies

Eye

- Describe the basic Anatomy of Eye

ENT

- Discuss anatomy of Ear, Nose, Para nasal Sinuses and Oral Cavity

Prime:

Communication Skills

- Dealing with patients

Behavioral Sciences / Professionalism

- Attributes of Professionalism

Research

- Study Designs
- Research question **Skills:**

Special Pathology

- Identify morphological features of Basal cell carcinoma and Squamous cell carcinoma
- Identify morphological features of Tuberculous osteomyelitis

Pharmacology

- Writing a prescription for a patient with Rheumatoid arthritis
- Writing a prescription for a patient with Gout

Forensic Medicine

- Identify types of mechanical wound
- Identify the causative weapon
- Identify the manner of wound causation
- Issue a medico legal certificate for the given wound

Orthopedic/Medicine

- Acquire a thorough history in relevance to MSK and take focused general examination of musculoskeletal system.
- Identify, evaluate and interpret the X-ray to diagnose fractures/musculoskeletal conditions
- Discuss the radiological characteristics of fractures and radiological characteristics of dislocations

Attitude:

While not necessarily taught explicitly, students are expected to develop following attitudes throughout the course:

1. Demonstrate teamwork, leadership, punctuality and good manners
2. Demonstrate humbleness and use socially acceptable language during academic and social interactions with colleagues and teachers.

3. Make ethically competent decisions when confronted with an ethical, social or moral problem related to MSK in professional or personal life
4. Discuss ethical issues, social and preventive aspect of health care in the context of MSK system.

3rd Year MBBS Block H: MSK II Module **Theme I: Aching Bones**		
S.No	**Topic**	**Learning Outcomes**
ANATOMY		
	Important Anatomical Characteristics of MSK	Discuss important anatomical characteristics of musculoskeletal system
PHYSIOLOGY		
	Important Physiological Characteristics of MSK	Discuss important Physiological characteristics of musculoskeletal system
PATHOLOGY		
	Metabolic diseases of bone	Describe the following metabolic diseases of bone from pathological point of view: • Osteopenia and Osteoporosis • Paget Disease (Osteitis Deformans) • Osteomalacia and Rickets
	Fracture and Osteonecrosis	Classify fractures and describe healing process in fractures
		Enlist aetiologies of osteonecrosis (Avascular Necrosis)
		Describe clinical features and morphological findings in osteonecrosis
	Osteomyelitis	Classify osteomyelitis and delineate its etiology, pathogenesis, common clinical features, morphological findings, and complications related to osteomyelitis
	Bone Tumors	Classify bone tumors
		Describe the frequency of different bone tumors in general population
		Enlist common clinical features found in common types of bone tumors.
		Enlist key morphological features of Osteosarcoma, Osteoid osteoma and Osteoblastoma
	Cartilage-Forming Tumors	Discuss the frequency of different cartilaginous tumors in general population
		Enlist common clinical features of common cartilaginous tumors

	Tumors of Unknown Origin	Describe etiology, pathogenesis, and key clinico-morphological features of Ewing's Sarcoma and Giant Cell Tumor
	Lesions Simulating Primary Neoplasms	Describe key clinico-morphological features and essential points in the pathogenesis of Fibroma
PHARMACOLOGY		
	NSAIDs	Describe the clinical applications of NSAIDs in the treatment of musculoskeletal disorders
	Drug affecting Bone & Mineral Homeostasis	Classify drugs used in metabolic bone disorders
		Enlist calcium preparations
		Describe clinical uses of calcium salts
		Enlist vitamin D preparations
		Describe actions of vitamin D on intestine, Kidney and Bone
		Describe clinical uses of vitamin D
		Describe the mechanism of action, clinical uses and adverse effects of Bisphosphonates
		Describe the mechanism of action, clinical uses and adverse effects of calcitonin
		Classify drugs used to treat osteoporosis
		Explain the mechanism of action of SERM (Raloxifene) and RANK ligand (Denosumab)
FORENSIC MEDICINE		
	Mechanism of production of wound	Define and classify wound
		Describe mechanism of action of wound production associated factors, appearance and complications.
	Abrasion	Define and classify abrasion
		Explain types of abrasion and mechanism of wound production associated factors, appearance, and complication.
		Differentiate between antemortem & postmortem abrasion.
		Describe the medico legal aspects of abrasion
	Bruise	Define and classify bruise

		Describe types of bruise and mechanism of wound production associated factors, appearance, and complication.
		Differentiate between ante mortem & postmortem Bruise.
		Describe the medico legal aspects of Bruise
	Lacerated wound	Define and Classify lacerated wound
		Describe types of lacerated wound and Mechanism of wound production associated factors, appearance and complication.
		Difference between ante mortem & postmortem Laceration.
		Describe the medico legal aspects of Lacerated wound
	Incised Wound	Define and classify incised wound
		Describe types of incised wound and mechanism of wound production associated factors, appearance, and complication.
		Difference between ante mortem & postmortem Incised Wound
		Differentiate between incised & lacerated wound.
		Describe the medico legal aspects of Incised wound
	Stab wounds	Define and classify Stab wound
		Describe types of Stab wound and mechanism of wound production associated factors, appearance, and complication.
		Difference between ante mortem & postmortem stab wound
		Describe the medico legal aspects of stab wound
	Battered baby syndrome	Explain the salient features of diagnosing Battered baby syndrome
COMMUNITY MEDICINE		
	Ergonomics	Describe Ergonomics
		Describe the principles & importance of Ergonomics at work place
		Explain the epidemiology of musculoskeletal disorders
		Discuss prevention and control strategies for Musculoskeletal disorders
	Public health aspects of disability limitations: (Osteoporosis, Osteomalacia and Rickets)	• Explain the types of rehabilitation and public health issues faced by the disabled person, and measures to be taken for rehabilitation • Discuss epidemiology and prevention of Osteoporosis,

		Osteomalacia and Rickets
MEDICINE		
	Osteoporosis and Osteomalacia	Describe Osteoporosis and Osteomalacia
		List common causes and risk factors of Osteoporosis and Osteomalacia
		Discuss clinical features , differential diagnosis of Osteoporosis and Osteomalacia
		Enlist the Investigations for patient presenting with Osteoporosis and Osteomalacia
ORTHOPEDICS		
	Fractures	Describe and illustrate types of fracture, fracture patterns, displacement and angulation of fractures in children and adults.
		Explain open fractures Discuss the basic principles of wound debridement.
	Bone Tumours	To recognize, investigate and describe the radiological features of common benign and malignant Bone Tumours.
RADIOLOGY		
	X-Ray Interpretation	Identify and interpret different types of fractures
EYE		
	Anatomy of Eye	Describe anatomy of Orbit
		Describe anatomy of Eye Ball
ENT		
	Ear	Explain anatomy of ear
PAEDIATRICS		
	Bone pains and aches in children	Common causes of bones aches and pains including Growing pains in children
		Discuss nutritional Rickets causation, clinical presentation, Lab and Radiological findings and prevention
	Skeletal dysplasia's	Discuss clinical feature and differential diagnosis of the following • Achondroplasia • Osteopetrosis • Osteogenesis Imperfecta
PRIME/RESEARCH		
	Proposal writing	Write a proposal for research project using KMU or CPSP guidelines or any other standard guidelines
PRIME/MEDICAL EDUCATION		
	Attributes of professionalism-Empathy	Discriminate empathy and sympathy

		Demonstrate empathy in patient health professional interaction

Theme II: Joint Stiffness		
S.No	**Topic**	**Learning Outcomes**
PATHOLOGY		
	Osteoarthritis	Describe aetiology and pathogenesis of osteoarthritis
		Discuss clinical and morphological features of osteoarthritis
		Enumerate complications of osteoarthritis
	Rheumatoid Arthritis	Describe aetiology and pathogenesis of Rheumatoid Arthritis
		Discuss clinical and morphological features of Rheumatoid Arthritis
		Enumerate complications of Rheumatoid Arthritis
	Seronegative Spondyloarthropathies	Classify and explain Spondyloarthropathies
		Discuss pathogenesis and clinical features of Ankylosing Spondylitis
		Discuss pathogenesis and clinical features of Reactive Arthritis
		Discuss pathogenesis and clinical features of Psoriatic Arthritis
	Infectious Arthritis	Describe etiology and pathogenesis of Suppurative Arthritis
		Discuss clinical featuresand morphological features of Suppurative arthritis.
		Enumerate complications of Suppurative arthritis
		Describe etiology and pathogenesis of Mycobacterial Arthritis
		Discuss clinical features and morphological features of Mycobacterial Arthritis
		Enumerate complications of Mycobacterial Arthritis
	Rheumatic Fever	Describe key structural features, virulence factors, modes of pathogenesis and diagnosis of Streptococcus pyogenes
		Explain etiology, pathogenesis, clinical features, diagnosis, and complications of Rheumatic Fever.
	Crystal-Induced Arthritis	Enlist different types of crystalInduced arthritis
		Describe key points of aetiology, pathogenesis, clinical features, morphological features, and complications of: • Gout

		• Calcium Pyrophosphate Crystal deposition Disease (Pseudo- Gout)
PHARMACOLOGY		
	Pharmacotherapy of Gout	Classify drugs used to treat gout
		Describe the role of NSAIDs in the treatment of gout
		Describe the role of Glucocorticoids in the treatment of gout
		Describe the mechanism of action of various drugs (Colchicine, Probenecid, Allopurinol, Febuxostat) used in the treatment of Gout
		Discuss the adverse effects of antigout drugs
		Describe the drug interactions of Allopurinol and Probenecid
		Enlist the drugs causing hyperuricemia
		Discuss the mechanism by which drugs causes hyperuricemia
	Pharmacotherapy of Rheumatoid Arthritis	Classify drugs used in Rheumatoid arthritis
		Discuss the role of NSAIDs in Rheumatoid Arthritis
		Discuss the role of Glucocorticoids in Rheumatoid Arthritis
		Define and classify DMARDs
		Enlist biological and non-biological agents used to treat rheumatoid arthritis
		Describe pharmacokinetics mechanism of action, clinical uses and adverse effects of methotrexate.
		Enlist adverse effects and therapeutic uses of DMARDs
FORENSIC MEDICINE		
	Age of Wound & Complication	Describe events associated with wound healing
		Differentiate between old and fresh wound
		Describe injury zone on the basis of histo-chemical changes and Biochemical events taking place.
	Qisas & Diyat	Define hurt, Wound & injury
		Classify hurt according to International law
		Types of hurt according to Qisas & Diyat Act
		Explain Punishments (tazir), compensation and Fine (Diyat)
	Injured person medical aid act	Describe the salient features of injured person medical aid

		act
	Work-men compensation laws	Describe the salient features of Work-men compensation laws
MEDICINE		
	Rheumatoid Arthritis	Describe Rheumatoid Arthritis with its clinical presentation and differential diagnosis.
	Ankylosing Spondylitis	Describe Ankylosing Spondylitis with its clinical presentation and differential diagnosis.
ORTHOPEDICS		
	Bone and Joint Infections	Descirbe the aetiology, pathology, clinical presentation and investigations of Bone and Joint infections
ENT		
	Nose, Para Nasal Sinuses & Oral Cavity	Discuss anatomy of Nose, Para nasal sinuses & oral cavity
PAEDIATRICS		
	Juvenile Idiopathic arthritis (JIA)	Discuss criteria for classification of JIA
		Discuss its clinical features and differential diagnosis.
PRIME/MEDICAL EDUCATION		
	Communication Skills: Dealing with Patients	Explain importance of answering questions and giving explanation and/or instructions

Theme III: Muscle weakness and Trauma		
S.No	**Topic**	**Learning Outcomes**
PATHOLOGY		
	Tumors of adipose tissue	Classify soft tissue tumors and provide a brief description of their salient clinical features
		Enlist key morphological features of lipoma and liposarcoma
	Fibrous Tumors	Describe important clinicopathological and morphological features of: • Nodular Fasciitis • Fibromatoses
	Muscle tumors	Classify muscle tumors
		Describe etiology, clinicomorphological features, and complications of Rhabdomyosarcoma

		Describe etiology, clinicomorphological features, and complications of Leiomyoma
		Describe etiology, clinicomorphological features, and complications of Leiomyosarcoma
		Describe etiology, clinicomorphological features, and complications of Fibrosarcoma
	Skeletal muscle atrophy and myopathies	Describe pathological features of Skeletal Muscle Atrophy
		Describe pathological features of Neurogenic and Myopathic changes in Skeletal Muscle
		Describe pathological features of Inflammatory Myopathies
		Describe pathological features of Dermatomyositis
		Describe pathological features of Polymyositis
		Describe pathological features of Inclusion Body Myositis
		Describe pathological features of Toxic Myopathies
	Inherited Diseases of Skeletal Muscle	Describe genetic abnormality, morphology and clinical features of Muscular Dystrophies
PHARMACOLOGY		
	Skeletal muscle relaxants	Classify skeletal muscle relaxants.
		Describe the mechanism of action of Non-depolarizing and depolarizing neuromuscular blockers.
		Discuss the differences between depolarizing and non-depolarizing skeletal muscle relaxants
		Describe the therapeutic uses and adverse effects of skeletal muscle relaxants
		Describe centrally acting skeletal muscle relaxants (Spasmolytics)
		Name drugs causing malignant hyperthermia
		Discuss the rationale for use of Dantrolene in the treatment of malignant hyperthermia
		Discuss succinylcholine apnea and its management
FORENSIC MEDICINE		
	Transportation Accidents	Discuss injuries to the driver & front seat occupant and rare seat occupant.
		Discuss spinal injuries including Whiplash injury and railway spine
		Explain Railway injuries with medico legal significance
		Discuss Air crash accidents.
	Firearm Injuries	Describe wound ballistics and its types.
		Describe terms /Definition used in firearm injuries, types

		of bullets.
		Explain basic mechanism of firearm.
		Explain ranges of fire in firearm injuries, beveling phenomenon, wound production mechanism.
		Identify types of gun powders and ammunition used.
		Interpret findings of injuries produced by different weapons.
		Explain pattern of identification of entry and exit wound.
		Explain information inferred from examination of firearm entry wound.
	Injuries By Explosives	Describe mechanism of production of injuries by bomb blast.
		Explain different causes of death in blast injuries.
		Interpret Autopsy findings in explosion fatalities.
	Thermal Injuries	Describe Thermal Injuries
		Describe their classifications
		Describe Burns and Scalds
	Electrical Injuries	Explain electrocution
		Types of electrical injuries
		Describe PM findings
		Explain Lightning
COMMUNITY MEDICINE		
	Rehabilitation of disabilities: Poliomyelitis	Define disabilities and its types, and concepts, and distinguish between impairment, disability and handicapped, and significance of DALYs and QALYs.
		Describe the Epidemiology, determinants & distribution of poliomyelitis
		Describe the prevention and control measures and rehabilitation of Poliomyelitis
	Accidents and its prevention	Describe of types of accidents and their mechanisms and their prevention (Haddon`s model)
		Describe Road Traffic Accidents
		Classify different types of road traffic accidents and injuries?
		Describe and compare the burden of road traffic accidents in a developed country with a developing country like Pakistan
		List and Explain the risk factors of road traffic accidents
		Explain effective public health strategies used at

		individual and national level to prevent for road traffic accidents
MEDICINE		
	Myopathies	Define Myopathy
		Enlist Myopathies (Hereditary & Acquired Myopathies)
		Describe the etiology and clinical features of Myopathies
		Plan investigations for Myopathies
ORTHOPEDIC		
	Application of Cast	Explain the emergency treatment of an injured limb.
		Explain emergency immobilization techniques of the Neck, Spinal column and limbs.
		Describe and discuss the basic principles pertaining to application of a cast, the complications of cast application.
		Discuss the principles of a threepoint pressure system in a cast.
	Soft Tissue Injuries, Spinal Injuries	Describe the common ligamentous and tendon injuries and advise appropriate management
		Recognize common Spinal fractures, and provide appropriate initial management
PAEDIATRICS		
	Congenital/Hereditary Myopathies	Discuss common congenital and hereditary myopathies, their genetics, causation, clinical presentation, diagnosis.
	Duchene Muscular dystrophy (DMD)	Describe DMD, its clinical presentation and differential diagnosis.

Theme IV: Skin Rash and Itching		
S.No	**Topic**	**Learning Outcomes**
PATHOLOGY		
	Important pathological terms	Define the following skin lesions and describe these with respect to their etiologies and gross morphological features. • Macule • Papule • Nodule • Plaque • Vesicle • Bulla • Blister • Pustule • Scale • Lichenification

		• Excoriation
		• Hyperkeratosis • Parakeratosis • Acanthosis • Dyskeratosis • Acantholysis • Papillomatosis • Lentiginousspongiosis • Urticaria • Pemphigus • Bullous pemphigoid • Warts
	Eczematous dermatitis	Classify eczematous dermatitis
		Describe the morphological and clinical features of acute eczematous dermatitis
		Describe the etiology and pathogenesis of • Contact dermatitis • Atopic dermatitis • Drug related eczematous dermatitis • Photoeczematus eruption • Primary irritant dermatitis
	Erythema multiforme	List the conditions which are associated with erythema multiforme and describe its clinical features
	Psoriasis	Describe the etiopathogenesis, morphological and clinical features of psoriasis
	Pre-malignant epithelial lesions	List the pre-malignant epithelial lesions (Epidermal) • List the predisposing factors for squamous cell carcinoma of skin • Differentiate squamous cell carcinoma from basal cell carcinoma on the basis of morphology and clinical features
	Nevocellular Nevi and Malignant Melanoma	List types of Nevocellular Nevi (Congenital Nevus, blue nevus, Spitz's Nevus, halo nevus dysplastic nevus) along with their clinical significance. (Dermal) • Describe the clinical and morphological features of dysplastic nevi • Describe malignant melanoma with respect to frequent site of origin, clinical and morphological features.
	Viral skin infections	Describe the following viral skin infections in context of etiopathogenesis: • Herpes simplex virus • Herpes zoster virus
	Fungal skin infections	Classify and describe the following fungal skin infections in context of etiopathogenesis: • Tinea

		• Candida
	Skin and soft tissue infections	Describe the following skin lesions in context of ethiopathogenesis and diagnosis • Impetigo • Cellulitis / Erysipelas • Folliculitis • Skin Abscess (Furuncle & Carbuncle) • Necrotizing Soft Tissue Infections
PHARMACOLOGY		
	Drugs used for dermatological disorders	Classify dermatological preparations
		Enlist topical antibacterial, antifungal &antiviral preparations.
		Describe clinical uses and adverse effects of topical antibacterial, antifungal and antiviral drugs.
		Discuss oral treatment of candidiasis dermatophytosis and onychomychosis.
		Describe various acne preparations and antibiotics used to treat acne.
		Enlist clinical uses of immunomodulators (Imiquimod, Tacrolimus) related to skin diseases.
		Enlist ectoparasiticides
		Enlist clinical uses and adverse effects of Permethen.
		Discuss drug treatment of Scabies & Pediculosis.
		Describe the mechanism of action and adverse effects of various agents used for pigmentation disorders
		Describe the clinical uses and adverse effects of drugs used for the treatment of psoriasis.
		Describe clinical uses and adverse effects of topical corticosteroids
		Enlist dermatological disorders responsive to topical corticosteroids ranked in order of sensitivity.
		Discuss keratoytic agents, antipruritic agents, trichogenic and antitrichogenic agents and use of antineoplastic agents in topical conditions
MEDICINE/DERMATOLOGY		
	Important pathological terms with Clinical presentations	Enlist and explain the clinical presentation of the following skin Lesions: • Macule • Papule • Nodule • Plaque • Vesicle

		• Bulla • Blister • Pustule • Scale • Lichenification • Excoriation • Hyperkeratosis • Parakeratosis • Acanthosis • Dyskeratosis • Acantholysis • Papillomatosis • Lentiginousspongiosis • Urticaria • Pemphigus • Bullous pemphigoid • Warts
	Pre-malignant skin conditions	Enlist the pre-malignant skin conditions Explain their differential diagnosis on the basis of clinical presentations Enlist the relevant investigations
	Malignant conditions of skin	Enlist the malignant conditions of skin (squamous and basal cell carcinoma) Explain their differential diagnosis on the basis of clinical presentations
		Enlist the relevant investigations
	Nevocellular Nevi	List the types of Nevocellular Nevi and discuss their differential diagnosis on the basis of their clinical presentations. Enlist the relevant investigations
FAMILY MEDICINE		
	Leishmaniasis	Explain the clinical features and management of cutaneous Leishmaniasis in primary healthcare
PAEDIATRICS		
	Juvenile Dermatomyocytis (JDM)	Discuss diagnostic criteria of JDM
		Discuss its clinical features differential diagnosis
PRIME/RESEARCH		
	Qualitative and quantitative study 3	Write a proposal for research project using KMU or CPSP guidelines or any other standard guidelines
LAB WORK		

S.No	Topic	Practical
PATHOLOGY		
	Tuberculous osteomyelitis	Identify gross and microscopic morphological features of tuberculous osteomyelitis
	Osteogenic sarcoma, Osteoclastoma and chondrosarcoma	Identify gross and microscopic morphologic features of osteogenic sarcoma, osteoclastoma and chondrosarcoma
	ASO (Anti Streptolysin O) test	Perform ASO (Anti Streptolysin O) test by latex agglutination technique
	Tumors of Skin	Identify gross and microscopic features of • Squamous cell carcinoma • Basal cell carcinoma
PHARMACOLOGY		
	Gout	Write prescription for Gout
	Rheumatoid Arthritis	Write prescription for Rheumatoid Arthritis
	Drugs used to treat Dermatological Disorders	Write down prescription for scabies.
		Write down prescription for Psoriasis
FORENSIC MEDICINE		
	Examination of wound and weapon	• Abrasion • Bruise • Laceration • Incised wound • Qisas and Diyat models/ • Dura prints of injuries
	Examination of wound and weapon	• Stab wound • Fracture • Displacement • Qisas and Diyat models of injuries/ multimedia slides remaining
	Examination of wound and weapon	Firearm injuries / Weapons Identification of bullets
	Writing a medico legal certificate	Medicolegal report writing in case of firearm Injuries

ASSESSMENT BLUEPRINT of BLOCK H

BLOCK H Paper: MCQs Distribution

Subject	Multisystem-1 module	Blood and Immunology-2	Musculoskeletal (MSK)-2 module	Total MCQs
Pharmacology	12	03	05	20
Pathology	16	22	13	51
Forensic medicine	09	02	09	20
Community medicine	03	04	03	10
ENT			01	01
Eye			01	01
PRIME			01	01
Research			05	05
Medicine	01	02	02	05
Orthopedics			02	02
Pediatrics		01	03	04
Total	**41**	**35**	**44**	**120**

Paper-H OSPE Outline

Subject	OSPE/OSCE	Viva stations	Total*
Pharmacology	5	2	7
Pathology	3	2	5
Forensic medicine	2	2	4
Community medicine	0	2	2
Paeds (history and physical examination)	1	0	1
Medicine (history and physical examination)	1	0	1
Total	12	8	20

A minimum of 20 stations will be used in final exams. Total marks will be 120 (6 marks for each station).

Paper-I (CVS II and Respiratory Module)

3rd Year MBBS Block I: CVS II Module

S. No.	Theme	Week
1	Chest Pain	2 (1)
2	Blood pressure	1
3	Shortness of breath	2 (1)

General Learning Objectives???

3rd Year MBBS Block I: CVS II Module
Specific Learning Outcomes

Theme:1 Chest Pain

S.No	Topic	Learning Outcomes
ANATOMY		
	Gross anatomy of heart, valves and coronary arteries	Describe surface anatomy of the heart and heart valves
		Describe the anatomy of coronary circulation
		Enumerate heart valves and describe their gross morphology
BIOCHEMISTRY		
	Lipoproteins and cholesterol	Classify and Describe types of lipoproteins
		Summarize cholesterol synthesis
PATHOLOGY		
	Atherosclerosis	Discuss the risk factors, Morphology, pathological changes and consequences of Atherosclerotic plaque
	Ischemia and infarction	Define Ischemia and infarction, and differentiate it from infarction
		Discuss Classification and pathophysiology of ischemic heart disease
		Discuss pathophysiology of myocardial infarction
PHARMACOLOGY		
	Antianginal drugs	Classify antianginal drugs
		Explain mechanism of action, pharmacokinetics and adverse effects of organic nitrates and calcium channel blockers
		Explain the rationale for use of **β**-adrenergic blockers and sodium channel blocker in the management of angina pectoris
	Lipid lowering drugs	Briefly describe the types of dyslipidemias
		List the lipid lowering drug classes
		Explain the mechanism of action, effect on serum lipid profile and adverse effects of each of the five drug classes

		Discuss drug-drug interaction of lipid lowering drugs
	Anticoagulant drugs	Classify anticoagulant drugs
		Discuss mechanism of action, uses of Unfractionated heparin
		Compare low molecular weight and unfractionated heparin
		Describe adverse effects of heparin and treatment of heparin overdose
		Describe mechanism of action and uses of direct Xa and IIa inhibitors
		Describe mechanism of action and uses of warfarin
		Describe adverse effects of warfarin and treatment of warfarin overdose
		Compare heparin and warfarin in terms of mechanism and onset of action
		Explain monitoring of anticoagulant therapy
		Describe important diet and drug interactions of warfarin
	Antiplatelet and thrombolytic drugs	Classify antiplatelet drugs
		List indications of antiplatelet therapy
		Explain the mechanism of action and adverse effects of each antiplatelet drug group
		Name thrombolytic drugs and explain their mechanism of action, uses and adverse effects
FORENSIC MEDICINE		
	Chest trauma	Describe heart injuries caused by regional injuries
		Discuss chest wall injuries in general
		Enumerate the complications of rib fracture
	Sudden death	Define sudden death
		Explain the causes of sudden death
		Describe autopsy findings in sudden death
		Describe the medicolegal importance of sudden death
COMMUNITY MEDICINE		
	Noncommunicable diseases: Cardiovascular diseases of public health importance	Define Cardiovascular disease (CVD)
		Elaborate the concept of CVD risk stratification

		Describe the epidemiology of cardiovascular diseases and explain cardiovascular diseases of Public Health importance globally and in Pakistan
		Explain the known risk factors of CVD and cultural, racial and gender difference in CVD prevalence and incidence
	Hypertension	Describe the epidemiology of hypertension and its public Health importance globally and in Pakistan
GENERAL MEDICINE/CARDIOLOGY		
	Coronary Heart disease	Discuss CAD risk factors and strategies to reduce them
		Discuss strategies for primary and secondary prevention of CHD in outpatient setting
		Define chronic stable angina, its clinical signs and symptoms, laboratory findings, imaging techniques for assessment of it and management protocols
		Discuss coronary vasospasm and angina with normal coronary angiograms
	Acute coronary syndrome	Define Acute coronary syndrome
		Explain the spectrum of illness in ACS and relevant management steps
		Describe the clinical features and steps of the management of Myocardial infarction
		Describe risk stratification in myocardial infarction
		Describe complications of acute MI
	Hypertrophic cardiomyopathy	Discuss clinical features, imaging protocols, risk stratification and short/long-term management of hypertrophic cardiomyopathy
PRIME/MEDICAL EDUCATION		
	Informed consent	Obtaining informed consent from a patient before an invasive procedure

Theme II: Blood pressure

S.No	Topic	Learning Outcomes
PATHOLOGY		
	Blood pressure	Describe the mechanisms of blood pressure regulation
		Classify shock
	Shock	Describe the pathophysiology and types of shock
		Describe the stages pf shock
		Define sepsis and septic shock

		Discuss causes, pathogenesis, and laboratory findings in shock
		Discuss Disseminated intravascular coagulation in the context of sepsis
		Describe classification and pathophysiology of Hemorrhage
	Hypertension	Describe the causes, pathogenesis, morphology and complications of Hypertension
	Aneurisms	Discuss pathophysiology of hypertension in pregnancy
		Describe the etiology, morphology and manifestations of vascular aneurisms
		Describe the causes, Pathogenesis and types of Aortic Aneurysm
	Aortic dissection	Describe the pathogenesis, morphology and clinical features of Aortic Dissection
	Vasculitis	Define vasculitis
		Classify vasculitides
		Describe the immunological mechanisms of non-infectious vasculitis
		Describe the morphology and clinical features of Giant cell arteritis
		Describe the morphology and clinical features of Takayasu arteritis
		Describe the morphology and clinical features of Polyarteritis nodosa
		Describe the morphology and clinical features of Kawasaki disease
		Describe the morphology, serological markers and clinical features of Wegener granulomatosis
		Describe the morphology and clinical features of Thromboangitis obliterans
	Diseases of veins	Differentiate between thrombophlebitis and Phlebothrombosis
		Describe the etiology and clinical features of varicose veins
		Enlist the benign and malignant tumors of the arteries and veins
PHARMACOLOGY		
	Antihypertensive drugs	Classify antihypertensive drugs
		Discuss role of diuretics in the management of hypertension
		Discuss the role of ACE inhibitors, Angiotensin receptor-blocking agents, Renin inhibitor in hypertension
		Explain the rationale for the use of β-blockers, α-adrenoceptor blocking agent, centrally acting sympatholytic drugs in hypertension
		Describe the direct vasodilators (mechanism of action and drug toxicity) in relation to antihypertensive drug therapy

		Describe the role of Calcium channel blockers in hypertension
GENERAL MEDICINE/CARDIOLOGY		
	Hypertension	Define and classify hypertension
		Discuss drug treatment protocols for hypertension
		Describe the risk factors and complications of hypertension
		Describe the management of hypertensive emergencies and urgencies
FORENSIC MEDICINE		
	Cardiac poisons	Classify Cardiac Poisons
		Describe the characteristic, clinical signs/symptoms, treatment and medicolegal aspects of cardiac glycosides
		Discuss cardiac effects of methylphenidate, cocaine and Ice
		Describe the characteristic, clinical signs/symptoms, treatment and medico legal aspects of Oleander
PRIME/MEDICAL EDUCATION		
	Counselling skills	Develops counselling skills in professional life

Theme III: Shortness of breath

S.No	Topic	Learning Outcomes
PHYSIOLOGY		
	Cardiac cycle	Outline major events in cardiac cycle
		Discuss physiology of heart sounds and murmurs
PATHOLOGY		
	Congestive heart failure	Describe the types, etiology, pathogenesis, and clinical features of congestive heart failure
	Cardiomyopathies	Describe the Pathological patterns, causes, morphological changes and clinical features of Cardiomyopathies
	Congenital heart diseases	Describe the Etiology, Pathogenesis and clinical features of Tetrology of Fallots, ASD, VSD and pulmonary stenosis
	Valvular heart diseases	Describe the Etiology, pathogenesis and clinical features of Aortic stenosis, Aortic regurgitation, Mitral stenosis and Mitral regurgitation
	Rheumatic fever	Discuss pathophysiology and laboratory findings in rheumatic fever
	Rheumatic heart disease	Discuss pathological changes and morphology of rheumatic heart disease
	Thrombosis and Embolism	Describe the mechanism and pathogenetic mechanisms of vascular thrombosis
		Enlist hypercoagulable states
		Define embolism

		Discuss types of embolism
		Describe the etiology, pathogenesis, morphology and clinical features of pulmonary embolism
	Endocarditis	Discuss Etiology, Pathogenesis, Morphology, diagnostic criteria, clinical features and complications of infective endocarditis
		Discuss the types of non-infected vegetation
PHARMACOLOGY		
	Drugs used in heart failure	Define the different classes of the drug used in the treatment of heart failure
		Explain the pharmacological effects, clinical uses, adverse effects and drug interactions of digitalis glycosides
		Explain the signs symptoms and treatment of digoxin overdose
		Enlist positive inotropic drugs (other than digoxin) that are used in heart failure
		Classify the five major groups of diuretic drugs and relate them to their site of action
		Discuss the mechanism of action, clinical applications and adverse effects of carbonic anhydrase enzyme inhibitors, osmotic diuretics, thiazide diuretics, loop diuretics and potassium sparing diuretics
		Enlist potassium sparing and potassium losing diuretics
	Antiarrhythmic drugs	Classify antiarrhythmic drugs
		Describe the effect of different classes of antiarrhythmic drugs on membrane potential of cardiomyocytes
		Explain the mechanism of action of all the classes of antiarrhythmic drugs
		Discuss the adverse effects and clinical uses of antiarrhythmic drugs
		Discuss workup and management of pulmonary edema
GENERAL MEDICINE/CARDIOLOGY		
	Heart failure	Enlist and explain causes of heart failure
		Describe workup and management of heart failure
	Disorders of heart rate and rhythm	Classify arrhythmias and heart blocks
		Describe the etiology, ECG findings and management of Atrial fibrillation
		Discuss types, workup and management of ventricular arrhythmias
	Pulmonary embolism	Describe the etiology, clinical features and diagnostic workup of pulmonary embolism
		Discuss risk stratification and management of pulmonary embolism

	Pulmonary hypertension	Discuss cardiac causes of pulmonary hypertension and outline their management
	Myocarditis	Discuss causes and management of myocarditis
	Pericardial diseases	Define and classify pericarditis
		Discuss clinical findings and treatment of pericarditis
		Describe the etiology and management of pericardial effusion
PAEDIATRICS		
	Cyanotic and acyanotic congenital heart disease	Delineate the difference between the acyanotic and cyanotic heart disease conditions
		Enumerate the various defects, involving both conditions
	Rheumatic fever	Describe the etiology of rheumatic fever
		Describe Duckett Johns criteria for diagnosis of RF
		Discuss about primary and secondary prophylaxis of rheumatic heart disease
PRIME/MEDICAL EDUCATION		
	SWOT Analysis	Perform SWOT analysis for a particular task

LAB WORK

S.No	Topic	Learning Outcomes
PHARMACOLOGY		
	Myocardial Infarction	Construct a prescription for a patient with Myocardial Infarction
	Hypertension	Construct a prescription for a patient with Hypertension
	Congestive Cardiac Failure	Construct a prescription for a patient with Congestive Cardiac Failure
PATHOLOGY		
	Lipid Profile	Demonstrate Estimation of total cholesterol
	Hemangioma	Identify the morphological changes occurring in hemangioma
FORENSIC MEDICINE		
	Cardiac toxins	Identify the following cardiogenic toxins: • Digitalis • Cannabis • Heroin

3rd Year MBBS Block I: Respiratory II Module

S.No	Theme	Duration
1	Cough with sputum, and fever.	Two weeks
2	Wheezy Chest and Shortness of breath	Two weeks

General Learning Outcomes

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

Knowledge:

1) Explain various lower respiratory tract infections
2) Explain obstructive respiratory diseases.
3) Describe various Granulomatous lung diseases
4) Describe medico legal aspect of asphyxial death.
5) Describe respiratory tract diseases of public health importance with emphasis on agent factors, epidemiology, preventive and control measures.
6) Describe management of common respiratory problems.

Skills:

7) Prescribe medication according to guidelines for common respiratory disorders.

Attitude:

3rd Year MBBS Block I: Respiratory II Module Theme I: Cough with sputum, and fever		
S.No	**Topics**	**Learning Outcomes**
ANATOMY		
		Describe clinical anatomy of thorax including thoracic wall, lungs and trachea-bronchial tree anatomy
		Correlate the different developmental stages of lung with its congenital anomalies
		Describe the surface marking of clinically relevant areas of the respiratory system
PHYSIOLOGY		
		Describe the mechanics of ventilation and different volumes and capacities of lungs
		Describe respiratory gas exchange.
BIOCHEMISTRY		
		Describe the effects of hyperventilation (e.g. Anxiety) and hypoventilation (e.g. COPD) on pH and blood gases, HCO3 and electrolytes.
MICROBIOLOGY		
	Legionella	Describe Pathogenesis, Structure, Clinical Findings & Laboratory Diagnosis of Legionella infection
	Mycoplasma	Describe Pathogenesis, Structure, Clinical findings & Laboratory Diagnosis of mycoplasma infection.
	H-Influenza	Describe Pathogenesis, Structure, Clinical Findings & Laboratory Diagnosis of H-Influenza infection.
	Bordetella	Describe Pathogenesis, Structure, Clinical Findings & Laboratory Diagnosis of Bordetella infection
	Mycobacterium Tuberculosis	Describe Pathogenesis, Important Properties, Clinical Findings & Laboratory Diagnosis of Mycobacterium Tuberculosis.
	Pulmonary Infections	Describe community acquired pneumonia and its different types.
		Describe community acquired atypical Pneumonia.
		Describe etiology, pathogenesis & clinical features of nosocomial pneumonia.
		Describe etiology, pathogenesis & clinical features of pneumonia.
		Describe etiology, pathogenesis & clinical features of chronic pneumonia.

		Describe etiology, pathogenesis, clinical & radiologic features of Pulmonary Tuberculosis.
		Describe pneumonia in immunocompromised host.
	Granulomatous diseases	Describe sarcoidosis its etiology, pathogenesis, morphology and clinical course.
		Describe etiology, pathogenesis, clinical & radiologic features of hypersensitivity pneumonitis.
		Describe etiology, pathogenesis, clinical & radiologic features of pulmonary eosinophilia.
	Lung abscess	Define Lung Abscess
		Describe Pathogenesis, morphology & Clinical Course of Lung abscess
	Empyema	Describe empyema & its pathogenesis
	Laryngeal tumors	Describe the risk factors, morphology, clinical features and staging of laryngeal tumors.
PHARMACOLOGY		
	Anti-tussives	Classify Anti-tussives
	Cough Suppressants	Describe the pharmacology of Cough suppressants
	Expectorants	Describe the pharmacology of Expectorants, Mucolytic agents in cough
	Tuberculosis	Classify Anti tuberculous drugs
		Describe the pharmacology of First line antituberculous drugs
		Describe the pharmacology of 2nd line antituberculous drugs
		Discuss the drug treatment & duration of susceptible newly diagnosed pulmonary tuberculosis patient
		Discuss the development of resistance to mycobacterium tuberculosis against conventional antibiotics
		Discuss the classification & duration of therapy in patients having MDR tuberculosis
		Discuss the drug treatment & duration of antitubercular therapy in pregnant woman & patients having Hepatic & Renal insufficiency
		Describe the rationale for the use of Multi Drug therapy against pulmonary tuberculosis.
COMMUNITY MEDICINE		
	Tuberculosis	Describe agent, host and environmental factors for the disease.
		Describe DOTS strategy for Tuberculosis
		Explain different preventive and control measures for Tuberculosis including "stop TB" and "End TB"

		strategies
	Influenza and COVID infection	Describe types of influenza
		Describe agent, host and environmental factors for the disease.
		Explain the antigenic drift and antigenic shift
		Describe various preventive and control measures for influenza
		Describe the epidemiology, clinical features, control measures and vaccination for COVID-19 infection
FAMILY MEDICINE		
	Social determinants of health	Describe the social determinants of health
	Environmenta l and climate factors in disease causation	Explain the role of environmental and climate factors in disease causation
	Principles of prevention and health promotion	Describe the Principles of prevention and health promotion
		Describe, the role of counselling and patient education in health promotion and disease prevention
	Tuberculosis (individuals` identifications , routine contact tracing, and linking to care)	Explain the types of Pulmonary Tuberculosis
		Explain the pathophysiology, clinical features, complications, and management of a patient with pulmonary Tuberculosis
		Describe the technique of contact tracing in a patient with non-MDR and MDR tuberculosis
		Describe the indications of specialist referrals in patients with Pulmonary Tuberculosis
FORENSIC MEDICINE		
	Asphyxia (General Aspects)	Define asphyxia
		Define anoxia
		Enlist causes of anoxia

		Explain causes of asphyxia
		Classify mechanical asphyxia
		Describe patho physiology of asphyxia
		Describe general signs of asphyxia
	Hanging	Define hanging
		Describe causes of death in hanging
		Explain mechanism of death in hanging
		Describe the procedure of neck dissection in hanging
		Describe autopsy findings in hanging
		Explain medico legal aspects of hanging
	Mechanical asphyxia (Strangulation)	Define strangulation
		Describe causes of death in strangulation
		Explain mechanism of death in strangulation
		Describe the procedure of neck dissection in strangulation
		Describe autopsy findings in strangulation
		Explain medico legal aspects of strangulation
	Drowning	Define drowning
		Describe causes of death in drowning
		Explain mechanism of death in drowning
		Describe types of drowning
		Describe autopsy findings in drowning
		Differentiate between ante and post mortem drowning
		Explain medico legal aspects of drowning
	Suffocation	Define suffocation and explain its medico legal aspects.
	Smothering	Define smothering
		Explain medico legal aspects of smothering
	Chocking	Define chocking

		Explain medico legal aspects of chocking
	Gagging	Define Gagging
		Explain medico legal aspects of Gagging
	Overlaying	Define overlying
		Explain medico legal aspects of overlying
	Traumatic asphyxia	Define traumatic asphyxia
		Describe autopsy findings of traumatic asphyxia
		Explain medico legal aspects of traumatic asphyxia
	Sexual asphyxia	Define sexual asphyxia
ENT		
	Larynx anatomy	Describe clinical anatomy of larynx.
	Laryngitis	Describe etiology, clinical feature, management of acute and chronic laryngitis.
MEDICINE		
	Respiratory symptoms	Describe approach to a patent of respiratory symptomatology
	Differential diagnosis	Discuss the differential diagnosis of granulomatous inflammation including TB
	Pulmonary TB	Describe the signs & symptoms, investigations, clinical diagnosis, management protocol & prognosis for TB and MDRTB according to WHO categories.
PEDIATRICS		
	Childhood Pneumonia	Classify pneumonia according to IMNCI (integrated management of neonatal and childhood illnesses)
		Describe the risk factors for recurrent pneumonia in childhood.
		Describe the etiological agents for Pneumonias according to the age of the child.
		Describe the indication for hospitalization of child with pneumonia.
RADIOLOGY		
		Describe the common radiological abnormalities on chest x-rays

Theme II: Wheezy chest & shortness of breath

S.No	Topic	Learning Outcomes
PATHOLOGY		
	Atelectasis	Define Atelectasis

		Describe different types of atelectasis
	Acute Lung injury	Define Acute Respiratory distress Syndrome (ARDS)
		Describe Pathogenesis and morphological features of ARDS
	Obstructive Pulmonary disease	Define obstructive pulmonary disease and enlist its different types
		Define Emphysema
		Describe different types of emphysema
		Describe the pathogenesis morphology and underline course of emphysema
		Define chronic bronchitis
		Describe its pathogenesis and morphology
		Describe asthma and its pathogenesis
		Differentiate between types of asthma
		Describe morphology and clinical course of asthma
		Define bronchiectasis, describe the causes, morphology and pathogenesis of bronchiectasis
	Restrictive or infiltrative lung diseases	Define diffuse interstitial lung disease.
		Describe pathogenesis of diffuse interstitial lung disease.
		Enlist major categories of chronic interstitial lung disease
		Describe the fibrosing lung diseases.
		Describe pneumoconiosis, its morphology and different types.
		Describe drug and radiation induced pulmonary diseases.
	Diseases of vascular origin	Describe pulmonary embolism, hemorrhage and infarction.
		Describe pulmonary Hypertension.
		Describe diffuse alveolar hemorrhage syndromes.
	lung tumors	Describe carcinoma of lung, its etiology pathogenesis, morphology and clinical course.
		Differentiate between small cell lung carcinoma and non-small cell lung carcinoma.
		Describe bronchial carcinoids
		Describe malignant mesothelioma and its morphology
	Pleural lesions	Describe pleural effusion and pleuritis.

		Describe pneumothorax, Hemothorax and chylothorax
PHARMACOLOGY		
	Asthma	Classify the Drugs used in the treatment of asthma
		Describe the role of beta 2 agonists used in Asthma
		Describe the role of Methylxanthine drugs used in Asthma
		Describe the role of Antimuscarinic agents used in Asthma
		Describe the role of Corticosteroids used in Asthma
		Describe the pharmacokinetic & pharmacodynamic aspects of Mast cell stabilizers used in Asthma
		Describe the pharmacokinetic & pharmacodynamic aspects of Leukotriene antagonist used in Asthma
		Describe the pharmacokinetic & pharmacodynamic aspects of Anti-IgE antibodies used in Asthma
		Describe drug treatment of acute and chronic asthma and status asthmatics
COMMUNITY MEDICINE		
	Asthma	Describe the epidemiology & preventive measures of asthma.
		Define occupational asthma and describe its preventive measures.
	Pneumoconiosis	Describe various pneumoconiosis diseases
		Describe the control and preventive measures of pneumoconiosis
	Diphtheria and Pertussis	Describe the epidemiological determinants of Diphtheria and Pertussis
		Describe preventive and control measures.
		Explain their current public health importance in Pakistan.
FORENSIC MEDICINE		
	Asphyxiant (CO)	Explain medico legal aspects of sexual asphyxia
		Enlist sources of CO poisoning
		Describe signs and symptoms of CO poisoning
		Explain treatment plan of CO poisoning
		Describe autopsy findings of CO poisoning
		Explain ML aspects of CO poisoning
	CO2	Enlist sources of CO2 poisoning

		Describe signs and symptoms of CO2 poisoning
		Explain treatment plan of CO2 poisoning
		Describe autopsy findings of CO2 poisoning
		Explain ML aspects of CO2 poisoning
		Enlist sources of H2S poisoning
		Describe signs and symptoms of H2S poisoning.
	H2S	Explain treatment plan of H2S poisoning
		Describe autopsy findings of CO poisoning
		Explain ML aspects of H2S poisoning
	War gases	Define war gases
		Classify war gases
		Describe medico legal aspects of war gases
ENT		
	Non –Neoplastic laryngeal lesions	Describe clinical features and management of different non neoplastic layrangeal lesions (Vocal cords nodules, polyps, and laryngocele)
	Neoplastic laryngeal lesions	Describe the clinical feature and management of neoplastic laryngeal lesions.
	Vocal cord Palsy	Describe the clinical feature and management of vocal cord palsy
	Emergency Tracheotomy	Describe the indication, contraindication, complications, and operative steps to perform emergency tracheotomy.
MEDICINE		
	COPD	Describe the epidemiology, patho-physiology and etiology of COPD
		Explain the clinical presentation of COPD
		Describe the investigations required for the diagnosis of COPD
		Describe the management plan of COPD
	Asthma	Describe the epidemiology, pathophysiology, etiology, and contributing factors related to the development of asthma
		Describe the clinical presentation, diagnosis and treatment of asthma
		Classify asthma on the basis of clinical presentation into mild, moderate, life threatening and near fatal asthma
		Explain the stepwise pharmacologic approach for the treatment of asthma status asthmaticus

		Describe long-term asthma management plan including pharmacological, physical and occupational health education.
	Respiratory failure	Describe the long term Oxygen therapy in COPD
	Pneumothorax	Describe the etiology, classification, diagnosis and management of pneumothorax
	Pleural effusion	Describe the causes of exudates and transudate effusion.
		Differentiate between exudate and transudate effusion.
FAMILY MEDICINE		
	COPD	Explain the management strategies of a patient with COPD in general practice
		Describe the strategies for prevention of complications of COPD
		Describe the methods of home oxygen therapy
		Perform routine annual health checkup of an Asthmatic and COPD patient under supervision
		Identify the red-flags in a patient with COPD and appropriately refer to speciality care when required
	Bronchial Asthma	Discuss the risk factors for Asthma in our population
		Explain the risk assessment for Asthma
		Interpret spirometry results
		Discuss the primary and secondary prevention of Asthma in a primary health setting
		Identify the guidelines that should be followed in a patient with Asthma
		Identify the red-flags in a patient that need referral for specialist care
	ARIs (Croup and Epiglottitis)	Differentiate Croup and epiglottitis based on etiology and clinical features.
		Explain the management of croup and epiglottitis.
		Explain the most effective ways to prevent and control ARIs
	Respiratory distress syndrome(RDS)	Describe the risk factors, clinical features, investigation and management for RDS.
	Reactive air way disease.	Describe the different types of wheezers in pediatric population
		Discuss the risk factor for persistent wheezing /asthma.

		Describe management of bronchiolitis
	Cystic fibrosis and bronchiectasis	Define bronchiectasis and its risk factors.
		Describe diagnostic criteria for cystic fibrosis.
		Describe the GI, respiratory and other systemic manifestations of cystic fibrosis.
PRIME/MEDICAL EDUCATION		
	Power dynamics	Explain the concept of power dynamics and delegate powers to juniors and team mates

LAB WORK

S.No	Topic	Practical
PHARMACOLOGY		
		Write the proper prescription for Pulmonary Tuberculosis
FORENSIC MEDICINE		
		Demonstrate the differences between hanging and strangulation on a model
		Demonstrate the differences between different types of hanging on a model
COMMUNITY MEDICINE		
	Visit	Visit to TB control program center
	Mask wearing.	Demonstrate Identification of different types of masks and its uses.
		Demonstrate the proper protocol for wearing a mask
PHARMACOLOGY		
		Demonstrate the proper stepwise use of metered dose inhaler along with spacer.
		Write the proper prescription for Acute & Chronic Asthmatic patients
		Write the proper prescription for patients with Status Asthmaticus

ASSESSMENT BLUEPRINT OF BLOCK I

BLOCK I Paper: MCQs Distribution

Subject	CVS	Respiratory module	Total MCQs
Pharmacology	12	5	17
Pathology	20	22	42
Forensic medicine	4	9	13
Community medicine	2	6	8
ENT	0	6	6
PRIME	2	1	3
Research	1	1	2
Medicine	13	2	15
Pediatrics	3	5	8
Anatomy	1	1	2
Physiology	1	1	2
Biochemistry	1	1	2
Total	**60**	**60**	**120**

BLOCK-I (CVS and Respiratory Module) OSPE Outline

Subject	OSPE/OSCE	Viva stations	Total*
Pharmacology	5	2	7
Pathology	2	2	4
Forensic medicine	3	2	5
Community medicine	0	2	2
Medicine (history and physical examination)	1	0	1
Pediatrics (history and physical examination)	1	0	1
Total	**12**	**8**	**20**

4th Year MBBS

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BLOCK-J

(NEUROSCIENCES-II)

NEUROSCIENCES-II MODULE

Themes

S. No	Themes	Duration in days
1	Disturbed sleep	5
2	Disturbed mood & behavior	5
3	Right-sided weakness and inability to speak	3
4	Loss of consciousness and Fits	5
5	Tremors	2
6	Headache	5
7	Paraplegia	2
8	Numbness and tingling	3

General Learning Objectives

By the end of NS II Module, 4th year MBBS students will be able to:

Knowledge:

1) Describe anxiety disorders and their pharmacological management.
2) Explain the concepts of Mood disorders and their pharmacological management.
3) Explain psychotic disorders and their pharmacological management.
4) Describe the pathophysiology and management of Dementias.
5) Elaborate the pathophysiology, clinical features, management, and prevention of cerebrovascular diseases.
6) Classify epilepsy and describe the pharmacological management of epilepsy in children and adults.
7) Describe the types and protocols of anesthesia and explain the drugs used as anesthetics.
8) Explain the pathology and clinical features of cerebellar diseases.
9) Elaborate the clinical features and pharmacological management of Parkinson`s disease.
10) Explain the clinical features and management of Motor neuron disease and Friedrich`s ataxia. 11) Describe the pathology and management of head injury.
12) Describe the pathogenesis, clinical features, and management of common CNS infections.
13) Classify brain, spinal cord, and peripheral nerves tumors, and describe their clinical features and management.
14) Explain the pathophysiology, clinical features, investigations and management of Multiple sclerosis, transverse myelitis, and Guillain Barre Syndrome.
15) Classify peripheral neuropathies and elaborate their etiologies and clinical presentations.
16) Explain the clinical features and forensic approach to a patient with neurotoxic poisons.
17) Explain the forensic aspects of insanity and head injury.

Skills:

1) Describe the pathophysiology and management of Dementias.
2) Elaborate the pathophysiology, clinical features, management, and prevention of cerebrovascular diseases.
3) Classify epilepsy and describe the pharmacological management of epilepsy in children and adults.
4) Describe the types and protocols of anesthesia and explain the drugs used as anesthetics.
5) Elaborate the clinical features and pharmacological management of Parkinson`s disease.
6))Describe the pathology and management of head injury.
7) Describe the pathogenesis, clinical features, and management of common CNS infections.

8) Explain the pathophysiology, clinical features, investigations and management of Multiple sclerosis, transverse myelitis, and Guillain Barre Syndrome.
9) Explain the clinical features and forensic approach to a patient with neurotoxic poisons.

Attitude:

1) Describe anxiety disorders and their pharmacological management.
2) Explain the concepts of Mood disorders and their pharmacological management.
3) Explain psychotic disorders and their pharmacological management.
4) Describe the pathophysiology and management of Dementias.
5) Explain the forensic aspects of insanity and head injury.

Specific Learning Objectives

Theme Wise Learning objectives

Theme I: Disturbed sleep		
S No	**Topics**	**Learning Outcomes**
Psychiatry		
1	Sleep disorders	Describe the types of sleep disorders
		Explain the pharmacological and non-pharmacological management of sleep disorders
		Describe the ways of improving healthy sleep
2	Non-organic insomnia	Define non-organic insomnia
		Explain the management of non-organic insomnia
3	Sleep wake cycle disorders	Describe the concept of sleep-wake cycle disorder
		Describe the pharmacological and non-pharmacological
		management of sleep-wake wake cycle disorder
Pharmacology		
1	Introduction to the Pharmacology of CNS	Describe basic terms like neurotransmitters, neuromodulator/neurotropic factors, withdrawal symptoms (abstinence syndrome), cross-tolerance, reverse tolerance (sensitization) and cross-dependence
		Describe the blood-brain barrier and its clinical significance
		Enlist the principal neurotransmitters and their receptors in the CNS
		Describe voltage-gated, ligand-gated (ionotropic),

		ion channels and metabotropic receptors on the neuronal membrane
		Classify the drugs acting on the CNS
2	Sedative-hypnotics (Minor tranquilizers)	Classify broadly the Sedative-Hypnotics
3	Benzodiazepines	Classify Benzodiazepines
		Describe the pharmacokinetics of Benzodiazepines
		Describe the mechanism of action of Benzodiazepines
		Describe the pharmacological effects of Benzodiazepines
		Describe the clinical uses of Benzodiazepines
		Describe the adverse effects of Benzodiazepines
		Describe the tolerance and dependence on Benzodiazepines
4	Barbiturates	Describe the drug interactions of Benzodiazepines
		Name the antidote (competitive antagonist) to Benzodiazepines
		Classify barbiturates
		Describe the mechanism of action and clinical uses of barbiturates
		Describe the difference regarding the mechanism of action of Barbiturates in comparison to Benzodiazepines
5	Buspirone	Describe the mechanism of action and clinical use of Buspirone
		Describe the merits and demerits of Buspirone in comparison to Benzodiazepines
6	Ramelteon	Describe the mechanism of action and clinical use of Ramelteon
7	CNS stimulants	Classify CNS stimulants
8	Respiratory analeptics (Doxa pram, Nikethamide)	Describe the mechanism of action, clinical uses and adverse effects of Respiratory analeptics
9	Methyl xanthine/Theophylline, Caffeine, Theobromine)	Describe the mechanism of action, clinical uses and adverse effects of Methyl xanthine
10	Sibutramine	Describe the mechanism of action and clinical use of Sibutramine
Forensic Medicine		
1	Classification of	Define and classify neurotoxins

	neurotoxins	
2	Cerebral Poisons- Somniferous Poisons (Morphine, Opium)	Describe and enlist Somniferous poison. Describe the mechanism of action for the Somniferous poison.
3	Heroin	Describe different signs, symptoms and autopsy appearance in a typical of Somniferous poisons.
		Describe fatal dose, treatment, and diagnosis for the Somniferous poisons.
		Describe medico-legal importance for the Somniferous poisons.
		Describe and enlist Somniferous poison.
4	Inebriant Poisons (Ethyl Alcohol, Methyl Alcohol)	Describe and enlist Inebriant poison.
		Describe mechanism of action for the Inebriant poison.
		Describe different sign, symptoms, and autopsy appearance in a typical of Inebriant poisons.
		Describe fatal dose, treatment, and diagnosis for the Inebriant poisons.
		Describe medico-legal importance for the Inebriant poisons.
5	Sedative & Hypnotics (Chloral hydrate, Barbiturates)	Describe and enlist sedative and hypnotics
		Describe mechanism of action for the Sedative and hypnotics.
		Describe different sign, symptoms, and autopsy appearance in a typical of Sedative and hypnotics.
		Describe fatal dose, treatment, and diagnosis for the Sedative and hypnotics.
		Describe medico-legal importance for the Sedative and hypnotics.
6	Fuels, stimulants and hallucinogens • Agrochemical poisons • Kerosene • Hallucinogens- LSD • Stimulants- Amphetamines	Describe and enlist fuels, stimulants and hallucinogens.
		Describe mechanism of action of fuels, stimulants and hallucinogens.
		Describe different sign, symptoms and autopsy appearance in a typical case of fuels, stimulants and hallucinogens poisoning.
		Describe fatal dose, treatment, and diagnosis of fuels, stimulants and hallucinogens.

7	Drug Dependence	Describe medico-legal importance of fuels, stimulants and hallucinogens.
		Describe Drug dependence and its psychological effects.
		Describe drug abuse and outline the procedure to investigate a case due to narcotics.
Community medicine/epidemiology		
1	Epidemiology	Define epidemiology
		Explain the basic concepts of epidemiology
2	Study design	Classify and elaborate study designs
3	Screening	Explain the screening in epidemiology
4	Measures of mortality and morbidity	Explain the measures of morbidity and mortality

Theme II: Disturbed Mood & Behavior

S NO	Topics	Learning Outcomes
Psychiatry (Mood and anxiety disorders)		
1	Depressive disorders	Classify depressive disorders
		Describe the aetiology, clinical features and management protocols of different depressive disorders
2	Bipolar Affective Disorder	Describe the clinical features and management protocols of Bipolar affective disorders
3	Suicide	Describe the preventive measures of suicide
4	Anxiety Disorders	Classify anxiety disorders
		Differentiate between medical and psychiatric causes of anxiety
		Differentiate between anxiety and phobia
		Describe the pharmacological and non-pharmacological management of different anxiety disorders including relaxation techniques and breathing exercises
5	Dissociative disorders	Explain the different behavioral and neurological presentations of dissociative disorders
		Describe the pharmacological and non-pharmacological management of dissociative disorders
6	Stress related disorders	Classify stress related disorders
		Explain the concept of stress in stress related disorders
		Explain the pharmacological and non-pharmacological management of stress related disorders
7	Somatoform disorders	Classify somatoform disorders
		Describe the concept of medically unexplained

		symptoms
		Counsel a patient with medically unexplained symptoms
8	Atypical depression and seasonal affective disorder	Describe the clinical presentation of atypical depression
		Recognize the symptoms of atypical depression
		Describe the management of atypical depression and seasonal affective disorders
Psychiatry (Psychotic illnesses)		
1	Personality disorders	Classify personality disorders
		Describe the clinical features, diagnostic criteria and management of personality disorder
2	Psychotic disorders	Differentiate between organic and non-organic psychosis
		Explain the concept of psychosis
		Classify psychotic disorders
3	Schizophrenias	Describe the clinical features, diagnostic criteria and management of Schizophrenias
		Explain the role of psychotherapy and Electroconvulsive therapy in Schizophrenias
		Describe the rehabilitations strategies with patients of Schizophrenias
4	Delusional disorders	Describe the types and management of delusional disorders
		Describe the ways of differentiating delusional disorders from Schizophrenias
5	Substance abuse disorder	Describe the concept of drug dependence
		Classify of drug abuse
		Describe the principles of management of substance abuse
		Explain the concept of harm reduction
General Medicine		
1	Alzheimer`s disease and Dementias	Explain the pathophysiology, clinical features and management of Alzheimer`s disease
		Describe the reversible and irreversible causes of Dementia
Pharmacology		
1	Depression	Describe the Monoamine hypothesis of depression
2	Antidepressants	Classify antidepressants
3	SSRIs (Selective Serotonin Reuptake Inhibitors)	Enlist SSRIs
		Enlist the most selective SSRIs
		Describe the pharmacokinetics, mechanism of action, clinical uses, adverse effects and drug interactions of SSRIs

		Classify antidepressants
4	TCAs (Tricyclic Antidepressants)	Enlist TCAs
		Describe the mechanism of action, clinical uses, adverse effects and drug interactions of TCAs
		Enlist TCAs
5	MAOIs (Monoamine Oxidase Inhibitors)	Enlist MAOIs
		Describe the pharmacokinetics,
6	Psychoses (Schizophrenia and others)	mechanism of action, clinical use, adverse effects and drug interactions of MAOIs
		Describe Serotonin syndrome
		Describe Hypertensive Cheese reaction
		Describe St John's Wort
		Describe the procedure of switching-over from one category of antidepressants to another one
		Describe "Augmentation" of antidepressant therapy
		Describe Electroconvulsive Therapy (ECT) for depression
		Describe the Dopamine hypothesis of Schizophrenia
		Classify Antipsychotics
7	Antipsychotics (Anti-schizophrenic drugs)	Describe the advantages of atypical antipsychotics over the Typical Classical/Traditional/Old) agents
		Describe the mechanism of action of Antipsychotics
		Describe the pharmacological effects of Antipsychotics
		Describe the clinical uses of Antipsychotics
		Describe the drug interactions of Antipsychotics
		Describe the adverse effects of Antipsychotics
		Explain the drug treatment of extrapyramidal syndrome
8	Bipolar affective disorder (Manic Depressive illness)	Describe the concept of "mood-stabilization" in Bipolar affective disorder (Manic Depressive illness)
9	Mood-stabilizing drugs	Enlist Mood-stabilizing drugs
10	Lithium carbonate	Describe the pharmacokinetics, mechanism of action, clinical uses, adverse effects and drug interactions of Lithium carbonate
11	Alcohols	Describe alcoholism
		Describe the pharmacokinetics of Ethanol
		Describe the mechanism of action of Ethanol
		Describe the pharmacological effects of Ethanol
		Describe the clinical uses of Ethanol
		Describe the adverse effects of Ethanol
		Describe Disulfiram-like reaction with example of drugs causing it
		Describe the management of Ethanol intoxication
		Describe the management of Ethanol withdrawal

		symptoms
		Describe the treatment of alcoholism
		Describe briefly Methanol poisoning
12	Opioids (Morphine, Diamorphine, Codeine, Pethidine, Methadone, Pentazocine,	Differentiate between Opioids and Opiates
		Describe the term "narcotic"
		Describe the source of Opium
13	Buprenorphine, Dextromethorphan)	Enlist the "brain's own Morphine" (endogenous Opioids)
		Classify Opioids
		Enlist Opioids with mixed agonist-antagonist properties
		Enlist Opioids with partial agonist activity
		Describe the pharmacokinetics, mechanism of action, pharmacological effects, clinical uses, adverse effects and drug interactions of Opioids
		Describe the use of opioids as palliative care in terminal illness
		Describe opioid rotation
		Describe the treatment of Opioid over dosage
		Describe the Opioid antagonists (antidotes)
		Describe Opioid dependence
		Describe the management of Opioid dependence
		Describe the contraindications of Opioids
		Enlist the drugs used for pain in opioid addicts
14	Tramadol	Describe the mechanism of action and clinical use of Tramadol
15	Drugs of abuse	Describe substance abuse, drug dependence, addiction and habituation
		Describe the Dopamine hypothesis of addiction
		Enlist the drugs causing addiction
		Enlist the non-addictive drugs of abuse
		Describe "Club drugs"
		Enlist the drugs having high- risk of addiction (scored 5 on the list of relative-risk of addiction)
		Enlist the drugs having moderate-risk of addiction (scored 4 on the list of relative-risk of addiction)
		Describe the drug treatment of Nicotine, Alcohol, Cannabis and Opioid abuse
		Describe the drug abuse in sports with examples
Forensic Medicine		
1	Insanity and relationship to criminal charges	Define insanity.
		Classify insanity and explain its sub-types
		Describe relationship of insanity with criminal charges.
		Describe different pleas and its legal exception based

		on unsoundness of mind.
		Describe McNaughten rules, Durham`s rule and Impulse along with its application and criticism.
		Differentiate between true and feigned insanity
2	Forensic Psychiatry	Define and describe Forensic Psychiatry.
		Describe different terms used in Forensic Psychiatry: a) Affect b) Confabulation c) Delirium d) Delusion e) Fague f) Hallucination g) Illusion h) Intelligent Quotient i) Lucid Interval j) Neurosis k) Psychopath l) Psychosis m) Stupor
3	Mental health act	Define mental disorders based on mental health act
		Describe procedure of admission and discharge of mentally ill patient based on mental health act
		Describe procedure of handling a wandering lunatic
4	Will	Define testamentary capacity
		Enlist conditions required for a valid Will
		Describe the role of a doctor in taking a Will from a sick person
5	Civil and criminal responsibility of mentally ill patients	Explain the concept of civil and criminal responsibility of mentally ill patients
Community Medicine		
1	Mental health	Describe classification of mental health illnesses
		Define mental health
		Discuss global perspectives and epidemiology of mental health disorders
		Discuss risk factors leading to mental health problems
		Discuss prevention and control of mental health disorders
PRIME/MEDICAL EDUCATION		
1	Conflict resolution	Explain the prerequisites for conflict resolution as a leader
		Show the ability to solve problems regarding difficult patients/attendant.
Community medicine/biostatistics		
1	Biostatistics: Introduction	Describe the significance of biostatistics in health and epidemiology
2	Data and variable types	Define and classify variables

3	Sampling	Define sampling
		Discuss types of sampling
4	Biases in epidemiological studies	Define Bias
		Discuss different types of biases
		Discuss how bias can be prevented

Theme III: Right-sided weakness and inability to speak

S NO	Topic	Learning Outcomes
Pathology		
1	Hypoxia, ischemia, and infarction	Define hypoxia, ischemia, and infarction, and describe its morphology and consequences in the context of CNS involvement
2	Intracranial hemorrhage	Describe the aetiology, risk factors and morphology of intracranial hemorrhage
	Strokes syndromes	Describe the aetiology, risk factors, morphology, and clinical and radiological features of stroke
	Subarachnoid hemorrhage (SAH)	Explain the aetiology, risk factors and clinical features of SAH
General Medicine		
1	Stroke	Describe the risk factors of stroke
		Explain the types of strokes
		Describe the clinical features, radiological features, and management of a patient with intracerebral bleed
		Describe the clinical features, radiological features, and management of a patient with stroke due to an infarction
Community Medicine		
1	Non-communicable diseases: Strokes	Discuss the epidemiological determinants of stroke in community
		Discuss the prevention and rehabilitation of strokes
Neurosurgery		
1	Stroke	Describe the neurosurgical management of stroke and Subarachnoid hemorrhage
Community Medicine/biostatistics		
1	Measures of central tendency	Classify measures of central tendency
		Interpret and signify the results
		Describe the advantages and disadvantages of different measures
2	Measures of dispersion	Classify measures of dispersion
		Calculate measures of dispersion
		Interpret the results of measures of dispersion
		Explain the advantages and disadvantages of measures of dispersion
		Explain the use of different measures in specific circumstances
3	Normal distribution	Define normal distribution

		Describe normal distribution
		Calculate and graphically represent normal distribution
		Explain its use & significance in relation to data
		Describe percentile and interquartile range
		Calculate and depict percentile and interquartile range
		Explain use and significance of these in different situations
4	Confidence Interval, Confidence level, Standard error	Define confidence level and interval
		Describe confidence level and interval
		Calculate confidence level and interval
		Explain their use and significance in different situations
5	P value, critical region, rejection	Define P value, critical region, rejection region, α ß errors
7	Region, alpha beta errors	Describe P value, critical region, rejection region, α ß errors
		Calculate P value, critical region, rejection region, α ß errors
		Describe their use and significance in different situations

Theme IV: Loss of consciousness and Fits

S#	Topics	LEARNING OUTCOMES
General Medicine		
1	Seizures	Define seizures
		Differentiate between a seizure and syncope
		Classify epilepsy
		Explain the pathophysiology, clinical features, risk factors, investigations and treatment of Tonic-Clonic epilepsy
		Explain the pathophysiology, clinical features, investigations and treatment of absence seizures
		Explain the pathophysiology, clinical features, investigations and treatment of psychomotor epilepsy
		Explain the management of a patient with status epilepticus
Anesthesia		
1	Anesthesia	Define anesthesia
2	Introduction to the subject	Describe different types of anesthesia
3	General anesthesia	Describe the methods of induction of anesthesia
4	Neuroaxis block	Describe the following terms: Spinal block Epidural block • Caudal block Combined spinal /Epidural
5	Regional anesthesia	Describe the following terms: Nerve block

		Single shot • Continuous infusion Local infiltration
6	Preoperative evaluation and risk assessment	Explain the purpose of preoperative evaluation
		Perform risk assessment of patient undergoing general anesthesia
		Describe the steps of history taking in preoperative evaluation for anesthesia
		Describe the plans of general and regional anesthesia techniques
		Describe the ASA classification for pre-operative risk assessment
7	Monitoring in Anesthesia	Describe the non-invasive and invasive techniques of patients` monitoring for the following parameters during general anesthesia Non-invasive: Oxygenation Hemodynamic Temperature Electrical activity Neuromuscular activity
Pharmacology		
1	Anti-seizure drugs (Anti-epileptics)	Classify anti-seizure drugs
		Enlist the “Broad-spectrum” anti-epileptics (Valproate and Lamotrigine)
2	Carbamazepine	Describe the mechanism of action, clinical uses, adverse effects and drug interactions of Carbamazepine
3	Phenytoin	Describe the pharmacokinetics of Phenytoin with reference to the phenomenon of zero-order kinetics
		Describe the mechanism of action, clinical uses, adverse effects and drug interactions of Phenytoin
4	Valproate	Describe the mechanism of action, clinical uses, adverse effects and drug interactions of Valproate
5	Ethosuximide	Describe the mechanism of action, clinical uses and adverse effects of Ethosuximide
6	Phenobarbitone	Describe briefly the historic role of phenobarbitone in the management of epilepsy
7	Benzodiazepines	Name the benzodiazepines used in the management of epilepsy
8	Lamotrigine, Topiramate and others Status epilepticus General anesthetics	Name the new antiepileptic drugs
		Describe the mechanism of action, clinical uses and adverse effects of Lamotrigine and Topiramate
		Describe the use of antiepileptics during pregnancy
		Describe drug interaction of antiepileptics with oral contraceptive pills
		Describe the management of status epilepticus
		Describe the stages of general anesthesia
		Describe balanced anesthesia
9	Inhaled anesthetics (N_2O, Halothane, Isoflurane, Sevoflurane, Desflurane)	Describe the pharmacokinetics of Inhaled anesthetics
		Discuss the clinical significance of Blood: Gas partition coefficient of Inhaled

		anesthetics
		Describe the mechanism of action of Inhaled anesthetics
		Define MAC_{50} (minimum Alveolar Concentration- 50%)
		Describe the significance of MAC_{50}
		Describe the pharmacological effects of Inhaled anesthetics
		Describe the adverse effects of Inhaled anesthetics
		Describe second gas effect
		Describe diffusion hypoxia
		Describe Malignant hyperthermia and its management
		Describe the properties of an ideal inhaled anesthetic
10	IV anesthetics (Thiopentone, Propofol, Etomidate, Ketamine, Midazolam, Fentanyl)	Describe the mechanism of action, clinical use and adverse effects of Intravenous anesthetics
		Describe re-distribution of Thiopentone
		Define neuroleptanalgesia and neuroleptanaesthesia
		Describe dissociative anesthesia
		Name the anesthetic agent that causes dissociative anesthesia
		Describe TIVA (Total Intravenous Anesthesia) technique
	Pre-anesthetic medications Obstetric analgesia	Describe Pre-anesthetic medications
		Describe the drugs used as Pre-anesthetic medications
		Describe the drugs for obstetric analgesia
Forensic Medicine		
1	Deliriant Poisons • Dhatura • Hyoscyamus nigra Cannabis indica	Describe and enlist Deliriant poisons.
		Describe mechanism of action of the Deliriant poisons.
		Describe different sign, symptoms and autopsy appearance in a typical of Deliriant poisons.
		Describe fatal dose, treatment, and diagnosis of the Deliriant poisons.
		Describe medico-legal importance of the Deliriant poisons.
		Describe and enlist Deliriant poisons.
Community Medicine/biostatistics		
1	Z test & it's application, Types / Shapes of frequency distribution	Define & describe 'z' test
		Describe its use in different statistical settings
		Calculate 'z' test
		Explain its application in hypothesis testing
		Interpret and apply to clinical settings
		Discuss various shapes of frequency distribution
		Describe the applications of parametric and non-parametric tests

Theme V: Tremors

S NO	Topics	Learning Outcomes
Pathology		
1	Neurodegenerative	Describe the aetiology, risk factors, morphology and

	disorders: • Alzheimer`s disease • Parkinson`s disease • Huntington's Disease and Spinocerebellar ataxias Motor Neuron disease	clinical features of Alzheimer`s disease
		Describe the ethology, risk factors, morphology and clinical features of Parkinson`s disease
		Describe the aetiology, risk factors, morphology and clinical features of Huntington`s disease
		Describe the clinical features of spinocerebellar ataxias
General Medicine		
1	Parkinson`s disease	Describe the aetiology, risk factors, morphology and
		clinical features of Motor Neuron Disease
		Describe the types, clinical presentation and management of Motor neuron disease
Pharmacology		
1	Drugs for Parkinsonism	Classify drugs for Parkinsonism
2	Levodopa (with Carbidopa)	Describe the pharmacokinetics, mechanism of action, adverse effects, contraindications and drug interactions of Levodopa
		Discuss the rationale of combining Carbidopa (or Benderizine) with levodopa
		Describe the on-off phenomenon
		Describe the end-of-dose akinesia
3	Bromocriptine	Describe "drug holidays" for Levodopa
		Describe the mechanism of action, clinical uses and adverse effects of Bromocriptine
4	Selegiline	Describe the mechanism of action and clinical uses of Selegiline
		Describe the differentiating point regarding the use of Selegiline as antiparkinsonian drug and its use as an antidepressant drug
5	Apomorphine	Describe the mechanism of action and clinical use of Apomorphine
6	Drug-induced Parkinsonism	Enlist the drugs causing Parkinsonism-like symptoms
		Enlist the drugs used in the management of drug- induced Parkinsonism
		Describe the rationale of avoiding Levodopa in drug-induced Parkinsonism
Paediatric		
	Cerebellar ataxias	Describe the clinical features and management of Friedreich's Ataxia
Community medicine/biostatistics		

1	"t" test & its application	Define & describe 't' test
		Explain its use in different statistical settings
		Calculate 't' test
		Describe its application in hypothesis testing
		Interpret and apply to clinical settings
		Calculate degree of freedom
		Chi square test & its application
		Describe its use in different statistical settings
		Calculate 'x2' test
		Explain its application in hypothesis testing
		Interpret and apply to clinical settings
2	Correlation, regression	Describe Correlation & Regression
		Interpret and apply to clinical settings
	Practical Problems in biostatistics	Discuss practical problems encountered in the application of biostatistics and SPSS

Theme VI: Headache		
S No	**Topics**	**Learning Outcomes**
Pathology		
1	Meningitis	Explain the aetiology, clinical features, investigations and complications of acute pyogenic meningitis
		Explain the aetiology, clinical features, investigations and complications of Tuberculous meningitis
2	Encephalitis	Explain the aetiology, clinical features, investigations and complications of viral encephalitis
3	Brain abscess	Explain the aetiology, clinical features, investigations and complications of brain abscess
4	Cerebral Toxoplasmosis	Explain the aetiology, clinical features, investigations and complications of Cerebral Toxoplasmosis
5	Tumours of CNS Gliomas Embryonal neoplasms Meningioma Other neoplasms	Describe the classification of brain tumours on the basis of primary and secondary origin and benign and malignant
		Describe the classification, gross and microscopic morphology and clinical features of Gliomas
		Describe the classification, gross and microscopic morphology and clinical features of embryonal neoplasms of brain
		Describe the gross and microscopic morphology and clinical features of Meningioma
		Enlist brain neoplasms other than gliomas, meningioma and embryonal cell neoplasms
		Enlist the metastatic bra neoplasms
Pharmacology		
1	Migraine and Cluster headaches	Classify drugs used for the treatment of Migraine and Cluster headaches
		Enlist the drugs used for the prophylaxis of Migraine and Cluster headaches
2	Triptans (Sumatriptan and others)	Describe the mechanism of action, clinical use and adverse effects of Sumatriptan
3	Ergot alkaloids	Enlist Ergot alkaloids
		Describe the pharmacological effects of Ergot alkaloids
4	Ergotamine	Describe the mechanism of action, clinical use and adverse effects of Ergotamine
Forensic Medicine		
1	Head Injury	Describe head injury in relation to scalp and skull injuries.
		Classify different varieties of skull fractures.
		Explain commonest site of skull fracture.
		Describe mechanism of cerebral injury including coup and counter coup mechanism.
		Describe injuries to cranial content and its medicolegal importance.
		Describe intracranial hemorrhages and its types in detail as per medicolegal point of view.
		Describe the medicolegal aspects of Punch-drunk syndrome

General Medicine		
1	Meningitis	Explain the aetiology, pathogenesis, clinical presentation, investigations and management of Acute pyogenic meningitis
		Explain the aetiology, pathogenesis, clinical
		presentation, investigations and management of Tuberculous meningitis
Community medicine		
1	Rabies	Explain the aetiology, clinical presentation of a patient with Rabies
		Describe post-exposure prophylaxis of Rabies
Family medicine		
1	Rabies prophylaxis	Describe the types of wounds inflicted by rabid dog bite
		Explain the types of active and passive immunization for Rabies post-exposure prophylaxis
		Describe the indications of Rabies vaccine and immunoglobulins
Paediatric		
1	Meningitis	Explain the aetiology, pathogenesis, clinical presentation, investigations and management of Acute pyogenic meningitis in children and neonates
2	TBM	Explain the aetiology, pathogenesis, clinical presentation, investigations and management of Acute pyogenic meningitis in children
Psychiatry		
1	Chronic daily headache	Differentiate between neurological and psychological headache (chronic tension headache)
		Identify the red signs in patients with headache
		Describe the principles of management of acute and chronic headaches
PRIME/RESEARCH		
1	Data analysis	Use MS Excel for data analysis / Use SPSS for data analysis
		Use Endnote for reference management
		Compile, analyze and write a dissertation
Theme VII: Paraplegia		
S No	**Topic**	**Learning Outcomes**
Pathology		
1.	Multiple sclerosis and other demyelinating disorders of CNS	Explain the pathogenesis, morphology and clinical features of multiple sclerosis
		Describe the morphology of the Acute demyelinating encephalomyelitis Acute necrotizing hemorrhagic encephalitis
Forensic Medicine		
1	Neurotoxins	Describe and enlist spinal poison.
		Describe mechanism of action for the spinal poison.
		Describe different sign, symptoms and autopsy appearance

		in a typical case of spinal poisons.
		Describe fatal dose, treatment, and diagnosis for the spinal poisons.
		Describe medico-legal importance for the spinal poisons.
		Describe vertebral and spinal injuries
2	Snake bite neurotoxins	Describe different sign, symptoms and autopsy appearance in a typical case of snake bite poisons
3	Botulism toxins	Describe different sign, symptoms and autopsy appearance in a typical case of botulism
General Medicine		
	Multiple sclerosis	Explain the pathophysiology, clinical features and management of Multiple sclerosis
	Transverse myelitis	Describe the aetiology, pathophysiology, clinical features and management of Transverse myelitis
	Caries spine	Explain the pathophysiology, clinical features, investigations and management of Caries spine
Orthopedics		
		Describe the general management of a patient with traumatic paraplegia
Neurosurgery		
		Describe the general management of a patient with traumatic paraplegia
		Describe the types, clinical features and surgical management of spinal Tumours

Theme VIII: Numbness and tingling		
S#	**Topics**	**LEARNING OUTCOMES**
Pathology		
1	Patterns and types of peripheral nerves injury	Describe the patterns and types of neuronal injury
2	Acute and chronic demyelinating neuropathies	Describe the pathophysiology and clinical features of Guillain Barre syndrome
		Explain the pathophysiology of Chronic demyelinating polyneuropathies
3	Myasthenia Gravis	Describe the pathophysiology and clinical features of Myasthenia Gravis
4	Tumors of Peripheral nerve	Enlist the tumours of peripheral nerves
		Describe the clinical features, of Neurofibromatosis
Pharmacology		
1	Local an aesthetics (Lignocaine and others)	Classify Local anaesthetics
		Enlist the Local anaesthetics used for surface anaesthesia
		Enlist the Local anaesthetics used for infiltration anaesthesia, nerve block, spinal anaesthesia and epidural anaesthesia
		Describe EMLA (Eutectic Mixture of Local Anaesthetics) and its clinical use
		Describe the pharmacokinetics of Local anaesthetics
		Describe the mechanism of action of Local anaesthetics
		Describe the pharmacological effects of Local anaesthetics on nerves
		Describe the differential blockade of peripheral nerves by Local anaesthetics
		Describe the pharmacological effects of Local anaesthetics on other excitable membranes
		Describe the clinical uses of Local anaesthetics
		Describe the major advantages of adding Adrenaline to Lignocaine for infiltration anesthesia
		Calculate the quantity of Adrenaline/ml in the traditionally used combinations of Adrenaline and Lignocaine (i.e. 1:200,000 & 1: 80,000)
		Describe the adverse effects of Local anaesthetics
		Classify Local anaesthetics
Forensic Medicine		
1	Neurotoxins: Peripheral poison	Describe and enumerate peripheral poisons.
		Describe mechanism of action for the peripheral poisons.
		Describe different sign, symptoms and autopsy appearance in a typical of peripheral poisons.
		Describe fatal dose, treatment, and diagnosis for the peripheral poisons.
		Describe medico-legal importance for the peripheral poisons.

General Medicine		
1	Guillain Barre syndrome	Explain the pathophysiology, clinical features and management of Guillain Barre syndrome
2	Neuropathies	Describe the causes, types, distribution and clinical features of different neuropathies
3	Myasthenia Gravis	Explain the pathophysiology, clinical features and management of Myasthenia Gravis
		Describe the clinical features, types and management of Neurofibromatosis
Paediatric		
1	Hereditary neuropathies	Describe the types, clinical features and management of hereditary neuropathies
Orthopedics		
1	Peripheral nerve injury	Describe the types and management of peripheral nerve injury
		Explain entrapment neuropathies
		Describe the risk factors, clinical features and management of Carpal tunnel syndrome

Practical Work		
S#	**Topics**	**LEARNING OUTCOMES**
Pathology		
1	CSF	Describe the chemical, cytological composition of CSF
		Estimate the following analysis of CSF: • Chemistry • Cytology • Gram stain • Microbiology
2	Histopathological specimens of brain Tumours	Identify the gross structure and microscopic features of: • Meningioma • Glioma/Astrocytoma
Pharmacology		
1	Depression	Formulate a prescription for a newly diagnosed case of depression
2	Epilepsy	Formulate prescriptions for patients with Tonic-Clinic and Petit-mal epilepsy
3	Migraine headache	Formulate prescription for a patient with migraine headache
Forensic medicine		
1	Somniferous poisons	Recognition of Opium and Heroin
2	Inebriant poisons	Recognition of Ethyl Alcohol and its examination
3	Fuel	Recognition of Kerosene oil

4	Deliriant	Recognition of Dhatura and Cannabis
5	Spinal poison	Recognition of Nux Vomica seeds
Community medicine		
1	Data presentation pie chart histogram bar chart and its types Venn diagram scatter plot	Identify and interpret the charts
2	Application and Interpretation of statistical data	Apply a statistical test on a given scenario
3	Data interpretation	Interpret the normal distribution curve, skewed distribution, bi and poly-modal distribution & Standard Normal Curve

Paper-J (Neurosciences-2)

Table-1: MCQs

Subject	Total MCQs
Pharmacology	20
Pathology	22
Forensic medicine	18
Community medicine	27
PRIME	02
Medicine	11
Psychiatry	09
Neurosurgery	02
Pediatrics	05
Anaesthesia	03
Family medicine	01
Total	**120**

Table-2: OSPE/OSCE

Subject	Viva stations	Total OSPE/OSCE stations	Total stations
Pharmacology	2	3	5
Pathology	2	2	4
Forensic medicine	2	2	4
Community medicine	2	3	5
Medicine (Neurological examination)	X	1	1
Psychiatry (counselling)	x	1	1
Total	8	12	20

* A minimum of 20 stations will be used in final exams. Total marks will be 120 (6 marks for each station).

BLOCK-K

(GIT & HEPATOBILIARY-II)

GIT & HEPATOBILIARY-II

Themes

S. No	Themes	Duration Weeks
1	Difficulty in swallowing	1
2	Pain epigastrium	1
3	Pain right upper abdomen	2
4	Diarrhea and constipation	3
5	Bleeding Per Rectum	1

General Learning Objectives

By the end of GIT-II Module, 4th year MBBS students will be able to:

Knowledge:

1. Describe the etiology, pathogenesis, morphology, clinical features, laboratory diagnosis, medical and surgical management of diseases of GIT & hepatobiliary system.
2. Interpret the liver function tests in different hepatic diseases.
3. Describe the basic and clinical pharmacology of drugs used in GIT & hepatobiliary diseases.
4. Describe medico legal aspects of abdominal trauma.
5. Describe medico legal aspects of vegetable acid, corrosive and irritants poisoning.
6. Describe the epidemiology and prevention of malnutrition and viral hepatitis.
7. Analyze demographic processes in context of public health care.

Skills:

1. Describe the etiology, pathogenesis, morphology, clinical features, laboratory diagnosis, medical and surgical management of diseases of GIT & hepatobiliary system.
2. Interpret the liver function tests in different hepatic diseases.
3. Write prescriptions for common GIT & hepatobiliary disorders.
4. Describe medico legal aspects of abdominal trauma.
5. Analyze demographic processes in context of public health care.

Attitude:

1. Write prescriptions for common GIT & hepatobiliary disorders.
2. Describe medico legal aspects of abdominal trauma.
3. Describe medico legal aspects of vegetable acid, corrosive and irritants poisoning.
4. Describe the epidemiology and prevention of malnutrition and viral hepatitis.

Specific Learning Objectives

Theme-1 (Difficulty in swallowing)		
S No	**Topic**	**LEARNING OUTCOMES**
Pathology		
1	Salivary Gland (Inflammation and tumors)	Classify the inflammatory and neoplastic diseases of salivary gland.
		Describe the etiology, morphology, and clinical presentation of inflammatory and neoplastic diseases of salivary gland.
2	Esophagus	Classify esophagitis.
		Describe the etiology, pathophysiology, morphology, clinical presentation, and complications of esophagitis
		Classify esophageal tumors.
		Describe the etiology, pathogenesis, morphology, clinical presentation, diagnosis, and complications of esophageal tumors
Medicine		
1	Oral Cavity Diseases	Discuss the etiology of stomatitis and Aphthous ulcers
		Discuss the clinical features of stomatitis and Aphthous ulcers
		Discuss the investigations of stomatitis and Aphthous ulcers
		Devise a management plan for stomatitis and Aphthous ulcers
2	Esophagus:	Discuss the causes of esophageal motility disorders
		Discuss the clinical features of esophageal motility disorders
3	Esophageal motility disorders	Discuss the relevant investigations of esophageal motility disorders
		Devise a management plan of esophageal motility disorders
4	Esophagitis	Discuss the etiology of esophagitis
		Discuss the clinical features of esophagitis
		Discuss the appropriate diagnostic testing for esophagitis
		Devise a management plan for esophagitis
5	Cardia achalasia	Discuss the etiology, clinical features, investigations, and management of Cardia achalasia
6	Gastro Esophageal reflux disease (GERD)	Discuss the risk factors, etiology, clinical features, investigations, complications, and management of GERD
ENT		
1	Cleft lip and palate	Discuss the etiology, clinical features, investigations, complications and management of cleft lip and palate
2	Pharyngitis and Tonsillitis	Discuss the etiology, clinical features, investigations, complications and management of Pharyngitis and acute Tonsillitis
		Explain the clinical features, and management of

		peritonsillar abscess
		Discuss the classification, etiology, clinical features, investigations, and management of Chronic Tonsillitis
3	Oropharyngeal cancer	Discuss the classification, etiology, clinical features, investigations, and management of oropharyngeal cancers
4	Salivary glands	Classify diseases of the salivary glands
		Explain the etiology, clinical features, investigations, and management of Mumps, and Sialadenitis
		Explain the etiology, clinical features, investigations, and management of salivary ducts stones
5	Dysphagia	Explain the types, etiology, clinical features, investigations, and management of a patient with dysphagia
Surgery		
1	Tumors of the esophagus	Discuss the classification, etiology, clinical features, investigations, staging and management of Esophageal cancers
2	Para-esophageal hiatus hernia	Explain the etiology, clinical features, investigations, and management of Para-esophageal hiatus hernia
PRIME/MEDICAL EDUCATION		
1	Social accountability	Explain the concept of social accountability
		Differentiate between different social accountability issues

Theme-2 (Epigastric pain)		
S No	**Topic**	**LEARNING OUTCOMES**
Pathology		
1	Gastritis	Explain the types, etiology, microscopic morphology, and clinical features of Gastritis
2	Peptic ulcers	Discuss the etiology, pathophysiology, morphology, complications, and lab. diagnosis of peptic ulcer disease
		Discuss the role of H. Pylori & campylobacter in the causation of Peptic ulcer disease
		Discuss the morphology, virulence factors and lab diagnosis of H. Pylori & campylobacter
3	Gastric polyps and tumors	Classify gastric polyps and tumors
		Describe the pathogenesis, morphology, lab diagnosis and complications of gastric polyps and tumors.
Medicine		
1	Gastritis	Explain the types, etiology, clinical features, investigations, management, and complications of Gastritis
2	Peptic ulcer disease	Explain the types, etiology, clinical features, investigations, management, and complications of Gastritis
		Describe H.pylori eradication therapy protocols in
3	Upper GI Bleeding	Explain the etiology, clinical features, investigations, and management of a patient with upper GI bleeding
		Describe the indications and procedures of pharmacological and endoscopic treatment of variceal bleeding
Pharmacology		
1	Anti-emetics	Classify anti-emetic drugs
		Describe the mechanism of serotonin antagonists as anti-emetic agents.
		Enlist the clinical uses (anti-emetic) and adverse effects of serotonin antagonists.
		Describe the pharmacological basis of serotonin antagonists in chemotherapy induced vomiting
		Describe the mechanism of H1-antagonists as anti-emetic agents.
		Enlist the clinical uses (anti-emetic) of H1-antagonists.
		Describe the mechanism of anticholinergic drugs as anti-emetic agents.
		Enlist the clinical uses (anti-emetic) of anticholinergic drugs.
		Describe the pharmacological basis of scopolamine in motion sickness
		Describe the anti-emetic mechanism of D2-receptor blockers (Metoclopramide & Domperidone).
		Enlist the clinical uses (anti-emetic) and adverse effects of D2- receptor blockers.
		Compare the pharmacological features of metoclopramide & Domperidone.

		Describe the drug interaction of metoclopramide
		Describe the mechanism of neuroleptics as anti-emetic agent.
		Enumerate the clinical uses (anti-emetic) of neuroleptic drugs.
		Describe the antiemetic mechanism of benzodiazepines.
		Describe the antiemetic mechanism of glucocorticoids.
		Enumerate the indications (anti-emetic) of glucocorticoids.
		List anti-emetic drugs used in morning sickness.
		List anti-emetic drugs used in chemotherapy induced vomiting.
2	Drugs used in the treatment of variceal bleeding	Enlist the drugs used in variceal hemorrhage
		Describe the mechanism of somatostatin and octreotide in variceal hemorrhage
		Describe the mechanism of Vasopressin & Terlipressin in variceal hemorrhage
		Describe the mechanism of beta-blockers in variceal hemorrhage
3	Drugs used in the treatment of Peptic ulcer disease and Gastritis	Classify the drugs used in Peptic ulcer disease
		Describe the mechanism of action, indications, and adverse effects of proton pump inhibitors (PPIs).
		Describe the pharmacokinetics of PPIs with special emphasis on time of administration
		Describe the drug interaction of Omeprazole & H2 blockers with Sucralfate
		Describe the drug interaction of Omeprazole with Clopidogrel
		Describe the mechanism of action, indications, and adverse effects of H-2 blockers.
		Compare/differentiate H2-blockers in terms of bioavailability and involvement in drug interactions
		Describe the mechanism of action, indications, and adverse effects of Antacids.
		Enumerate the properties of an ideal antacid.
		Describe the pharma kinetics of antacids with special emphasis on time of administration
		Describe the drug interactions of antacids with tetracyclines, iron and fluroquinolones.
		Describe the mechanism of sucralfate in the treatment of peptic ulcer
		List the indications of sucralfate.
		Discuss the drug interaction of sucralfate with digoxin, ketoconazole and tetracyclines.
		Describe the pharmacokinetics of sucralfate with special emphasis on time of administration.
		Describe the mechanism, indications, and adverse effects of bismuth compounds.
		Describe the role of anticholinergic drugs in peptic ulcer.
		List the indications (anti-peptic ulcer) of anticholinergic drugs.
		Discuss the pharmacological basis for the use of prostaglandin analogues (Misoprostol) in the treatment of peptic ulcer.
		List the contraindications of misoprostol.

		Describe triple therapy for the eradication of H.pylori infection.
		Describe quadruple therapy for the eradication of H.pylori infection
4	Common house-hold poisons	Enlist, domestic, medicinal, and garden poisons commonly used
5	Corrosives/Mineral acids	Enlist different commonly used mineral acids
		Enumerate physical appearance and uses of Sulphuric acid
		Describe mechanism of action, fatal dose & period of Sulphuric acid
		Describe clinical features and treatment of Sulphuric acid burns
		Describe postmortem appearance and forensic importance of Sulphuric acid burns
		Enumerate physical appearance and uses of nitric acid
		Describe mechanism of action and fatal dose & period of nitric acid
		Describe clinical features and postmortem appearance of nitric acid burns
		Enumerate physical appearance and uses of hydrochloric acid
		Describe clinical features and postmortem appearance of hydrochloric acid burns.
6	Corrosives/ Alkali	Enlist different commonly used alkali.
		Enumerate physical appearance and uses of alkali
		Describe mechanism of action, clinical features, and treatment of alkali burns.
		Describe postmortem appearance and forensic importance of alkali burns.
7	Corrosive/ organic acid	Enlist different commonly used organic acids.
		Enumerate physical appearance and uses of carbolic acid.
		Describe mechanism of action, fatal dose & period of carbolic acid.
		Describe clinical features and treatment of carbolic acid poisoning.
		Describe postmortem appearance and forensic importance of carbolic acid poisoning.
		Enumerate physical appearance and uses of oxalic acid.
		Describe mechanism of action, fatal dose & period of oxalic acid.
		Describe clinical features and treatment of oxalic acid poisoning.
		Describe postmortem appearance and forensic importance of oxalic acid poisoning.
8	Corrosive/vegetable acid and cyanides	Enumerate physical appearance, sources, and uses of cyanides.
		Describe mechanism of action, fatal dose & period of cyanides.
		Describe clinical features and treatment of cyanide poisoning.
		Describe postmortem appearance and forensic importance of cyanide acid poisoning.
		Enumerate physical appearance, sources, and uses of cyanides.

Surgery		
1	Gastric cancer	Describe the types, etiology, risk factors, lab diagnosis and management of a patient with gastric cancer.
2	Gastric outlet obstruction	Describe the etiology, diagnosis, and management of a patient with gastric outlet obstruction.
Community medicine and public health		
1	Health system of Pakistan: Introduction	Describe health care system of Pakistan using WHO Health system framework.
2	Primary health care (PHC)	Define PHC.
		Describe the history of development of PHC.
		Describe the concepts and components of PHC.
		Describe comprehensive & selective PHC.
		Describe reasons for failure of PHC.
		Describe Health Systems before & after PHC.
		Describe district health care system.
		Enumerate indicators for assessing PHC.
3	Health education	Define health education.
		Describe objectives and functions of health education.
		Describe the components of health education.
		Describe the methods of health education.
		Describe the communication channel in health education.
		Describe the constraints in health education.
		Describe classification of theories of health education
		Describe the stages in health education
		Describe the principles of health education
		Describe the strategies for an effective health education program
		Explain the methods of evaluation and effectiveness of a health education project
4	Health management information system (HMIS)	Define concept of HMIS
		Enumerate the components of HMIS
		Describe its importance in health care delivery system
		Enumerate the principles of HMIS
		Give the causes of failure of HMIS
5	Hospital administration	Define health care delivery system
		Describe the need of a specialized hospital administration
		Describe the attributes of a good hospital administrator
		Describe functions involved in hospital administration
		Describe the levels of hospitals and management levels in a hospital
6	Health plans - Longitudinal, horizontal, integrated, 5 year, ADP, SAP, Short term, long term	Describe different health plans
		Describe characteristics of health plans
7	Health plans - MDGs	Enumerate MDGS
		Describe targets & indicators of various health related MDGs
		Describe reasons for failure to achieve MDGS
8	Health plans – SDGs	Enumerate SDGs related to health
		Describe targets & indicators of various health related SDGs
		Describe Pakistan progress on set targets

9	Health planning	Define health planning
		Describe importance & use of planning in health
		Explain the reasons for ineffective health planning in Pakistan
		Describe health planning cycle
		Describe the types of health planning
10	Health economics	Define Health economics
11	Health policy	Explain the importance of economic studies in health
		Describe different tools used in economic evaluations
		Define health policy
		Describe its role in health system
		Describe different stages in policy making
		Describe the different types of policies
		Describe the constraints in policy making
		Describe health policy of Pakistan
12	Role of international health agencies in public health	Enumerate international health agencies working in health sector
		Discuss structure and function of WHO & UNICEF
		Explain the roles of WHO & UNICEF in Pakistan

Theme-3 (Pain right upper abdomen)		
S NO	**Topic**	**Learning Outcomes**
Anatomy		
1	Gross anatomy	Explain the lobes and segments of the liver
		Discuss the gross structure of gall bladder and biliary channels
		Explain the gross and microscopic structure of the pancreas
2	Liver histology	Explain the microscopic structure of the liver and gall bladder
3	Liver Function Tests	Enumerate the functions of the liver. Explain the significance of different liver function tests. Interpret the Liver function tests in different diseases.
4	Mechanisms of liver injury and repair	Describe the etiology and morphology of liver injury and repair
5	Acute Liver failure	Describe the etiology, pathogenesis, clinical and biochemical and other features of acute liver failure
6	Chronic Liver disease and liver cirrhosis	Describe the etiology, pathogenesis, clinical and biochemical and other features of chronic liver disease
		Explain the complications of liver cirrhosis
7	Portal hypertension	Describe the etiology, pathogenesis, clinical features and complication of portal hypertension
8	Viral hepatitis A and E	Explain the Etiology, pathogenesis, morphology and clinical features of Acute viral hepatitis A and E infection
9	Viral hepatitis B	Explain the Etiology, risk factors, pathogenesis, morphology and clinical features of Acute viral hepatitis B infection
		Explain the pathogenesis, morphology and clinical features of Chronic viral hepatitis B infection
		Discuss the stages of viral hepatitis B infections
		Discuss the complications of chronic Hepatitis B virus infection
		Discuss the serological markers of hepatitis B Virus infection
		Explain the preventive strategies of Hepatitis B virus infection
10	Viral Hepatitis C	Explain the Etiology, risk factors, pathogenesis, morphology and clinical features of viral hepatitis C infection
		Discuss the complications of chronic Hepatitis C virus infection
11	Autoimmune hepatitis	Define autoimmune hepatitis
		Explain the serological and morphological features of autoimmune hepatitis
12	Toxin and Drug induced hepatitis	Explain the etiology and morphological features of toxins and drug induced hepatitis
13	Alcoholic liver disease	Discuss the morphology, pathogenesis and complications of Alcoholic liver disease
14	Metabolic liver diseases Non-Alcoholic liver disease (NAFLD) Hemochromatosis Wilson`s disease Alpha-1 antitrypsin deficiency	Describe the morphology, clinical features and complications of NAFLD, Hemochromatosis, Wilson`s disease and Alpha-1 Anti-Trypsin deficiency
		Describe the etiology, morphology, clinical features and complications of Hemochromatosis
		Describe the etiology, morphology, clinical features and complications of Wilson`s disease
		Describe the etiology, morphology, clinical features and complication of Alpha-1 Anti-Trypsin deficiency
15	Liver abscess	Describe the etiology, pathogenesis, morphology,

		clinical presentation, complications and lab diagnosis of Liver abscess
16	Tumors of the liver	Classify liver tumors
		Explain the benign tumors of the liver
		Discuss the risk factors, etiology, morphology, clinical features, staging and complications of hepatocellular carcinoma
17	Gall bladder Gall stones Cholecystitis Gallbladder cancer	Discuss the types, risk factors, etiology, morphology, clinical features and complications of gall stones
		Discuss the risk factors, etiology, morphology, clinical features and complications of acute cholecystitis
		Discuss the risk factors, etiology, morphology, clinical features and complications of Chronic cholecystitis
		Discuss the risk factors, etiology, morphology, clinical features, staging and complications of carcinoma gall bladder
18	Pancreas	Enlist and define the congenital anomalies of pancreas
		Discuss the risk factors, etiology, morphology, clinical features and complications of acute pancreatitis
		Discuss the risk factors, etiology, morphology, clinical features and complications of chronic pancreatitis
		Describe the pathogenesis and complications of pancreatic pseudocyst
		Discuss the risk factors, etiology, morphology, clinical features, staging and complications of carcinoma of pancreas
Pediatrics		
1	Hereditary hyperbilirubinemias	Classify hereditary hyperbilirubinemias
		Explain the types, clinical features, investigations, and management of different hereditary hyperbilirubinemias
2	Acute hepatitis A	Explain the Etiology, pathogenesis, clinical features, investigations, and treatment of Acute viral hepatitis A infection
Medicine		
1	Hepatitis B virus infection	Explain the Etiology, pathogenesis, clinical features, investigations, and treatment of Acute viral hepatitis B infection
		Explain the Etiology, pathogenesis, clinical features, investigations, and treatment of chronic viral hepatitis B infection
2	Hepatitis C virus infection	Explain the Etiology, pathogenesis, clinical features, investigations, and treatment of chronic viral hepatitis C infection
		Explain the clinical features, investigations, management, and complications of liver cirrhosis
		Explain the treatment of a patient with hepatic encephalopathy
3	Metabolic liver	Discuss the management of a patient with Wilson`s disease

	diseases	Discuss the management of a patient with Hemochromatosis
		Discuss the management of a patient with primary biliary cirrhosis
		Discuss the management of a patient with autoimmune hepatitis
4	Hepatic vein obstruction	Discuss the etiology, clinical features, investigations and management of a patient with hepatic vein obstruction
5	Hepatocellular carcinoma	Explain the etiology, clinical features, investigations, treatment and complications of hepatocellular carcinoma
6	Carcinoma of the pancreas	Discuss the risk factors, etiology, clinical features, staging and complications of carcinoma of pancreas
Surgery		
1	Gall bladder and pancreas	Explain the etiology, clinical features, investigations, treatment and complications of gall stones
		Explain the etiology, clinical features, investigations, treatment and complications of acute and chronic cholecystitis
		Explain the etiology, clinical features, investigations, treatment and complications of acute and chronic pancreatitis
2	Carcinoma of the gall bladder	Discuss the risk factors, etiology, clinical features, staging and complications of carcinoma of gall bladder
3	Liver abscess	Explain the etiology, clinical features, investigations, treatment, and complications of liver abscesses
4	Hydatid liver cysts	Explain the etiology, clinical features, investigations, treatment, and complications of Hydatid liver cysts
Pharmacology		
1	Hepatotoxic drugs	Describe first pass hepatic metabolism
		Enlist common hepatotoxic drugs
		Explain the drug treatment of paracetamol poisoning
2	Drugs used in the treatment of hepatitis B	Classify the drugs for hepatitis B virus infection
		Describe the duration and adverse effects of drugs used in the treatment of chronic hepatitis B
3	Drugs used in the treatment of hepatitis C	Classify the drugs for hepatitis C virus infection
		Describe the duration and adverse effects of drugs used in the treatment of chronic hepatitis C
Community medicine		
1	Viral Hepatitis	Describe the epidemiological determinants of Hepatitis B & C
		Describe the prevalence and incidence with reference to local context
		Describe the preventive & control measures for Hepatitis B & C
Family Medicine		

1	Acute and chronic hepatitis	Explain the etiology and clinical features of acute hepatitis
		Explain the management strategies of acute hepatitis in family practice
		Explain the aetiology, clinical features, and complications of Chronic hepatitis
		Explain the management strategies of chronic hepatitis in family practice
		Describe the red flags in a patient with acute and chronic hepatitis for referral to specialty care

Theme-4: (Diarrhea and Constipation)		
Pathology		
1	Intestinal obstruction	Define hernia, adhesions, volvulus, and intussusception
2	Ischemic bowel disease	Describe the etiology, pathogenesis, morphology, and complications of small bowel ischemia
3	Diarrheas	Define malabsorption syndrome
		Classify diarrheas
		Explain the etiology, morphology, clinical features and complications of Celiac disease
4	Bacterial enterocolitis	Explain the etiology, pathogenesis, and clinical features of bacterial enterocolitis
		Explain the etiology, pathogenesis, morphology and clinical features of Salmonellosesis
5	Parasitic enterocolitis	Classify the parasites invading the small gut
6	Entamoeba histolytica	Discuss the life cycle, morphology, pathogenesis, clinical features, and complications of Amebiasis
7	Giardia lamblia	Discuss the life cycle, morphology, pathogenesis, clinical features, and complications of Giardiasis
8	Hymnologies nana	Discuss the life cycle, morphology, pathogenesis, clinical features, and complications of H. nana infestation
9	Diphyllobothrium latum	Discuss the life cycle, morphology, pathogenesis, clinical features, and complications of Diphyllobothrium latum
10	Schistosoma haematobium, mansoni and japonicum	Enlist physical characteristics of Trematodes.
		Classify Schistosoma based on organ systems affected
		Describe the routes of infection, pathophysiology life cycle, clinical features, and lab diagnosis of Schistosoma hematobium, mansoni and japoncum.
		Compare the morphological characteristics of eggs of different species of Schistosoma.
11	Ascaris lumbricoides	Discuss the life cycle, morphology, pathogenesis, clinical features, and complications of Ascaris lumbricoides
12	Strongylidae's	Discuss the life cycle, morphology, pathogenesis, clinical features, and complications of Strongyloides
13	Ankylostoma duodenale	Discuss the life cycle, morphology, pathogenesis, clinical features, and complications of Ankylosstoma duodenale
14	Enterobius vermicularis	Discuss the life cycle, morphology, pathogenesis, clinical features, and complications of Enterobius vermicularis
Medicine		
	Intestinal tuberculosis	Discuss the etiology, pathogenesis, clinicalfeatures, investigations, treatment, and complications of intestinal tubercuLearning Outcomesis
Surgery		
1	Acute appendicitis	Discuss the etiology, risk factors, pathogenesis, clinical features, differential diagnosis, investigations, treatment, and complications of acute appendicitis

2	Intestinal obstruction	Discuss the etiology, clinical features, investigations, management, and complications of intestinal obstruction
Pharmacology		
1	Antidiarrheal agents (Opioids, Colloidal bismuth compounds, Kaolin & Pectin, etc	Define and classify antidiarrheal agents
		Describe the mechanism of action of different antidiarrheal agents
2	Laxatives (Bulk-forming, stool softeners, osmotic laxatives, stimulant laxatives, etc.	Define and classify laxative drugs
		Describe the mechanism of action of different laxatives
3	Lactulose	Describe the pharmacological basis of Lactulose in the treatment of hepatic encephalopathy
4	Anti-amoebic drugs	Classify anti-amoebic drugs
		Describe mechanism of actions of Metronidazole & Dialoxanide. Furoate Describe the drug interaction of Metronidazole with Alcohol.
5	Anthelmintics	Classify Anti-Helminthic drugs
		Enumerate clinical use(s), adverse effects and contraindications of Albendazole, Mebendazole, Pyrantal Pamoate, Ivermectin, Praziquantel & Niclosamide
		Describe mechanism of action of Albendazole, Mebendazole, Pyrantal Pamoate, Ivermectin, Praziquantel & Niclosamide
6	Anti-Salmonellosis drugs	List the drugs used in enteric fever.
		Describe the basis for selection of antibiotics in enteric fever based on age, pregnancy, and resistance
		Describe the clinical applications of fluroquinolones in the treatment of gastrointestinal disorders
7	Irritants	Classify irritants poisons
8	Irritants: Metallic poisons	Enlist common metallic irritant poisons
		Describe physical appearance, uses, mechanism, fatal dose, fatal period and signs and symptoms of Copper and Mercury poisons
		Describe the treatment, postmortem appearance and medicolegal importance of common Copper and Mercury poisons
		Describe the signs and symptoms, treatment, postmortem appearance and medicolegal importance of acute and chronic Arsenic poisoning
		Describe the signs and symptoms, treatment, postmortem appearance and medicolegal importance of acute and chronic Lead poisoning
9	Irritants /mechanical	Enlist commonly encountered mechanical poisons
		Enumerate symptoms and signs, treatment, postmortem appearance and forensic importance of

	poisons/ powder glass Irritants/nonmetallic poisons	powder glass
		Enlist commonly encountered inorganic elements poisoning
		Enumerate physical appearance and uses of phosphorus
		Describe mechanism of action, fatal dose & period of phosphorus
		Describe clinical features and treatment of phosphorus poisoning
		Describe postmortem appearance and forensic importance of phosphorus poisoning
		Describe physical appearance, uses, mechanism of action, clinical features, treatment, postmortem appearance, and forensic importance of aluminum phosphide
		Describe physical appearance, uses, mechanism of action, clinical features, treatment, postmortem appearance, and forensic importance of chlorine
		Describe physical appearance, uses, mechanism of action, clinical features, treatment, postmortem appearance, and forensic importance of iodine
11	Irritants/vegetable poisons	Enlist commonly encountered inorganic elements poisoning.
		Describe characteristics, active principles, and
		Enumerate uses, fatal dose and fatal periods of vegetable poisons
		Describe treatment, postmortem appearance, and forensic importance of vegetable poisons
12	Irritants/animal poisons	Differentiate between poisonous and non-poisonous snakes
		Classify snakes based on their venom.
		Describe the characteristics of snake venoms
		Classify different snakes' venoms
		Describe steps of management of snake bite
		Describe postmortem appearance and medico legal aspects of venomous snake bite
		Describe sign and symptoms of scorpion bite
Community Medicine		
1	Overview of common intestinal worms' infestation and their control	Describe the common intestinal worm infestation in our local context
		Describe the epidemiological determinants of common worm infestation with reference to local context
		Describe the preventive & control measures for common worm infestation
2	Control of dysentery	Describe the epidemiology of Dysentery.
		Describe the prevention & control measures of Dysentery
3	Food hygiene	Describe the term food Hygiene
		Describe the importance of food hygiene
		Describe the process of Food hygiene
Family Medicine		
1	Enteric infections	Classify enteric infections

		Describe the etiology, clinical features, investigations, and management of Salmonellosis
		Describe the red flags in a patient with Salmonella infections for referral to specialty care
		Explain the etiology, and management of acute gastroenteritis
		Discuss the primary and secondary prevention of acute gastroenteritis in a primary healthcare setting
		Describe the red flags in a patient with acute gastroenteritis for referral to specialty care
Pediatrics		
1	Lactase deficiency	Describe the clinical features, investigations, complications, and management of Lactase deficiency
2	Infectious diarrhea	Describe the etiology, clinical features, investigations, complications, and management of infectious diarrhea in children
3	Celiac disease	Describe the etiology, clinical features, investigations, complications, and management of Celiac disease
Theme- 5 (Bleeding per Rectum)		
Pathology		
1	Inflammatory bowel disease (IBD)	Classify IBD
		Discuss the risk factors and etiology of IBDs
		Explain the pathogenesis clinical presentation of IBD
		Differentiate between Ulcerative colitis and Crohn`s disease
		Discuss the investigations and management of IBDs
		Explain the intestinal and extra-intestinal manifestations/complications of IBDs
		Explain the role of surveillance colonoscopy in patients with Ulcerative colitis
2	Diverticular disease	Explain the etiology, pathogenesis, morphology, and clinical features of Colonic diverticulosis
3	Colonic polyps	Classify colonic polyps.
		Describe the pathogenesis, morphology, clinical presentation, complications, and diagnosis of different types of colonic polyps
4	Hemorrhoids	Define hemorrhoids
		Explain the morphology, pathogenesis, and clinical features of Hemorrhoids
5	Colorectal carcinoma	Describe the adenoma carcinoma sequence
		Describe the pathogenesis, morphology, clinical presentation, complications and staging of colorectal Carcinoma
Surgery		
1	Ulcerative colitis	Explain the etiology, pathogenesis, clinical features, complications, and surgical management of Ulcerative colitis
2	Crohn`s disease	Explain the etiology, pathogenesis, clinical features, complications, and surgical management of Crohn`s disease

3	Diverticular disease	Explain the etiology, pathogenesis, clinical features, complications and management of Diverticulosis and Diverticulitis
3	Anal diseases: • fistula • fissures • hemorrhoids	Define perianal fistula and anal fissure
		Explain the risk factors and management of anal fistula and anal fissures
		Explain the risk factors and management of hemorrhoids
4	Colorectal cancers	Classify colorectal cancers
		Describe the staging of colorectal cancers
		Explain the pathogenesis, risk factors and clinical features of colorectal cancers
		Explain the complications, management, and prognosis of colorectal cancers
5	Ischemic Colitis	Explain the etiology, pathogenesis, clinicalfeatures, complications, and management of Ischemic colitis
Medicine		
1	Irritable bowel syndrome	Explain the risk factors, clinical features, and management of irritable bowel syndrome
2	Ulcerative colitis	Explain the etiology, pathogenesis, clinical features,complications, and surgical management of Crohn`s disease
3	Crohn`s disease	Explain the etiology, pathogenesis, clinical features, complications, and management of Crohn`s disease
4	Ano-rectal infections	Classify anorectal infections.
		Explain the risk factors, clinical features and management of anorectal infections including sexually transmitted infections
Pharmacology		
1	Drugs used in the treatment of irritable bowel syndrome (IBS)	Enlist the drugs used in IBS
		Describe the mechanism of action of antispasmodics (anticholinergics), 5-HT receptor antagonisms (Alosetron) in IBS
2	Drugs used in the treatment of IBD	Classify the drugs used in IBD
		Describe the mechanism of actions of aminosalicylates, glucocorticoids, purine analogues, methotrexate, monoclonal antibodies, and anti-integrin in IBDs
		Explain the adverse effects of drugs used in the treatment of IBD
Forensic Medicine		
1	Abdominal injuries	Describe injuries to abdominal wall
		Describe injuries to esophagus, intestine, and stomach
		Describe injuries to liver and spleen.

Practical Work		
Pathology		
1	Ascaris Lumbricoides	Identify the important morphological and staining characteristics of the ova
2	Enterobius vermicularis	Identify the important morphological and staining characteristics of the ova
3	Ancylostoma duodenale	Identify the important morphological and staining characteristics of the ova
4	Liver Function Tests	To interpret normal and abnormal liver function tests in different clinical scenarios
Pharmacology		
1	Peptic ulcer disease	construct prescription for Helicobacter-associated peptic ulcer disease (Triple therapy & Quadruple therapy)
2	Anti-emetics	construct prescriptions for motion sickness, morning sickness, post-operative patient
		construct prescriptions for cancer chemotherapy-induced vomiting
		construct a prescription for a patient suffering from amoebic dysentery
3	Enteric fever	construct a prescription for a patient suffering from Enteric fever
		Write a prescription for a patient suffering from Ascariasis
Forensic Medicine		
1	Poisons	Identify corrosives
2	Corrosives	Case presentation of vitriol age
3	Irritants	identify common irritant poisons
3	Metallic poisons	identify common Metallic and non-metallic poisons
4	Vegetable and animal poisons	identify common Vegetable and animal poisons
Community Medicine		
1	Protein calorie malnutrition	Identify the model
		Differentiate between the clinical features of 2 models
		Justify its public health importance
		Signify the concept of food fortification and food adulteration
2	My food plate/ The pyramid	Identify the model
		Describe different components of the model
3	Health education	identify a health education message on the problem/scenario provided
		Formulate a health education message on the problem/scenario provided

4	House fly /arthropods	Identify the model
		Explain the disease caused by this vector and its control
5	Aedes Egypt	Identify the model
		Explain the disease caused by this vector and its control
6	Autoclave	Identify the model
		Explain the types of items for which autoclaves are used
		Explain the steps of instruments sterilization

Paper-K (GIT and Hepatobiliary-II)

Table: MCQs

Subject	Total MCQs
Pharmacology	16
Pathology	41
Forensic medicine	16
Community medicine	18
PRIME	01
Medicine	11
Surgery	12
Pediatrics	03
Family medicine	02
Total	**120**

Table: OSPE

Subject	Viva stations	OSPE/OSCE stations	Total
Pharmacology	2	2	4
Pathology	2	2	4
Forensic medicine	2	2	4
Community medicine	2	4	6
Medicine (GIT examination)	x	1	1
Surgery (GIT/local examination)	x	1	1
Total	8	12	20

* A minimum of 20 stations will be used in final exams. Total marks will be 120 (6 marks for each station).

BLOCK-L

(RENAL-II, Endocrine & Reproduction-II)

RENAL-II

Themes

S#	Theme	Duration in Weeks
1	Facial swelling	1 week
2	Scanty Urine	2 weeks
3	Loin pain and dysuria	
4	Urinary retention	

General Learning Objectives

By the end of Renal Module, 4th year MBBS students will be able to:

Knowledge:

1) Describe applied anatomy of Urinary System with video demonstration
2) Discuss physiology of the renal system
3) Describe the different Acid-base Disorders and the Mechanism for maintaining Acid-base Balance
4) Classify the diseases involving glomeruli, tubules, interstitium, renal blood vessels, Chronic nephron loss, Cystic, urine out flow obstruction, congenital-developmental and neoplastic diseases of renal system
5) Describe the etiology, pathogenesis, clinical manifestations, diagnosis, and prognosis of the renal system diseases.
6) Describe the Pharmacology of drugs used in the treatment of Renal System Diseases.
7) Describe ethics of Organ Transplantation.
8) Describe prevalence of renal diseases.
9) Describe the clinical features of renal diseases.
10) Enumerate/Describe various renal diseases primarily effecting pediatrics age

group.

11) Describe pathogenesis and management of renal stones.
12) Describe pathogenesis and management of bladder outlet obstruction (BOO).

Skills:

1) Describe applied anatomy of Urinary System with video demonstration
2) Perform various practical's used in laboratory diagnosis of renal diseases.
3) Diagnose & manage Acute &Chronic Kidney Disease, Nephrotic, Nephritic Syndromes, Urinary Tract Infections.
4) Management of Urinary Tract Infections, Chronic Kidney Diseases & Renal Transplant patients during Pregnancy.
5) Describe pathogenesis and management of renal stones.
6) Describe pathogenesis and management of bladder outlet obstruction (BOO).

Attitude:

1. Describe ethics of organ transplantation.
2. Management of urinary tract infections, chronic kidney diseases, and renal transplant patients during pregnancy.

Specific Learning Objectives

Theme I: Facial Swelling		
S No	**Topic**	**LEARNING OUTCOMES**
Anatomy		
1	Describe applied anatomy of renal system	Discuss the gross anatomical features (internal and external) of kidney.
		Describe the structures entering and leaving the hilum of kidney along with their relations.
		Discuss the lympho-vascular supply of kidney.
Physiology		
1	GFR	Describe glomerular filtration rate (GFR), determinants of GFR and estimation of GFR.
2	Absorption of water and Solutes	Describe the absorption of water and solutes along different parts of nephron
Biochemistry		
1	Acid-base Balance	Describe the mechanisms for maintaining the Acid-base Balance.
2	Acid-base Disorders	Describe different Acid-base Disorders.
Pathology		
1	Basic terms	Define the terms: Azotemia, uremia, Nephrotic syndrome, Nephritic syndrome, asymptomatic hematuria, rapidly progressive glomerulonephritis
		Acute kidney injury, chronic kidney disease, end-stage renal disease (ESRD),
		Renal tubular defects, Nephrosclerosis, UTI,
		urolithiasis, Hydronephrosis, Oncocytoma and carcinoma
		Describe the pathogenesis of Nephrotic and Nephritic syndrome
2	Glomerular Disease	Describe the pathological responses, pathogenesis and mediators of glomerular injury
		Classify Glomerular diseases.
		Differentiate between major Primary Glomerular diseases in Terms of clinicopathological features and different microscopic findings
		Discuss the etiologies, clinicopathological features and morphology of the diseases presenting as Nephritic syndrome and Nephrotic syndrome
		Explain the pathogenesis and morphology of minimal change disease
		Describe the etiology, pathogenesis, morphology and clinical presentation of focal segmental glomerulosclerosis
		Describe the etiology, pathogenesis, morphology and clinical presentation of membranoproliferative

		glomerulonephritis
		Describe the etiology, pathogenesis, morphology and clinical presentation of IgA nephropathy
		Describe the pathogenesis, morphology of diabetic and other types of secondary nephropathies
3	Acute Tubular Injury (ATI)	Define Acute Tubular Injury (ATI).
		Describe the etiology, clinico-pathological features and morphology of ischemic and toxic ATI.
		Compare the pattern of tubular damage in ischemic and toxic injury
4	Vascular events	Discuss the etiology, pathogenesis, and morphology of Nephrosclerosis, malignant hypertension and Renal Artery stenosis.
Medicine		
1	Interpretation of urinalysis	explain various abnormalities and their interpretation and importance regarding specific diagnoses
		Highlight the importance of urine abnormalities in other systemic diseases apart from kidney and urogenital tract abnormalities
2	Nephrotic syndrome	Define Nephrotic Syndrome.
		Interpret the criteria for diagnosing Nephrotic Syndrome
		Recognize symptoms and signs of Nephrotic Syndrome
		Identify the complication of nephrotic syndrome
		Interpret the important investigations
		Discuss the management plan for Nephrotic syndrome
3	Nephritic syndrome	Interpret the criteria for diagnosing Nephritic Syndrome
		Identify symptoms and signs of Nephritic Syndrome
		Identify important causes
		Enumerate important investigations
		Discuss the treatment plan
	Electrolytes abnormalities • Hyponatremia • Hypernatremia • Hypokalemia • Hyperkalemia	Define Hyponatremia
		Discuss Types of Hyponatremias
		Describe clinical features
		Enlist/ interpret the diagnostic lab investigations
		Calculate the sodium deficit and free water deficit
		Calculate rate of sodium replacement
		Discuss complications
		Define Hypernatremia
		Describe clinical features
		Enlist diagnostic lab investigations
		Calculate the sodium deficit and free water deficit
		Calculate rate of fluid replacement
		Describe management plan.
		Define Hypokalaemia
		Describe clinical features
		Interpret diagnostic lab investigations
		Discuss complications.
		Describe/JUSTIFY management plan

		Define Hyperkaliemia
		Describe clinical features
		Enlist diagnostic lab investigations
		Discuss complications Describe management plan
Pediatrics		
1	Acute post streptococcal glomerulonephritis (ApGN)	Define AGN and APGN
		Describe the pathogenesis of Nephritic syndrome
		Know clinical features and differential diagnosis of ApGN
		Describe investigations required to reach a diagnosis of ApGN
		Effectively describe the treatment requires for patients with ApGN
		Define nephrotic syndrome.
2	Nephrotic syndrome (NS)	Describe pathophysiology of nephrotic syndrome
		Classify NS in to its subtypes
		Describe clinical features of NS
		Enumerate and describe tests required to reach diagnosis of NS
		Outline treatment steps in the management of NS
		Know the complications of NS and describe its prognosis.

Theme II: Scanty Urine		
S no	**Topic**	**Learning Outcomes**
Pathology		
1	Renal function test	Describe the normal ranges of Blood urea, creatinine, and electrolytes
2		Explain creatinine clearance and other radiological and Biochemical renal function tests and their clinical significance
3	Acute kidney injury	Explain the etiology, pathogenesis, morphology and clinical presentation and complications of acute kidney injury
4	Chronic Renal Failure	Explain the etiology, pathogenesis, morphology and clinical presentation and complications of chronic renal failure.
5	Interstitial and glomerulonephritis	Explain the etiology and pathogenesis of interstitial nephritis
		Explain the etiology, pathogenesis, and morphology of glomerulonephritis.
Medicine		
1	Acute Kidney Injury (AKI	Define AKI.
		Enlist/Interpret the criteria for diagnosing AKI
		Discuss/ Differentiate prerenal & post renal causes
		Identify symptoms and signs of AKI
		Identify /Interpret the important complications
		Enumerate/DISCUSS important investigations
		Construct a management plan for a patient with AKI
2	Chronic Kidney Disease (CKD)	Define CKD
		Enlist criteria for diagnosing CKD
		Identify important causes
		Identify symptoms and signs of CKD
		Identify the important complications
		Enumerate important investigations Discuss the treatment plan
3	Renal Replacement Therapy (RRT)	Define RRT
		Enlist the different types of RRT
		Identify/Enumerate important indications of dialysis
		Identify/Enlist the important complications of dialysis
		Discuss the Renal transplant
		Enlist and discuss the types of transplant rejection
Forensic Medicine		
1	Ethics of Organ Transplantation	Describe Ethics of Organ Transplantation
		Describe current legislation of HOTA (Human Organ Transplant Act)
		Identify loop holes in existing system of human organ transplant.

Surgery/Urology		
1	Renal transplant surgery	Enlist diagnostic indicators of renal transplant
		Describe pre-requisite for successful renal transplant
		Discuss post renal transplant care of patient
		Describe common complications of renal transplant surgery
		Enlist immunosuppressive drugs used in Renal transplant
Family Medicine		
1	Acute renal presentations- primary care management and Red flags	Explain the etiology, clinical features and presentation of acute renal failure
		Describe the steps of management of a patient with anuria and oliguria
		Identify patients that need urgent and proper referral for specialist care in primary health with anuria and acute and chronic renal disease
Community Medicine		
1	Environmental health: Introduction	Explain the importance of environmental health
		Define and classify environmental degradation
2	Water pollution	Define water pollution and describe its importance for health
		Describe the different types of water pollution as simple bio degradable, complex biodegradable and complex non- degradable
3	Water quality management	Explain the importance and daily requirements of water.
		Describe the qualities and criteria of different sources of water including surface water, ground well, shallow wellz deep well.
		Classify different methods of purification of water
		Describe natural methods of purification of water
		Describe physical methods.
		Describe chemical methods.
		Describe filtration methods both small scale and large scale
		Describe purification of water in special circumstances
		Enumerate different water quality parameters
		Describe physical parameters
		Describe different chemical parameters and its interpretation.
		Explain the permissible limits of chemical parameters.

Theme III: Loin pain and Dysuria		
S No	Topic	Learning Outcomes
Pathology		
1	Pyelonephritis	Discuss the etiology, clinico-pathological presentation, morphology, and complications of Acute Pyelonephritis,
		Discuss the etiology, clinico-pathological presentation, morphology and complications of, chronic pyelonephritis
		Discuss the etiology, clinico-pathological presentation, morphology, and complications of drug induced nephritis
2	Cystic Diseases of the Kidney	Classify the cystic diseases of Kidney.
		Describe the inheritance Pathological features, Complications, and prognosis of polycystic diseases of Kidneys.
		Differentiate between the inheritance, pathological features, typical outcomes and clinical features of Adult and Childhood Polycystic Kidney Diseases
		Differentiate between the inheritance, pathological features, typical outcomes, and clinical features of Child hood Polycystic Kidney Diseases.
3	Urolithiasis	Enlist the types of Renal stones.
		Discuss the etiology and pathogenesis of Renal stones
		Co-relate the occurrence of renal stones with different metabolic diseases
		Differentiate between the different renal stones based on frequency, predisposing factors, urine PH and morphology.
4	Neoplasms of the Kidneys Renal cell carcinoma	Classify the benign and malignant tumors of the Kidney.
		Discuss the etiology, morphology, and prognosis of Renal cell carcinoma
5	Wilm's Tumor	Discuss the genetics, clinico-pathological features, morphology, and prognosis of Wilm's tumor
6	Diagnosis and management of renal tumors	Describe the various investigations to diagnose renal tumors albumin/creatinine ratio, urine for micro albumin)
		Discuss management of renal tumors
7	Congenital anomalies of bladder	Describe the congenital anomalies of bladder and urethra
8	Acute Cystitis	Discuss the etiology, morphology clinico-pathological features and complications of Acute
9	Chronic Cystitis	Discuss the etiology, morphology clinico-pathological features and complications of Chronic Cystitis.
Pharmacology		
1	Urinary Tract Infection (UTI)	Describe the clinical pharmacology of drugs used in the management of acute and chronic UTI (Co-trimoxazole, Nitrofurantoin, Cephalosporins, Amoxacillin-clavulanic

		acid, etc).
Community Medicine		
1	HIV/AIDS, Syphilis	Describe HIV/AIDS considering Risk groups, pathology,Diagnosis, treatment, and Prevention
		Describe Syphilis in terms of causative agent, incubation period, transmission, manifestation, diagnosis treatment and prevention.
	Chlamydia, Genital warts, Gonorrhea	Describe Chlamydia in terms of etiology, transmission, symptoms, treatment, and prevention.
		Describe Genital warts in terms of causes, transmission, symptoms, treatment, and prevention.
		Describe Gonorrhea in terms of causes, transmission, symptoms, treatment, and prevention.
	Human Papilloma virus,	Describe Human Papiloma Virus (HPV) in terms of causes, types, transmission, symptoms, screening, and prevention.
Medicine		
1	Autosomal Dominant Polycystic Kidney Disease (ADPKD)	Define ADPKD.
		Enlist/Interpret the criteria for diagnosing ADPKD.
		Identify/interpret the genetic causes.
		Identify/ symptoms and signs of ADPKD.
		Identify/Interpret the important complications.
		Enumerate& interpret important investigations.
		Construct a management plan.
2	Urinary Tract Infections (UTIs)	Define UTIs.
		Enlist the criteria for diagnosing UTIs.
		Identify/Differentiate the complicated and uncomplicated UTIs.
		Identify symptoms and signs of UTIs.
		Identify the important complications.
		Enumerate/discuss/ interpret/ important investigations.
		Construct a management plan for a patient with UTI.
Radiology		
3	Urological Investigation	Uses of plain X-ray KUB (Kidney, ureter, bladder).
		Discuss role of CT in Urology.
		Discuss role of nuclear scans.
		Discuss DTPA Scan, DMSA Scan, MAG 3 Scan.
		Investigate renal system during pregnancy.
Surgery/Urology		
1	Kidney Stones	Enlist factors predisposing to specific stone types
		Discuss evaluation of stone formers
		Discuss clinical features and Diagnosis of renal stone
		Describe renal stone treatment options
2	Renal trauma	Describe Initial resuscitation of renal trauma patient

		Classify mechanism and grading of renal trauma
		Discuss clinical and radiological assessment of renal trauma
3	Pelvic Ureteric junction obstruction in adult (PUJO)	Discuss management plan of renal trauma.
		Define PUJ obstruction.
		Enlist etiology (congenital and acquired causes).
		Describe clinical presentation of PUJO.
		Interpret Investigations (renal ultrasound, IVU (Intravenous urography), MAG-3 renography, retrograde pyelography).
		JUSTIFY Management PLAN options (Endopyelotomy, Pyeloplasty).
4	Anomalies of renal fusion and ascent	Describe various anomalies of renal tracts like Horseshoe kidney, Ectopic kidney, Renal agenesis, Malrotated kidney, Urinary tract duplication.
	Renal Cell Carcinoma (RCC)	Describe clinical presentation and investigation of RCC.
		Enlist Treatment of localized RCC.
		Construct Management of metastatic RCC.
Obs & Gynae		
1	Asymptomatic bacteriuria	Define asymptomatic bacteriuria.
		Describe the effects of asymptomatic bacteriuria pregnancy.
		Management plan of asymptomatic bacteriuria
2	Acute symptomatic urinary tract infections	Define Acute Cystitis
		Describe effects of asymptomatic bacteriuria
		Plan management of Acute Cystitis in pregnancy
		Describe the effects of acute Pyelonephritis on pregnancy.
		Plan Management of acute Pyelonephritis.
Pediatrics		
1	Urinary tract infection (UTI)	Describe the types of UTI.
		Discuss prevention and management of UTI in children.

Theme IV: Urinary retention		
S No	**Topic**	**Learning Outcomes**
Anatomy		
1	Describe applied anatomy of ureters, urinary bladder, prostate and urethra	Describe gross structure of kidney, ureter, bladder, and urethra.
		Describe the microscopic structure of prostate
		Discuss the microscopic structure of urethra
Pathology		
1	Obstructive Uropathy	Discuss the obstruction in urogenital tract at different levels.
		Discuss the effects of obstruction on function morphology of kidney.
		Describe clinico-pathological features and morphology of Hydronephrosis
2	Tumors of urinary bladder	Classify tumors of urinary bladder.
3	BPH	Discuss the etiology, pathogenesis, morphology, staging and prognosis of urothelial (Transitional Cell) Tumors
		Describe pathophysiology of Benign prostatic hypertrophy and risk factors
4	Carcinoma prostate	Describe pathogenesis, risk factors and staging.
Pharmacology		
1	Drugs for benign prostatic hyperplasia	Classify the drugs used in the management of BPH
		Enlist the alpha-adrenergic blocking drugs with special reference to those having specific affinity for prostate muscle.
		Describe the role of alpha blockers, 5-alpha reductase inhibitors (Finasteride) and combination therapy in BPH.
		Enlist the adverse effects of the drugs used to treat BPH.
2	Carcinoma of prostate	Enlist the hormonal agents used in the management of Prostatic carcinoma.
		Describe the mechanism of action of Gonadotropin-releasing hormone (Goserelin) and anti-androgens (Cyproterone acetate and Flutamide) in the management of Prostatic carcinoma.
		Enlist the anticancer chemotherapeutic agents used

		in the management of Prostatic carcinoma.
Community Medicine		
1	Air Pollution & air quality management	Define air pollution.
		Enumerate criteria pollutants.
		Describe the sources and limits of air pollutants.
		Describe the adverse effects of air pollutants on health.
		Explain the measures for control of air pollution
		Describe the global adverse effects of air pollution- ozone depletion, greenhouse effect, smog, acid rain.
2	Noise pollution, radiation pollution and its control	Define noise pollution.
		Explain adverse effects of noise pollution on health.
		Describe factors effecting hearing loss.
		Enumerate acceptable noise standards.
		Discuss the measures for prevention of adverse effects of noise.
		Classify different types of radiations to which humans are exposed.
		Describe the adverse effects and preventive measure of different type of nonionizing radiations.
		Describe the adverse effects and preventive measure of ionizing radiations.
3	Waste management	Explain the importance of waste management in health
		Describe management of waste [organic of human and animal origin] as per water carriage system
		Describe the management of waste [organic of human and animal origin] as per conservancy system
		Describe management of solid waste [refuse]
		Define hospital waste management
4	Hospital waste management	Explain the importance of hospital waste management in health
		Classify hospital waste
		Know the impacts of improper hospital waste management on health
		Describe the methods to minimize hospital waste
		Describe the methods of treatment of hospital waste
		Explain the waste management trends in developing countries
5	Disasters and health	Define disaster management
		Describe classification of disasters
		Describe the mortality & morbidity due to disaster itself & mismanagement of disaster relief activities
		Describe pre-disaster management
		Describe post disaster management in

		immediate, intermediate, and long-term stages.
		Discuss management and preventive measures from previous disasters.
		Describe the history of disasters in Pakistan.
Surgery/Urology		
1	carcinoma of urinary bladder	Discuss clinical Presentation of bladder cancer.
		Describe diagnosis and clinical staging of bladder cancer.
		Construct management Plan of bladder cancer.
2	Enlarged Prostate	Define IPSS (International prostate symptoms scoring) for enlarged prostate.
		Describe watchful waiting for enlarged prostate.
		Enlist medical management of BPH.
		Minimal invasive management of BPH.
		Invasive surgical surgeries
		TURP (transurethral resection of prostate)
		Open prostatectomy
3	Carcinoma prostate	Describe clinical presentation and management
4	Urinary Incontinence	Define urinary incontinence
		Discuss urinary incontinence
		Classify urinary incontinence
		Discuss nocturnal enuresis
		Enlist causes and pathophysiology
		Describe evaluation of incontinence
		Enumerate Investigation of incontinence
		Describe conservative treatment options surgical options
5	Urethral strictures	Describeetiology, Presentation, investigation, and management of urethral stricture
6	Posterior urethral valve	Discuss clinical presentation and management of Posterior urethral valves (PUV).
Practical work		
S No	**Topic**	**Learning Outcomes**
Pathology		
1	Urine collection methods, physical examination of urine specimen	Demonstrate the procedure of urine collection, physical examination volume, color, appearance, pH of specimen.
2	Microscopic examination of centrifuge specimen	Perform the physical examination of urine and prepare report of an abnormal urine with pyuria and hematuria Interpret the results.
3	Chemical examination of non-centrifuged urine specimen	Demonstrate substances for chemical examination and the different procedures of detection of protein in urine.
		Demonstrate the Principle of protein detection by heat method in urine

		Perform the heat and acetic acid test and the test for Bence Jones protein. Interpret the results
		Demonstrate the tests for detection of reducing substances in urine and the principle of Benedict's test
		Perform the Benedict's test. Interpret the results
		Demonstrate the substances seen in urine under microscope i.e. cells (Pus cells, RBCs, Epithelial cells and other different cells), Crystals, castes etc
		Prepare the sediment for urine examination.
		Detect various substances in a slide prepared from sediment under the microscope Interpret the results.
4	Urine staining, and culture	Demonstrate the Staining methods and their principles for urine specimens of acute and chronic UTI
		Identify the uropathogens shown in the slide
		Demonstrate sterilized methods for collections of specimens for culture and sensitivity.
		Perform a practical for culture and sensitivity by disc diffusion method for any uro pathogen.
Pharmacology		
	Prescriptions for acute and chronic UTI	Formulate prescriptions for acute and chronic UTI
Community Medicine		
1	Incinerator/waste disposal models	Identify the model
		Explain the steps of waste disposal
2	Water sources	Identify the model related sources of water
3	Sand filters	Identify the model
		Identify its different layers and mechanism of purification
		Calculate the dose of bleaching powder required for disinfection of water in a domestic tank
		Assess the quality of water sample on the basis of physical parameters (color, turbidity, suspended particles, temperature and Ph.)
		Interpret the bacteriological quality of water on the basis of presumptive coliform test

Endocrine & Reproduction-II

Themes

S. No	Theme	Duration in days
1	Tall/short stature	3
2	Neck swelling and Muscle cramps	6
3	Excessive thirst and urination	6
4	Moon face	5
5	Infertility and pregnancy	15
6	Breast lump	3

General Learning Objectives

By the end of Endocrine & Reproduction Module, 4th year MBBS students will be able to:

Knowledge:

1) Describe the pathology, clinical features, investigations, and treatment of Hyper and hypopituitarism
2) Describe the pathology, clinical features, investigations, and treatment of Hyper and hypothyroidism, and hyper and hypoparathyroidism
3) Describe the classification, pathogenesis, clinical features, investigations, and treatment of Diabetes mellitus
4) Explain the pathology, clinical features, investigations, and treatment of Hyper and hypoadrenalism
5) Explain the causes of male and female infertility and its management
6) Explain the classification, pathology, and management of testicular tumors
7) Explain benign and malignant breast disease
8) Discuss the etiology, risk factors, clinical features, investigations, and treatment of carcinoma of breast
9) Describe the pharmacokinetics and pharmacodynamics of pituitary, gonadal, pancreatic, thyroid, and adrenocortical hormones, their synthetic analogues and antagonists, and their role in the management of relevant disease conditions
10) Discuss the laws related to sexual offenses, and management of a rape victim in forensic aspects
11) Explain the pathophysiology and surgical management of benign prostatic hyperplasia and carcinoma of the prostate

Skills:

1) Describe the pathology, clinical features, investigations, and treatment of Hyper and hypopituitarism
2) Describe the pathology, clinical features, investigations, and treatment of Hyper and hypothyroidism, and hyper and hypoparathyroidism
3) Explain the pathology, clinical features, investigations, and treatment of Hyper and hypoadrenalism
4) Explain the classification, pathology, and management of testicular tumors
5) Explain benign and malignant breast disease
6) Describe the pharmacokinetics and pharmacodynamics of pituitary, gonadal, pancreatic, thyroid, and adrenocortical hormones, their synthetic analogues and antagonists, and their role in the management of relevant disease conditions
7) Discuss the laws related to sexual offenses, and management of a rape victim in forensic aspects

Attitude:

1) Explain the causes of male and female infertility and its management.
2) 1Formulate prescriptions for patients with Graves' disease and diabetes mellitus.
3) Discuss the laws related to sexual offenses and management of a rape victim in forensic aspects.

Specific Learning Outcomes

Theme-1: Tall / short stature		
Subject	**Topic**	**Learning outcomes**
Pathology		
1	Pituitary gland- Physiological anatomy	Explain the gross and microscopic structure of pituitary gland
		Explain the functions of hormones of the anterior and posterior pituitary gland and their regulation by the Hypothalamus
2	Hyperpituitarism/Pituitary adenomas: • Prolactinomas • Somatotrophic tumors • Corticotrophic tumors • others	Explain the causes of hyperpituitarism
		Discuss the gross and microscopic structure of pituitary adenomas, and the hormones secreted from these
		Explain the clinical manifestations of different types of pituitary adenomas
3	Hypopituitarism	Describe the etiology and clinical manifestations of hypopituitarism
Medicine		
1	Acromegaly/Gigantism	Explain the etiology, clinical features, investigations, treatment, and complications of Acromegaly/gigantism
2	Hyperprolactinemia	Discuss the etiology, clinical features, investigations, and treatment of hyperprolactinemia
3	Hypopituitarism/Sheehan`s syndrome	Explain the etiology, clinical features, investigations and treatment of Hypopituitarism and Sheehan`s syndrome
Pharmacology		
1	Growth hormone	Describe the sources of Growth hormone (old and new sources)
		Describe the mechanism of action, clinical uses and adverse effects of Growth hormone
2	Growth hormone antagonists (Octreotide and others)	Enlist Growth hormone antagonists
		Describe the clinical role of Octreotide in acromegaly
		Describe the route of administration, dosage, and adverse effects of octreotide in acromegaly and gigantism
3	Bromocriptine	Describe the mechanism of action, clinical uses, and adverse effects of Bromocriptine
Pediatrics		
1	Short stature	Describe the method to measure and plot height; and calculate height velocity. and midparental, target height to allow early diagnosis of growth disorders in pediatric patients
		Explain the diagnostic criteria that allow to differentiate

		causes of growth deficiency
		Discuss the tools for better communication with patients and families and coordination of multidisciplinary care
		Discuss treatment of growth hormone deficiency or other diseases responsible for short stature and their appropriate management
Neurosurgery		
1	Surgical management of pituitary adenoma	Explain the surgical treatment and complications of pituitary macro/microadenomas
2	Occupational Health:	Define occupational health
Community Medicine		
1	Introduction	Discuss importance of occupational health
		Describe ergonomics
		Describe principles and responsibilities of occupational health officer [OHO]
2	Physical hazards	Enumerate physical hazards (heat, cold, noise, light, vibrations, pressure effect, Radiations)
		Discuss its ill effects on health
		Discuss its preventive measures
3	Chemical hazards	Enumerate chemical hazards (inorganic dust diseases, organic dust diseases, metals & chemicals)
		Discuss its ill effects on health
		Discuss preventive measures
4	Mechanical, Biological & Psychosomatic hazards	Describe mechanical hazards
		Discuss control measures of mechanical hazards
		Discuss control measures of mechanical hazards
		Discuss control measures of biological hazards
		Describe psychosomatic stressors
		Discuss control measures of psychosomatic stressors
5	Animal hazards	Describe types, prevalence, and statistics of snake bite
		Discuss prevention and management of snake bite
		Discuss causes of poor management with respect to awareness and vaccination
6	Preventive measures, health insurance, social security schemes	Describe various preventive measures of occupational hazards (Medical engineering and legal measure)
		Discuss role and benefits of health insurance
		Discuss social security and its benefits
7	Demography: Introduction	Define demography and various related terms
		Explain and interpret population pyramid
		Explain demographic transition
		Describe the causes of high and low fertility and mortality
8	Growth rate	Define population growth rate, CDR, CBR
		Describe growth rate
		Describe population explosion & its implications
		Explain advantages of population control
9	Demographic indicators	Describe the demographic indicators of Pakistan

PRIME/MEDICAL EDUCATION		
1	Dealing with patients	Serve the patient as an individual, considering lifestyle, beliefs, and support system
2	Community Need analysis	Identify the health care needs of community
3	Gender based violence	Classify gender-based violence
		Explain the reasons for gender-based violence
		Discuss the outcomes of gender-based violence
		Explain the preventive strategies for gender-based violence
		Discuss the legal implications of gender-based violence in Pakistani context.

Theme-2: Neck swelling and muscle cramps		
S No	**Topic**	**Learning Outcomes**
Physiology		
1	Physiologic anatomy of the Thyroid gland	Explain the gross and microscopic structure of Thyroid gland
		Explain the synthesis and functions of hormones of the thyroid gland and their regulation by the anterior pituitary
Pathology		
1	Hyperthyroidism including Grave`s disease	Discuss the etiology, pathogenesis and morphology of Hyperthyroidism and Grave`s disease
2	Hypothyroidism	Discuss the etiology, pathogenesis, morphology, and clinical features of Hypothyroidism
3	Thyroiditis	Discuss the classification, morphology, and presentations of Thyroiditis
4	Multinodular goiter	Explain the etiology, clinical features, and complications of multinodular goiter
5	Thyroid malignancies	Classify thyroid malignant disorders
		Explain morphology, clinical features, and prognosis of thyroid malignancies
Medicine		
1	Hyperthyroidism including Grave`s disease	Discuss the etiology, clinical features, investigations and treatment and prognosis of Hyperthyroidism and Grave`s disease
		Explain the pathogenesis, clinical features, and management of Grave`s Ophthalmopathy
2	Hypothyroidism	Discuss the types, etiology, clinical features, investigations, and treatment of Hypoparathyroidism
3	Thyroiditis	Describe the classification, etiology, clinical features, investigations, and treatment of Thyroiditis
4	Multinodular goiter	Discuss the etiology, clinicalfeatures, investigations, and management approach to a patient with multinodular goiter
5	Thyroid malignancies	Classify thyroid malignant disorders
		Discuss the pathogenesis, clinical features, investigations, and management of Thyroid malignancies
6	Hyperparathyroidism	Discuss the types, etiology, clinical features, investigations, and treatment of Hyperparathyroidism
7	Hypoparathyroidism	Discuss the types, etiology, clinical features, investigations, and treatment of Hypoparathyroidism
Pharmacology		

	Thyroid hormones	Enlist thyroid preparations (used clinically as well as older-obsolete ones)
		Describe the mechanism of action, pharmacological effects, clinical use and adverse effects of Thyroxine (T4) and Tri-iodothyronine (T3)
	Antithyroid drugs	Classify Antithyroid drugs
		Describe the mechanism of action, clinical use, and adverse effects of Thioamides
		Describe the mechanism of action, clinical use, and adverse effects of Potassium iodide
		Describe Lugol's iodine solution
		Describe the mechanism of action, clinical use, and adverse effects of Radioactive iodine (131I)
		Describe the use of ß-blockers in hyperthyroid patients
Pediatrics		
1	Congenital hypothyroidism	Discuss the types and clinical features of hypoparathyroidism
		Discuss investigations and treatment of Hypoparathyroidism
Community Medicine		
1	Iodine deficiency / Goitre	Discuss sources of iodine and goitrogens
		Discuss iodine deficiency disorders and daily requirement of Iodine
		Explain the epidemiological determinants and control strategies for iodine deficiency/goiter

Theme-3: Excessive thirst and urination		
S No	**Topic**	**Learning Outcomes**
Pathology		
1	Diabetes Mellitus • Classification • Diagnosis • Insulin resistance • Betacell dysfunction • Complications o Acute o Chronic	Classify Diabetes mellitus
		Explain the diagnostic criteria of DM
		Explain the mechanisms of insulin resistance
		Explain the mechanisms of beta cell dysfunction
		Explain the acute and chronic complications of DM
2	Pancreatic neuroendocrine tumors	Describe the types and clinical presentations of pancreatic neuroendocrine tumors
Medicine		
1	Diabetes mellitus • Types • Insulin resistance syndromes • Clinical features investigations	Explain the different types of DM
		Discuss the mechanism presentation, and management of insulin resistance
		Discuss the clinical features of DM
		Explain the diagnostic workup of a patient with DM
		Classify the pharmacological treatment of DM
		Explain life style modifications in the management of DM
2	• Treatment • Complications	Discuss the acute and chronic complications of DM
3	Hypoglycemic coma	Explain the etiology, clinical features, and management of hypoglycemic coma
4	Diabetic ketoacidosis	Explain the precipitating factors, diagnostic work up, and treatment of a patient with diabetic ketoacidosis
5	Hyperosmolar non-kenotic diabetic coma	Explain the precipitating factors, diagnostic work up, and treatment of a patient with Hyperosmolar non-ketotic diabetic coma
6	Lactic acidosis	Explain the precipitating factors, diagnostic work up, and treatment of a patient with Lactic acidosis
7	Posterior pituitary gland	Discuss the functions of hormone Vasopressin secreted by the posterior pituitary gland
		Explain the etiology, clinical features, investigations, and treatment of Diabetes insipidus
8	SIADH	Explain the etiology, and pathogenesis of SIADH secretion
Pharmacology		
1	Insulin	Classify Insulins
		Describe the sources of Insulin
		Describe the differences between the human, bovine and porcine Insulins
		Describe the mechanism of action and clinical uses of Insulin

		Describe the complications of Insulin therapy
		Describe the management of hypoglycemia caused by Insulin
		Describe the management of diabetic ketoacidosis
2	Oral hypoglycemic drugs	Classify oral hypoglycemic drugs
		Enlist euglycaemic drugs
		Describe the mechanism of action and adverse effects of Sulphonyl Reas
		Describe the mechanism of action and clinical use of Meglitinides
		Describe the mechanism of action, clinical use, and adverse effects of Biguanides
		Describe the mechanism of action, clinical use, and adverse effects of Thiazolidinediones
		Describe the mechanism of action, clinical use, and adverse effects of α-glucosidase inhibitors
		Describe the mechanism of action and clinical use of Pramlintide,Exenatide and Sitagliptin
3	Glucagon	Describe the mechanism of action and clinical use of Glucagon
4	Vasopressin/Desmopressin	Describe the mechanism of action, clinical use, and adverse effects of Desmopressin
		Enlist the drugs used in nephrogenic diabetes insipidus
Pediatrics		
1	Management of Type 1 Diabetes mellitus in children	Enumerate the blood glucose parameters and the clinical signs for an early diagnosis of diabetes in a child.
		Recognize how diabetes may present in young children or babies, to make the diagnosis and prevent coma or death
		Plan investigations and management plan for a newly diagnosed and a known diabetic child.
		Enumerate the different types of insulins.
Community Medicine		
1	Non-communicable diseases: Prevention of diabetes mellitus	Discuss Prevalence of diabetes mellitus globally and in Pakistan
		Discuss modifiable and non-modifiable risk factors for diabetes mellitus
		Describe epidemiological determinants of diabetes mellitus
		Discuss screening methods for diabetes mellitus
		Discuss the prevention (Primary, secondary, and tertiary) and care of diabetes mellitus

Theme-4: Moon face		
S No	**Topic**	**Learning Outcomes**
Physiology		
1	Physiology of the Adrenal cortical hormones	Explain the gross and microscopic structure of Adrenal gland
		Explain the synthesis and functions of hormones of the adrenal cortex and their regulation by the anterior pituitary
Pathology		
1	Hypercortisolism and Cushing`s syndrome	Discuss the etiology of Hypercortisolism
		Explain the etiology and clinical features, of Cushing`s syndrome
2	Hyperaldosteronism	Explain the etiology, and presentation of primary Hyperaldosteronism
3	Adrenogenital syndrome	Explain the etiology, clinical features, of Adrenogenital syndrome
4	Adrenal insufficiency • Primary (Acute and Chronic) • Secondary	Classify adrenal insufficiency in the context of its etiology
		Discuss the clinical presentations and complications of adrenal insufficiency
5	Adrenal neoplasms	Discuss the types of adrenal neoplasms
		Explain the morphology and clinical features of adrenal neoplasms
6	Pheochromocytoma	Explain the morphology and clinical features of Pheochromocytoma
7	Multiple Endocrine Neoplasia syndromes (MEN)	Classify Multiple endocrine neoplasia syndrome
		Explain the morphology and clinical features of MEN
Medicine		
1	Hypercortisolism and Cushing`s syndrome	Explain the etiology, clinical features, diagnostic workup, and management of Hypercortisolism/Cushing`s syndrome
2	Primary Hyperaldosteronism	Explain etiology, clinical features, diagnostic workup, and management of Primary Hyperaldosteronism
3	Adrenogenital syndrome	Explain the etiology, clinical features, diagnostic workup, and management of Adrenogenital syndrome
4	Adrenal insufficiency • Primary (Acute and Chronic) • Secondary	Classify adrenal insufficiency
		Explain the etiology, clinical features, investigations, and treatment of primary Addison`s disease
		Explain the etiology, clinical features, investigations, and treatment of pituitary adrenal insufficiency
5	Adrenal neoplasms	Explain the types of adrenal tumors
		Discuss the clinical presentations, diagnostic workup, and treatment of adrenal tumors
6	Pheochromocytoma	Explain the clinical features, investigations, management, and complications of Pheochromocytoma
	Gastro-entero-pancreatic endocrine tumors (GEP-NETs) including Carcinoid tumors	Explain the clinical features, investigations, management of GEP- NETs/Carcinoid tumors.
Pharmacology		
1	Glucocorticoids	Classify Glucocorticoids

		Describe the mechanism of action, pharmacological effects, clinical uses, and adverse effects of glucocorticoids
		Describe dexamethasone suppression test
2	Glucocorticoid antagonists /synthesis inhibitors	Enlist Glucocorticoid antagonists/synthesis inhibitors
		Describe the mechanism of action, clinical uses and adverse effects of Mifepristone, Ketoconazole, Metyrapone and Aminoglutethimide
3	Aldosterone antagonists	Describe the mechanism of action, clinical uses, and adverse effects of Spironolactone (apart from being used as diuretic)
Community Medicine		
1	Introduction to nutrition, basic measurements & allowances	Classify nutrients
		Discuss quality of nutrients in diet
		Discuss the balanced diet
		Discuss energy value of different nutrients
2	Macronutrients	Describe classification of macronutrients
		Discuss the functions and importance of various macronutrients
		Discuss daily allowance of macro nutrients
		Discuss the diseases caused by their deficiency and excess
3	Micronutrients -Vitamin deficiencies allowances & control	Describe classification of micronutrients
		Discuss the function and importance of various vitamins
		Discuss daily allowances of vitamins
		Discuss diseases caused by their deficiency
		Discuss the function and importance of various minerals essential for health
4	Micronutrients -mineral deficiencies allowances and control	Discuss daily allowance of minerals intake
		Discuss diseases caused by their deficiency
5	Undernutrition–Protein calorie malnutrition and control	Define undernutrition and its classification.
		Discuss protein calorie malnutrition & its causes
		Describe the various classifications for assessment of PEM
		Discuss control strategies of malnutrition
6	Over-nutrition / obesity and it's control	Define obesity
		Calculate BMI
		Discuss Epidemiology of obesity.
		enumerate Causes of obesity.
		Explain the Complications of obesity
		Formulate a management plan for obesity
		Discuss Prevention of obesity

Theme-5: Infertility and pregnancy		
S NO	**Topic**	**Learning Outcomes**
Pathology		
1	Testicular tumors	Classify testicular tumors
		Explain the gross and microscopic morphology of benign and malignant testicular tumors
		Discuss the staging and prognosis of testicular malignant tumors
2	Prostatic disorders Prostatitis	Explain the etiology and morphology of Prostatitis
		Explain the gross and microscopic morphology and complications ofBPH
3	• Benign prostatic hyperplasia (BPH) • Prostatic carcinoma	Explain the clinical features, types and staging of prostatic carcinoma
4	Sexually transmitted diseases (STDs) • Syphilis • Gonorrhea	Explain the types of STDs
		Explain the stages, morphology, clinical features, and complications of Syphilis
		Name the organisms causing Gonorrhea and its clinical features
5	Introduction to gynecological cancers	Enlist different types of gynecological cancers
6	Cervical carcinoma	Explain the gross and microscopic morphology, clinical features and staging of Cervical carcinoma
7	Endometritis	Explain the etiology and pathogenesis of endometritis
8	Uterine fibroids	Explain the etiology and morphology of uterine fibroids
9	Endometriosis	Explain the etiology, pathogenesis and morphology of endometriosis
10	Endometrial hyperplasia and endometrial carcinoma	Explain the etiology, pathogenesis, morphology of Endometrial hyperplasia /carcinoma
11	Polycystic ovarian disease	Explain the etiology, risk factors, clinical features and morphology of Polycystic ovary syndrome
12	Tumors of the ovary • Benign • malignant	Classify benign and malignant tumors of the ovary
		Explain the gross and microscopic morphology, clinical features, staging and complications of ovarian carcinoma.
Gynecology		
1	Anatomy of the reproductive tract	Describe the anatomy of the perineum, the vagina, cervix and uterus, the adnexa and ovary
2	Menopause	Define Menopause.
		Describe physiological and non-physiological menopause
		Explain the clinical effects of menopause on women
		Outline the assessment of menopausal women, based on modifiable and non-modifiable risk factors.
		Explain the management of menopause
		Describe the types, side-effects, relative and absolute contraindications of hormone replacement

		therapy (HRT)
3	Contraception	Define contraception.
		Classify contraceptive methods
		Explain their mechanisms of action, efficacy, and failure rates
		Explain the risks and benefits of each method
		Identify the complications of different contraceptive methods
4	Polycystic ovary syndrome	Explain the risk factors, aetiology, clinical features, investigations, treatment, complications, and prognosis of polycystic ovary syndrome
5	Uterine fibroids	Explain the risk factors, clinical features, and management of uterine fibroids
6	Endometrial cancers	Explain the risk factors, clinical features, investigations, prognosis, and management of endometrial carcinoma
7	Cervical carcinomas	Explain the risk factors, clinical features, investigations, prognosis, and management of cervical carcinoma
8	Female infertility	Define infertility
		Discuss the causes and management of female infertility
9	Malignant diseases of the ovaries	Classify benign and malignant diseases of the ovaries
		Explain the clinical features, diagnosis, serological markers, staging, management, and complications of ovarian carcinoma
10	Uterovaginal prolapse	Describe the etiology, clinical features, complications, management of Uterovaginal prolapse
11	Urinary incontinence	Classify urinary incontinence
		Explain the etiology, clinical features, management, and prevention of urinary incontinence
12	Endometriosis	Define endometriosis
		Explain the etiology, clinical features, investigations, management of Endometriosis
13	Abnormal uterine bleeding	Explain the etiology of abnormal uterine bleeding
		Describe the diagnostic approach to a patient with abnormal uterine bleeding
14	Miscarriage	Define miscarriage
		Explain the etiology, risk factors, management, and prevention of miscarriage
15	Ectopic gestation	Describe the etiology, clinical features, diagnosis, and management of ectopic gestation
16	Gestational trophoblastic diseases (GTDs)	Classify GTDs
		Explain the etiology, clinical features, diagnosis, management, and complications of H. Mole
		Explain the etiology, clinical features, diagnosis, management, and complications of Choriocarcinoma
17	Vaginal discharge and STDs	Explain the etiology and diagnostic workup of vaginal discharge
		Describe the risk factors, etiology, clinical features, management, complications, and prevention of STDs
Pharmacology		
1	Gonadotropins (FSH & LH) and human chorionic	Describe the mechanism of action, clinical uses, and adverse effects of Gonadotropins (FSH & LH) and human chorionic

	gonadotropin	gonadotropin (hCG)
		Describe the role of gonadotropins in male infertility
2	Gonadotropin-releasing hormone and analogues (Gonadorelin and others)	Describe the mechanism of action, clinical uses and adverse effects of Gonadotropin-releasing hormone and analogues (Gonadorelin and others)
3	Oxytocin	Describe the mechanism of action, clinical uses, and adverse effects of Oxytocin
4	Oestrogens	Classify Oestrogens
		Describe the mechanism of action, organ system effects, clinical uses, adverse effects, and contraindications of Oestrogens
		Describe Premarin
5	Progestins	Classify Progestins
		Describe the mechanism of action, organ system effects, clinical uses, adverse effects, and contraindications of Progestins
6	Oral contraceptives	Classify Oral contraceptives
		Describe the mechanism of action, organ system effects, clinical uses, adverse effects, and contraindications of oral contraceptive pills.
		Describe mini pills with their advantages and disadvantages
		Describe post-coital contraceptives
7	Parenteral and implantable contraceptives	Describe the use of Parenteral (Medroxyprogesterone) and implantable (Norplant system) contraceptives
8	Ovulation-inducing agent (Clomiphene)	Describe the mechanism of action, clinical use, and adverse effects of Clomiphene
9	Mifepristone	Describe the mechanism of action, clinical uses, and adverse effects of Mifepristone
10	Danazol	Describe the mechanism of action, clinical uses, and adverse effects of Danazol
11	Androgens and anabolic steroids	Enlist Androgens and anabolic steroids
		Describe the mechanism of action, clinical uses, and adverse effects of androgen preparations
12	Antiandrogens	Classify antiandrogens
		Describe the role of Ketoconazole as steroid synthesis inhibitor, its clinical uses, and adverse effects
		Describe the mechanism of action and clinical use of Finasteride
		Describe the mechanism of action and clinical use of Cyproterone acetate
		Describe the role of Spironolactone as androgen receptor blocker and its use in this context
13	Male contraception	Enlist the drugs used for male contraception
		Describe the role of Gossypol as male contraceptive agent
Forensic Medicine		
1	Impotence and sterility	Define impotence
		Define sterility
		Examine under supervision a case of sterility and impotence
		Describe important causes leading to sterility and

		impotence in males as well as in females
		Appreciate difference between sterility and impotence
		Medicolegal importance of sterility and impotence
2	Sterilization	Define sterilization
		Medicolegal importance of sterilization
		Discuss the technique of sterilization in males and females
		enumerate legal formalities before sterilization
3	Artificial insemination	Define artificial insemination
		Enumerate its different types
		Describe medicolegal aspects of artificial insemination
		Define test tube baby
		Define surrogate motherhood and enumerate its medicolegal importance
4	Virginity	Define virginity
		Discuss signs of virginity
		Enumerate different types of hymen.
5	Pregnancy	Define pregnancy
		Describe presumptive signs of pregnancy
		Discuss probable signs of pregnancy
		Appreciate conclusive signs of pregnancy
		Enumerate signs of pregnancy in dead
		Discuss Medicolegal aspects of pregnancy
		Describe Isqat e Haml & Isqat E Janin as per PPC
6	Delivery	Define delivery
		Appreciate signs of recent delivery in living
		Appreciate or identify signs of recent delivery in dead
		Identify signs of remote delivery in living and dead
		Enumerate medicolegal aspects of delivery
7	Legitimacy & dissolution of marriage	Define legitimacy
		Define illegitimate child
		Enumerate medicolegal aspects of legitimacy
		Define superfetation
		Enumerate medicolegal aspects of affiliation/ adoption
		Enlist legal grounds for nullity and dissolution of marriage
8	Natural sexual offences: Rape & Incest	Define rape as per CrPC
		Enumerate medicolegal aspects of rape
		Examine under supervision a case of rape victim
		Examine under supervision examination of the accused
		Define incest
9	Zina	Define Muhsan as per Hudood ordinance 1979.
		Define Zina according to the Hudon ordinance 1979.
		Enumerate the conditions required for liability in case of Zina.
		Enlist punishment of Zina
		Enumerate steps of proof of Zina in the court
		Describe steps of complaint in case of Zina as per Cr PC
10	Unnatural sexual offences Sodomy	Define sodomy
		Enumerate steps of examination of passive agent in sodomy
		Enumerate steps of examination of active agent
		Define and describe buccal coitus
		Define and describe tribadism
		Define bestiality
11	Sexual perversions	Define sexual perversions
		Enumerate its different types
		Define and describe sadism
		Define and describe masochism

		Define and describe fetishism
		Define and describe exhibitionism
		Define and describe transvestism
		Define and describe uranism
		Define and describe voyeurism
		Define and describe frotteurism
		Define and describe urolagnia
12	Abortion	Define abortion
		enumerate its different types
		enumerate salient features of natural abortion
		enumerate salient features of artificial abortion
		differentiate between natural and criminal abortion
		examine under supervision a case of criminal abortion and legal formalities to be fulfilled in such a case
Urology/Surgery		
1	Causes of male infertility	Discuss the causes of male infertility
		Explain the diagnostic workup of a male infertile patient
Surgery		
1	Cryptorchidism	Define Cryptorchidism
		Explain the etiology, complications, and management Cryptorchidism
2	Hydrocele and varicocele	Explain the cause, clinical features, complications and surgical management of hydrocele and varicocele
3	Benign prostatic hyperplasia	Explain the etiology, clinical features, complications, management of BPH
4	Carcinoma of prostate	Explain the etiology, clinical features, complications, staging, management, and prognosis of carcinoma of the prostate
Community Medicine		
1	Safe motherhood	Define reproductive health
		Describe components of reproductive health
		Define safe motherhood
		Discuss pillars of safe motherhood
1	Antenatal care	Discuss antenatal care
		Discuss antenatal visits as per WHO
2	Family planning and post abortion care	Define family planning & different methods of family planning
		Discuss contraceptive prevalence rate and factors responsible for low CPR
		Discuss Post abortion care
3	Child promotion and development strategies (IMNCI, IMCI and growth monitoring)	Define IMNCI & IMCI
		Describe components of IMNCI
		Enumerate principles of IMNCI
		Discuss growth monitoring
4	Prevention of reproductive health diseases	Discuss different reproductive health diseases
		Discuss STIs in detail
		Discuss risk factors and Prevention of CA cervix
Family medicine		

1	Menstrual disorders	Enlist menstrual disorders
		Explain the etiology, investigations, and management of menstrual disorders in primary care
2	Menopause	Explain the clinical features, and management of menopausal symptoms and complications in primary care
3	Contraception	Explain the types of contraception methods
		Explain the merits and demerits of different contraceptive techniques
		Describe the complications associated with the use of oral and injectable contraceptives
4	Vaginal discharge and STDs	Explain the etiology of vaginal discharge
		Describe the diagnosis and management of vaginal discharge in primary care
		Classify Sexually transmitted infections in females
		Describe the clinical features, investigations, and management of STDs in females in primary care

Theme-6: Breast Lump		
S NO	**Topic**	**Learning Outcomes**
Pathology		
1	Fibrocystic changes • Cysts and fibrosis • Epithelial hyperplasia • Adenosis	Explain the fibrocystic changes in breast including cysts, fibrosis, epithelial hyperplasia and adenosis
2	Fibro-adenoma	Explain the morphology of Fibro-adenoma of the breast
3	Papilloma	Explain the morphology of papilloma of the breast
4	Carcinoma of the breast	Explain the risk factors, etiolopathogenesis, clinical features, staging, and complications of carcinoma of the breast
5	Gynecomastia	Discuss the causes and morphology of Gynecomastia
Surgery		
1	Investigations of breast diseases	justify the investigations of a patient with a breast lesion
2	Benign breast diseases	Classify benign breast diseases
3	Malignant breast diseases	Classify malignant breast diseases
		Discuss the risk factors, etiology, clinical features, investigations, management, and prognosis of a patient with breast cancer
		Describe the role of hormone receptors in breast cancer
		Explain the complications of breast cancer surgery
		Discuss the role of pharmacological treatment options in breast cancer management
		Explain the role of selective estrogen receptors modulators in the prevention of breast cancer in high-risk women
Pharmacology		
1	Selective Estrogen Receptor Modulators (SRMs)- Tamoxifen and others	Enlist Selective Estrogen Receptor Modulators (SERMs)
		Describe the mechanism of action and clinical uses of Tamoxifen
Community Medicine		
1	Breast feeding	Discuss advantages of breast feeding
		Discuss artificial feeding
		Discuss baby friendly hospital initiative
		Discuss guidelines on infant and child feeding
2	Screening and prevention of breast cancer	Discuss different methods of screening for breast cancer
		Discuss levels of prevention of breast cancer
Radiology		
1	Radiological approaches to breast cancer screening	Explain the indications, procedure, and interpretation of ultrasound and mammography in the investigation of breast lumps
PRIME/MEDICAL EDUCATION		
1	Counselling- Breaking bad news.	Explain the concept of SPICES model of breaking bad news

Practical work		
S NO	**Topic**	**Learning Outcomes**
Pharmacology		
1	Graves' disease	Formulate prescription for a patient with Graves' disease
2	Diabetes mellitus	Formulate prescription for a patient with type 1 and type 2 Diabetes mellitus
Pathology		
1	Glucose estimation	Check glucose in urine
		Check blood glucose in a given sample.
2	Goiter	Identify the microscopic features of multinodular goitre
3	Pap smear	Interpret a pap smear slide
4	Fibroids	Identify the microscopic features of uterine fibroids
5	Carcinoma breast	Identify the microscopic features of carcinoma of the breast
Forensic Medicine		
1	Examination of a rape victim and assailant	Take consent from a rape victim
		Examine a rape victim/manikin
		Describe the procedure of taking sample from the victim/manikin/item
		Describe the procedure of Sealing and preservation of the specimen
2	Examination of sodomy victim and assailant	Describe the procedure of Examining a victim of sodomy
		Describe the procedure of Taking sample from the victim/manikin/item
		Describe the procedure of Sealing and preservation of the specimen
Community Medicine		
1	Contraception	Identify the contraceptive device/drug
		Explain the merits and demerits
		Discuss the method of administration of the given device/drug
2	Mother and child health	Identify the chart
		Devise a schedule plan for antenatal visits as per WHO criteria
3	EPI schedule	Counsel the mother for EPI schedule
4	Vaccination and immunization	Identify the vaccine
		Explain its uses
		Discuss its schedule of administration
		Discuss the results of VVM (vaccine voile monitor) and its uses in epidemics
5	IMCI- anthropometric measures / Shakir`s tape	Identify the model
		Measure the mid-arm circumference
		Calculate the weight and height of the child
		Interpret the results
6	Growth chart	Identify the chart
		Plot the graph using a scenario
		Interpret different parts of the chart
7	Demographic indicators	Interpret the given demographic indicator (population pyramid, HDI, PQLI, Growth rate and dependency ratio)

Paper-L (Renal-II, and Endocrine and Reproduction-II)

Table: MCQs

Subject	Renal-2	Endocrine and Reproduction-2	Total MCQs
Community medicine	11	6	17
Pharmacology	02	07	09
Pathology	11	12	23
Forensic medicine	01	06	07
Surgery	06	03	09
Gynaecology	01	39	40
Medicine	05	05	10
Pediatrics	02	01	03
Family medicine	01	01	02
Total	**40**	**80**	**120**

Table: OSPE/OSCE

Subject	Viva stations	OSPE/OSCE stations	Total
Pharmacology	2	1	3
Pathology	2	2	4
Forensic medicine	2	1	3
Community medicine	2	4	8
Research viva	2**	x	
Gynecology	1	2	3
Medicine (Endocrinology/DM)	0	1	1
Total	11	11	22

* A minimum of 22 stations will be used in final exams. The total marks will be 120 (6 marks for each station).
**there will be 2 allocated stations for research viva (one internal and one external) at one time for which the number of marks for each station will be 10 (with a total of 20 marks) allocated for research viva plus 15 marks for conducting research). A total of 35 marks have been allocated for the thesis (research project).

BLOCK-M-1

ENT Module

Teaching Hours Allocation

Themes	Total Hours	In class teaching (Hours)	Clinical (Hours)
Theme 01: Foundation of Otorhinolaryngology & Head and Neck	11	---	11
Theme 02: Sore Throat	21	15	06
Theme 03: Difficulty in Swallowing	09	05	04
Theme 04: Hoarseness & Stridor	36	19	17
Theme 05: Deafness, Ear Discharge & Dizziness	27	19	08
Theme 06: Nasal Obstruction	29	19	10
Theme 07: Swelling Neck	14	06	08
Total	**147**	**83**	**64**

General Learning Objectives

By the end of ENT Module, 4th year MBBS students will be able to:

Knowledge:

1. Describe the anatomy and physiology of Ear, Nose, Throat & Neck.
2. Describe benign and malignant tumors involving the ENT and Head & Neck.
3. Prescribe hematological investigations, x-ray paranasal sinuses, CT/MRI scan of paranasal sinuses, temporal bone and Head & Neck & interpret it.
4. Describe the ABC protocol for resuscitation of traumatic patients.
5. Discuss differential diagnosis of membrane on the tonsils and describe diphtheria.
6. Describe sialadenitis, sialolithiasis and enumerate the benign and malignant salivary tumors.
7. Discuss a treatment plan for the patients with various common diseases of the ENT and Head and Neck region.
8. Describe dysphagia and its causes, Plummer-Vinson Syndrome and malignant tumors of hypopharynx that could lead to dysphagia and hoarseness along with their management.
9. Describe the management of corrosive ingestion and foreign body in the esophagus.
10. Describe various congenital and acquired disorders of the ENT and Head & Neck region.
11. Describe the significance of hoarseness and stridor & enumerate their causes and clinical features of respiratory obstruction.
12. Describe tracheostomy and indications for this procedure.
13. Describe squamous cell carcinoma of the larynx and the impact of stage of disease on management and survival of patient.
14. Explain the mutual association of hearing and balance disorders & the various conditions that give rise to these disorders.
15. Describe the clinical features and course of otosclerosis, Meniere's disease, vestibular neuronitis & BPPV.
16. Diagnose suppurative otitis media & describe its intracranial and extra cranial complications.
17. Describe rhinosinusitis, its various types of rhino-sinusitis and its complications.
18. Describe the diseases of the nasal septum & define DNS and enumerate its various types.
19. Describe the pathophysiology, types, and management of Sino nasal polyposis.
20. Enumerate various conditions resulting in nasal obstruction & discharge.
21. Describe various types of allergic & non-allergic rhino-sinusitis.
22. Enumerate fungal and other granulomatous diseases of the nose & paranasal sinuses and describe their management.

23. Categorize various conditions benign & malignant neoplasms of the nose & paranasal sinuses.
24. Classify various types of neck swellings and describe clinical differentiating features of benign & malignant neck masses.
25. Describe a classification of various lymph nodes levels in the neck and describe the lymphatic drainage of the head and neck.
26. Describe the anatomy and physiology of salivary glands
27. Describe benign & malignant diseases of the salivary glands

Skills:

1. Obtain appropriate history, examine Ear, Nose, oral cavity, pharynx, larynx and Neck including mirror examinations and functional examinations of these areas.
2. Assist in diagnostic procedures and take swab for culture and sensitivity from ear, Nose & throat under supervision.
3. Prescribe hematological investigations, x-ray paranasal sinuses, CT/MRI scan of paranasal sinuses, temporal bone and Head & Neck & interpret it.
4. Perform clinical tests of hearing, tuning fork tests and balance independently
5. Interpret pure tone audiogram & tympanogram.
6. Describe the ABC protocol for resuscitation of traumatic patients.
7. Discuss a treatment plan for the patients with various common diseases of the ENT and Head and Neck region.
8. Describe the management of corrosive ingestion and foreign bodies in the esophagus.
9. Differentiate clinically between various types of stridor and possible site of obstruction.
10. Describe tracheostomy and indications for this procedure.
11. Diagnose suppurative otitis media & describe its intracranial and extra cranial complications.
12. Classify various types of neck swellings and describe clinical differentiating features of benign & malignant neck masses.
13. Obtain informed consent from patients and communicate with the patients, their families and community regarding diseases & their relevant issues.

Attitude:

1. Describe the ‘rehabilitation of deaf and mute children and the impact of hearing impairment in children.
2. Obtain informed consent from patients and communicate with the patients, their families and community regarding diseases & its relevant issues.

Specific Learning Objectives

Theme I – Sore Throat		
S No	**TOPIC**	**LEARNING OBJECTIVES**
1	Anatomy & physiology of oral cavity, Pharynx & salivary glands	Discuss the anatomy of oral cavity and site classification of oral cavity. Discuss applied anatomy of pharynx & mechanism of deglutition Discuss applied anatomy of nasopharynx and anatomy and physiology of adenoids Discuss applied anatomy of oropharynx and anatomy and physiology of pharyngeal tonsils Discuss the anatomy of minor and major salivary glands
2	Acute Pharyngitis	Discuss classification, types, aetiology, clinical features, diagnosis and treatment of acute pharyngitis
3	Chronic Pharyngitis	Discuss classification, types, aetiology, clinical features, diagnosis and treatment of chronic pharyngitis
4	Acute Tonsillitis/ Peritonsillar abscess (Quinsy)	Discuss classification, types, aetiology, clinical features, diagnosis and treatment of acute tonsillitis Discuss the aetiology, clinical features and treatment of quinsy
5	Chronic Tonsillitis	Discuss classification, types, aetiology, clinical features, diagnosis and treatment of chronic tonsillitis
6	Oral ulceration	Enumerate differential diagnosis of oral ulcers and discuss management of Aphthous ulcers
7	Trauma to the palate and Oropharynx	Discuss the principles of soft tissue & bone repair in palatal and pharyngeal trauma.
8	Carcinoma of oral cavity	Discuss the aetiology , clinical features and treatment of oral carcinoma
9	Approach to a patient with sore throat	Enumerate differentials of sore throat and discuss important differentiating points
10	Anatomy & physiology of salivary glands	Describe the anatomy & physiology of parotid, submandibular, sublingual & minor salivary glands
11	Non neoplastic disorders of the salivary glands	Describe non neoplastic disorders of salivary glands, its management and treatment

12	Sialolithiasis and sialectasis	Describe stone formation and stasis of secretions in the salary glands and its management
13	Neoplasm of salivary glands	Describe the features, course and management of benign and malignant, submandibular, sublingual and minor salivary glands
14	Complications of salivary gland surgeries	Describe in detail different surgical procedures of salivary glands and its complications

Theme II - Difficulty in Swallowing		
Topic	**Hours**	**Learning Objectives**
Dysphagia & Plummer Vinson Syndrome	1 hour	Discuss Dysphagia & the anatomy and physiology of Esophagus and the appropriate medical and surgical treatment of dysphagia. Discuss PVS & the predisposing factors for causation & management
Pharyngeal and esophageal Pouches	1 hour	Discuss Pharyngeal pouch & the predisposing factors, clinical features, and treatment.
Oropharyngeal Tumors	1 hour	Enumerate oropharyngeal tumors. Discuss the types, aetiology and treatment of oropharyngeal carcinoma.
Hypo pharyngeal Tumors	1 hour	Enumerate oropharyngeal tumors. Discuss the aetiology and treatment of hypo pharyngeal carcinoma.
Tumors of Esophagus.	1 hour	Classify esophageal tumors & describe the etiology, clinical features, and treatment options.

Theme III - Hoarseness & Stridor		
Topic	**Hours**	**Learning Objectives**
Applied anatomy of potential spaces in & around the larynx and neck	2 hours	Discuss applied anatomy of larynx. Discuss the pre-piglottic, paraglottic & Rinke's space.
Anatomy of Potential neck spaces	3 hours	Discuss anatomy of deep fascia of neck & anatomy of potential pharyngeal and neck spaces.
		Discuss surgical anatomy of peritonsillor, parapharygeal & submandibular spaces. Discuss anatomy of retro pharyngeal space.
Applied anatomy & physiology of	2 hours	Discuss applied anatomy of Larynx, Discuss the physiology of larynx.

Larynx/neck , Voice physiology		Discuss the physiology of voice, speech production & its regulation
Acute Laryngitis	1 hour	Discuss etiology, clinical features, diagnosis, and treatment of acute simple laryngitis
Chronic Laryngitis	1 hour	Discuss chronic laryngitis including chronic granulomatous conditions of the larynx, its clinical features, diagnosis, and treatment.
Vocal nodules & vocal polyps	1 hour	Discuss differentiating points between vocal nodules & polyps, its aetiology, clinical features, diagnosis, and treatment.
Vocal cord paralysis	1 hour	Discuss paralytic causes of hoarseness, its types, clinical features, diagnosis, and treatment.
Stridor	1 hour	Enumerate causes of stridor. Explain types of stridor. Discuss management of congenital stridor
Apyrexial causes of stridor	1 hour	Discuss the etiology and management of acquired apyrexial causes of stridor
Pyrexial causes	1 hour	Discuss the etiology and management of pyrexial causes of stridor
Laryngeal trauma	1 hour	Discuss the management of laryngeal trauma
Acute Respiratory obstruction	1 hour	Discuss signs of respiratory obstruction. Enumerate alternate airways & discuss tracheostomy.
Laryngotracheal Foreign body	1 hour	Discuss the etiology, types & treatment of Laryngotracheal Foreign bodies.
Malignant Tumours of the Larynx / Carcinoma of Larynx	1 hour	Discuss incidence, epidemiology, risk factors, Pathology & classification of carcinoma larynx. Discuss UICC classification of laryngeal sites & subsites. Discuss management of carcinoma of all the subsites
Approach to a patient with hoarsesness	1 hour	Discuss the differentials diagnosis of hoarseness and explain management approach to a patient presenting with hoarseness

Theme IV - Deafness, Ear Discharge & Dizziness		
TOPIC	**HOURS**	**LEARNING OBJECTIVES**
Applied Anatomy and Physiology of Ear	2 hours	Describe the applied anatomy of the external, middle & internal ear. Discuss the functions of the ear. Discuss basic principles & interpretation of various tuning fork tests. Discuss the interpretation of PTA & impedance audiometry
Trauma to External Ear and the Temporal Bone	1 hour	Classify the trauma to external ear and the temporal bone. Describe the appropriate imaging investigations & treatments.
Otitis Externa	1 hour	Discuss Otitis Externa, its clinical features, differential diagnosis and relevant clinical & radiological investigations and treatment.

Acute Suppurative otitis media	1 hour	Discuss acute suppurative otitis media. Describe its clinical features, differential diagnosis and relevant clinical & radiological investigations and treatment
Chronic Suppurative Otitis Media without chloesteatoma	1 hour	Discuss Chronic Suppurative Otitis Media and its clinical features, differential diagnosis and relevant clinical & radiological investigations and treatment.
Chronic Suppurative Otitis Media with Cholesteatoma	1 hour	Discuss cholesteatoma and its clinical features, differential diagnosis and relevant clinical & radiological investigations and treatment.
Complications of Suppurative Otitis Media.	1 hour	Discuss intracranial & extracranial otogenic complications and enumerate the appropriate clinical & radiological investigations and treatment.
Mastoiditis: Acute and Chronic	1 hour	Discuss mastoiditis, its clinical features, differential diagnosis and relevant clinical & radiological investigations and treatment.
Acoustic Neuroma	1 hour	Discuss acoustic neuroma & the appropriate clinical, audiological, and imaging studies used in diagnosis and treatment of acoustic neuroma.
Approach to patient with a Conductive hearing loss	1 hour	Discuss the differential diagnosis of hearing loss & the medical and surgical management of CHL. Discuss otosclerosis & its medical & surgical treatment of otosclerosis. Discuss OME & its medical and surgical treatment
Approach to patient with a Sensorineural Hearing loss (SNHL)	2 hours	Discuss SNHL & its differential diagnosis. Discuss tinnitus & its management. Discuss Ototoxicity & its management.
Vertigo Vestibular Neuronitis Meniere's Diseases BPPV	1 hour	Discuss true vertigo & its types, pathophysiology, investigations & management. Discuss Meniere's disease & its treatment. Discuss BPPV & its clinical features, diagnoses & treatment.
Approach to a deaf patient	1 hour	Discuss the approach to a deaf patient.
Approach to Management of Deaf Child	1 hour	Differentiate congenital, developmental, and acquired hearing loss & describe the impact of hearing impairment at various ages and their management.

Theme V - Nasal Obstruction		
Topic	**Hours**	**Learning Objectives**
Applied Anatomy, Physiology of Nose &	2 hours	Discuss the surgical anatomy, physiology & congenital disorders of the nose & PNS. Discuss the congenital disorders of the nose, palate & choanal atresia

Paranasal Sinuses		
Diseases of the Nasal Septum	1 hour	Discuss DNS, its types, the clinical features, medical & surgical treatment of nasal obstruction.
Sino-Nasal Polyposis	1 hour	Discuss Sino-nasal polyposis, its types and describe the clinical features, medical & surgical treatment of nasal polyps.
Fungal Rhinosinusitis	1 hour	Discuss various fungi implicated in fungal rhinosinusitis and the appropriate clinical, radiological investigations and treatment of fungal rhinosinusitis.
Sino-Nasal Tumors	1 hour	Discuss various benign and malignant tumors affecting the nose and paranasal sinuses and their clinical features, step involved in diagnosis and treatment options.
Trauma to Nose and Face and CSF rhinorrhea	1 hour	Discuss the Le Forte classification of mid face fractures & the appropriate clinical and radiological investigations & management of these fractures. Discuss CSF rhinorrhea and the predisposing factors, types, clinical features, investigations and treatment.
Headaches and Facial Pain	1 hour	Discuss rhinogenic headaches and the appropriate clinical, radiological investigations and treatment.
Granulomatous Diseases of the Nose	1 hour	Discuss various granulomatous disorders affecting the nose & the clinical features, investigations & treatments.
Adenoids	1 hour	Discuss anatomy diseases of adenoids and treatment
Juvenile Nasopharyngeal Angiofibroma	2 hours	Enumerate diseases of the nasopharynx. Discuss Juvenile nasopharyngeal angiofibroma, clinical features, investigations and treatment.
Nasopharyngeal Carcinoma	1 hour	Discuss the risk factor, clinical features, investigation, treatment and follow up nasopharyngeal carcinoma
Acute Sinusitis	1 hour	Discuss acute sinusitis & the appropriate clinical, radiological investigations and steps involved in treatment of patients.
Chronic Sinusitis	1 hour	Discuss chronic sinusitis & the appropriate clinical, radiological investigations and steps involved in treatment of patients.
Complications of Sinusitis	1 hour	Enumerate the predisposing factors for development of complications due to sinusitis. Discuss treatment.
Allergic Rhinitis (AR) and Non-allergic	1 hour	Discuss allergic rhinitis and its types, pathophysiology, investigations & the medical and surgical treatment. Discuss non –allergic rhinitis and the appropriate clinical and radiological investigations and its treatment.
Infective Rhinitis: Acute. & Chronic.	1 hour	Discuss infective rhinitis and the medical and surgical treatment of various types of acute and chronic infective rhinitis.

Foreign Body, Rhinolith, Maggots Nose	1 hour	Discuss Rhinolith and maggots in the nose and the appropriate medical and surgical treatment of patients with these conditions.
Approach to a patient with Epistaxis	1 hour	Approach to a patient with epistaxsis. Discuss epistaxis & the appropriate clinical, radiological & hematological investigations & treatment of the condition.

Theme VI - Neck Swelling		
Topic	**Hours**	**Learning objectives**
Para pharyngeal Abscess	1 hour	Discuss the etiology and management of each Para pharyngeal abscess.
Retropharyngeal Abscess	1 hour	Discuss the types, etiology, treatment and complications of each retropharyngeal abscess.
Submandibular Abscess	1 hour	Discuss the causes and treatment of submandibular abscess.
Trauma of the Larynx and Neck	1 hour	Classify the nature of trauma to the neck & larynx. Discuss clinical features, investigations and treatment.
Approach to a neck swelling	1 hour	Discuss the approach to neck swelling.
Evaluation of metastatic lymph nodes and occult primary in Neck (Occult Primary).	1 hour	Discuss Occult primary & the predictable nodal drainage in head and Neck region. Discuss the signs and symptoms of occult primary & the appropriate clinical and radiological investigations & different treatment options.

Clinical Schedule

Theme I - Foundation of Otorhinolaryngology & Head and Neck			
Topic	**Hours**	**Learning objectives**	**Assessment method**
History taking	01	Obtain detailed history of sore throat	OSCE

Examination	02	Perform Examination in a sore throat patient including general physical, local and systemic examination	OSCE
Nasopharyngeal examination	02	Perform mirror examination of nasopharynx	OSCE
Examination of oral cavity and oropharynx	02	Examine oral cavity and oropharynx in a systematic way	OSCE
Hypopharyngeal Examination	01	Perform Indirect hypopharyngoscopy with mirror	OSCE
Mouth Gauge and other instruments	01	Assemble mouth gauge and name the instrument used in tonsillectomy with utility of each instrument.	OSCE
Examination of Neck	02	Perform systematic examination of Neck	OSCE

Theme II - Sore Throat

Topic	Hours	Learning objectives	Assessment method
Communicate with patient of tonsillectomy	01	Obtain a pre-operative informed consent from a patient of tonsillectomy	OSCE
Tonsillar surgery & its instruments	02	Observe tonsillectomy surgery and identify instruments used	OSCE
Conservative management of sore throat	01	Discuss a conservative management plan for inpatient acute follicular tonsillitis	OSCE
Scrubbing technique	01	Demonstrate scrubbing hands using proper solution & take proper time by proper method	OSCE
Biopsy from oral ulcer	01	Assist to take a biopsy from tongue ulcer	OSCE

Theme III - Difficulty in Swallowing			
Topic	**Hours**	**Learning objectives**	**Assessment method**
Rigid Endoscopy system	01	Identify instruments & equipment used in rigid endoscopy system, describe rigid endoscopies.	OSCE
Oral & oropharyngeal mass palpation	01	How to palpate a mass in the oral cavity and oropharynx	OSCE
Oesophagoscopy	02	Observe rigid oesophagoscopy done for pharyngeal growth or dysphagia	OSCE

Theme IV - Hoarseness and Stridor			
Topic	**Hours**	**Learning objectives**	**Assessment method**
History taking	02	Obtain detailed history of hoarseness & stridor	OSCE
Examination	02	Perform Examination in a patient with hoarseness & stridor, including general physical, local and systemic examination	OSCE
Indirect laryngoscopy examination	01	Perform mirror examination of Laryngopharynx	OSCE
Examination of Neck	01	Perform systematic examination of Neck	OSCE
Investigations of Laryngeal diseases	01	Fill requisition form for different types of investigations into Laryngeal diseases.	OSCE
Video laryngoscopy	01	Observe a video of laryngoscopy for the diagnosis of hoarseness in clinical setting	OSCE
Conservative management of Hoarseness	01	Discuss a conservative management plan for a patient of hoarseness due to voice abuse.	OSCE
Laryngoscopy	02	Observe rigid system laryngoscopy under general anesthesia and identify instruments used in the procedure	OSCE

Communicate with a patient for voice rest	01	Counsel a patient on voice rest	OSCE
Stridor in bilateral abductor vocal paralysis	02	Council bilateral abductor paralysis patient & its management in a post thyroidectomy patient	OSCE
Biopsy from laryngeal growth.	01	Observe the procedure for taking biopsy from laryngeal growth.	Formative
Tracheostomy	01	Demonstrate the procedure of tracheostomy	Formative
Communicate with patient on laryngectomy	01	Demonstrate the procedure how to Obtain informed consent from a patient for total laryngectomy	OSCE

Theme V - Deafness, Ear Discharge & Dizziness

Topic	Hours	Learning objectives	Assessment method
History taking	02	Obtain detailed history from a patient with ear discharge/deafness/dizziness	OSCE
Local Examination	01	Perform clinical examination of the hearing & balance system.	OSCE
Otoscopy Tuning fork test Balance testing Examination under microscope	03	Perform otoscopic examination of the ear Perform tuning fork tests Perform test of balance, peripheral & central Assist in performing EUM	OSCE
Investigations of ear diseases	01	Discuss & fill requisition form for different types of investigations for ear diseases.	OSCE
Interpretation of audiogram and Impedance	01	Discuss the interpretation of audiogram and impedance.	OSCE

Theme VI - Nasal Obstruction

Topic	Hours	Learning objectives	Assessment Method
History taking	02	Obtain detailed history from a patient with nasal obstruction	OSCE

Local Examination	01	Perform clinical examination of the nose & paranasal sinuses.	OSCE
Anterior & posterior Rhinoscopy		Perform anterior & posterior Rhinoscopies with mirror	
Probe test		Perform probe test	
Nas endoscopy	01	Assist in performing Nas endoscopy.	OSCE
Pus culture / sensitivity	01	Perform Take swab from nose for different purpose	
X – Rays nasopharynx /PNS		interpret X – Rays nasopharynx/PNS for enlarged soft tissues shadow	OSCE
Nasal patency & adenoid facies in enlarged adenoids	01	Perform examination for nasal patency in enlarged adenoids.	OSCE
Adenoid surgery	01	Observe adenoid surgery being done in operating room	Formative
CT scan nose & nasopharynx	01	Interpret CT scan in nasopharyngeal angiofibroma, describe bowing sign.	Formative
Nasopharyngeal Biopsy	01	Observe surgery for nasopharyngeal biopsy	Formative
Investigations of nose & paranasal sinuses diseases	01	Document Fill requisition form for different types of investigations for nose & paranasal sinuses diseases.	Formative

Theme VII - Swelling Neck			
Topic	**Hours**	**Learning objectives**	**Assessment method**
Examination of Neck Nodes	02	Perform systematic examination of all groups of neck nodes	OSCE
Examination of lump in the neck	01	Perform examination of lump in the neck in a systematic way.	OSCE
Surgery on a	01	Observe surgery on a pharyngeal	OSCE

pharyngeal abscess		abscess & describe drainage of peritonsillar abscess	
Thyroid examination	01	Perform Thyroid Examination both anatomically & functionally	OSCE
Pharyngeal abscess surgery related instruments	01	Identify instruments used in drainage of pharyngeal abscess surgery	OSCE
Examination of parotid	01	Perform examination of parotid swelling	OSCE
Examination of thyroid	01	Perform examination of thyroid gland	OSCE

Paper M-1 (ENT module)

Table-7: MCQs

Module	Total MCQs
ENT	90

Table-8: OSCE

Module	Total OSCE stations
ENT	15

BLOCK-M-2

(EYE Module)

EYE Module

Teaching Hours Allocation

heme	In class teaching (Hours)	Clinicals (Hours)	Total (Hours)
Theme 1: Foundation of Ophthalmology	08	25	33
Theme 2: Lid Abnormalities & Bulging Eyes	10	21	31
Theme 3: Red Eye	17	14	31
Theme 4: Visual loss	18	15	33
Theme 5: Childhood Blindness & Crossed Eyes	09	21	30
Total	62	96	158

General Learning Objectives

By the end of Eye Module, 4th year MBBS students will be able to:

Knowledge:

1. Describe the visual standards.
2. Define and classify blindness.
3. Describe the anatomy and physiology of visual pathway and different visual field defects.
4. Describe the basics and usage of optical coherence tomography (OCT), visual fields and ultrasonography in common eye disorders.
5. Discuss ptosis, ectropion and entropion and describe the treatment options.
6. Describe the differential diagnosis of red eye.
7. Explain the pathophysiology, and management of different conjunctival inflammations.
8. Explain the pathophysiology, and management of different corneal inflammations.
9. Discuss the pathophysiology, and management of uveal inflammations.
10. Describe the aqueous humor dynamics and its role in glaucoma.

11. Enumerate different causes of gradual visual loss and propose their management plan.
12. Enumerate different causes of sudden visual loss (painful/painless) and propose their management plan.
13. Describe squint, its presentation and principles of management.
14. Enumerate different causes of double vision and propose their management plan.
15. Enumerate different causes of childhood blindness and propose their management plan.
16. Discuss the clinical importance of white pupil in children.
17. Define amblyopia, describe its causes and management.
18. Differentiate between different terms used in ocular trauma.

Skills:

1. Differentiate different types of lid bumps and propose a management plan for it.
2. Examine bulgy eyes and investigate different causes of it.
3. Propose the management plan of ocular injuries.

Specific Learning Objectives

Theme 1: Foundation of Ophthalmology		
Topic	**Learning objectives**	**Hours**
Standards Of Vision and Blindness	Discuss visual standards and blindness according to WHO classification.	01
Pupil Reflexes and Drugs Used In Common Eye Conditions	Describe the normal and abnormal pupil reflexes. Discuss drugs used in common eye diseases.	01
Visual Pathway and Visual Field Defects	Describe the visual pathway. Describe the common visual field defects.	01
Optical Coherence Tomography (OCT) and Visual fields (VF)	Discuss the uses of OCT and VF in ophthalmology.	01
Fundus Fluorescein Angiography (FFA) and Ultrasonography	Discuss the uses of FFA and Ultrasonography in ophthalmology.	01
Optics & Eye	Discuss visual functions (visual acuity, color vision, contrast sensitivity, light brightness), Refraction, Pseudophakia, Aphakia, and Anisometropia	01

Refractive Errors	Discuss pathophysiology and clinical presentation of myopia, hypermetropia, astigmatism and presbyopia	01
Correction of Refractive Errors	Describe management of myopia, hypermetropia, astigmatism and presbyopia.	01

Theme 2: Lid abnormalities & Bulging Eyes		
Topic	**Learning objectives**	**Hours**
Differential Diagnosis of Lid Bumps	Discuss overview of different causes of lid bumps.	01
Chalazion, Stye	Describe pathophysiology and management of chalazion and stye.	01
Tumors of Eyelids	Discuss different eyelid tumors and its pathogenesis.	01
Management of Lid Bumps	Describe management plan of lid bumps.	02
Ptosis	Discuss causes of ptosis, assessment and their management.	01
Trichiasis, Entropion and Ectropion	Discuss Trichiasis, Entropion and Ectropion, assessment and their management.	01
Proptosis – Basics	Discuss the etiology, clinical features, investigation and management of proptosis in children and adults	01
Pre-septal and Orbital Cellulitis	Discuss the etiology, clinical features, investigation and management of proptosis in children and adults. Enumerate Differential diagnosis / causes of proptosis in children and adults.	01
Thyroid Eye disease (TED)	Discuss the etiology, clinical features, investigation and management of TED.	01
Myasthenia Gravis & Migraine	Discuss the etiology, clinical features, investigation, and management of Myasthenia Gravis. Discuss the etiology, clinical features, investigation, and management of Migraine.	01

Theme 3: Red Eye		
Topic	**Learning objectives**	**Hours**
Red eye	Enumerate causes of red eye. Describe pathophysiology and management of different conjunctival (Bacterial /Viral /Fungal/Allergic) inflammations.	02

Corneal Inflammations/Infections	Discuss the etiology, clinical features, investigation, and management of non-infectious corneal inflammations. Discuss investigations for corneal ulcers.	01
Bacterial Keratitis	Discuss the etiology, clinical features, investigation, and management of different bacterial corneal ulcers.	01
Fungal, Viral & Acanthamoeba Keratitis	Discuss the etiology, clinical features, investigation, and management of different fungal, viral & acanthamoeba corneal ulcers.	02
Dacryocystitis	Discuss the etiology, clinical features, investigation, and management of congenital nasolacrimal duct obstruction. Assess the time of probing in children. Differentiate between acute, acute on chronic and chronic Dacryocystitis. Discuss the etiology, clinical features, investigation, and management of Dacryocystitis.	01
Dry Eyes	Discuss the etiology, clinical features, investigation, and management of Dry Eyes with special emphasis on Vit. A deficiency and Sjogren's syndrome.	01
Blepharitis	Discuss the etiology, clinical features, investigation, and management of blepharitis.	01
Pterygium, Pseudo-Pterygium, Episcleritis & Scleritis	Describe differences between Pterygium, Pseudo-pterygium, Episcleritis & Scleritis and their management.	01
Basic Concepts In Ocular Trauma	Discuss definitions, classification & clinical evaluation of ocular injuries and principles of management. Discuss corneal and conjunctival foreign bodies and their treatment.	01
Open Globe Injury (OGI) / IOFB / Sympathetic Ophthalmia (SO)	Classify OGI. Discuss the etiology, clinical features, investigation, and management of OGI and IOFB. Discuss the etiology, clinical features, investigation, and management of SO.	01
Closed Globe Injury (CGI) Orbital Floor Injury	Discuss the etiology, clinical features, investigation, and management of CGI. Classify CGI.	01
Radiation, Thermal, Chemical Injuries	Discuss etiology, clinical features, investigation, and management of radiation injury. Discuss the etiology, clinical features, investigation, and management of thermal injury Discuss the etiology, clinical features, investigation, and management of chemical injury.	01
Visual Rehabilitation	Discuss various options of visual rehabilitation after ocular trauma. Discuss rehabilitation services for blind people in our setup.	01
Uveitis – Basics	Discuss Definitions, classifications, history & workup of uveitis.	01

Anterior & Posterior Uveitis	Discuss the etiology, clinical features, investigation, and management of Anterior uveitis. Discuss the etiology, clinical features, investigation, and management of Posterior Uveitis.	01

Theme 4: Visual Loss

Topic	Learning objectives	Hours
Visual Loss & Intraocular Pressure (IOP)	Classify causes of visual loss in following order: Visual loss associated with Anterior segment. Visual loss associated with Posterior segment. Discuss Aqueous humor dynamics and its role in IOP. Enumerate causes of gradual & sudden visual loss. Define and Classify Glaucoma.	01
Open angle glaucoma	Discuss the differences between POAG, NTG and OHT. Discuss the etiology, clinical features, investigation, and management of POAG. Discuss the etiology, clinical features, investigation, and management of NTG. Discuss the etiology, clinical features, investigation, and management of OHT.	01
Primary Angle Closure Glaucoma (PACG)	Discuss the stages of PACG. Discuss the etiology, clinical features, investigation, and management of Acute angle closure.	01
Neovascular Glaucoma & Lens Induced Glaucoma	Discuss the etiology, clinical features, investigation, and management of Neovascular glaucoma.	01
	Discuss the etiology, clinical features, investigation, and management of lens induced glaucoma.	
Treatment Options In Glaucoma	Enumerate different treatment options in glaucoma. Discuss the indications of each treatment option.	01
Cataract	Define cataract. Describe the types of Age-related cataract. Describe the pathogenesis and complications of cataract. Describe the management of cataract.	01
Cataract Surgery Complications	Discuss the etiology, clinical features, investigation, and management of Endophthalmitis. Discuss the etiology, clinical features, investigation, and management of Panophthalmitis.	01
Corneal Ectasia, Dystrophy & Degeneration	Discuss the etiology, clinical features, investigation, and management of keratoconus. Give overview of corneal dystrophies and degenerations.	01
Diabetic Eye Disease	Discuss the effects of diabetes on eye.	01

	Discuss the etiology, clinical features, investigation, and management of Diabetic Eye Disease (Diabetic Retinopathy and maculopathy).	
Hypertensive Retinopathy	Discuss the effects of hypertension on eye. Discuss the etiology, clinical features, investigation, and management of Hypertensive Retinopathy.	01
Central Retinal Vein Occlusion (CRVO) And	Discuss the etiology, clinical features, investigation, and management of CRVO.	01
Central Retinal Artery Occlusion (CRAO)	Discuss the etiology, clinical features, investigation, and management of CRAO.	01
Retinal Detachment (RD)	Discuss the etiology, clinical features, investigation, and management of RD.	01
Choroidal Melanoma	Discuss the etiology, clinical features, investigation, and management of choroidal melanoma. Describe the importance of this condition on mortality.	01
Night Blindness – Retinitis Pigmentosa, Vit. A Deficiency	Discuss the etiology, clinical features, investigation, and management of Retinitis pigmentosa. Discuss the etiology, clinical features, investigation, and management of Vit. A deficiency.	01
Optic neuritis	Classify optic neuritis. Discuss the etiology, clinical features, investigation, and management of optic neuritis.	01
Hereditary, Nutritional & Toxic Optic Neuropathies	Discuss the etiology, clinical features, investigation, and management of these optic neuropathies.	01
Papilledema	Describe the difference between papilledema and disc swelling. Discuss the etiology, clinical features, investigation, and management of papilledema.	01

Theme 5: Childhood Blindness & Crossed Eyes

Topic	Learning objectives	Hours
White pupil (leukocoria) and Retinoblastoma (RB)	Describe the importance of white pupils in children. Differentiate different causes of white pupil in children. Discuss investigations in white pupils. Discuss the etiology, clinical features, investigation and management of RB.	01
Congenital Cataract	Define congenital cataract. Describe the types of congenital cataracts. Describe the pathogenesis and complications of congenital	01

	cataracts. Describe the management of congenital cataracts.	
Congenital Glaucoma	Discuss the etiology, clinical features, investigation and management of Congenital Glaucoma.	01
Amblyopia	Define Amblyopia. Discuss the etiology, clinical features, investigation, and management of amblyopia.	01
Squint – Basics	Discuss definitions, clinical evaluation of squint and principles of management	01
Concomitant Squint	Define concomitant squint.	01
Esotropia	Discuss the etiology, clinical features, investigation, and management of esotropia.	01
Exotropia	Discuss the etiology, clinical features, investigation, and management of exotropia.	01
Diplopia & Incomitant Squint	Discuss differential diagnosis/causes of diplopia. Define incomitant squint. Discuss the etiology, clinical features, investigation, and management of 3rd nerve palsy. Discuss the etiology, clinical features, investigation, and management of 4th nerve palsy. Discuss the etiology, clinical features, investigation, and management of 6th nerve palsy.	01

Clinical Schedule

Theme 1: Foundation of Ophthalmology			
Topic	**Learning objectives**	**Assessment method**	**Hours**
1. History Taking 2. Visual Acuity	Take detailed history in ocular conditions Check visual acuity.	OSCE	03 + 02
3. Pupil Examination	Perform pupillary examination.	OSCE	03
4. Visual Fields (Confrontation)	Perform visual fields examination by confrontation methods.	OSCE	03
5. Slit-Lamp Examination	Identify parts of slit-lamp	OSCE	01

6. Anterior Segment Examination	Examine anterior segment on slit lamp	OSCE	01
7. Direct Ophthalmoscopy	Perform direct ophthalmoscopy	OSCE	02
8. Retinoscopy	Identify trial lenses used in refraction.	OSCE	03
9. Indirect Ophthalmoscopy	Perform indirect ophthalmoscopy	OSCE	02
Investigations 10. OCT 11. Visual Fields 12. Biometry 13. B-Scan 14. FFA 15. Corneal Topography	Describe/interpret the results of: OCT Visual fields Biometry B-scan FFA & Corneal topography	OSCE	03 + 02

Theme 2: Lid Abnormalities & Bulging Eyes

Topic	Learning objectives	Assessment method	Hours
Eversion Of Upper Lids	• Observe Eversion of upper lids	OSCE	01
Ptosis Examination	• Perform ptosis examination.	OSCE	03
Ptosis And Its Surgeries	• Observe ptosis surgery	OSCE	03
Lids Abnormalities	• Examine common lid abnormalities (Ectropion, Entropion, Chalazion, Stye)	OSCE	03
Lids Surgery Related Instruments	• Identify instruments used in lids surgery	OSCE	03
Lid Reconstruction Procedures	• Observe lid reconstruction procedures	OSCE	05
Proptosis	• Observe proptosis	OSCE	03

Theme 3: Red Eye			
Topic	**Learning objectives**	**Assessment Method**	**Hours**
Use Of Topical Anesthesia and Staining	• Perform topical anesthesia and staining.	OSCE	01
Removal Of Superficial Foreign Bodies	• Observe corneal foreign body removal.	OSCE	01
Corneal Scrapping	• Observe corneal scrapping.	OSCE	02
Keratoplasty Surgery	• Observe keratoplasty.	OSCE	03
Lacrimal Regurgitation Test	• Perform lacrimal regurgitation test.	OSCE	01
Dacryocystorhinostomy (DCR) Surgery & Its Instruments	• Observe DCR surgery and identify instruments used	OSCE	03
Ocular Trauma	• Observe first aid to Ocular trauma • Perform eye washing in chemical injury.	OSCE	03
Globe Repair Surgery	• Observe OGI surgery.	OSCE	03

Theme 4: Visual Loss			
Topic	**Learning objectives**	**Assessment Method**	**Hours**
Normal Disc Disc Abnormalities Swollen Disc(S)	• Examine normal disc • Examine glaucomatous disc. • Examine swollen disc	OSCE	03
Detection Of Retinal Lesions Retinal Vascular Diseases	• Detect common retinal conditions • Differentitate different retinal vascular conditions.	OSCE	03
Retinal Detachment	• Identify RD in pictures • Observe Retinal detachment surgery	OSCE	03
Use Of Lasers In Eye Intravitreal Injections	Discuss • Use of lasers in eye • Intravitreal injections	OSCE	02

Tonometry	Observe goldman tonometery	OSCE	01
Glaucoma Filtration Surgery	Observe Glaucoma filtration surgery	OSCE	03

Table 11: Childhood Blindness

Theme 5: Childhood Blindness & Crossed Eyes			
Topic	**Learning objectives**	**Assessment method**	**Hours**
Congenital Glaucoma	• Observe congenital glaucoma examination (EUA) and surgery	OSCE	03
Cataract (Adult and Congenital)	• Detect cataract on ocular examination	OSCE	03
Cataract surgery	• Observe types of Adult and Congenital cataract surgery	OSCE	03 + 03
Extraocular Mmovements	• Perform extraocular movements and squint examination	OSCE	03
Squint Eexamination	• Perform cover / uncover / alternate cover tests • Identify the pattern of squint (Esotropia vs. Exotropia)	OSCE	03
Squint Surgery	• Observe squint surgery	OSCE	03

Paper M-2 (Eye module)

Table: MCQs

Module	Total MCQs
Eye	90

Table: OSCE

Module	Total OSCE stations
Eye	15

Final Year MBBS

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BLOCK-N

(Foundation-3, Blood-3 and MSK-3)

FOUNDATION - III MODULE

Themes

S#	Theme	Duration in Weeks
1	The In-Patients	1
2	Peri-operative Care	1

General Learning Objectives

By the end of Foundation-III modules, Final Year MBBS students will be able to:

Knowledge:

1) Discuss the process of Evidence-based medicine/practice.
2) Explain the concepts and processes of patient safety and types of medical errors.
3) Explain the objectives and process of clinical audit and governance.
4) Discuss the principles of communications skills, counseling, and breaking bad news.
5) Discuss the psychological aspects of patient care in hospital and ambulatory care settings.
6) Explain the concepts of surgical skills, perioperative, intraoperative, and postoperative care.
7) Discuss the concepts of palliative and end-of-life care.
8) Explain the concepts of developmental assessment in pediatrics.

Skills:

1) Explain the objectives and process of clinical audit and governance.
2) Discuss the principles of communications skills, counseling, and breaking bad news.
3) Explain the concepts of surgical skills, perioperative, intraoperative, and postoperative care.
4) Explain the concepts of developmental assessment in pediatrics.

Attitude:

1) Explain the concepts and processes of patient safety and types of medical errors.
2) Discuss the principles of communications skills, counseling, and breaking bad news.
3) Discuss the psychological aspects of patient care in hospital and ambulatory care settings.
4) Discuss the concepts of palliative and end-of-life care.

Theme-wise Specific Learning Objectives

Theme-1: The in-patient		
S NO	**TOPIC**	**LEARNING OBJECTIVES:**

Medical Education		
1	Clinical decision making (Evidence- based Medicine)	Define Evidence Based Medicine.
		Explain the steps of evidence-based medicine/practice
		Discuss the levels of evidence.
2	Patient safety	Explain the concepts of patient safety.
		Discuss the types, etiology, and prevention of medical errors.
3	Clinical governance and clinical audit	Explain the components of clinical governance.
		Explain the steps of clinical audit.
4	Patient and family counselling/ breaking bad news.	Explain the steps of SPIKES model of breaking bad news and counselling.
Psychiatry		
1	Family health education	Explain the care of a patient at home especially for chronic illnesses
		To enhance the compliance of both pharmacological and onpharmacological management in acute and chronic illnesses
		Explain strategies to reduce follow up tertiary care visits
2	Initial psychiatric assessment	Discuss the initial psychiatric assessment of a patient admitted.
Surgery		
1	Basic surgical skills	Explain the principles of patient care and safety in operation theatre / surgical safety checklists
		Explain the principles of skin and abdominal incisions
		Explain the principles of wound closure and drain usage and diathermy
2	Laparoscopic and robotic surgery	Explain the principles, advantages, disadvantages, indications, and complications of Laparoscopic and Robotic surgery.
3	Surgical informed consent	Explain the types and components of informed consent in surgical practice.
4	Nutrition and fluid therapy	Assess the fluid and electrolytes requirements in pre-and post-operative patients.
		Explain the different methods of providing nutritional support and their complications.
5	Postoperative care	Explain the standards of postoperative care.
		Discuss the general and system specific postoperative complications.
Radiology		
1	Diagnostic imaging	Describe the basic principles of radiation protection
		Explain the types and principles of different imaging techniques and their indications.
Medicine		

1	End-of-Life and palliative care	Discuss the steps and prerequisites of end of life and palliative care.
2	Geriatric Care	Explain the concepts of geriatric care and problems associated with it.
Pediatrics		
1	Pediatric history taking and physical examination	Take history from parents from neonatal age to pediatric age.
		Perform physical examination in a neonate and pediatric age group patient including growth parameters.
2	Developmental assessment	Perform development assessment of a child
		Explain the components of developmental assessment in children of different age groups

Theme-2: Perioperative Care		
S NO	**TOPIC**	**LEARNING OBJECTIVES:**
Surgery		
1	Enhanced Recovery after Surgery (ERAS)	Describe the ERAS protocol
		Discuss the components of ERAS protocol
		Explain the benefits of ERAS
2	Pain Management	Evaluate a patient with postoperative pain
		Manage a patient with pain during perioperative phase
		Discuss the pathophysiological consequences of postoperative pain
Medicine		
1	Preoperative evaluation and fitness for anesthesia and surgery	Evaluate a patient for fitness for surgery and anesthesia.

BLOOD & IMMUNOLOGY – III

Themes

S. No	Themes	Duration in Hours
1	Pallor	7
2	Fever	8

3	Bleeding	5

General Learning Objectives

By the end of Blood & Immunology-III Module, Final year MBBS students will be able to:

Knowledge:

1) Explain the etiology, clinical features, diagnostic workup, and management of a patient with Anemia.
2) Explain the etiology, clinical features, diagnostic workup, and management of a patient with anemia of pregnancy.
3) Explain the etiology, clinical features, diagnostic workup, and management of a patient with Leukopenia.
4) Explain the etiology, clinical features, diagnostic workup, and management of a patient with Leukocytosis.
5) Explain the management and complications of a patient with hematological malignancies.
6) Discuss the diagnostic workup of a patient with splenomegaly.
7) Explain the etiology, clinical features, diagnostic workup, and management of a patient with bleeding and clotting disorders.
8) Explain the etiology, clinical features, diagnostic workup, and management of a patient with anemia of pregnancy

Skills:

1) Explain the etiology, clinical features, diagnostic workup, and management of a patient with Anemia.
2) Explain the etiology, clinical features, diagnostic workup, and management of a patient with anemia of pregnancy.
3) Explain the etiology, clinical features, diagnostic workup, and management of a patient with Leukopenia.
4) Explain the etiology, clinical features, diagnostic workup, and management of a patient with Leukocytosis.
5) Discuss the diagnostic workup of a patient with splenomegaly.
6) Explain the etiology, clinical features, diagnostic workup, and management of a patient

with bleeding and clotting disorders.

7) Explain the etiology, clinical features, diagnostic workup, and management of a patient with anemia of pregnancy

Attitude:

1) Explain the etiology, clinical features, diagnostic workup, and management of a patient with anemia of pregnancy.
2) Explain the management and complications of a patient with hematological malignancies.
3) Explain the etiology, clinical features, diagnostic workup, and management of a patient with anemia of pregnancy

Theme-wise Specific Learning Objectives

Theme-1: Pallor		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Pediatrics		
1	Anemia	Evaluate a neonate, infant and child with anemia (congenital/acquired).
		Explain the diagnostic workup needed for different age group in Pediatric patients with anemias of inadequate production and Hemolytic Anemia.
		Classify anemias based on history, physical examination and relevant investigations considering different age groups
		Manage an infant and child with iron deficiency anemia and megaloblastic anemia
		Manage a neonate and infant with hereditary anemias
		Manage a child with hemolytic Anemia: • 7Thalassemia • Sickle cell anemia • Hereditary spherocytosis • G6PD deficiency
		Manage a child with anemia resulting from bone marrow failure (Aplastic anemia)
		Perform physical examination of a neonate, infant and child with anemia
		Perform general physical and systemic examination keeping in mind the hematological problem for a specific Pediatric age group

		Counsel a parent of a neonate, infant and child with Thalassemia major
Medicine		
1 Anemias		Evaluate a patient with anemia
		Explain the diagnostic workup of a patient with anemias
		Classify anemias based on history, physical examination and relevant investigations
		Manage a patient with iron deficiency anemia
		Manage a patient with hereditary anemias
		Manage a patient with hemolytic anemias (hereditary and acquired)
		Manage a patient with anemia resulting from bone marrow failure
		Take history from a patient with anemias
		Perform physical examination of a patient with anemia
		Perform hematological examination
		Counsel a patient with different types of anemias
Gynecology		
1	Anemia in pregnancy	List the various causes of anemia in pregnancy.
		Describe Feto-maternal complications of anemia in pregnancy.
		Interpret the blood picture of a pregnant patient with anemia
		Outline diagnostic workup and management plan of a patient with anemia in pregnancy.
		Take history and perform physical examination of a patient with anemia in pregnancy.
		Counsel a pregnant patient with anemia.
Theme-2: Fever		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Pediatrics		
1	Leukopenia	Evaluate a report of peripheral blood film
		Explain the diagnostic approach to a child with Leukopenia
		Take a history of a child/infant with leukopenia / aplastic anemia

2	Leukemias	Explain the diagnostic approach to a child with leukocytosis
		Classify Leukemias
		Explain the diagnostic approach to a patient with suspected leukemia
		Explain the management of a child with acute Leukemias
		Take history and perform physical examination of a patient with leukocytosis
		Counsel a parent with a child with ALL.
3	Splenomegaly	Classify the causes of splenomegaly in Pediatric age group
		Explain the diagnostic approach to a child with splenomegaly
Medicine		
1	Leukopenia	Evaluate a peripheral blood film
		Explain the diagnostic approach to a patient with Leukopenia
		Take history from a patient with leukopenia and aplastic anemia
2	Leukemias	Explain the diagnostic approach to a patient with leukocytosis
		Classify Leukemias
		Explain the management of a patient with acute Leukemias
		Explain the management of a patient with chronic Leukemias
		Take history and perform physical examination of a patient with leukocytosis
3	Splenomegaly	Classify the causes of splenomegaly
		Explain the diagnostic approach to a patient with splenomegaly
4	Lymphadenopathy	Classify the causes of generalized lymphadenopathy
		Explain the diagnostic approach to a patient with generalized lymphadenopathy
		Classify lymphomas
		Explain the management of a patient with Lymphoma (Hodgkin`s and non-Hodgkin`s)
		Explain tumor lysis syndrome and its management
		Explain the common adverse effects of chemotherapeutic

		agents used in hematological malignancies and their management and prevention.
		Counsel a patient with newly diagnosed hematological malignancy

Theme-3: Bleeding		
S NO	**Topic**	**Learning objectives**
Pediatrics		
1	Definition of terms	Define Petechiae, purpura, ecchymosis
2	Bleeding and clotting disorders	Explain the diagnostic approach to a child/infant with bleeding disorder
		Classify clotting disorders and explain their etiologies
		Explain the coagulation screen
		Interpret the common hematological parameters in a child with bleeding disorder (Platelets count, BT, CT, PT, APTT, Fibrinogen levels, FDPs)
		Explain the management of Von Willebrand disease
		Explain the management of a child with Hemophilia A
		Explain the management of a child with Idiopathic Thrombocytopenic Purpura
		Explain the dosage and administration of factor VIII in a child/infant in different situations like accidents, fall of deciduous teeth, surgery etc.
		Take history and perform physical examination of a child with history of bleeding disorder
Medicine		
1	Bleeding and clotting disorders	Explain the diagnostic approach to a patient with bleeding disorder
		Classify hypercoagulable states and their management and prevention of thrombosis

MUSCULOSKELETAL SYSTEM-III

Themes

S. No	Themes	Duration in Hours
1	Joint pains	12
2	Aching bones	6
3	Muscle weakness	5
4	Skin rashes and burns	8

General Learning Objectives

By the end of Musculoskeletal-III Module, Final year MBBS students will be able to:

Knowledge:

1. Discuss the diagnostic and therapeutic approach to children and adult patients with arthritides.
2. Explain the surgical management of different arthritic disorders.
3. Elaborate on the management of osteoporosis, Rickets, and Osteomalacia.
4. Explain the types of spine diseases and their management.
5. Explain the types, etiology, clinical features, and management of primary muscle diseases including poliomyelitis
6. Discuss different dermatological conditions in terms of etiology, classification, investigations, and management.

Skills:

1. Discuss the diagnostic and therapeutic approach to children and adult patients with arthritides.
2. Take history and examine a patient with an arthritic condition
3. Counsel a patient with chronic arthritic condition, psoriasis, and muscular dystrophies.

Attitude:

1. Counsel a patient with chronic arthritic condition, psoriasis, and muscular dystrophies

Specific Learning Objectives

Theme-1: Joint pains		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Introduction to arthritides: • Classification • Serological tests	Classify autoimmune diseases of joints based on the pattern of joint involvement: A) Peripheral • Symmetrical • Oligoarticular • Monoarticular B) Axial
		Explain the types, and indications of autoimmune markers in different Rheumatological disorders
		Describe different modalities of investigations and their indications used in different arthritic disorders
		Explain the extra-articular manifestations of inflammatory arthritides
2	Management of adult arthritides	Explain the differential diagnosis, diagnostic and therapeutic approaches to an adult patient with mono-arthritis
		Explain the differential diagnosis, diagnostic and therapeutic approaches to an adult patient with symmetrical polyarthritis
		Explain the differential diagnosis, diagnostic and therapeutic approaches to an adult patient with oligoarticular arthritis
3	Management of common arthritic disorders	Discuss the management of patients and complications with Rheumatoid arthritis
		Discuss the management, complications, and prognosis of a patient with SLE
		Explain the management and complications of a patient with Ankylosing spondylitis
		Discuss the clinical features and diagnosis of Reiter`s syndrome, Reactive arthritis and Psoriatic arthritis
		Discuss the management of patients and complications with

		Osteoarthritis
		Discuss the management of patients and complications with acute Gout and Gouty Arthritis
		Take history and perform a physical examination of a patient with symmetrical arthritis
		Counsel a patient with new onset Rheumatoid arthritis.
Pediatrics		
1	Orthopedic evaluation of a child Management of pediatric arthritides	Perform orthopedic evaluation of a neonate and child
		Explain the differential diagnosis, diagnostic workup, and therapeutic approaches to a pediatric patient with mono-arthritis
		Explain the differential diagnosis, diagnostic workup and therapeutic approaches to a pediatric patient with symmetrical polyarthritis
		Explain the differential diagnosis, diagnostic workup, and therapeutic approaches to a pediatric patient with oligoarticular arthritis
2	Management of common arthritic disorders in children	Discuss the management of patient and complications with Juvenile idiopathic arthritis
		Take history and perform a physical examination of a child with Arthritis
		Counsel a child and his parents with new onset Juvenile Chronic arthritis
Orthopedics		
1	Surgical management of disabling Rheumatoid arthritis	Explain the surgical interventions and their indications in the management of disabling Rheumatoid arthritis • Rheumatic hand disorders • Rheumatic foot disorders
2	Tuberculous/ Septic arthritis	Discuss the etiology, risk factors, Clinical presentation, Diagnostic approach, and management of tuberculous and septic hip and knee arthritis.

Theme-2: Aching Bones		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Osteoporosis	Explain the etiology, risk factors, complications, management, and prevention of Osteoporosis
Pediatrics		
1	Rickets and Osteomalacia	Discuss the diagnostic approach to a child with Rickets
		Discuss the etiology, clinical, radiological, and laboratory features of Rickets and Osteomalacia and their treatments
		Take history and perform a physical examination of a patient with Rickets
Orthopedics		
1	Deformities and congenital disorders	Classify common deformities and congenital disorders of bones
		Discuss the pathophysiology, clinical features and complications of Achiondroplasia
		Discuss the pathophysiology, clinical features and complications of Osteogenesis imperfecta
		Discuss the pathophysiology, clinical features and complications of Paget`s disease
2	Structural spine abnormalities	Classify and explain structural spine abnormalities in terms of clinical features, complications, and management
3	Osteomyelitis	Explain the etiology, clinical presentation, investigations, and medical and surgical management of Osteomyelitis
4	Caries Spine	Explain the etiology, clinical presentation, investigations, and medical and surgical management of Caries spine

Theme-3: Muscle weakness		
S NO	**TOPIC**	**LEARNING OBJECTIVES**

Medicine		
1	Proximal myopathy	Elaborate on the etiology and diagnostic workup of a patient with proximal muscle weakness
2	Polymyositis and dermatomyositis	Discuss the pathogenesis, clinical features, investigations, differential diagnosis and management of Polymyositis and Dermatomyositis
Pediatrics		
1	Muscular dystrophies	Classify muscular dystrophies
		Explain the pathogenesis, clinical features, differential diagnosis, management and prognosis of Duchenne muscular dystrophy
		Explain the pathogenesis, clinical features, differential diagnosis, management and prognosis of myotonic dystrophy
		Compare the clinical features and prognosis of Becker, limb-girdle, and facioscapulohumeral dystrophies
		Take history and perform a physical examination of a child with muscular dystrophy
		Counsel the parents of a child suffering from Muscular dystrophy
Orthopedics		
1	Poliomyelitis	Explain the Orthopedic complications of poliomyelitis their Diagnostic workup and Management
Psychiatry		
1	Somatoform disorders	Classify somatoform disorders
		Explain the criteria for the diagnosis of pain somatoform disorders
		Explain the clinical presentation, psychiatric assessment, pharmacological and psychological management of a patient with fibromyalgia and other somatoform disorders
		Take psychiatric history from a patient suffering from somatoform disorder
		Counsel a patient with somatoform disorder

Theme-4: Skin rashes and burns		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Dermatology		
1	Cutaneous manifestations of Systemic diseases	Explain the common cutaneous manifestations of metabolic, endocrine, autoimmune, and neoplastic diseases
2	Drugs rash	Classify the different types of drug rashes
		Explain the clinical manifestations, differential diagnosis, and management of erythema multiforme/Steven Johnson/Toxic Epidermal Necrolysis.
3	Viral Infections of the skin • Chicken pox and Herpes Zoster • Warts (Human Papilloma Virus) • Molluscum Contagiosum • Cutaneous manifestation of AIDS	Explain the clinical manifestations, differential diagnosis and management of Chicken Pox and Herpes Zoster
		Classify Warts
		Explain the mode of transmission, differential diagnosis and management of warts
		Explain the mode of transmission, clinical presentation, differential diagnosis, and management of Molluscum Contagiosum in children and adults
4	Acute Bacterial infections of the skin • Impetigo • Folliculitis • Furunculosis • Carbuncles	Describe the etiology, clinical features, and management of acute bacterial skin lesions described
5	Chronic bacterial infections of the skin • Cutaneous Tuberculosis • Leprosy • Syphilis	Discuss the etiology, clinical features, and management of chronic bacterial skin lesions described
6	Fungal infections • Pityriasis	Explain the etiology, clinical features, and management of fungal infections described

	versicolor • Dermatophytosis • Candidiasis	Explain the different types of Acne
7	Sebaceous glands diseases Acne	Explain the pathogenetic mechanisms, clinical features, complications, differential diagnosis, and management of Acne
8	Autoimmune blistering disorders • Pemphigus Vulgaris • Bullous pemphigoid	Describe the etiology, clinical features, and management of diseases described
9	Eczemas	Classify Eczema
		Explain the clinical presentation, differential diagnosis and management of different types of Eczemas
10	Inflammatory dermatosis • Psoriasis • Lichen Planus • Sebbhoriac Dermatitis • Erythema Nodosum • Urticaria	Describe the etiology, clinical features, and management of diseases mentioned
11	Erythroderma	Discuss etiology, clinical presentation, differential diagnosis, and management of Erythroderma.
		Take history form a patient with generalized Rash.
		Counsel a patient suffering from Psoriasis.
Surgery/ Plastic Surgery		
1	Burns • Classification • Assessment • Management • Complications	Classify burns.
		Assess a patient of burns in terms of burn area calculation, fluid assessment, and referral to specialized burn units.
		Discuss the initial and long-term management of burns
		Explain the early and late complications of burns
		Calculated burn area.
		Counsel a patient and his/her family members with burns.

THEORY EXAMINATION SCHEME

Block-N (Foundation-3, Blood-3 and MSK-3)

Block	Module	Subject hours	Subject MCQs	Total MCQs	Paper MCQs
N	Foundation – 3	PRIME	5	25	120
		Medicine	3		
		Surgery	10		
		Psychiatry	3		
		Pediatrics	3		
		Radiology	1		
	Blood – 3	Pediatrics	17	35	
		Medicine	16		
		Gynecology	2		
	MSK – 3	Medicine	21	60	
		Orthopedics	12		
		Paediatrics	7		
		Dermatology	14		
		Surgery/plastic surgery	5		
		Psychiatry	1		

PRACTICAL EXAMINATION SCHEME

OSCE station distribution of different subjects

BLOCK-N (TOTAL STATIONS=20 AND 6 MARKS/STATION)					
Subjects	**OSCE stations**		**Viva stations**	**Logbook and history books (1-station)**	**Structured Long case =30 marks)**
	Static/ interactive	**Short cases**			
Medicine+ Rheumatology	2	2	1	General Surgery and allied	General Surgery
Surgery	2	0	1		
Paediatrics	2	2	1		
Orthopedics	1	1	1		
Dermatology	2	0	1		
Total	9	5	5	1	1

BLOCK-O

(Cardiorespiratory Module-3)

CARDIORESPIRATORY MODULE-3

Themes

S. No	Themes	Duration in Hours
1	Chest Pain and Palpitations	10 hours
2	Shortness of Breath	27 hours
3	Fever and Cough	19 hours
4.	Painful leg and Blood Pressure	5 hours
Total		61hours

General Learning Objectives

By the end of Cardiorespiratory Module, Final year MBBS students will be able to:

Knowledge:

1) Discuss the management of a patient with chest pain
2) Explain the management of patients with different types of ischemic heart diseases
3) Explain the management of patients with different types of arrhythmias
4) Discuss the management of traumatic chest injuries as a primary care physician
5) Explain the management of a patient with heart failure
6) Explain the management of patients with different types of Obstructive lung diseases
7) Discuss the management of pleural and pericardial diseases
8) Explain the diagnostic criteria and management of Bacterial endocarditis and Rheumatic fever and their complications
9) Explain the clinical features and management of cyanotic and acynotic congenital and Valvular heart diseases
10) Discuss the management of cardiomyopathies and myocarditis
11) Explain the diagnostic workup and management of patients with different types of Pneumonias
12) Explain the management approach of a patient with Hypertension
13) Discuss the diagnostic approach and management of DVT and its prevention.

Skills:

1) Discuss the management of a patient with chest pain
2) Explain the management of patients with different types of arrhythmias
3) Discuss the management of traumatic chest injuries as a primary care physician
4) Discuss the management of pleural and pericardial diseases
5) Explain the diagnostic workup and management of patients with different types of Pneumonias
6) Discuss the diagnostic approach and management of DVT and its prevention.

Attitude:

1) Explain the management approach of a patient with Hypertension
2) Discuss the diagnostic approach and management of DVT and its prevention.

Specific Learning Objectives

Theme 1: Chest Pain and Palpitations		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Approach to a patient with chest pain	Discuss the diagnostic workup and management approach for a patient with chest pain
		Take history and perform physical examination of patient with chest pain
2	Ischemic heart diseases	Classify IHD
		Explain the management approach to a patient with stable angina pectoris
		Explain the management approach to a patient with unstable angina pectoris
		Explain the management approach to a patient with acute MI.
		Discuss the risk stratification strategies in post-MI patients
3	Disorders of Rhythm	Classify arrhythmias and heart block and discuss their ECG abnormalities
		Explain the diagnostic and management approach to a patient with irregularly irregular pulse
		Discuss the management approach to a patient with SVT
		Discuss the management approach to a patient with Ventricular tachycardia

		Explain the management of a patient with different types of heart blocks
		Counsel a patient with recent onset acute MI
Cardiology		
1	Cardiac intervention techniques	Explain the different types, methods, and indications of cardiac interventions in cardiology practices
Pediatrics		
1	Supraventricular tachycardia	Discuss the clinical presentation and the diagnostic workup needed for Supraventricular tachycardia in Pediatric patients
		Counsel a parent of a neonate, infant and child with Supraventricular tachycardia
Surgery		
1	Chest trauma Hemothorax	Discuss the diagnostic workup for Chest trauma
		Discuss the management options for a patient with Chest trauma
		Perform ABC in a case presenting with chest trauma
		Observe chest intubation of a patient presenting with chest trauma

Theme 2: Shortness of breath		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine (CVS)		
1	Congestive cardiac failure	Explain the types, etiology, clinical features, investigations, prognosis, and management of a patient with CCF.
		classify cardiomyopathies
		Explain the etiology, clinical features, and management of a patient with myocarditis
	Pericarditis and pericardial effusion	Explain the etiology, clinical features, and management of a patient pericarditis and pericardial effusion

Medicine (Respiratory)		
1	Bronchial asthma (Wheezy chest)	Explain the diagnostic and management approach for a patient with chronic wheezy chest
		Differentiate between bronchial asthma and cardiac asthma
2	COPD	Explain the diagnostic and management approach for a patient with COPD
		Interpret Pulmonary Function test results
		Interpret a report of Arterial blood gases
3	Interstitial lung disease (ILD)	Discuss the types, etiology, clinical and radiological presentation, investigations, and management of a patient with ILD
4	Pleural effusion	Explain the diagnostic and management strategies in a patient with pleural effusion
		Assist in pleural fluid aspiration
5	Pneumothorax	Explain the diagnostic and management strategies in a patient with Pneumothorax
	Pulmonary embolism	Discuss the risk factors diagnostic criteria, complications, and treatment of a patient with suspected pulmonary embolism
Pulmonology		
1	Respiratory Failure	Explain the types, etiology, and pathogenesis of Respiratory Failure
		Discuss the diagnostic workup and management for Respiratory Failure
		Discuss the types, indications, and approaches to Oxygen therapy
Pediatrics		
1	Acyanotic heart disease	Discuss the clinical presentation and the diagnostic workup needed for Acyanotic heart disease in Pediatric patients
		Discuss the management of an infant and child with Acyanotic

		heart disease
2	Ventricular Septal Defect (VSD)	Discuss the diagnostic workup and management for Ventricular Septal Defect.
3	Atrial Septal Defect (ASD)	Discuss the diagnostic workup and management for Atrial Septal Defect
4	Aortic stenosis	Discuss the diagnostic and management workup for Aortic stenosis
5	Coarctation of aorta	Explain the etiology clinical presentation of Coarctation of aorta
		Discuss the diagnostic workup and management for Coarctation of aorta
6	Cyanotic heart disease	Discuss the clinical presentation and the diagnostic workup needed for Cyanotic heart disease in Pediatric patients
		Discuss the management of an infant and child with Cyanotic heart disease
		Perform physical examination of a neonate and infant with Cyanotic heart disease
		Counsel a parent of a neonate, infant and child with Cyanotic heart disease
7	Tetralogy of Fallot (TOF)	Explain the etiology and clinical presentation of Tetralogy of Fallot
		Discuss the diagnostic workup and management for Tetralogy of Fallot
8	Transposition of Great Arteries (TGA)	Explain the etiology and clinical presentation of Transposition of Great Arteries
		Discuss the diagnostic workup and management for Transposition of Great Arteries
9	Ebstein anomaly	Explain the etiology and clinical presentation of Ebstein anomaly
		Discuss the diagnostic workup and management for Ebstein

		anomaly
10	Total Anomalous Pulmonary Venous Drainage or Connections (TAPVC)	Explain the etiology and clinical presentation of TAPVC
		Discuss the diagnostic workup and management for TAPVC
11	Truncus arteriosus	Explain the etiology and clinical presentation of Truncus arteriosus
		Discuss the diagnostic workup and management for Truncus arteriosus
12	Tricuspid atresia	Explain the etiology and clinical presentation of Tricuspid atresia
		Discuss the diagnostic workup and management for Tricuspid atresia
13	Congestive Cardiac Failure (CCF)	Discuss the clinical presentation and the diagnostic workup and management needed for Congestive Cardiac Failure in Pediatric patients
		Take history and perform physical examination of a neonate, infant and child with Congestive Cardiac Failure
		Counsel the parents of a neonate, infant and child with Congestive Cardiac Failure
14	Cardio-myopathy	Discuss the management algorithm of an infant and child with Cardiomyopathy
15	Cystic fibrosis	Explain the etiology and clinical presentation of Cystic fibrosis
		Discuss the diagnostic workup and management for Cystic fibrosis
Family Medicine		
1	IHD/CCF	Explain the management strategies of a patient with IHD and heart failure in general practice including the psychosocial impact of disease on patient and their families

		Describe the strategies for prevention of IHD and CCF
		Identify the red-flags in a patient with IHD/CCF and appropriately refer to speciality care when required
Surgery		
1	Thoracostomy and chest intubation	Explain the indications for Thoracostomy and chest intubation.
		Observe the procedure of Thoracostomy and chest intubation
		Counsel a patient for the procedure of Thoracostomy and chest intubation

Theme 3:		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Bacterial endocarditis	Explain the risk factors, etiology, clinical features, diagnostic criteria, management, and prevention of Bacterial endocarditis.
2	Pneumonias	Discuss the etiology and classification of pneumonias
		Explain the etiology, risk factors clinical features, diagnosis, and management of patients with different types of pneumonias.
		Examine a patient with features of pneumonia
3	Pulmonary Tuberculosis	Explain the diagnostic workup, management, and complications of a suspected case of pulmonary TB
4	Bronchiectasis	Develop a management algorithm for a patient with bronchiectasis
5	Lung abscess	Explain the etiology, clinical and radiological features, complications, and management of a patient with lung abscess.
6	Lung tumors	Classify lung tumors
		Explain the diagnostic workup and management and complications of a patient with suspected Bronchogenic carcinoma

		Explain the diagnostic workup and management and complications of a patient with suspected pleural mesothelioma
7	Cardiovascular involvement in systemic diseases	Discuss the cardiovascular manifestations of systemic diseases, their clinical features, investigations, prognosis, and relevant management
8	Pulmonary involvement in systemic diseases	Discuss the pulmonary manifestations of systemic diseases, their clinical features, investigations, prognosis, and relevant management
Pediatrics		
1	Rheumatic fever	Discuss the clinical presentation and the diagnostic workup needed for Rheumatic fever in Pediatric patients
		Discuss the management of an infant and child with Rheumatic fever
		Perform physical examination of a neonate, infant with Rheumatic fever
		Counsel a parent of a neonate, infant and child with Rheumatic fever
2	Acute Respiratory Infections (ARI)	Explain the clinical presentation and diagnostic needed for Acute Respiratory Infections
		Discuss the management of an infant and child with Acute Respiratory Infections
		Perform physical examination of a neonate infant with Acute Respiratory Infections
		Counsel a parent of a neonate, infant and child with Acute Respiratory Infections
3	Croup	Explain the clinical presentation and diagnostic workup needed for Croup

		Discuss the management of an infant and child with Croup
4	Pneumonia	Explain the clinical presentation and diagnostic workup needed for Pneumonia
		Discuss the management of an infant and child with Pneumonia
Family Medicine		
1	Acute respiratory presentations- primary care management and Red flags	Explain the approach to a patient with cough or shortness of breath in a primary health care setting.
		Discuss the differential diagnosis of a patient with cough or shortness of breath
		Discuss the investigations for a patient with cough or shortness of breath in a primary health care setting
		Identify common red flags
		Identify patients that need urgent and proper referral for specialist care
Pediatrics		
1	Rheumatic fever	Discuss the clinical presentation and the diagnostic workup needed for Rheumatic fever in Pediatric patients.
		Discuss the management of an infant and child with Rheumatic fever.
		Perform physical examination of a neonate infant with Rheumatic fever.
		Counsel a parent of a neonate, infant and child with Rheumatic fever.
2	Infective endocarditis	Discuss the clinical presentation and the diagnostic workup needed for Infective endocarditis in Pediatric patients
		Discuss the management of an infant and child with Infective endocarditis.
		Perform physical examination of a neonate infant with Infective endocarditis.
		Counsel a parent of a neonate, infant and child with Infective endocarditis.

3	Myocarditis	Discuss the clinical presentation and the diagnostic workup needed for Myocarditis.
		Discuss the management of an infant and child with Myocarditis.
		Perform physical examination of a neonate, infant with Myocarditis.
		Counsel a parent of a neonate, infant and child with Myocarditis.

Theme-4: Painful leg and Blood pressure		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Deep vein thrombosis (DVT)	Discuss the diagnostic algorithm for an elderly patient with a sudden swollen and painful limb.
		Discuss the diagnosis and management strategies for a patient with DVT.
2	Coarctation of Aorta	Explain the types, clinical features, investigations, complications, and management of Coarctation of the Aorta.
3	Systemic Hypertension	Discuss the management approach to a patient who is newly diagnosed hypertensive.
		Take history from a hypertensive patient
		Perform a physical examination of a hypertensive patient
		Counsel a newly diagnosed hypertensive patient
Family medicine		
1	Hypertension in general practice	Explain the management strategies of a hypertensive patient in general practice including the psychosocial impact of disease on patients and their families.
		Describe the strategies for prevention of hypertension and its complications.
		Identify the red flags in a hypertensive patient and appropriately refer to speciality care when required

THEORY EXAMINATION SCHEME

Block-O (CVS-3 and Respiratory-3)

Block	Module	Subjects	Subject MCQs	Total MCQs	Paper MCQs
O	Cardiopulmonary - 3	**CVS-3**			120
		Medicine/cardiology	45	70	
		Pediatrics	25		
		Respiratory-3			
		Medicine/pulmonology	25	50	
		Pediatrics	20		
		Surgery	5		

PRACTICAL EXAMINATION SCHEME

OSCE station distribution of different subjects

BLOCK-O (TOTAL STATIONS=20 AND 6 MARKS/STATION)					
Subjects	OSCE stations		Viva stations	Logbook and history books (1-station)	Structured Long case =30 marks)
	Static/ interactive	Short cases			
Medicine	2	1	1	General Medicine and Allied	General Medicine
Cardiology	3	1	1		
Pediatrics	2	2	1		
Pulmonology	3	1	1		
Total	10	5	4	1	1

BLOCK-P

(Renal-3, Endocrine & Reproduction-3)

RENAL-III MODULE

Themes

S. No	Themes	Duration in Hours
1	Facial swelling	4
2	Scanty Urine	6
3	Loin pain and dysuria	5
4	Pain and swelling of external genitalia	5

General Learning Objectives

By the end of Renal Module, Final year MBBS students will be able to:

Knowledge:

1) Discuss the diagnostic approach and management of an adult and a child with suspected glomerular disease.
2) Discuss the diagnostic approach and management of an adult and a child with acute and chronic renal disease.
3) Discuss the management of a patient with nephrocalcinosis.
4) Discuss the etiology, clinical features, and management of common electrolyte abnormalities.
5) Explain the diagnosis and management of a patient with hematuria and UTIs.
6) Explain the common diseases of the urogenital system.

Skills:

1) Discuss the diagnostic approach and management of an adult and a child with suspected glomerular disease.
2) Discuss the diagnostic approach and management of an adult and a child with acute and chronic renal disease.
3) Discuss the management of a patient with nephrocalcinosis.
4) Discuss the etiology, clinical features, and management of common electrolyte abnormalities.
5) Explain the diagnosis and management of a patient with hematuria and UTIs.
6) Take history and perform a physical examination of urogenital system.
7) Counsel a patient with acute and chronic renal failure.

Attitude:

1) Counsel a patient with acute and chronic renal failure.

Specific Learning Objectives

Theme 1: Facial swelling		
S NO	**TOPIC**	**LEARNING OBJECTIVE**
Medicine/ Nephrology		
1	Investigations of renal diseases	Discuss the biochemical, radiological, hematological, and other specialized investigations and their interpretations in renal diseases.
2	Approach to a facial swelling	Discuss the diagnostic workup and management approach for a patient with facial swelling of renal origin
		Take history and perform physical examination of patient with facial swelling
3	Minimal change disease	Explain the diagnostic workup and management and complications of a patient with Minimal change disease.
4	Post streptococcal Glomerulonephritis	Explain the diagnostic workup and management and complications of a patient with Post-Streptococcal Glomerulonephritis.
5	IgA Nephropathy	Explain the diagnostic workup and management and complications of a patient with IgA Nephropathy.
6	Chronic glomerulonephritis	Explain the diagnostic workup and management and complications of a patient with Chronic glomerulonephritis
Pediatrics		
1	Nephrotic Syndrome	Discuss the clinical presentation, the diagnostic workup and management for suspected GN and Nephrotic Syndrome in Pediatric patients.
		Take a history from a patient with Nephrotic Syndrome.
		Perform physical examination of a patient with suspected GN and

		Nephrotic Syndrome.
		Effectively counsel a child and his/her parents with nephrotic syndrome.

Theme-2: Scanty Urine		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine / Nephrology		
1	Electrolyte disorders	Explain the etiology, clinical features, diagnosis, and treatment of Hyper and Hyponatremia.
		Explain the etiology, clinical features, diagnosis, and treatment of hyper and hypokalemia.
		Explain the etiology, clinical features, diagnosis, and treatment of hyper and hypophosphatemia.
		Explain the etiology, clinical features, diagnosis, and treatment of hyper and hypomagnesemia.
2	Blood Ph abnormalities	Explain the etiology, clinical features, diagnosis and treatment of Metabolic acidosis and alkalosis and its associated compensations.
		Explain the etiology, clinical features, diagnosis and treatment of respiratory acidosis and alkalosis and its associated compensation.
3	Scanty Urine	Discuss the diagnostic workup and management approach for a patient with oliguria and anuria.
4	Uremia	Discuss the pathophysiological mechanisms, clinical manifestations, investigations, and management of a patient with Uremia.
5	Chronic Kidney Injury	Explain the diagnostic workup and management and complications of a patient with Chronic Kidney Injury
Pediatrics		
1	Acute Kidney Injury (AKI)	Discuss the clinical presentation, the diagnostic workup and management for Acute Kidney Injury in Pediatric patients.
2	Chronic Renal Failure (CKD)	Discuss the clinical presentation, the diagnostic workup and management for Chronic Renal Failure in Pediatric patients.

Theme-3: Loin pain and dysuria		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine / Nephrology		
1	Approach to blood in urine (haematuria)	Take a history from a patient presenting with blood in the urine.
		Perform a physical examination of a patient with blood in the urine.
		Discuss the diagnostic workup and management approach for a patient blood in urine.
2	Loin pain and dysuria	Discuss the diagnostic workup and management approach for a patient with loin pain and dysuria.
3	Acute pyelonephritis	Discuss the diagnostic workup and management approach for a patient with acute pyelonephritis.
4	Acute and chronic prostatitis	Discuss the diagnostic workup and management approach for a patient with acute and chronic prostatitis
Surgery		
1	Nephrolithiasis	Explain the etiology, risk factors, types, approach, investigations, treatment, and prevention of Nephrolithiasis
		Take history from a patient presenting with acute Flank and loin pain.
		Perform a physical examination of a patient with acute Flank, and loin pain.
		Counsel a patient presenting with nephrolithiasis.
2	Dysuria	Discuss the diagnostic workup for Dysuria.
		Discuss the management options for a patient with Dysuria
3	Hematuria	Discuss the diagnostic workup for Hematuria.
		Discuss the management options for a patient with Hematuria.

Theme-4: Pain and swelling of external genitalia		
SUBJECT	**TOPIC**	**LEARNING OBJECTIVES**
Surgery		
1	Testicular torsion	Discuss the diagnostic workup for Testicular torsion
		Discuss the management options for a patient with Testicular torsion.
2	Hydrocele	Discuss the diagnostic workup for Hydrocele.
		Discuss the management options for a patient with Hydrocele.
3	Testicular tumors	Explain the diagnostic workup and management and complications of a patient with suspected Testicular tumors.
4	Epididymo-orchitis	Discuss the diagnostic workup for Epididymo-orchitis.
		Discuss the management options for a patient with Epididymo-orchitis.
Pediatric Surgery		
1	Hypospadias	Discuss the types, complications, and management of a child with Hypospadias.
Urology		
1	Male infertility	Discuss the diagnostic approach and management options for a male patient with infertility.
Medicine/ Nephrology		
1	Sexually transmitted infections	Classify STDs and enlist their treatment options.
		Discuss the management approach of a patient with a new onset lesion on the genitalia.

ENDOCRINE & REPRODUCTION- III

Themes

S. No	Themes	Duration in Hours
1	Tall/Short Stature	3
2	Neck Swelling and Muscle cramps	5
3	Excessive Thirst & Urination	8
4	Moon Face	4
5	Pregnancy and Breast Lump	20

General Learning Objectives

By the end of Endocrine and Reproduction-III Module, Final year MBBS students will be able to:

Knowledge:

1) Discuss the clinical conditions resulting in Tall/short stature and its management.
2) Discuss the clinical conditions causing Excessive thirst and Urination and its management.
3) Discuss the clinical conditions resulting in Infertility and its management.
4) Discuss pathophysiology of Pregnancy, its Management, and complications.
5) Discuss the development of fetus, its growth, and complications.
6) Discuss the pathophysiology of Obstetrics emergencies, its Management, and complications.

Skills:

1) Discuss the clinical conditions resulting in Tall/short stature and its management.
2) Discuss the clinical conditions causing Excessive thirst and Urination and its management.
3) Discuss the clinical conditions resulting in Infertility and its management.
4) Discuss the development of fetus, its growth, and complications.
5) Discuss the pathophysiology of Obstetrics emergencies, its Management, and complications.

Attitude:

6) Discuss the clinical conditions resulting in Infertility and its management.
7) Discuss the pathophysiology of Obstetrics emergencies, its Management, and complications.

Specific Learning Objectives

Theme-1: Tall / short stature		
S NO	**Topic**	**Learning Objectives**
Medicine		
1	Anterior pituitary gland	Discuss the diagnostic approach and management of a patient with tall stature.
2	Posterior pituitary gland	Discuss the approach consideration of a patient with polydipsia
		Explain the diagnostic approach and treatment of a patient with Diabetes insipidus.
Pediatrics		
1	Short stature	Discuss the diagnostic approach and management of a child with short stature.

Theme-2: Neck swelling and muscle cramps		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Thyroid gland disorders	Discuss the diagnostic approach, management, and complications of a patient with suspected hyperthyroidism.
		Discuss the diagnostic approach, management, and complications of a patient with suspected hyperthyroidism.
2	Parathyroid gland	Discuss the diagnostic approach, management, and complications of a patient with tetany.
		Take history and perform physical examination of a patient with goitre.
		Counsel a patient with goitre.
Surgery		
1	Thyroid nodule	Explain the diagnostic approach, management, and complications of multinodular goitre.
		Explain the diagnostic approach, and management of a patient with solitary thyroid nodule.
		Perform thyroid examination
Pediatrics		
1	Thyroid disorders	Explain the neonatal screening for hypothyroidism
		Explain the diagnostic approach and management of a child with suspected Cretinism
		Discuss the complications of Cretinism
		Psychomotor Take history and perform physical examination of a child with hypothyroidism/cretinism.

Theme-3: Excessive thirst and urination		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Diabetes Mellitus	Explain the diagnostic approach, screening and management of a patient with suspected Diabetes Mellitus.
		Elaborate the pharmacological and non-pharmacological management strategies in the management of type-1 and type- 2 DM.
		Elaborate on the acute and chronic complications of DM and their management
		Discuss the diagnostic approach, management, and complications of hyperglycemic syndromes in Diabetic patients.
		Explain the diagnosis, management and complications of a diabetic patient presenting with hypoglycemia's.
		Take history and perform physical examination of a patient with Type 2 DM.
		Counsel a newly diagnosed patient with DM.
Family Medicine		
1	Diabetes mellitus general practice management	Explain the management strategies of a diabetic patient in general practice including the psychosocial impact of disease on patients and their families.
		Describe the strategies for prevention of diabetes mellitus and its complications.
		Identify the red flags in a diabetic patient and appropriately refer to specialty care when required.
Surgery		
1	Diabetic foot ulcers	Discuss the classification, investigations, management, and complications of diabetic foot ulcers
		Examine and stage a diabetic foot ulcer

Nephrology		
1	Diabetic nephropathy	Explain the pathogenesis, clinical features, complications, short and long-term management of Diabetic Nephropathy
Pediatrics		
1	Type-1 DM	Explain the diagnostic approach, screening, and management of a Child with suspected Type-1 Diabetes Mellitus
		Take history and perform physical examination of a patient with Type 2 DM
		Counsel a newly diagnosed patient and parents with type 1 DM

Theme-4: Moon face and obesity		
S NO	**Topic**	**Learning Objectives**
Medicine		
1	Cushing`s syndrome	Discuss the diagnosis, management, and complications of a patient with suspected Cushing`s syndrome.
		Explain the Dexamethasone suppression test in terms of its indications and interpretation.
		Explain the protocol of steroids withdrawal in a patient with steroids abuse.
		Take history and perform physical examination of a patient with Cushing`s syndrome.
2	Addison`s disease	Discuss the diagnosis, management, and complications of a patient with suspected Addison`s disease (both primary and secondary).
		Explain the concept of steroids replacement in terms of its indications and precautions.
3	Obesity	Discuss the etiology, complications, medical and surgical approaches to the management of obesity.
		Take history and perform physical examination of a patient with morbid obesity.

		Counsel a morbidly obese patient regarding the complications and lifestyle management.

Theme-5: Pregnancy and breast feeding		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Gynecology and Obstetrics		
1	Obstetrics history and examination	Take an obstetric history and perform abdominal, pelvic, and obstetric examination of a pregnant lady.
		Measure and interpret blood pressure in a pregnant lady
		Examine the breast of a full-term pregnant female
		Perform urine examination via dipstick technique for pregnancy, glucose, urine, and bacteria
2	Antenatal care	Define and explain the aims of antenatal care
		Discuss the components of antenatal care
		Explain different types of screening tests during antenatal care
		Discuss the maternal and neonatal complications associated with increased BMI in pregnancy
		Identify high risk women of developing pre-eclampsia, preterm birth, fetal growth restriction, and vitamin D deficiency
		Perform and record proper antenatal check-ups
		Counsel a pregnant lady about the complications of pregnancy
3	Assessment of fetal wellbeing	Explain the methods of assessment of fetal wellbeing
		Explain the types and diagnosis of fetal abnormalities
4	Prenatal diagnosis	Explain the reasons, classification, and methods of prenatal diagnosis
5	Antenatal maternal and obstetric	Discuss musculoskeletal, gastroenterological, and hematological problems associated with pregnancy.
		Discuss the risk factors and management of venous thromboembolism in pregnancy.

	complications	Explain the causes, complications, and management of polyhydramnios and oligohydramnios.
		Discuss the etiology, complications and management of fetal malpresentations.
		Explain the approach and management of a pregnant lady with antepartum bleeding.
		Discuss the etiology, prevalence, management, and prevention of Rh isoimmunization.
6	Preterm labor PROM / PPROM	Discuss the etiology, complications, and management of preterm labor.
Family Medicine / Obstetrics		
1	Hypertensive disorders in pregnancy	Classify hypertension in pregnancy and disorders of hypertension in pregnancy.
		Discuss the diagnostic approach, management, complications and prevention of Pre-eclampsia and Eclampsia
2	Diabetes mellitus and pregnancy	Explain the management of a pregnant lady with gestational DM and overt DM
Obstetrics		
1	Perinatal infections	Classify prenatal infections.
		Explain the screening and preventive strategies of common perinatal infections.
2	Labour	Explain the management of normal labour at different stages
		Explain the management of abnormal labour at different stages
		Discuss the indications and complications of analgesia and anaesthesia in labour.
		Discuss the management of labour at special circumstances like uterine scar, fetal malposition's, and multiple pregnancies,
		Explain the types, indications, and complications of operative deliveries.
		Discuss the indications and complications of Caesarian section
3	Management of	Discuss the management of labor at special circumstances like

	labor in special circumstances	Uterine scar, fetal malpositions, fetal death, multiple pregnancies, and post-date pregnancies
		Explain the types, indications, and complications of operative deliveries.
		Discuss the indications and complciations of Caesarian section.
		Observe normal labor and assisted deliveries.
4	Obstetric emergencies	Classify obstetric emergencies.
		Discuss the management of sepsis in pregnancy
		Explain the management and complications of placental diseases in a pregnant woman.
		Observe a normal delivery
5	Postpartum bleeding	Discuss the etiology, diagnostic and management approach to a patient with postpartum haemorrhage.
6	Puerperium	Classify puerperal disorders and their management
Psychiatry		
1	Psychiatric disorders in pregnancy and puerperium	Classify different psychiatric disorders in pregnancy and puerperium.
		Discuss the management of puerperal psychosis and depression
		Counsel a patient and her family with postpartum psychosis/depression.
Pediatrics		
1	The neonate	Discuss the types and management of common problems of preterm and term babies
		Discuss the principles of neonatal care
		Observe the care of a neonate in nursery
		Take history and perform physical examination of a neonate
Surgery		
1	Breast diseases	Discuss approach to a patient with breast lump emphasizing on diagnostic work-up of different breast pathologies (complexity of benign and malignant breast diseases) including imaging and

		procedures.
		Discuss the diagnostic approach and management of a patient with nipple discharge.
		Perform a Clinical breast examination by all techniques including “radial wagon wheel” and “spoke” method
		Counsel a patient with breast cancer about the diagnosis, management, and screening of her family members.

THEORY EXAMINATION SCHEME

Block-P (Renal-3 and Endocrine and Reproduction-3)

Block	Module	Subjects hours	Subject MCQs	Total MCQs	Paper MCQs
P	Renal-3	Medicine/Nephrology	22	40	120
		Surgery/Urology	10		
		Pediatrics	6		
		Pediatric surgery	2		
	Endocrine and Reprouction-3	Medicine/ Family medicine	12	80	
		Obstetrics	56		
		Surgery	8		
		Paediatrics	4		

PRACTICAL EXAMINATION SCHEME

OSCE station distribution of different subjects

BLOCK-P (TOTAL STATIONS=20 and 6 marks/station)					
Subjects	**OSCE stations**	**Viva stations**	**Short cases**	**Logbook and history books (1-station)**	**Structured Long case (30 marks)**
Gynecology	7	1	2	Gynecology And Obstetrics	Gynecology And Obstetrics
Medicine+ Endocrinology	2	1	1		
Pediatrics	1	1	0		
Surgery	1	1	1		
Total	11	4	4	1	1

BLOCK-Q

(Neurosciences-III, GIT-III, Multisystem-II)

NEUROSCIENCES-III

Themes

S. No	Themes	Duration in Hours
1	Disturbed mood & behavior	4
2	Right-sided weakness and inability to speak	2
3	Loss of consciousness and Fits	3
4	Tremors	3
5	Headache	9
6	Paraplegia	8

General Learning Objectives

By the end of Neurosciences-III Module, Final year MBBS students will be able to:

Knowledge:

1) Discuss the management approach to a patient with different types of Dementia
2) Discuss the management of common psychiatric disorders, autism, and substance abuse disorders
3) Explain the management of different types of strokes, and epilepsy
4) Discuss the management of different types of movement disorders
5) Explain the management of different intracranial infections
6) Discuss the management of intracranial space-occupying lesions and head injuries
7) Explain the management of common neuropathies and spinal cord diseases

Skills:

1) Explain the management of different types of strokes, and epilepsy
2) Discuss the management of intracranial space-occupying lesions and head injuries
3) Explain the management of common neuropathies and spinal cord diseases

Attitude:

1) Discuss the management of common psychiatric disorders, autism, and substance abuse disorders

Specific Learning Objectives

Theme-1: Disturbed mood and behavior		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Dementia	Discuss the etiology, clinical features, and management of different types of Dementias
		Classify the reversible and irreversible causes of Dementia
		Explain the pathophysiology and clinical features of a patient with Huntington's disease
		Discuss the diagnostic work up and management for patients suspected of dementia
		Perform mini-mental state examination
Psychiatry		
2	PTSD	Explain the etiology and management of a patient with PTSD
3	OCD	Explain the etiology and management of a patient with OCD
4	Somatic symptoms disorder	Explain the etiology and management of a patient with Somatic symptoms disorder and Chronic pain syndromes
5	Autism spectrum disorder	Explain the etiology and management of a child with autism spectrum disorder.
6	Substance abuse	Explain the risk factors, types of substance abuse, clinical features, withdrawal symptoms, complications and management of a patient with substance abuse
		Counsel and educate a family of a patient with Dementia
Family Medicine/ General Medicine		
7	Anxiety and depression	Explain the approach to a patient with anxiety and depression in a primary health care setting.

		Explain the risk assessment for mental health
		Identify common red flags.
		Discuss the guidelines for management of a patient with Anxiety and depression in a primary health care setting.
		Perform Screening for Anxiety, Depression and Schizophrenia.
		Perform a consultation with a patient with anxiety or depression under supervision.
		Observe the consultation of a family physician with a patient with anxiety or depression

Theme 2: Right-sided Weakness and Inability to Speak				
Subject	**Topic**	**Hours**	**Domain of Learning**	**Learning objectives**
Medicine	Stroke syndromes	1	Cognitive	Discuss the diagnostic and management approach for a patient with Right-sided weakness and inability to speak due to an ischemic stroke.
		1	Cognitive	Discuss the diagnostic workup and management for a patient suspected of Haemorrhagic stroke
	Subarachnoid haemorrhage SAH)		Cognitive	Discuss the diagnostic workup and management for patients suspected of SAH
			Psychomotor Skills	Demonstrate the complete assessment of the patient on the NIH stroke scale under supervision
			Psychomotor Skills	Demonstrate the assessment of a comatose patient on the Glasgow coma scale under supervision
			Psychomotor Skills	Interpret the CT and MRI findings in stroke patients
			Affective domain	Counsel a stroke victim about future prevention and management of complications

Theme-3: Loss of consciousness and Fits				
Subject	**Topic**	**Hours**	**Domain of Learning**	**Learning objectives**
Medicine	Coma	1	Cognitive	Discuss the management algorithm of a patient with coma
	Epilepsy		Cognitive	Discuss the diagnostic work up and management for a patient with fits
		1	Cognitive	Discuss the diagnostic work up and management for a patient with Tonic Clonic epilepsy
			Cognitive	Discuss the diagnostic work up and management for a patient with Status Epilepticus
			Psychomotor Skills	Perform a consultation with a patient with epilepsy under supervision

			Psychomotor Skills	Write prescriptions for patients with Tonic-Clonic and Petit-mal epilepsy
			Affective	Counsel a patient with Epilepsy
Pediatrics	Epilepsy	1	Cognitive	Discuss the diagnostic work up and management for children with seizures and Epilepsy
			Psychomotor Skills	Perform a consultation with a child having epilepsy under supervision emphasizing history and examination.
			Psychomotor Skills	Write a prescription for a child with Tonic-Clonic and Petit-mal epilepsy
			Affective Domain	Counsel and educate the Parents/guardian of a child with epilepsy.
Theme-4: Tremors and movement disorders				
Subject	**Topic**	**Hours**	**Domain of Learning**	**Learning objectives**
Medicine	Movement Disorders	1	Cognitive	Classify movement disorders
			Cognitive	Discuss the diagnostic workup and management for patients suspected Cerebellar disorders
			Cognitive	Discuss the diagnostic and management approach to a patient with Ataxia
			Cognitive	Discuss the diagnostic and management approach to a patient with Chorea
	Parkinson`s disease	1	Cognitive	Discuss the diagnostic criteria, pharmacological, psycho-social, and rehabilitative approaches to the management of a patient with Parkinson's disease
			Psychomotor	Examine a patient with Parkinson`s disease by taking history and performing a physical examination.
Psychiatry	Dystonia	1	Cognitive	Discuss the diagnostic approach and management for patients suspected of

				Drug-Induced Dystonia
Theme 5: Headache				
Subject	**Topic**	**Hours**	**Domain of Learning**	**Learning objectives**
Medicine	Headache	1	Cognitive	Explain the diagnostic approach to patients with acute and chronic headaches
	Migraine		Cognitive	Explain the types, risk factors, diagnostic approach, management, and prevention of Migraine
			Psychomotor Skills	Demonstrate Complete history and examination of patient with migraine
			Affective domain	Discuss the lifestyle changes preventing migrainous headaches
	Meningitis	1	Cognitive	Classify meningitides
			Cognitive	Differentiate between the clinical features, investigations, CSF findings, radiological findings, and complications in patients with viral, bacterial, and tuberculous meningitis
			Cognitive	Discuss the pharmacological and surgical management approaches in patients with different types of meningitides
			Psychomotor Skill	Take history and perform relevant physical examination and elicit signs of meningitis in a suspected patient
			Psychomotor Skill	Interpret a CSF report in a patient with viral, acute pyogenic and tuberculous meningitis
			Psychomotor Skill	Observe the Lumbar puncture
			Affective domain	Counsel a patient and his/her family with Tuberculous meningitis regarding complications, treatments` side effects and follow ups

	Encephalitis	1	Cognitive	Discuss the etiology, pathogenesis, clinical
Family Medicine/ General Medicine	Headache	1	Cognitive	Explain the approach to a patient with Headache in a primary health care setting
			Cognitive	Identify common red flags in a patient with headache
			Cognitive	Discuss the investigations for a patient with Headache in a primary health care setting.
			Cognitive	Identify patients that need urgent and proper referral for specialist care.
Pediatrics		1	Cognitive	Discuss the diagnostic work up and management for children with Headache
	Meningitis	1	Cognitive	Discuss the diagnostic work up and managements for children suspected of Meningitis
			Cognitive	Explain the short term and long-term sequelae of meningitis
			Psychomotor Skills	Describe assessing the initial triad symptoms of meningitis in children
	Big head	1	Cognitive	Explain the diagnostic and therapeutic approach to a child with big head
Neurosurgery	Intracranial space	1	Cognitive	Classify intracranial space occupying lesions (benign, malignant and infections)
	occupying lesions		Cognitive	Discuss the clinical features, radiological findings and treatment of intracranial space occupying lesions
	Head Injury	1	Cognitive	Discuss the diagnostic workup and management for patients with Head Injury
			Affective domain	Counsel about the post-operative care of patients with head injuries and their families.

Theme-6: Lower limb weakness				
Subject	**Topic**	**Hours**	**Domain of Learning**	**Learning objectives**
Medicine	Multiple Sclerosis	1	Cognitive	Discuss the diagnostic approach and management of a patient with suspected Multiple Sclerosis
			Psychomotor	Examine the lower limbs of a patient with paraplegia
			Affective Domain	Discuss and counsel the pts regarding the changes in the lifestyle of patients with Multiple sclerosis
	Acquired Neuropathies	1	Cognitive	Classify acquired neuropathies and discuss their clinical features, investigations, and management
	Approach to lower lim bs weakness	1	Cognitive	Discuss the diagnostic algorithm of a patient with lower limbs weakness
Pediatrics	Hereditary neuropathies	1	Cognitive	Classify hereditary neuropathies and discuss their clinical features, investigations, and management
Pediatric surgery	Congenital malformation s - Spina Bifida/myelo m eningocele	1	Cognitive	Explain the clinical features, investigations, and management of a pa child with Spina Bifida/Myelomeningocele
			Affective Domain	Discuss and counsel the pts regarding the changes in the lifestyle of patients with congenital malformations
Neurosurge ry	Syringomyelia	**1**	Cognitive	Describe Syringomyelia and Explain the onset of Syringomyelia
			Cognitive	Discuss the diagnostic work up and management for pts suspected of Syringomyelia.
Orthopedic s	Diseases of the vertebrae and intervertebr al discs	**1**	Cognitive	Classify diseases of the vertebrae and intervertebral discs, their clinical features, investigations, complications, and management
	Kyphoscoliosis	**1**	Cognitive	Discuss the etiology, clinical features, management of Kyphoscoliosis.

GIT-III Module

THEMES

S. No	Themes	Duration in Hours
1	Difficulty in swallowing and Epigastric Pain	4
2	Yellow discoloration of the sclera	5
3	Diarrhea and Pain Abdomen	8
4	Constipation and bleeding per rectum	6

GENERAL LEARNING OBJECTIVES

By the end of GIT Module, Final year MBBS students will be able to:

Knowledge:

1) Discuss the approach to the management of a patient with dysphagia and upper GI bleed.
2) Explain the approach to the management of a patient with pain epigastrium.
3) Discuss the management of a patient with acute and chronic hepatitis, liver cirrhosis, and encephalopathy.
4) Explain the management of a patient with acute and chronic diarrheas.
5) Discuss the management of a patient with peritonitis and intestinal obstruction.
6) Explain the management of a patient with constipation and lower GI bleeding.

Skills:

1) Take history and perform a physical examination of a patient with GI diseases.
2) Counsel patients and their families with common GI diseases.

Attitude:

1) Counsel patients and their families with common GI diseases.

SPECIFIC LEARNING

OBJECTIVES

Theme-1: Difficulty in swallowing and epigastric pain					
Subject	**Topic**	**Hours**	**S. No**	**Domain of learning**	**Learning objectives**
Surgery	Dysphagia	1	1	Cognitive	Explain the diagnostic workup and management of a patient with dysphagia.
Medicine	Upper GI bleeding	1	2	Cognitive	Explain the diagnostic workup and management and complications of a patient with Upper GI bleeding
			3	Psychomotor	Take history and perform a physical examination of a patient with an upper GI bleed.
			4	Psychomotor	Observe upper GI endoscopy.
			5	Psychomotor	Observe NG tube insertion.
Pediatrics	Vomiting	1	6	Cognitive	Explain the diagnostic and therapeutic approach to a neonate and infant with persistent vomiting.
Gynaecology	Hyperemesis gravidarum	1	7	Cognitive	Discuss the management of a patient with vomiting of pregnancy.
			8	Affective	Counsel a patient with hyperemesis gravidarum.

Theme-2: Yellow discoloration of the sclera					
Subject	**Topic**	**Hours**	**S. No**	**Domain of learning**	**Learning objectives**
Medicine	Investigations	1	9	Cognitive	Elaborate on the investigations used for the diagnosis of hepatobiliary disorders and their interpretations.

			10	Psychomotor	Take history and perform physical examination of a patient with liver cirrhosis.
			11	Psychomotor	Observe Ascitic fluid paracentesis.
			12	Psychomotor	Interpret Ascitic fluid report.
			13	Affective	Counsel a patient with Liver cirrhosis due to Hepatitis B/C.
	Acute ful minant hepatitis and acute liver failure	1	14	Cognitive	Discuss the diagnostic approach and management of a patient with suspected acute fulminant hepatitis/acute liver failure.
	Hepatic encephalopathy		15	Cognitive	Explain the grading system, etiology, diagnostic approach, management, and prevention of hepatic encephalopathy.
			16	Psychomotor	Elicit Asterixis/ hepatic flap.
Surgery	Obstructive jaundice	1	17	Cognitive	Discuss the diagnostic approach and management of a patient with suspected obstructive jaundice.
			18	Affective	counsel a standardized patient with newly diagnosed Carcinoma head of the Pancreas.
Pediatrics	Hyperbilirubinemias	1	19	Cognitive	Discuss the diagnostic approach and management of a neonate and infant with jaundice.
			20	Psychomotor	Take history and perform physical examination of a child with jaundice.
			21	Affective	Counsel a child and his parents with Gilbert syndrome.
Gynaecology	Obstetrics cholestasis liver	1		Cognitive	Discuss the management of cholestasis in pregnancy and fatty liver in pregnancy
Theme-3: Pain Abdomen and Diarrhea					

Subject	Topic	Hours	S. No	Domain of learning	Learning objectives
Surgery	Acute appendicitis	1	22	Cognitive	Discuss the diagnostic approach and management of a patient with pain in the right iliac fossa due to suspected appendicitis.
	Pain abdomen		23	Cognitive	Discuss the diagnostic approach and management of a patient with pain in the abdomen of acute onset and chronic onset.
			24	Psychomotor	Illicit signs of acute appendicitis in a child.
			25	Affective	Counsel the parents of a child with acute appendicitis
	Intestinal obstruction	1	26	Cognitive	Discuss the etiology, diagnostic approach, and management of a patient with suspected intestinal obstruction.
	Intestinal perforation	1	27	Cognitive	Discuss the etiology, diagnostic approach, and management of a patient with suspected intestinal perforation/peritonitis.
	Hernias	1	28	Cognitive	Discuss the etiology, anatomical concepts, management, and complications of a patient with inguinal hernias .
			29	Psychomotor	Perform transillumination test for inguinal hernias.
Pediatrics	Malabsorption	1	30	Cognitive	Explain the diagnostic workup and management of a patient with Malabsorption due to celiac disease.
			31	Affective	Counsel a child and his/her parents regarding dietary advice regarding celiac disease
	Acute diarrhea	1	32	Cognitive	Explain the diagnostic workup and management of a patient acute watery diarrhea
			33	Psychomotor	Assess the state of hydration in a child with acute diarrhea
	Chronic diarrhea	1	34	Cognitive	Explain the diagnostic workup and management of a patient with chronic diarrhea.

Family medicine / Medicine	Approach to a patient	1	35	Cognitive	Explain the approach, differential diagnosis, investigations, initial management, and indications for referral of a patient with Abdominal Pain in a primary health care setting.
Theme-4: Constipation and bleeding per rectum					
Subject	**Topic**	**Hours**	**S. No**	**Domain of learning**	**Learning objectives**
Medicine	Approach to a patient bleeding Per rectum	1	36	Cognitive	Discuss the diagnostic workup
Surgery	Constipation	1	37	Cognitive	Discuss the diagnostic workup approach for a patient with constipation
	Ulcerative colitis	1	38	Cognitive	Discuss the approach to the management of a patient with ulcerative colitis, its short and long-term complications, and the role of surveillance colonoscopies in the prevention of colorectal malignancies.
	Crohn's Disease	1	39	Cognitive	Discuss the approach to the management of a patient with complications, and extra intestinal manifestations.
	Colorectal cancer	1	40	Cognitive	Discuss the approach to the management of a patient with suspected colorectal cancer and its staging
Pediatrics surgery	Hirschsprung's disease	1	41	Cognitive	Explain the etiology, clinical features, investigations, treatment of a child with Hirschsprung's disease.

Multisystem-II

THEMES

S. No	Themes	Duration in Hours
1	Weight loss/gain	9
2	Poisoning	7
3	Cold & Heat	3
4	The Abnormal Baby	7
5	Rash & Joint Pains	13

GENERAL LEARNING OBJECTIVES

By the end of Multisystem-II Module, Final year MBBS students will be able to:

Knowledge:

1. Explain the etiology, risk factors, complications, and management of obesity
2. Explain the classification, etiology, risk factors, and management of PCM
3. Explain the risk factors, clinical features, investigations, and treatment of common water-soluble and fat- soluble vitamins
4. Explain the concepts of nutritional support both in the hospital and community settings
5. Explain the risk factors, clinical features, complications, and management of Anorexia nervosa and Bulimia nervosa
6. Discuss the management of common household poisoning including natural gas and snake bites
7. Explain the management of heat and cold-related disorders
8. Discuss the high-altitude sickness, decompression sickness, drowning, and electrocution.
9. Discuss chromosomal abnormalities, their clinical features, and the concepts of genetic counselling
10. Discuss the management of different autoimmune disorders and vasculitides in children and adults and their complications.

Skills:

1. Discuss the management of common household poisoning including natural gas and snake bites
2. Explain the management of heat and cold-related disorders
3. Discuss the high-altitude sickness, decompression sickness, drowning, and electrocution.

Attitude:

1. Explain the concepts of nutritional support both in the hospital and community settings
2. Explain the risk factors, clinical features, complications, and management of Anorexia nervosa and Bulimia nervosa
3. Discuss chromosomal abnormalities, their clinical features, and the concepts of genetic counselling

SPECIFIC LEARNING OBJECTIVES

Theme-1: Weight loss/gain					
Subject	**Topic**	**Hours**	**S. No**	**Domain of learning**	**Learning objectives**
Medicine	Obesity	2	1	Cognitive	Classify the types of obesity.
			2	Cognitive	Discuss the etiology of obesity.
			3	Cognitive	Explain the methods of measuring obesity.
			4	Cognitive	Discuss the musculoskeletal, endocrine, cardiovascular, and psychological complications of obesity.
			5	Cognitive	Classify the drugs used in the management of obesity and their complications and adverse effects.
Surgery	Bariatric surgery	1	6	Cognitive	Discuss the forms of surgical management of obesity
	Vitamins deficiencies • Thiamine deficiency • Pyridoxine deficiency • B12 deficiency and pernicious • anemia	1	7	Cognitive	Explain the etiology, clinical features, investigations, and treatment of Beri Beri.
			8	Cognitive	Explain the etiology, clinical features, investigations, and treatment of Pyridoxine deficiency.
			9	Cognitive	Explain the etiology, clinical features, investigations, and treatment of B12 deficiency / pernicious anemia.
	Vitamin A, D, E, K deficiency	1	10	Cognitive	Explain the etiology, clinical features, investigations, treatment, and prevention of Vitamin A deficiency

			11	Cognitive	Explain the etiology, clinical features, investigations, and treatment of vitamin D deficiency
			12	Cognitive	Explain the etiology, clinical features, investigations, and treatment of vitamin E deficiency
			13	Cognitive	Explain the etiology, clinical features, and management of vitamin K deficiency
Surgery	Nutritional support/Enteral and parenteral nutrition	2	14	Cognitive	Define malnutrition and explain the methods of nutritional support.
			15	Cognitive	Explain the indications, contraindications, and complications of oral, enteral, and parenteral nutritional support
			16	Cognitive	Discuss the modes of clinical and laboratory monitoring of nutritional support
			17	Cognitive	Describe the routes of access of parenteral nutrition
			18	Psychomotor	Perform insertion of Nasogastric tube
			19	Psychomotor	Observe the insertion and care of PEG tube
			20	Psychomotor	Keep an intake and output record of an admitted patient on parenteral nutrition
			21	Affective	Counsel a patient before NG tube and PEG tube insertion
Pediatrics	Protein calorie malnutrition	1	22	Cognitive	Discuss the causes of malnutrition in developing countries - Describe the different forms of protein-energy malnutrition - Describe the symptoms of severe protein-energy malnutrition in children - Outline the treatment needed to treat a malnourished child - Define the criteria that classifies protein-energy malnutrition

					Discuss the causes of malnutrition in developing countries - Describe the different forms of protein-energy malnutrition - Describe the symptoms of severe protein-energy malnutrition in children - Outline the treatment needed to treat a malnourished child - Define the criteria that classifies protein-energy malnutrition Explain the different causes, forms, classification, clinical features, and management of PMC
Psychiatry	Anorexia nervosa and Bulimia nervosa	1	23	Cognitive	Discuss the etiology, precipitating factors, clinical features, and management of Anorexia nervosa
			24	Cognitive	Discuss the etiology, precipitating factors, clinical features, and management of Bulimia nervosa.
Theme-2: Poisoning					
Subject	**Topic**	**Hours**	**S. No**	**Domain of learning**	**Learning objectives**
Medicine	Approach to a patient with poisoning	1	25	Cognitive	Explain the management approach to a patient with poisoning in emergency setup
	Management of a comatose patient with poisoning	1	26	Cognitive	Discuss the management approach to a patient who presents in a comatose state in emergency
	Diagnosis of a patient with poisoning	1	27	Cognitive	Diagnose a patient with poisoning

	Common antidotes and general		28	Cognitive	Discuss the antidotes for common poisons and their management
	management of poisoning				
	Selected poisoning • Acetaminophen • Amphetamines and cocaine • Benzodiazepine • Insecticides and anticholinergics • Carbon monoxide • Ethanol and Methanol • Snake bites	1	29	Cognitive	Discuss the management of a patient with paracetamol poisoning
		3	30	Cognitive	Discuss the management of a patient with Amphetamine, cocaine and Ice poisoning
			31	Cognitive	Discuss the management of a patient with benzodiazepine poisoning
			32	Cognitive	Discuss the management of a patient with insecticide and anticholinergic poisoning
			33	Cognitive	Discuss the management of a patient with ethanol and methanol poisoning
			34	Cognitive	Discuss the management of a patient with Carbon monoxide (Natural gas) poisoning
			35	Cognitive	Discuss the management of a patient with snake venom poisoning
			36	Psychomotor	Perform gastric lavage
			37	Affective	Counsel a patient/family with poisoning

Theme-3: Cold and heat

Subject	Topic	Hours	S. No	Domain of learning	Learning objectives
Medicine	Heat-related disorders	1	38	Cognitive	Classify heat-related disorders
	Hyperthermia		39	Cognitive	Explain the etiology, pathogenesis, clinical features and management of Hyperthermia and heat stroke
			40	Cognitive	Differentiate between hyperthermia and hyperpyrexia

	Hypothermia	1	41	Cognitive	Explain the risk factors, complications, and management of hypothermia.
	Drowning		42	Cognitive	Explain the management of a patient with drowning
	Electrical injuries		43	Cognitive	Discuss the management of a patient with electrocution
	High altitude sickness	1	44	Cognitive	Discuss the clinical features, management, and prevention of high-altitude sickness.
	Decompression sickness		45	Cognitive	Discuss the management of a patient with decompression sickness.
Theme-4: The abnormal baby					
Subject	**Topic**	**Hours**	**S. No**	**Domain of learning**	**Learning objectives**
Pediatrics	Porphyria	1	46	Cognitive	Classify porphyria.
			47	Cognitive	Explain the etiology, pathogenesis, clinical features and treatment of different types of porphyria
	Down syndrome	1	48	Cognitive	Explain the risk factor, chromosomal aberrations, clinical features and complications of Down Syndrome
	Collagen disorders	1	49	Cognitive	Classify collagen disorders and their clinical features
	Glycogen storage diseases		50	Cognitive	Classify glycogen storage disease and their clinical features
	Mucopolysaccharidosis	1	51	Cognitive	Describe the clinical features and complications of mucopolysaccharidosis
	Galactosemia and Phenylketonuria		52	Cognitive	Describe the clinical features, investigations and complications of Galactosemia and Phenylketonuria
Medicine	Chromosomal disorders	1	53	Cognitive	Classify chromosomal disorders and give examples
	Single gene defects		54	Cognitive	Classify single gene disorders and give examples
	Sex linked disorders		55	Cognitive	Classify sex linked disorders and give examples

	Polygenic inheritance		56	Cognitive	Classify polygenic inheritance disorders and give examples
	Marfan syndrome	1	57	Cognitive	Explain the clinical features and complications of Marfan syndrome
Gynaecology	Genetic counselling and perinatal diagnosis	1	58	Cognitive	Explain the modes and indications of perinatal diagnosis
			59	Cognitive	Discuss the concept of genetic counseling
			60	Affective	Observe premarital counseling of a family for thalassemia.

Theme-5: Rash and joint pains

Subject	Topic	Hours	S. No	Domain of learning	Learning objectives
Medicine	Evaluation of an adult with suspected autoimmune disorder	1	61	Cognitive	Discuss the diagnostic approach to a patient who presents with suspected autoimmune disorder
			62	Cognitive	Explain the different serological and immunological investigations used in the diagnosis of autoimmune disorders
			63	Cognitive	Classify and explain the mechanism of action of different pharmacotherapies in the management of autoimmune disorders
	SLE	2	64	Cognitive	Explain the clinical features, investigations, management, prognosis and complications of SLE
			65	Cognitive	Discuss the diagnostic criteria for the diagnosis of SLE
			66	Cognitive	Explain the differences between SLE and drug induced lupus
	Antiphospholipid syndrome	1	67	Cognitive	Explain the clinical features, investigations, management, prognosis and complications of Antiphospholipid syndrome

	Scleroderma	1	68	Cognitive	Explain the clinical features, investigations, management, prognosis, and complications of Scleroderma/Systemic sclerosis
	Polymyositis and dermatomyositis	1	69	Cognitive	Explain the clinical features, investigations, management, prognosis and complications of polymyositis and dermatomyositis
	Sjogren Syndrome		70	Cognitive	Explain the clinical features, investigations, management, prognosis and complications of Sjogren Syndrome
	Giant cell arteritis and polymyalgia Rehumatica	1	71	Cognitive	Explain the clinical features, investigations, management, prognosis and complications of Giant cell arteritis and polymyalgia Rehumatica
	Polyarteritis nodosa	1	72	Cognitive	Explain the clinical features, investigations, management, prognosis and complications of Polyarteritis nodosa
	Wegener granulomatosis		73	Cognitive	Explain the clinical features, investigations, management, prognosis, and complications of Wegener granulomatosis
	Vascilitides	1	74	Cognitive	Classify vascilitides, their clinical features, diagnostic approach, and management
			75	Cognitive	Explain the clinical features, investigations, management, prognosis, and complications of Henoch-SchÕnlein purpura
			76	Cognitive	Explain the clinical features, investigations, management, prognosis, and complications of BehÇet syndrome
Pediatrics	Kawasaki disease	2	77	Cognitive	Explain the clinical features, investigations, management, prognosis and

					complications of Kawasaki syndrome
			78	Cognitive	Explain the clinical features, investigations, management, prognosis and complications of SLE in children
Nephrology	Renal involvement in different autoimmune disorders	2	79	Cognitive	Classify different pathological entities involving the kidneys in SLE, Rheumatoid arthritis and other autoimmune disorders
			80	Cognitive	Explain the renal complications and their management in SLE and Rheumatoid arthritis.

Theory Examination Scheme

Block-Q (Neurosciences-3, GIT-3 and Multisystem-3)

Block	Module	Subjects hours	Subject MCQs	Total MCQs	Paper MCQs
Q	NS-3	Medicine/ Family medicine	24	45	120
		Psychiatry	5		
		Pediatrics	8		
		Neurosurgery/surgery	4		
		Pediatrics surgery/Surgery	2		
		Orthopedics	2		
	GIT-3	Medicine	9	35	
		Surgery/ Pediatric surgery	17		
		Pediatrics	8		
		Gynaecology	1		
	Multisystem-2	Medicine/Nephrology	22	40	
		Paediatrics	11		
		Surgery	5		
		Psychiatry	1		
		Gynaecology	1		

CURRICULUM OF MBBS

Practical Examination Scheme

OSCE station distribution of different subjects

BLOCK-Q (TOTAL STATIONS=20 and 6 marks/station)					
Subjects	**OSCE stations**	**Viva stations**	**Short cases**	**Logbook and history books (1-station)**	**Structured Long case- 30 marks)**
Medicine/neurology/ Gastroenterology	4	1	2	Paediatrics	Paediatrics
Paediatrics	1	1	1		
Surgery/neurosurgery/ Paediatric surgery	5	1	1		
Psychiatry	1	1	0		
Total	11	4	4	1	1

2nd Year MBBS

2nd Year MBBS Block D: Neurosciences-1A Module

SR.No	Themes	Duration
1	Numbness and tingling	1 week
2	Paraplegia	1 week
3	Syncope	1 week
4	Hemiplegia / Aphasia	1 week
5	Tremors	1 week
6	Headache	1 week

General learning outcomes

At the end of this module, the 2nd year MBBS students will be able to:

Knowledge

1) Explain the gross and microscopic structural and functional features of peripheral nerves, spinal cord and brain.
2) Describe the development of forebrain, midbrain and hindbrain
3) Describe the basic functions of synapses, neurotransmitters and mechanisms of electrical events during neuronal excitation
4) Explain the structure and functions of different receptors during neuronal excitation
5) Describe the mechanisms and pathways of sensory inputs in the nervous system
6) Explain the organization, structure, functions, and neurotransmitters of autonomic nervous system
7) Describe the blood supply and venous drainage of brain and spinal cord
8) Describe the organization, structure and functions of motor system of the brain and spinal cord
9) Explain the organization, structure and functions of cerebellum and basal ganglia
10) Explain the structure, formation and drainage of cerebrospinal fluid in the brain and spinal cord
11) Describe the functions of limbic system and reticular activating system
12) Describe the pathophysiology and prevention of common diseases like stroke, epilepsy, hydrocephalus and brain injuries

Skill

13) Identify the microscopic structure of spinal cord, cerebral and cerebellar cortex
14) Examine nervous system of a standardized patient (sensations, motor functions, and higher cortical functions and tendon reflexes)

Attitude

Neurosciences-1A Module: Specific Learning Objectives: By the end of this module, students of 2nd year MBBS will be able to		
Theme-1 (numbness and tingling)		
SNO	**Topic**	**Learning Outcomes**
ANATOMY		
1	Overview of nervous system	Describe the general features of neurons and its classification
		Differentiate between central and peripheral nervous system
		Describe the general features of brain (forebrain, midbrain and hindbrain)
		Describe the general features of spinal cord including its enlargements at different levels
		Describe the general features of cranial and spinal nerves
		Differentiate between the anatomical aspects of sympathetic and parasympathetic system
EMBRYOLOGY		
2	Forebrain, midbrain and hindbrain	Describe the development of primary and secondary brain vesicles
		Enlist the derivatives of the brain vesicles
		Describe the development of prosencephalon, mesencepahalon and rhombencephalon
		Discuss congenital anomalies associated with each region of brain
PHYSIOLOGY		
3	Organization of the Nervous System	Describe general design of the nervous system
		Describe various divisions of the nervous system.

		Describe structural and functional unit of CNS.
		Describe Functional components of Neuron.
		Describe Functional and Structural classification of Neurons
		Describe major levels of central nervous system function
		Describe Glial cells and their functions.
		Compare nervous system to a computer
4	Basic Functions of Synapses	Define and classify synapses
		Explain physiological structure of synapse
		Describe Mechanism by Which an Action Potential Causes Transmitter Release from the Presynaptic Terminals
		Describe synaptic transmission and explain properties of synaptic transmission.
		Describe mechanism of action of neurotransmitter on the post synaptic membrane.
		Describe Second messenger system in the post synaptic neuron
5	Functions of Neurotransmitters	Define the characteristics of a neurotransmitter
		Enumerate the neurotransmitters involved in central nervous system.
		Classify neurotransmitters and describe the actions of some common neurotransmitters in central nervous system.

6	Electrical Events during Neuronal Excitation and Inhibition	Describe resting membrane potential of the neuronal soma.
		Describe Effect of Synaptic Excitation on the Postsynaptic Membrane—Excitatory Postsynaptic Potential.
		Describe Effect of Inhibitory Synapses on the Postsynaptic Membrane—Inhibitory Postsynaptic Potential.
		Describe Generation of Action Potentials in the Initial Segment of the Axon Leaving the Neuron—Threshold for Excitation
7	Sensory Receptors	Define and classify receptors.
		Classify receptors according to their location in the body.
		Describe specific functions of receptors.
		Describe Receptor or generation potential
		Discuss mechanism of action of sensory transduction.
8	Coding of Sensory Information	Describe Doctrine of specific nerve energies
		Describe Modality of Sensation—The "Labeled Line Principle"
		Define and discuss law of projection
		Discuss properties of stimulus; modality, Stimulus location Stimulus intensity Stimulus duration
		Describe Frequency of action potentials with threshold level of receptor potential
9	Transmission and Processing of Signals in CNS	Describe Relaying of signals through Neuronal pools; Divergence, Convergence, Prolongation of Signals

10	Types of nerve fibers, its regeneration and degeneration	Describe the mechanism of degeneration & regeneration.
		Describe the duration required for regeneration inside & out of CNS.
		Enumerate the causes of degeneration.
		Discuss Wallerian degeneration
		Identify the microscopic appearance of degenerating neurons
11	Somatic Sensations	Describe Tactile receptors in the skin and their functions: Pacinian corpuscles, Meissner's corpuscles, Ruffini endings, Merkle cell, A-delta and C free nerve endings
12	Transmission in the Dorsal column–medial Lemniscal system	Describe ascending pathways and enumerate the differences between the two.
		Describe Transmission in the Dorsal column–medial Lemniscal system
		Describe Spatial Orientation of the Nerve Fibers in the Dorsal Column–Medial Lemniscal System
		Describe two-point discrimination
13	Somatosensory Cortex	Identify the diagrammatic representation of different areas of the body in the somatosensory cortex I
		Identify Broadman's areas of cerebral cortex and correlate each one of them with their respective functions.
		Describe the functions of somatosensory area I.
		Describe layers of the somatosensory cortex and their function.

		Describe the functions of somatosensory association area
14	Transmission of Sensory signals in the Anterolateral pathway	Differentiate the submodalities of nondiscriminative touch, temperature and nociception based on receptor transduction mechanism, localization within the spinal gray matter, and central termination of the pathways.
		Describe functional organization at all levels and sub-modalities served by the anterolateral system and the equivalent components of the spinal trigeminal system.
BIOCHEMISTRY		
15	Neurotransmitters	Explain the biosynthesis of different neurotransmitters
16	Brain and nervous tissues metabolism	Describe the metabolism of brain and nervous tissues
GENERAL MEDICINE		
17	Peripheral neuropathies	Describe the etiology and types of peripheral neuropathies
		Discuss the clinical presentation and complications of diabetic neuropathies
LAB WORK		
18	Transverse section of spinal cord (cervical level) -1	Identify the slide of transverse section of cervical spinal cord under the microscope
19	Examination of sensations	Examine the sensations (tactile, position, pain, thermal, vibration) of lower limb on a standardized patient.

Theme-2 (Paraplegia)		
SNO	Topic	Learning Outcomes
ANATOMY		
1	Externals features of Spinal Cord	Describe the shape, grooves and sulci and extension of spinal cord
		Enlist the segments of spinal cord
		Differentiate between white and grey matter of spinal cord
		Describe the meningeal covering of spinal cord
		Describe the blood supply of spinal cord
2	Grey Matter of Spinal Cord	Describe the distribution of spinal cord into horns
		Differentiate between anterior, lateral and posterior horns
		Describe the distribution of sensory and motor neuron within the grey matter
		Explain formation of Rexed lamina of spinal cord
3	White matter of spinal cord	Enumerate the ascending tracts
		Explain the origin, pathway and termination of dorsal column medial lemniscal system Explain the origin, pathway
		and termination of anterolateral spinothalamic tract.
		Enumerate the descending tracts
		Explain the origin, pathway and termination of pyramidal tracts
		Explain the origin, pathway and termination of extrapyramidal tracts
		Differentiate between pyramidal and extrapyramidal tracts

EMBRYOLOGY		
4	Spinal cord	Discuss the development of alar and basal plate and its derivatives
HISTOLOGY		
5	Spinal cord	Identify the light microscopic transverse section of spinal cord at cervical, thoracic, lumbar and sacral regions
		Draw and label the transverse section of spinal cord at different levels
PHYSIOLOGY		
	Introduction to Motor Nervous System (General Principles)	Describe organization of the spinal cord for motor functions
		Give an overview of the components of nervous system involved in motor control
		Identify and differentiate upper and lower motor neurons
		Describe the types of anterior horn cells
		Describe the concept of Final Common Path
		Describe broad types of motor activities
	Motor functions of Spinal cord I: Stretch Reflex	Describe structural organization of the muscle spindle
		Define a reflex action and enlist components of reflex arc.
		Describe types of reflexes and their level of integration.
		Describe Stretch Reflex

		Differentiate between Static (Tonic) and Dynamic (Phasic) stretch reflex
		Describe Functions of muscle spindle
		Discuss physiological significance of these reflexes.
		Describe Functions of Gamma efferent system
		Describe the role of the muscle spindle in voluntary motor activity
	Motor functions of Spinal cord II: Golgi Tendon Reflex, Withdrawal Reflexes	Describe Golgi Tendon Reflex
		Differentiate between muscle spindle and Golgi tendon organ.
		Describe types of polysynaptic reflexes and their level of integration.
		Discuss physiological significance of these reflexes.
		Describe reciprocal inhibition and reciprocal innervation
	Support of the body against gravity, Reflexes of Posture And Locomotion	Describe Positive Supportive Reaction
		Describe Cord “Righting” Reflexes.
		Describe stepping and walking movements
		Describe Excitatory-Inhibitory Antagonism Between Pontine and Medullary Reticular Nuclei

	Vestibular Sensations and Maintenance of Equilibrium	Describe the physiologic anatomy of vestibular apparatus
		Describe function of the utricle and saccule in the maintenance of static equilibrium
		Describe function of semicircular ducts
		Describe Neuronal Connections of the Vestibular Apparatus
		Describe Vestibular mechanism for stabilizing the eyes
	Lesions of the Spinal Cord: Upper and Lower Motor Neuron lesion	Define muscle tone and describe its significance.
		Explain the sequence of events during development of muscle tone.
		Discuss spinal shock
		Differentiate between signs of the upper and lower motor neurons.
GENERAL MEDICINE		
	Hemi-section of spinal cord	Describe the clinical features of Brown Sequard syndrome
		Describe the etiology, clinical features, investigations and management of a patient with paraplegia
LAB WORK		
	(HISTOLOGY) Transverse section of thoracic segment of spinal cord-2	Identify the slide of transverse section of thoracic segments of spinal cord under the microscope

	(PHYSIOLOGY) Examination of deep tendon reflexes-1	Examine a standardized patient for deep tendon reflexes of lower limbs

Theme-3 (Syncope)		
S.No	Topic	Learning Outcomes
ANATOMY		
	Medulla	Enlist the components of brain stem
		Describe the external features of brainstem
		Describe the transverse section of medulla at the level of sensory decussation, motor decussation and inferior Olivary nuclei
		Enumerate the cranial nerves nuclei present within the medulla
	Pons	Describe the transverse section of pons at the level of cranial and caudal parts
		Enumerate the cranial nerves nuclei present within the pons
	Midbrain	Describe the transverse section of pons at the level of superior colliculus and inferior colliculus
		Enumerate the cranial nerves nuclei present within the midbrain
PHYSIOLOGY		
	Involuntary function of brain	Describe the involuntary functions of the brain
	Functions of reticular activating system	Describe the structure and functions of RAS

	Coma and brain death	Define coma and describe brain death
	The Autonomic Nervous System 1	Describe the differences in the locations, level and organization of sympathetic and parasympathetic nervous system.
		Identify the target organs of sympathetic and parasympathetic nervous system.
		Describe the distribution of afferent and efferent sympathetic and parasympathetic fibers to their respective target organs.
		Contrast the sympathetic and parasympathetic branches of the autonomic nervous system based on: spinal cord division of origin, length of preganglionic and postganglionic neurons, neurotransmitters and receptors at the ganglionic and target organ synapse.
	The Autonomic Nervous System 2	Discuss basic characteristics of sympathetic and parasympathetic functions
		Describe receptors on the effector organs
		Describe function of the adrenal medullae
		Describe sympathetic and parasympathetic "tone"
		Describe "alarm" or "stress" response of the sympathetic nervous system
PHARMACOLOGY		
	Drugs acting on sympathetic nervous system	Enlist the drugs acting on SNS and describe their mechanism of actions
	Drugs acting on parasympathetic nervous system	Enlist the drugs acting on PNS and describe their mechanism of action
FORENSIC MEDICINE		

	Brain death	Certify brain death
		Describe the medicolegal importance of brain death
LAB WORK		
	(Histology) Transverse section of lumbar spinal cord-3	Identify the slide of transverse section of Lumbar segment of spinal cord under the microscope
	(Physiology) Examination of deep tendon reflexes-2	Examine a standardized patient for upper limbs tendon reflexes

Theme-4 (Hemiplegia)		
ANATOMY		
	Cerebrum • Grey matter of cerebrum • White matter of • cerebrum	Division of cerebrum into different lobes, its surfaces, sulci and gyri
		Distribution of grey matter in cerebral hemispheres
		Enumerate the types of white matter fibers
		Differentiate between association, projection and commissural fibers

		Detailed account of corpus callosum
	Diencephalon	Structure and important nuclei of Thalamus and Hypothalamus
	Blood supply of brain	Describe the formation of circle of Willis
HISTOLOGY		
	Cerebral cortex	Identify the cerebral cortex on light microscope
		Enlist the different histological layers of cerebral cortex
PHYSIOLOGY		
	Cortical Control of Motor Functions	Describe Motor Functions of Specific Cortical Areas
		Describe transmission of signal from the motor cortex to the muscles. (Pyramidal and extrapyramidal).
		Explain the excitation of the spinal cord motor control areas by the primary motor cortex and red nucleus.
	Functions of Descending Tracts	Describe the functions of Descending Tracts
		Describe Decerebrate and Decorticate Rigidity
COMMUNITY MEDICINE		
	Risk factors of cerebrovascular diseases	Describe risk factors for the development of cerebrovascular diseases
		Explain the strategies to prevent cerebrovascular diseases
GENERAL MEDICINE		

	Stroke	Differentiate between hemorrhagic and ischemic stroke
		Describe the etiology, clinical features, investigations and prevention of stroke
LAB WORK		
	(HISTOLGOY) Cerebral cortex	Identify the histological layers of cerebral cortex under the microscope
	(PHYSIOLOGY) Examination of motor functions of the brain and spinal cord	Examine a standardized patient for power, tone and movements of upper and lower limbs, speech, memory and other higher cortical functions

Theme- 5 (Tremors)		
ANATOMY		
	Basal nuclei	Enumerate the components of basal nuclei Describe the structure and relation of corpus striatum, red nucleus and substantia nigra
	Cerebellum	Describe the general features of cerebellum
		Name the lobes of cerebellum and discuss its anatomical and physiological classification
		Enumerate the intracerebellar nuclei of cerebellum
		Describe the input and output of cerebellum
HISTOLOGY		
	Histology of cerebellum	Identify the cerebellar cortex on light microscope

		Enlist the different histological layers of cerebellar cortex
PHYSIOLOGY		
	Cerebellum I: Basic Circuit and Connections	Describe the divisions of cerebellum into 3 lobes and their connections.
		Describe Interconnections of neurons of cerebellar cortex
		Describe Cerebellar afferent fibers
		Describe Cerebellar efferent fibers
		Describe the functional circuits of cerebellum
	Cerebellum II: Functions and Disorders	Explain the functional differences between vermis and cerebellar hemispheres.
		Describe Functions of vestibulocerebellum
		Describe Functions of spinocerebellum
		Describe Functions of cerebrocerebellum
		Describe the clinical abnormalities of cerebellum
	Basal Ganglia I: Pathways and connections	Describe the anatomical and physiological classification of basal ganglia.
		Describe the functional circuits of basal ganglia.

		Describe connections of putamen circuit.
		Describe connections of caudate circuit.
		Enlist the differences between direct and indirect pathways
	Basal Ganglia II: Functions and Diseases	Describe functions of putamen circuit.
		Describe functions of caudate circuit.
		Explain the clinical problems related to basal ganglia
BIOCHEMISTRY		
	Phosphosphingolipids	Describe the metabolism of phosphosphingolipids
PHARMACOLOGY		
	Drugs used in Parkinson's disease	Describe the groups of drugs used in Parkinson`s disease and their mechanism of actions
GENERAL MEDICINE		
	Parkinson`s disease	Describe the pathology, clinical features and treatment of Parkinson`s disease
		Differentiate between cerebellar and parkinsonian tremors
LAB WORK		
	(Histology) Cerebellar cortex	Identify the histological layers of cerebellar cortex under the microscope
	(Physiology) Examination of cerebellum	Illicit cerebellar signs in a standardized patient

Theme-6 (Headache)		
ANATOMY		
	Dural venous sinus	Differentiate between paired and unpaired venous sinuses Discuss the structure and drainage of individual venous sinuses
	CSF in ventricular system	Discuss the structure of choroidal plexus and the formation of CSF in ventricles
PHYSIOLOGY		
	Pain Sensation Pathways	Describe pain receptors and type of stimuli causing pain.
		Describe types of pain.
		Explain in detail the pathway for pain.
	Pain suppression (analgesia) System in the brain and Spinal cord	Define analgesia
		Explain pain suppression system in the brain and spinal cord.
		Describe Gate control theory and Brain Opiate system
		Describe clinical abnormalities of pain: Primary and Secondary Hyperalgesia
	Headache, Referred Pain	Define referred pain and describe its mechanism.

		Describe the clinical significance of referred pain with examples.
		Enumerate the causes of referred pain.
		Enlist the causes of intra-cranial and extra-cranial headache and correlate with the underlying mechanism of pain.
	Thermal Sensations	Describe thermal receptors and their excitation
		Describe mechanism of stimulation of thermal receptors
		Describe transmission of thermal signals in the nervous system
	Functions of Specific Cortical Areas (Concept of Dominant Hemisphere)	Name the association areas of brain. Briefly describe their location and function?
		Draw the diagram of cerebral cortex to show the different functional areas
	Language and Speech	Define and classify speech
		Describe how the brain performs the function of speech.
		Describe Broca's area in the brain, and its function.
		Describe wernicke's area in the brain, and its function.
		Describe the speech pathways for perceiving a heard word and then speaking the same word & perceiving a written word and repeating it and correlate it with their clinical significance
		Describe the effects of damage to Broca's area and Wernicke's area
		Describe disorders related to speech.

	Learning and Memory	Define and classify memory and explain its basic mechanism.
		Describe the mechanism of synaptic facilitation and synaptic inhibition
		Describe consolidation of memory, and briefly describe one of its most important features.
		Describe Codifying of new memories
		Role of specific parts of the brain in the memory process
		Explain disorders related to memory.
	Activating-Driving Systems of the Brain	Describe bulboreticular facilitatory area. Explain continuous stimulation from lower brain by four neurohormonal systems.
		Explain continuous stimulation from lower brain by four neurohormonal systems.
	Limbic System	Describe the principal components of the limbic system: hippocampus, amygdala, prefrontal cortex, and nucleus accumbens), the pathways connecting them and their functions.
		Discuss the anatomy of memory and emotion in relation to the limbic system
		Describe Functions of limbic system
		Describe the connection of hypothalamus with different areas of brain.
		Describe the vegetative and endocrine functions of hypothalamus.
		Describe the behavioral functions of hypothalamus.

	Brain Waves and Sleep	Describe brain waves.
		Describe the clinical significance of EEG.
		Define sleep. Describe its various types and characteristics.
		Describe basic theories of sleep.
		Describe genesis of n-REM and REM sleep.
		Enumerate the neurotransmitters involved in sleep.
		Describe various sleep disorders.
	Seizures and Epilepsy	Define seizure and epilepsy.
		Classify seizures & epilepsies
		Enumerate causes of seizure and epilepsy.
		Discuss the clinical features of patient presents with epilepsy.
		Discuss the significance of electrophysiologic studies imaging and other investigations in epilepsy.
		Describe briefly about pharmacologic treatment.
	CSF formation, circulation and functions	Describe regulation of cerebral blood flow
		Describe formation, flow, and absorption of cerebrospinal fluid

		Describe Blood–Cerebrospinal Fluid and Blood-Brain Barriers
BIOCHEMISTRY		
	CSF	Describe the biochemical composition of CSF
	Prostaglandins and pain	Define Prostaglandins
		Describe the role of Prostaglandins in initiation of pain
PATHOLOGY		
	Alzheimer's disease	Explain the pathogenesis and microscopic findings of Alzheimer`s disease and its types
	Inflammation of brain	Describe the inflammatory processes related to meninges and brain parenchyma
		Describe the pathogenic mechanisms of meningitis and encephalitis
GENERAL MEDICINE		
	Epilepsy	Explain the types of epilepsy
		Describe the investigations and enlist anti-epileptic drugs
	Hydrocephalus	Describe the etiology, pathogenesis and clinical features of hydrocephalus
RADIOLOGY		
	Neuroradiology- CT scans	Describe relevant CT scan findings of intracerebral bleeds, hematomas and subarachnoid hemorrhage

		Describe relevant CT scan findings of ischemic strokes
	Neuroradiology- MRI scans	Describe relevant MR scan findings of intracerebral bleeds, hematomas
		Describe relevant MR scan findings of ischemic strokes
NEUROSURGERY		
	Brain injuries	Describe the types, clinical presentations and investigations of a patient with head injury
	Brain and spinal tumors	Explain the types, clinical features and investigations of brain and spinal tumors
LAB WORK		
	(Histology) Slides of sacral segments and overview of nervous tissues	Identify the slides of different neural structures under the microscope
	(Physiology) Neurological examination of upper and lower limbs	Examine a standardized patient for neurological system of upper and lower limbs

2nd Year MBBS Block D: Neurosciences-1B Module

SR.No	Themes	Duration
1	Facial palsy (face, 5th and 7th cranial nerves)	1 week
2	Neck swelling (thyroid, larynx, neck, muscles etc.)	1 week
3	Cleft palate (palate, tongue, pharynx)	1 week
4	Anosmia	
5	Diplopia / blindness (2nd, 3rd, 4th, 6th cranial nerve / eye ball / orbit)	1 week
6	Deafness (ear / 8th nerve)	1 week

General Learning Outcomes

At the end of this module, the 2nd year students will be able to:

Knowledge

1) Describe the structure of vertebrae, skull bones palate, pharynx, larynx, facial bones and base of the skull
2) Describe the contents walls and boundaries of anterior and posterior triangles of the neck
3) Describe the structure, relation, blood supply and venous drainage of thyroid
4) Describe the arteries, veins and nerves of the neck including cervical plexuses
5) Describe the nuclei, course, relations, and structures supplies by all cranial nerves
6) Describe the origin, course, relations and structures supplies by the arteries, veins and lymphatics of head and neck
7) Describe the anatomy of all the muscles of facial expression and head and neck
8) Describe the structure and functions of eye, ears, nose and paranasal sinuses
9) Describe the development of different structures of organs of the head and neck

Skill

10) Identify the microscopic structure of salivary glands and tongue
11) Examine a standardized patient`s cranial nerves
12) Demonstrate Perimetry and Audiometry

Attitude

Neurosciences-1B Module: Specific Learning Objectives: By the end of this module, students of 2nd year MBBS will be able to		
Theme-1 Facial Palsy		
SNO	Topic	Learning Outcomes
Anatomy		
	Osteology of mandible	Describe the gross features of adult mandible.
		Describe the bony features of mandible
		Name the joints formed by mandible
		Name the attachment of muscles and ligaments on mandible
	Norma frontalis	Describe the bony features of frontal view of skull
	Norma basalis	Name the bones forming the base of skull
		Identify the different foramina and name the structures passing through these foramina
		Describe the attachment and relation of base of skull
		Describe the clinical importance
	Norma lateralis	Name the boundaries of temporal fossa
		Enumerate the contents of temporal fossa
		Describe the relations of temporal fossa
		Name the boundaries of infratemporal fossa
		Enlist the contents of fossa

		Describe the relations of Infratemporal fossa
		Name the layers of scalp
	Scalp and muscles of facial expression	Describe the muscles of scalp
		Name the neurovascular supply of scalp
		Describe the lymphatic drainage of scalp
		Name the fascial muscles along with attachments, nerve supply and actions
	Muscles of mastication	Enumerate the muscles od mastication along with their attachments, nerve supply and actions
	Blood supply and lymphatic drainage of face	Describe the blood supply and lymphatic drainage of face portion
	Temporomandibular joint (TMJ)	Name the type of TMJ
		Name the ligaments related with TMJ
		Describe the relations of TMJ
		Name the muscles causing movements of TMJ
		Name the neurovascular supply of TMJ
	Extra cranial course of CN VII	Describe the extra cranial course of CN VII along with its clinical importance

EMBRYOLOGY		
	Face development	Discuss the five facial primordia
		Describe the inter-maxillary segment
		Describe the embryological defects of face
HISTOLOGY		
	Parotid glands	Identify the variety of gland according to nature of its acinus
		Discuss the capsular structure and its extensions in the gland
		Differentiate between the stroma and parenchyma of parotid gland
		Describe the ductal system of the gland and its lining epithelium
		Differentiate between the intercalated and striated ducts in intralobular parts of gland
		Describe the detailed structure of serous acinus
		Discuss the location of stenson,s duct and its structure
		Discuss clinical conditions related with parotid gland
BIOCHEMISTRY		
	Biotechnology	Describe the indications and procedure of Polymerase Chain Reaction (PCR), Cloning and Restriction fragment length polymorphism (RFLP)
	Purine Nucleotide synthesis and	Describe the process of nucleotide synthesis and degradation

	degradation	
	Hyperuricemia-Gout	Describe the normal levels of serum Uric acid in the blood
		Describe the mechanism of synthesis of Uric acid from Purines
		Describe the etiology, pathogenesis and clinical features of Gout
	Pyrimidine Nucleotide synthesis and degradation	Describe the mechanisms of Pyrimidines synthesis and degradation
	Salvage pathway of nucleotide synthesis	Explain the salvage pathway of Nucleotide synthesis
	The structural basis of cellular information	Explain the structural basis of cellular information
	DNA, chromosomes, discovery and organization in genome	Explain the structure, organization and functions of Chromosomes, DNA and genes
	DNA replication	Describe the process of DNA replication
	Transcription	Describe the mechanism of transcription
	Protein synthesis	Explain the mechanisms of protein synthesis

	Mutation	Define mutation
	DNA, damage and repairs	Explain the mechanisms of DNA damage and repair
	Bell`s palsy	Describe the clinical features and management of Bell`s palsy
LAB WORK		
	(Histology) Submandibular and Sublingual Salivary Gland	Identify the slide of submandibular and sublingual salivary glands under the microscope
	(Physiology) Examination of Cranial nerves, V, VII	Examine the cranial nerves V & VII on a standardized patient

Theme-2 Neck Swelling		
SNo.	Topic	Learning Outcomes
Anatomy		
	Typical cervical vertebra	Describe the bony features of typical cervical vertebrae
		Name the joints formed by typical vertebrae
		Describe the attachments
	Atypical cervical vertebra	Describe the bony features of atypical cervical vertebrae
		Name the joints formed by atypical vertebrae

		Describe the attachments
	Hyoid bone	Describe the bony features of hyoid bone
		Describe the attachments of muscles and ligaments with hyoid bone
	Pterygopalatine fossa	Name the boundaries of pterygopalatine fossa
		Enumerate the contents of pterygopalatine fossa
		Describe the relations of pterygopalatine fossa
	Deep fascia of neck	Enumerate the layers of deep cervical fascia
		Draw and labelled diagram of transverse section of neck showing deep cervical fascia
		Describe the layers of deep cervical fascia along with its clinical importance
	Larynx	Name the paired and unpaired cartilages of larynx
		Enumerate the ligaments and membrane of larynx
		Describe the sensory and blood supply of larynx
		Enumerate the intrinsic and extrinsic muscle of larynx along with its actions and nerve supply
		Describe the pyriform fossa
	Ant. triangle of neck	Enlist the subdivisions of anterior triangle of neck
		Describe the boundaries and contents of

		submental triangle
		Describe the boundaries and contents of carotid triangle Describe the boundaries and contents of digastric triangle Describe the boundaries and contents of muscular triangle
	Post triangle of neck	Enlist the subdivisions of posterior triangle of neck
		Describe the boundaries and contents of occipital triangle
		Describe the boundaries and contents of supraclavicular triangle
	Arteries of neck	Describe the course, Distribution and branches of main arteries of neck
	Veins of neck	Describe the course, Draining and tributaries of main veins of neck
	Cervical plexus and nerves of neck	Describe the cervical plexus along with its branches and distribution
Embryology		
	Pharyngeal apparatus	Describe the components of pharyngeal apparatus.
		Describe the development of pharyngeal apparatus
		Enlist the derivatives of the first pharyngeal arch
		Define the terms pharyngeal arch, pouch, cleft and membrane
		Enumerate the derivatives of the second pharyngeal arch
		Enumerate the derivatives of the 3rd

		pharyngeal arch
		Enumerate the derivatives of the 4th pharyngeal arch
		Enlist the derivatives of 1st ,2nd, 3rd and 4th pharyngeal pouches
		Describe the derivatives of pharyngeal, grooves, and membranes
		Discuss the arterial supply and innervation of the pharyngeal arches
		Describe the pharyngeal membranes
		Discuss the branchial cyst, sinuses, and fistula
		Describe the 1st arch developmental defects
Histology		
	Thyroid gland	Discuss the structural unit of thyroid gland
		Identify the lining epithelium of follicular cells
		Discuss the formation and storage of colloid in the lumen of follicular cells
		Describe the location and structure of parafollicular cells
		Discuss the interfollicular connective tissue
ENT		
	Lump in neck	Approach to a patient with lump in the neck
LAB WORK		
	(Histology) Thyroid gland	Identify the slide of thyroid gland under

		the microscope
	(Physiology) Examination of Cranial nerves XI, XII	Examine a standardized patient for Cranial nerves XI, XII

Theme-3 (Anosmia)

Theme-3 Anosmia		
SNo	Topic	Learning Outcomes
Anatomy		
	Nose and paranasal sinuses	Describe the external features of nose
		Describe the relations of nose with other structures
		Describe the nasal septum
		Describe the lateral wall of nose
		Name the neurovascular supply of nose
		Describe the olfactory nerve
		Describe the paranasal sinuses along with its clinical importance
EMBRYOLOGY		
	Development of nose	Describe the development of nasal cavities and paranasal air sinuses.
		Describe the development of nasolacrimal groove, duct, and sac
		Enlist developmental defects of nose
PHYSIOLOGY		
	Sense of Smell	Describe olfactory membrane
		Explain mechanism of excitation of the olfactory cells.

		Discuss Rapid Adaptation of Olfactory Sensations.
		Define threshold for smell
		Describe transmission of smell signals into the central nervous system
		Describe primitive and newer olfactory pathways into the central nervous system
		Describe centrifugal control of activity in the olfactory bulb by the central nervous system.
ENT		
	Sinusitis	Describe the causes and clinical features of acute and chronic sinusitis
ANATOMY		
	Tongue	Describe the mucosa and muscles of tongue along with its attachments, nerve supply and actions
	Salivary glands	Name the salivary glands
		Describe the location of each gland
		Describe the relations of each gland
		Name the nerve supply
		Describe the drainage of salivary glands along with its importance
	Palate	Name the bones forming the hard palate
		Describe the soft palate along with its muscles, attachments and nerve supply
		Describe the relations of palate
		Name the neurovascular supply of palate
	Pharynx	Enumerate the division of pharynx
		Describe the nasopharynx with its clinical significance
		Describe the oropharynx with its clinical significance
		Describe the laryngopharynx with its clinical significance

		Enlist the muscles of pharynx with its nerve supply and actions
	Extra-cranial course of CN IX, XXI, XII	Describe the extra cranial course of CN IX, X, XI and XII
EMBRYOLOGY		
	Tongue	Describe the development of anterior 2/3 of the tongue
		Discuss the role of the third pharyngeal arch in tongue development.
		Discuss the innervation, blood vessels, and muscles of tongue.
		Describe the development of papillae, taste buds and salivary glands.
		Describe the developmental anomalies of tongue.
	Palate	Describe the development of primary and secondary palate.
		Discuss the developmental defects of lip and primary, secondary palate
		Describe the development of anterior 2/3 of the tongue
		Discuss the role of the third pharyngeal arch in tongue development.
		Discuss the innervation, blood vessels, and muscles of tongue.
		Describe the development of papillae, taste buds and salivary glands.
		Describe the developmental anomalies of tongue.
		Describe the development of primary and secondary palate.
		Discuss the developmental defects of lip and

		primary, secondary palate
HISTOLOGY		
	Submandibular glands	Identify the variety of gland according to nature of its acinus.
		Discuss the capsular structure and its extensions in the gland
		Differentiate between the stroma and parenchyma of submandibular gland
		Describe the ductal system of the gland and its differences with parotid gland
		Describe the detailed structure of serous and mucous acinus
		Discuss the formation of serous demilune
		Discuss the opening of Wharton,s duct
		Discuss different pathological conditions of the gland
	Sublingual glands	Identify the variety of gland according to its nature of acinus
		Differentiate between the stroma and parenchyma of sublingual gland
		Describe the ductal system of the gland and its lining epithelium
		Describe the detailed structure of its acinus
		Discuss the opening of Bartholin ducts
		Discuss different pathological conditions of the gland
PHYSIOLOGY		
	Sense of Taste	Discuss primary sensations of taste
		Explain threshold for taste
		Describe the taste bud and its function

		Describe mechanism of stimulation of taste buds
		Describe transmission of taste signals into the central nervous system
PEDIATRIC SURGERY		
	Cleft palate	Describe the pathogenesis, clinical features and management of a patient with cleft palate
LAB WORK		
	(Histology) Tongue	Identify the slide of tongue under the microscope
	(Physiology) Examination of Cranial nerves I, IX, X	Examine a standardized patient for cranial nerve I, IX, X examination (sense of smell, taste, gag reflex)

Theme-4 (Diplopia)		
S.NO	Topic	Learning Outcomes
ANATOMY		
	Bony orbit	Name the bones forming the bony orbit
		Identify the foramina, fissures, and fossae associated with the orbit and what are the structures transmitted through these openings**.**
		Name the contents of orbit
	Eye ball	Name the layers of eyeball
		Describe the fibrous layer of eyeball
		Describe the pigmented layers of eyeball
		Describe the inner nervous layer of eyeball
		Describe the chambers and of eyeball
		Describe the secretion and drainage of aqueous humor and vitrous humor

		Describe the neurovascular supply of eye
		Describe the intra and extraoccualr muscles with their attachment, actions and nerve supply
	Extra cranial course of CN III, IV, VI	Describe the course of optic, oculomotor, trochlear and abducent nerve with clinical importance
EMBRYOLOGY		
	Development of eye	Define lens placode and formation of retina.
		Describe the development of ciliary body, iris, lens and choroid.
		Discuss the formation of sclera, cornea, sphincter and dilator pupillae
		Discuss the development of virtreous body and optic nerve
		Describe developmental anomalies of eye
HISTOLOGY		
	Eye	Enlist different histological layers of the eye
		Discuss retinal pigment epithelium(RPE) in detail
		Describe the structural details of rods
		and cones and the supporting cells
		Discuss structure of macula densa
		Describe the histological layers of cornea and retina
PHYSIOLOGY		
	Physical Principles of Optics	Describe refraction at interface between two media.
		Describe the physical principles of optics.
		Apply refractive principles to lenses
		Describe Focal Length of a Lens
		Explain formation of image by convex lenses
		Explain how to measure refractive power of a lens
	Optics of The Eye	Explain lens system of the eye.
		Describe the concept of “Reduced” Eye.

		Explain accommodation reflex.
		Explain presbyopia
		Describe that “depth of focus” of the lens system increases with decreasing pupillary diameter
		Define visual acuity.
		Explain the determination of distance of an object from the eye- —“DEPTH PERCEPTION”
		Describe errors of refraction
	Fluid System of The Eye—Intraocular Fluid	Describe the formation of aqueous humor by the ciliary body
		Describe the outflow of aqueous humor from the eye
		Describe Regulation of Intraocular Pressure and Glaucoma
	Anatomy and Function of The Structural Elements of The Retina	Describe foveal region of the retina and its importance in acute vision.
		Discuss the functional parts of the Rods and Cones.
		Describe blood supply of the retina—the central retinal artery and the choroid
	Photochemistry of Vision	Explain rhodopsin-retinal visual cycle and excitation of the rods
		Explain the role of vitamin A for formation of rhodopsin.
		Describe excitation of the rod when rhodopsin is activated by light
		Describe receptor potential, and logarithmic relation of the receptor potential to light intensity
		Describe mechanism by which rhodopsin decomposition decreases membrane sodium conductance—the excitation “cascade.”
		Explain dark and light adaptation.
	Color Vision	Describe photochemistry of color vision by the cones

		Explain tricolor mechanism of color detection
		Explain Young-Helmholtz theory of color vision.
		Explain color blindness.
	Neural Function of The Retina	Describe different neuronal cell types and their functions
		Describe the visual pathway from the cones to the ganglion cells
		Discuss the retinal neurotransmitters.
		Discuss retinal ganglion cells and their respective fields
		Describe lateral inhibition.
		Explain excitation of ganglion cells.
		Discuss on and off response of ganglion cells.
	Visual Pathways	Discuss the function of the dorsal lateral geniculate nucleus of the thalamus.
		Describe organization and function of the visual cortex
		Describe primary visual cortex.
		Describe secondary visual areas of the cortex.
		Describe two major pathways for analysis of visual information: (1) the fast “position” and “motion” pathway and (2) the accurate color pathway
		Describe neuronal patterns of stimulation during analysis of the visual image
		Discuss detection of color
	Eye Movements and Their Control	Describe muscular control of eye movements.
		Describe neural pathways for control of eye movements.
		Describe fixation movements of the eyes
		Explain mechanism of involuntary locking fixation—role of the superior colliculi.
		Explain “Fusion” of the visual images

		from the two eyes
		Describe neural mechanism of stereopsis for judging distances of visual objects
	Autonomic control of Accommodation and pupillary aperture	Describe autonomic nerves to the eyes
		Describe control of accommodation
		Describe control of pupillary diameter
		Discuss Pupillary reflexes or reactions in central nervous system disease.
COMMUNITY MEDICINE		
	Prevention of blindness	Describe the causative agents and prevention of community blindness
MEDICINE		
	Ocular nerves palsies	Describe the clinical features and etiology of 3, 4 and 6th nerve palsies
OPHTHALMOLOGY		
	blindness	Approach a patient with unilateral and bilateral blindness
LAB WORK		
	(Histology) Parotid Gland	Identify the histological layers of parotid gland under the microscope
	(Physiology) Visual Acuity	Examine a standardized patient for visual acuity and errors of refraction
	(Physiology) Perimetry	Examine a standardized patient for visual field function

Theme-6 (Deafness)		
SNo	Topic	Learning Outcomes
ANATOMY		
	External and middle ear	Describe the auricle
		Describe the external auditory meatus with clinical importance
		Name the neurovascular supply of external ear
		Name the boundaries of middle ear
		Describe the contents of middle ear
		Describe the auditory tube along with its clinical importance
	Inner ear	Describe the bony labyrinth
		Describe the membranous labyrinth
		Describe the course of CN VIII along with its clinical importance
EMBRYOLOGY		
	Development of ears	Describe the development of external and middle ear
		Explain the origin of internal ear along the relationship of saccule, utricle, semi-circular canals
		Describe the development of cochlear duct and organ of corti
		Enlist the developmental anomalies of external middle and internal ear
PHYSIOLOGY		
	Tympanic Membrane and The Ossicular system	Explain conduction of sound from the tympanic membrane to the cochlea.

		Describe “Impedance Matching” by the Ossicular System.
		Describe attenuation of sound by contraction of the tensor tympani and stapedius muscles.
		Describe transmission of sound through bone.
	Cochlea	Describe functional anatomy of the cochlea
		Describe basilar membrane and resonance in the cochlea.
		Describe transmission of sound waves in the cochlea—“traveling wave”
		Describe pattern of vibration of the basilar membrane for different sound frequencies.
		Describe amplitude pattern of vibration of the basilar membrane.
		Describe function of the organ of corti
		Describe Excitation of the Hair Cells
		Discuss the “place” principle
		Describe detection of changes in loudness—the power law.
		Describe threshold for hearing sound at different frequencies.
	Auditory Nervous Pathways	Describe auditory pathway.
		Explain the function of the cerebral cortex in hearing.
		Describe how to determine the direction from which sounds come.
		Describe transmission of centrifugal signals from CNS to lower auditory centres
		Describe different types of deafness.
	Vestibular Sensations	Describe the physiologic anatomy of vestibular

	and Maintenance of Equilibrium	apparatus
		Describe function of the utricle and saccule in the maintenance of static equilibrium
		Describe function of semi-circular ducts
		Describe Neuronal Connections of the Vestibular Apparatus
		Describe Vestibular mechanism for stabilizing the eyes
ENT		
	Hearing loss	Describe different clinical tests for hearing loss
		Describe the etiology and management of conduction and sensorineural hearing loss
LAB WORK		
	(Physiology) Examination of Cranial Nerves III, IV and VI	Examine a standardized patient for oculomotor, Abducens and Trochlear nerves with an ophthalmoscope
	(Physiology) Tuning fork test	Examine a standardized patient for hearing loss with tuning fork (Weber and Rinne`s test)
	(Physiology) Audiometry	Examine a standardized patient for functions of inner ear

BLOCK D Paper

FINAL DISTRIBUTION OF MCQs FOR 2nd YEAR NEUROSCIENCES MODULE

Subject	NS-1A	NS-1B	Total MCQs
Gross Anatomy	21	17	38
Histology	6	5	11
Embryology	3	5	8
Physiology	27	18	45
Biochemistry	2	3	5
PRIME including Research	3	2	5
Medicine	1	1	2
Pharmacology	1	0	1
Pathology	1	0	1
Forensic medicine	1	0	1
EYE	0	1	1
ENT	0	1	1
Pediatric surgery	0	1	1
Total	**66**	**54**	**120**

Block D OSPE Blueprint

Specialty	Practical's	# stations	total
Neuroscience 1A Anatomy	Osteology Nerve and Muscles Surface anatomy Embryology models Radiology	2	4
	Histology	1	
	Viva stations	1	
Neuroscience 1A Physiology	Superficial reflexes Deep tendon reflexes Descending Tracts Sensations	3	4
	Viva stations	1	
Neuroscience 1A Biochemistry	Viva stations	1	11

			1
Neuroscience 1B Anatomy	Osteology Nerve and Muscles Surface anatomy Radiology	2	4
	Histology	1	
	Viva stations	1	
Neuroscience 1B Physiology	Ophthalmoscopy Visual acuity/ Perimetry Perimetry Tuning fork test Audiometry	3	4
	Viva stations	1	
Neuroscience 1B Biochemistry	Viva stations	1	1
Total		18	18

Block E

Duration of Module: Nine Weeks

S.No	Themes	Duration
1	Painful swallowing	1 week
2	Abdominal pain	2 weeks
3	Jaundice	1 week
4	Diarrhea and Constipation	1 week
5	Bleeding Per Rectum	1 week
6	Hyperglycemia (Carbohydrate Metabolism)	1 week
7	Obesity (Lipid Metabolism)	4 days
8	Wasting (Protein Metabolism)	8 days

General learning outcomes

At the end of this 6 weeks` module, the 2nd year students will be able to:

Knowledge:

1) Describe the anatomy of oral cavity with respect to GI functions
2) Elaborate the structure and functions of salivary glands
3) Describe the structure and development of esophagus, stomach, small intestine and large intestine
4) Describe the anatomy of peritoneum and mesentery
5) Explain the movements, functions and regulations of gastrointestinal functions
6) Describe the structure, development and functions of hepatobiliary system and pancreas
7) Discuss the mechanisms of digestion and absorptions of carbohydrates, proteins, fats and other nutrients
8) Describe different physiological reflexes occurring upon stimulation of gastrointestinal organs
9) Discuss the chemistry and functions of gastrointestinal hormones
10) Describe common pathological conditions like peptic ulcers, viral hepatitis, obstructive jaundice, carcinoma of esophagus and colorectal cancers
11) Explain the metabolic processes related to carbohydrates, fats and protein metabolism

Skills:

Attitude:

12) Describe the components of medical ethics
13) Explain research ethics, research misconduct and plagiarism
14) Explain the psychosocial aspects of common psychiatric and functional bowel disorders

2nd Year MBBS Block E: Renal Module Specific Learning Outcomes		
Theme 1: Painful swallowing		
S. No	**Topic**	**Learning objectives**
ANATOMY		
	Oral cavity	Describe the musculature of tongue Describe the nerve supply of tongue
	Salivary glands	Describe the gross anatomy of parotid, submandibular and sublingual salivary gland
	Esophagus	Describe the extent, course, relations and gross structure of esophagus.
EMBRYOLOGY		
	Development of tongue	Describe the developmental events of tongue Enlist various anomalies of tongue development
	Development of esophagus	Describe the development of Esophagus
	Development of salivary glands	Describe the development of salivary glands
HISTOLOGY		
	Oral cavity	Describe the microscopic structure of lips
		Describe the histological features of tooth in longitudinal and transverse section
		Explain the histology of tongue.
		Differentiate between the microscopic picture of anterior 2/3rds and posterior 1/3rds of the tongue
	Esophagus	Identify the epithelium of esophagus and esophageal glands in mucosa
		Differentiate between musculature in different parts of

		the esophagus
PHYSIOLOGY		
	General principles of gastrointestinal motility	Describe electrical activity of gastrointestinal smooth muscle
		Describe the mechanism of excitation of smooth muscle of gastrointestinal
		Differentiate between slow wave and spike potential
	Neural control of GIT function (Enteric Nervous system)	Differentiate between mesenteric and submucosal plexus.
		Classify the following enteric nervous system neurotransmitters as excitatory or inhibitory: norepinephrine, acetylcholine, CCK, VIP, histamine, and somatostatin
		Describe the role of autonomic nervous system in regulation of GIT's function
		Differentiate between sympathetic and parasympathetic modulation of the enteric nervous system and the effector organs of the GI tract
		Describe three types of gastrointestinal reflexes
	Hormonal control of Gastrointestinal motility	Describe gastrointestinal hormone actions, stimuli for secretion, and site of secretion
	Functional types of movements in the gastrointestinal tract	Describe the functional types of movements in the gastrointestinal tract
		Describe law of gut.

		Describe blood flow through the villus and its significance
	Gastrointestinal blood flow— Splanchnic circulation	Describe anatomy of the gastrointestinal blood supply
		Describe the effect of gut activity and metabolic factors on gastrointestinal blood flow
		Describe nervous control of gastrointestinal blood flow
	Ingestion of food	Describe the mechanics of ingestion of food
		Describe chewing and mastication
		Describe different stages of swallowing.
		Describe the effects of the pharyngeal stage of swallowing on respiration
	General principles of alimentary tract secretion	Describe basic mechanisms of stimulation of the alimentary tract glands
		Describe dual effect of sympathetic stimulation on alimentary tract glandular secretion
	Role of mucus and saliva	Describe the secretion of saliva and its nervous regulation
		Describe the plasma and saliva concentrations of Na+, Cl-, and HCO3- at low secretion rates and at high secretion rates and the principal cell types involved in each secretion rate.
		State the substrates and digestion products of salivary amylase (ptyalin).

		Identify the stimuli and cell types involved in GI secretion of mucous, and identify the function of salivary mucus.
		Describe three types of stimuli that increase salivary secretion.
		State the components of the saliva important in oral hygiene, and identify the role of salivary secretions in eliminating heavy metals
	Disorders of swallowing and esophagus	Describe the clinical abnormalities of swallowing mechanism
		Describe Achalasia and Megaesophagus
BIOCHEMISTRY		
	Saliva	Describe the composition of salivary secretions
		Describe the formation and characteristics of salivary secretions
		Elaborate the functions of saliva
PATHOLOGY		
	Carcinoma of Esophagus	Describe the histological types and presentation of esophageal carcinoma
ENT		
	Oral ulceration	Enlist the causes of oral ulcerations
		Describe Aphthous ulcers and its treatment
		Describe the clinical features and drugs used to treat esophageal candidiasis

Theme 2: Pain Epigastrium		
ANATOMY		
	Anterior abdominal wall	Describe the origin, insertion, nerve supply and actions of anterolateral abdominal wall muscles
		Describe the formation of rectus sheath
		Describe the contents of rectus sheath
		Describe the surface anatomy of anterior abdominal wall Describe the structures related to transpyloric plane
		Enlist various types of abdominal hernias
	Inguinal canal	Describe the boundaries of inguinal canal
		Enlist the contents of inguinal canal in males and females
		Differentiate between direct and indirect inguinal hernia
	Peritoneum	Describe greater and lesser omentum
		Describe the nerve supply of peritoneum
		Describe the anatomy of lesser sac.
		Describe the boundaries of epiploiec foramen
		Describe the various peritoneal pouches, recesses and ligaments
	Stomach	Describe the gross structure of stomach
		Describe the blood supply and lymphatic drainage of stomach
		Describe the anatomy of stomach bed
	Duodenum	Describe the gross structure and blood supply of duodenum
		Write the relations of various parts of duodenum

	Pancreas	Describe the gross structure of pancreas and its ductal system
HISTOLOGY		
	Stomach	Enumerate the different layers of the stomach wall
		Write a note on gastric glands.
		Differentiate between fundic and pyloric mucosa
	Duodenum	Discuss histological features of duodenum and describe duodenal glands.
	Pancreas	Describe the histology of pancreas
		Differentiate histologically between exocrine and endocrine portions of pancreas
EMBRYOLOGY		
	Development of foregut	Describe the development of stomach
		Describe the development of duodenum
		Enlist various developmental anomalies of stomach
		Enlist various developmental anomalies of duodenum
	Pancreas	Describe the development of pancreas
		Enlist various anomalies of pancreas
PHYSIOLOGY		
	Motor function of Stomach	Describe the motor function of stomach.
		Describe basic electrical rhythm of the stomach wall
		Describe Pyloric pump
		Describe role of the pylorus in controlling

		stomach emptying
		Describe the regulation of gastric emptying
	Gastric secretion	Describe characteristics of the gastric secretions
		Describe the mechanism of secretion of different gastric glands
		Describe the phases and regulation of gastric secretion.
		Enlist the hormones that inhibit and increase gastric secretions.
		Enumerate the reflexes that inhibit and increase gastric secretions
BIOCHEMISTRY		
	Gastric secretions	Describe the chemical composition of gastric secretions
		Describe the functions of HCl and other constituents of gastric secretions
		Discuss the mechanism of synthesis and secretion of HCl from gastric mucosa
		Discuss the mechanism of secretion and role of Intrinsic factor from gastric parietal cells
PATHOLOGY		
	Peptic ulcer disease	Describe the mechanism of formation of peptic ulcers, its stages and complications
		Describe the etiology, pathology and clinical presentation of gastric cancer
		Describe the mechanism of development, presentation and complications of acute

		pancreatitis
PHARMACOLOGY		
	Drugs used in Peptic ulcer	Classify the drugs used in Peptic ulcer disease
		Describe the mechanism of action of drugs used in Peptic ulcer
FORENSIC MEDICINE		
	Poisons identification through gastric lavage	Enlist indications and contraindications for gastric lavage Describe the sampling technique of gastric lavage fluid
MEDICINE		
	GERD and Peptic ulcer	Describe the etiology, clinical features, complications and drug treatment of GERD and peptic ulcer disease
SURGERY		
	Peptic ulcer	Describe the complications of long-term peptic ulcer disease and its surgical management
	Lump in the abdomen	Describe common causes of lump in abdomen and enlist the common surgical procedures for treatment of hernia.
	Acute pancreatitis	Describe the etiology, clinical features, complications and management of acute pancreatitis

Theme 3: Jaundice		
S.No	Topic	Learning Outcomes
ANATOMY		
	Liver	Describe the borders and surfaces of liver

		Describe the visceral surface of liver
		Describe the peritoneal reflections and associated ligaments of liver
		Describe the lobes and segments of liver
		Describe the blood supply of liver
		Describe the hepato renal pouch of morrison and its clinical significance
	Extra hepatic billiary apparatus	Describe the gross anatomy of gall bladder
		Describe calot's triangle
		Describe the gross anatomy of extra hepatic billiary tree
	Spleen	Describe the gross anatomy of spleen and blood supply of spleen
	Hepatic portal venous system	Describe the formation and tributaries / branches of hepatic portal venous system
		Explain the clinical significance of hepatic portal system
EMBRYOLOGY		
	Development of distal fore gut	Describe the development of liver
		Describe the development of gall bladder and billiary tree
		Describe the developmental anomalies of liver and biliary tree
HISTOLOGY		
	Liver	Discuss the histological features of liver
		Describe liver parenchyma and general structural plan of the liver
		Describe the histological features of the structures

		present in the portal triad
	Spleen	Discuss the histological features of spleen
		Differentiate between red pulp and white pulp
PHYSIOLOGY		
	Pancreatic secretion	Describe the role of pancreatic secretions in digestion.
		Describe the phases and regulation of pancreatic secretion
	Physiology of liver	Describe Physiological Anatomy of the Liver
		Describe blood flow through the liver
		Describe metabolic functions of liver
		Describe Regulation of Liver Mass—Regeneration
		Describe Bilirubin formation and excretion
	Secretion of bile by liver	Describe the mechanism of secretion of bile by the liver
		Describe the function of bile salts in fat digestion and absorption
		Describe functions of the biliary tree in digestion
BIOCHEMISTRY		
	Bile	Describe the constituents of bile
		Describe the functions of bile
		Describe the mechanism of gall stone formation
PATHOLOGY		
	Acute/ chronic viral hepatitis	Describe the different viruses causing acute and chronic hepatitis

		Describe the pathogenesis, stages and clinical presentation of liver cirrhosis
PHARMACOLOGY		
	First pass hepatic metabolism of drugs	Describe the mechanism of drugs detoxification and metabolism in the liver
	Hepatotoxic drugs	Enlist some of the commonly used hepatotoxic drugs and their toxicities
FORENSIC MEDICINE		
	Hepatotoxic poisons	Enlist the poisons which cause hepatotoxicity Diagnose poisoning through routine toxicological sampling
COMMUNITY MEDICINE		
	Hepatitis B and C virus infection	Describe the epidemiology of hepatitis B and C virus infection and its control measures
		Describe water borne hepatitis (Hepatitis A and E) viruses and its control measures
MEDICINE		
	Liver cirrhosis	Describe the etiology, clinical features, complications and treatment options of liver cirrhosis
SURGERY		
	Obstructive jaundice	Describe the etiology, clinical features, biochemical investigations and treatment options of obstructive jaundice

Theme 4: Diarrhoea and Constipation		
S.No	Topic	Learning Outcomes
ANATOMY		
	Jejunum and ileum	Describe the gross features of jejunum and ileum
		Tabulate differences in gross features and blood supply of jejunum and ileum
	Mesenteries	Describe the mesentery of small intestine
	Appendix	Describe the gross features, blood supply and mesentery of appendix
		Describe the clinical correlates of appendix
	Abdominal aorta	Enumerate the branches of abdominal aorta.
		Describe the course and distribution of celiac trunk
		Describe the course and distribution of superior mesenteric artery
		Describe the course and distribution of inferior mesenteric artery
	Inferior vena cava	Describe the origin, course, tributaries and relations of inferior vena cava
	Lymphatic drainage	Describe the origin, course and relations of Cisterna chili
		Describe the lymphatic drainage of abdominal organs
EMBRYOLOGY		
	Development of midgut	Describe the formation and rotation of midgut loop
		Describe the physiological herniation of midgut loop
		Enlist the derivatives of mid gut loop
		Describe the development of mesenteries
		Describe the various anomalies of midgut

		development
HISTOLOGY		
	Jejunum and ileum	Discuss histological features of jejunum and describe plica circulares.
		Discuss histological features of ileum and describe Payers patches.
		Discuss the various structural specializations meant for increasing the surface area of small intestine (plica circulares, crypts of Lieberkühn, villi and microvilli)
	Appendix	Discuss histological features of appendix.
PHYSIOLOGY		
	Movements of the small intestine	Describe different types of movements of small intestine.
		Describe the control of peristalsis by nervous and hormonal signals
	Secretion of small intestine	Describe secretion of mucus by Brunner's glands in the duodenum
	Pancreatic enzymes	Describe the chemistry, secretion, functions and regulation of pancreatic enzymes
	Intestinal digestive enzymes	Describe the chemistry, secretion, functions and regulation of small intestinal digestive enzymes
		Describe secretion of intestinal digestive juices by the crypts of lieberkühn
	Gastrointestinal hormones	Describe the secretion, structure, functions and regulation of Gastrin, Secretin, Cholecystokinin and other GI hormones

	Disorders of small intestine	Describe abnormal digestion of food in the small intestine in pancreatic failure
		Describe malabsorption by the small intestinal mucosa in Sprue
BIOCHEMISTRY		
	Pancreatic secretions	Describe the composition of pancreatic secretions
		Describe the mechanism of secretion and actions of pancreatic enzymes
		Describe the mechanism of synthesis of Bicarbonates
	Digestion and absorption	Describe the mechanism of digestion and absorption of fats in the intestines
		Describe the mechanism of digestion and absorption of proteins in the intestines
		Describe the mechanism of digestion and absorption of carbohydrates in the intestines
		Describe the mechanism of absorption of Iron, Vitamin-B12 and Folate in the intestines
	Energy requirement of human body	Discuss the daily energy requirement of a human body in health and disease
		Define BMR
		Enlist the causes of high and low BMR
		Describe the daily requirements of common vitamins, Iron, Calcium, Iodine and other minerals
	Nutritional disorders	Define Protein energy malnutrition and its associated clinical conditions
	Adipose tissues	Discuss adipose tissue homeostasis
PHARMACOLOGY		
	Anti-diarrheal drugs	Classify anti-diarrheal drugs and their mechanism

		of action
	Drugs for constipation	Classify drugs used in constipation, and their mechanism of action
COMMUNITY MEDICINE		
	Food borne infection	Describe the epidemiology of food borne infections and their control measures
PAEDIATRICS		
	Acute gastroenteritis	Describe the aetiology, clinical features, complications and treatment of acute gastroenteritis

Theme 5: Bleeding Per Rectum		
S.No	**Topic**	**Learning Outcomes**
ANATOMY		
	Large intestine	Describe the gross features of cecum, ascending, transverse and descending and sigmoid colon
		Describe the mesentery of large intestine
		Describe the gross anatomy of rectum
		Describe the gross anatomy of anal canal
		Describe the blood supply of anal canal and its clinical correlates.
		Describe the boundaries and contents of Ischiorectal (anal) fossa
EMBRYOLOGY		

	Development of hind gut	Describe the partitioning of cloaca
		Enlist the derivatives of hind gut
		Enlist the developmental anomalies of hindgut
HISTOLOGY		
	Colon	Discuss the histological features of colon
		Describe the characteristic features of intestinal glands
	Rectum	Describe the histological features of Rectum
PHYSIOLOGY		
	Movements of the Colon	Describe different types of movements of colon
		Describe gastro-colic reflex and duodeno-colic reflexes
		Describe the mechanism of defecation reflex
	Secretion of Large Intestine	Describe secretion of mucus by the large intestine
	Disorders of Large intestine	Describe constipation, megacolon
		Explain mechanism of diarrhea and its causes.
		Explain paralysis of defection in spinal cord injuries
	General Disorders of the gastrointestinal tract	Describe the mechanisms of Vomiting and Nausea
		Describe Vomiting Act
		Describe Gastrointestinal Obstruction
		Describe gases in the gastrointestinal tract (flatus)

BIOCHEMISTRY		
	Intestinal juices	Describe the composition of intestinal juices
PATHOLOGY		
	Carcinoma of colon and Rectum	Describe the etiology, histological findings, clinical presentation and staging of carcinoma of colorectal carcinoma
SURGERY		
	Colorectal malignancies	Describe the etiology, clinical features, investigations and management of colorectal cancers

Metabolism

Theme-6: Glucose control (Carbohydrate metabolism)		
BIOCHEMISTRY		
	Oxidative Phosphorylation	Describe the generation of proton gradient & the resultant motive force across the inner mitochondrial membrane by transport of electrons through ETC which in turn produces ATP by oxidative phosphorylation
		Describe the structure of ATP synthase enzyme(complex-V) & explain how it works as a rotary motor to synthesize ATP from ADP & Pi
	Respiratory Chain Inhibitors & Uncouples	Describe the control of the rate of respiration, oxidation of reducing equivalents via ETC & its tightly coupling with oxidative phosphorylation in mitochondria
		Discuss certain common poisons which block respiration or oxidative phosphorylation & identify their site of action
		Explain how uncouplers act as poisons by dissociating oxidation from oxidative phosphorylation via ETC but at the same time they may have a physiological role in

		generating body heat
	Glycolysis	Define Glycolysis
		Describe the entry of glucose into different kinds of cells through various GLUT transporters
		Describe the reactions of glycolysis
		Describe the transportation of NADH to Mitochondria via various Shuttles
		Describe the energetics of glycolysis
		Describe the fates of pyruvate
		Describe the types of glycolysis especially the anaerobic glycolysis
		Describe the key enzymes and regulation of glycolysis
		Discuss the glycolysis in RBC
		Describe the biomedical Significance and clinical disorders of glycolysis
		Discuss glycolysis in cancer cells
	Oxidation of Pyruvate	Describe the conversion of pyruvate into acetyl CoA
		Enumerate the enzymes & coenzymes of PDH complex
		Describe the sequence of reactions catalyzed by PDH complex.
		Describe the regulation of PDH complex
		Discuss the clinical aspects of PDH complex especially the congenital lactic acidosis
	Tricarboxylic Acid Cycle	Define citric acid cycle
		Describe the sources of acetyl CoA in mitochondria
		Describe the reactions of TCA
		Discuss the energetics of TCA

		Discuss the energy yield of one molecule of glucose when it is converted into carbon dioxide and water
		Name the vitamins that play key role in TCA
		Describe the amphibolic nature of TCA
		Discuss the regulation of TCA
		Enumerate the inhibitors of TCA and their sites of inhibition
	Gluconeogenesis	Define Gluconeogenesis
		Name the organs and sub cellular location where Gluconeogenesis occurs
		Describe the substrates or precursors of Gluconeogenesis
		Describe the three bypass reactions
		Describe the Gluconeogenesis from Fatty Acids
		Discuss the Cori's cycle
		Discuss the regulation of Gluconeogenesis
		Name the key enzymes of Gluconeogenesis
	Hexose Mono Phosphate shunt	Discuss the Role of Pentose Phosphate Pathway
		Name the tissues where Hexose Mono Phosphate shunt occurs
		Describe the reactions of the two parts of Hexose Mono Phosphate shunt
		Describe the Role of thiamine in Hexose Mono Phosphate shunt
		Enumerate the Similarities & differences b/w glycolysis and HMP shunt pathway
		Discuss the functions of NADPH (produced in Hexose Mono Phosphate shunt) in various tissues and cells
		Discuss G6PD deficiency and its effects in various

		tissues and cells
		Describe the regulation of HMP shunt pathway
	Uronic Acid Pathway	Enumerate the products of Uronic acid pathway and their importance
		Discuss why ascorbic acid is vitamin for humans
	Galactose Metabolism	Describe the uses & requirements of galactose in the body
		Discuss the various reactions with enzymes involved
		Describe the Genetic Deficiencies of Enzymes in Galactose Metabolism and their effects
	Fructose Metabolism	Describe the Main source of Fructose
		Discuss the various reactions with enzymes involved
		Discuss the Fructose formation in Seminal fluid
		Describe the mechanism of formation of diabetic cataract
		Discuss the Defects in Fructose Metabolism and their effects
	Glycogen Metabolism	Describe the structure and functions of the glycogen especially the significance of its polymer nature
		Describe the Difference between Liver & muscle glycogen
		Describe the synthesis of glycogen by two mechanisms with its enzymes
		Discuss the breakdown of glycogen with its enzymes
		Describe the Regulation of Glycogen metabolisms
		Discuss the glycogen storage diseases with deficient enzymes and cardinal clinical features

Theme 7: Obesity (Fat metabolism)		
S.No	Topic	Learning Outcomes

BIOCHEMISTRY		
	Fatty acid (FA) synthesis (*De Novo*)	Enumerate the organs where fatty acid synthesis occurs with sub cellular sites
		Discuss the source of Acetyl CoA that will be used for FA synthesis with reason
		Discuss how acetyl CoA comes out of mitochondria for the synthesis of FA
		Describe the steps of FA synthesis with enzymes
		Describe the FA synthase enzyme with its structure and components
		Describe the product of FA synthase and the subsequent fate of this product
		Discuss the regulation of FA synthesis
		Discuss why animals cannot convert fatty acids into glucose
		Describe the further elongation and desaturation of FA and its regulation
	Mobilization of stored fats (oxidation of FA)	Describe how fats are mobilized from adipose tissues to the organs where they will be used for oxidation
		Enumerate the various methods of oxidation of FA
		Discuss the stages of beta oxidation with its reactions
		Calculate the no. of ATP obtained when one molecule of palmitic acid is oxidized completely
		Describe the genetic deficiencies of FA oxidation i.e. MCAD & CAT deficiencies with their hallmarks
		Discuss the oxidation of odd-chain FA
		Compare the processes of FA synthesis with FA oxidation

	Metabolism of Ketone bodies	Enumerate the ketone bodies
		Define ketogenesis
		Describe the steps of ketogenesis
		Discuss the energy yield during ketogenesis in liver
		Enumerate the conditions in which there is increased ketogenesis
		Discuss utilization of ketone bodies
		Discuss the energy yield in ketone bodies utilization in extra hepatic tissues
		Describe the regulation of ketogenesis in well-fed healthy conditions, during early stages of starvation & in prolonged starvation
		Discuss the ketoacidosis in diabetes
	Complex Lipid metabolism	Describe the synthesis of triacylglycerol by two mechanisms
		Describe the synthesis of phosphatidic acid
		Enumerate the substances formed from phosphatidic acid
		Describe the synthesis of glycerophospholipids
		Discuss the degredation of glycerophospholipids
		Describe the synthesis of ceramide and sphingophospholipids (shingomyelin)
		Discuss the degradation of shingomyelin
		Discuss Niemann-Pick disease with its cardinal clinical features
		Discuss Farber disease with its cardinal clinical features
		Describe the synthesis of glycosphingolipids
		Describe the degradation of glycosphingolipids
		Describe the abnormalities of phospholipid metabolism

		i.e. true demyelinating diseases and sphingolipidosis
	Eicosanoid metabolism	Define eicosanoids and describe their two classes
		Describe the synthesis of prostanoids by cyco-oxygenase pathway
		Enumerate the two isomers of cyclo-oxygenase with their inhibition
		Discuss why low dose aspirin therapy is used in strokes and heart attacks
		Describe biochemical reason for the adverse effects of NSAIDs & steroids
		Describe the catabolism of the prostanoids
		Describe the lipoxygenase pathway for synthesis of Leukotrienes and lipoxins
		Describe the synthesis of leuktriene biosynthesis inhibition
		Enumerate the leukotriene receptor antagonists
	Metabolism of cholesterol	Describe the major sites of cholesterol synthesis as well as sub cellular sites
		Describe the source of cholesterol synthesis
		Describe the various steps of cholesterol synthesis
		Discuss the regulation of cholesterol synthesis
		Enumerate the inhibitors of HMG CoA reductase inhibitors
		Describes the degradation and excretion of cholesterol with synthesis of bile acids, their conjugation, bile salt formation and micelle formation in lumen of the intestine
		Discuss the enterohepatic circulation of bile salts
		Discuss the role of bile acid sequestrants i.e.

		cholestyramine and dietary fibre
		Discuss the regulation of bile acid synthesis
	Metabolism of lipoproteins	Describe the structure of a typical lipoprotein particle
		Enumerate the various classes of LP
		Enumerate the functions of apolipoproteins
		Describe the steps of chylomicrons' metabolism
		Describe the metabolism of VLDL
		Describe the metabolism of LDL
		Describe the metabolism of HDL
	Disturbances of Lipid metabolism	Differentiate between hyperlipidemias and dyslipidaemia
		Describe the Classification of hyperlipidemias with enzyme deficiency
MEDICINE		
	Hyperlipidemias	Describe the epidemiology, preventive strategies and diseases associated with hyperlipidemias

Theme 8: Wasting (Protein metabolism)		
S.No	**Topic**	**Learning Outcomes**
BIOCHEMISTRY		
	Amino acid pool & chemical processes for dissimilation of proteins	Discuss how amino acid pool is formed
		Discuss the chemical processes responsible for dissimilation of proteins: transamination, deamination and transdeamination
		Discuss the clinical importance of transaminases
	Ammonia transport and	Discuss how ammonia is formed in various tissues and

	effects of ammonia toxicity on brain	transported to liver Discuss the effects of ammonia toxicity in brain
	Urea cycle & its associated inherited disorders	Describe the Krebs-Henselet Cycle of Urea Formation in Liver
		Describe the clinical significance of various enzymes involved in urea formation
	Metabolism of aromatic amino acids	Discuss biosynthesis, fate, metabolic functions and related inherited disorders of aromatic amino acids
	Metabolism of sulphur containing amino acids	Discuss biosynthesis, fate, metabolic functions and related inherited disorders of sulphur containing amino acids
	Metabolism of individual amino acids	Discuss biosynthesis, fate, metabolic functions and related inherited disorders of Glycine, serine, and alanine
		Discuss biosynthesis, fate, metabolic functions and related inherited disorders of acidic amino acids
		Discuss biosynthesis, fate, metabolic functions and related inherited disorders of branched chain amino acids

LAB WORK

S.NO	TOPIC	LEARNING OUTCOMES
	Lips and tongue	Identify the histological features of lips and tongue under the microscope
	Esophagus	Identify the histological features of Esophagus under the microscope
	Stomach	Identify the histological features of stomach under the microscope
	Duodenum	Identify the histological features of duodenum under the microscope
	Liver	Identify the histological features of liver under the microscope
	Gall bladder	Identify the histological features of gall bladder under the microscope
	Jejunum and Ilium	Identify the histological features of Jejunum and Ilium under the microscope
	Appendix	Identify the histological features of Appendix under the microscope

	Colon and Rectum	Identify the histological features of Colon and Rectum under the microscope
PHYSIOLOGY		
	Examination of abdomen	Examine a standardized patient`s abdomen
BIOCHEMISTRY		
	Determination of plasma proteins	Estimate the plasma proteins in a given blood sample
	Determination of free, total and combined acidity of the Gastric juice	Estimate free, total and combined acidity of gastric juice
	Determination of serum Bilirubin	Estimate serum Bilirubin in a given blood sample
	Determination of Titrable acidity of urine	Estimate the Titrable acidity of urine
	Determination of serum cholesterol	Estimate serum Cholesterol in a given blood sample

2nd Year MBBS Block E:

Renal Module

SR.No	Themes	Duration
1	Flank Pain /Loin Pain	1 week
2	Scanty Urine /Urinary retention and Edema	1 week
3	Urinary Incontinence	1 week

General Learning Outcomes???

2nd Year MBBS Block E: Renal Module Specific Learning Outcomes		
Theme-1 Loin pain/ Flank Pain		
S.No	**Topic**	**Learning Outcomes**
ANATOMY		
	1.Overview of the urinary system	1. List and describe the main components of the urinary system
	2. Kidneys	2. Discuss the location, anatomical structure, and relations of right and left kidneys to other abdominal organs 3. Discuss the gross morphological composition of kidneys • Capsule • Pericapsular adipose tissue • Cortex • Medulla • Pelvis • Hilum • Vascular system within kidneys • Arterial supply • Venous drainage • Lymphatic's

		• Innervation 4. Enumerate the various coverings of the kidney 5. Explain the clinical significance of coverings of the kidneys 6. Describe the structures entering and leaving the hilum of kidney and their relations
	3.Posterior abdominal wall	7. Describe the general features of lumbar vertebrae
		8. Describe the special features of lumbar vertebrae
		9. Enlist the muscles of posterior abdominal wall. Describe their origin, insertion, nerve supply and actions
		10. Explain the course and relations of Abdominal Aorta
		11. Enumerate and elaborate the paired branches of abdominal aorta
		12. Discuss the formation of inferior vena cava
EMBRYOLOGY		
	4.Development of the urinary system	13. Trace the embryological origins and development of the urinary system
	5.Congenital anomalies of the urinary system	14. List and describe the common congenital anomalies of kidney and ureter.
HISTOLOGY		

	6.Kidney	15. Describe the parenchyma of kidney 16. Enlist different components of uriniferous tubules 17. Describe Histological features of the various components of Nephron 18. Describe the histological features of renal corpuscle 19. Describe filtration barrier 20. Describe the parts of collecting tubules 21. Describe the microscopic anatomy of collecting duct Enlist the components of juxtaglomerular apparatus
PHYSIOLOGY		
	7.Physiological Anatomy Of the kidneys and Overview of its Functions	23. States major functions of the kidneys & brief physiological anatomy of kidney.
		24. Define the components of the nephron and their interrelationships: renal corpuscle, glomerulus, nephron, and collecting-duct system.
		25. Draw the relationship between glomerulus, Bowman's capsule, and the proximal tubule.
		26. Describe the 3 layers separating the lumen of the glomerular capillaries and Bowman's space; defines podocytes, foot processes, and slit diaphragms. location within the glomerulus. Detail of renal vessels & Pressure within them. Describe, in general terms, the differences among superficial cortical, midcortical, and juxtamedullary nephrons.
		28. List the individual tubular segments in order; states the segments that comprise the proximal tubule, Henle's loop, and the collecting-duct system; defines principal cells and intercalated cells.
		29. Define juxtaglomerular apparatus and describes its 3 cell types; states the function of the granular cells.

		30. Define the basic renal processes: glomerular filtration, tubular reabsorption, and tubular secretion
	8.Glomerular Filtration: Determinants and Equation	31. Describe how molecular size and electrical charge determine filterability of plasma solutes; states how protein binding of a lowmolecular-weight substance influences its filterability.
		32. State the formula for the determinants of glomerular filtration rate, and states, in qualitative terms why the net filtration pressure is positive.
		33. Define filtration coefficient and states how mesangial cells might alter the filtration coefficient; states the reason glomerular filtration rate is so large relative to filtration across other capillaries in the body.
		34. Describe how arterial pressure, afferent arteriolar resistance, and efferent arteriolar resistance influence glomerular capillary pressure.
		35. Describe how changes in renal plasma flow influence average glomerular capillary oncotic pressure.
		36. State the Starling forces involved in capillary filtration.
		37. State how changes in each Starling force affect glomerular filtration rate
	9.Nervous & Hormonal Control of Renal Circulation	38. Define renal blood flow, renal plasma flow, glomerular filtration rate, and filtration fraction, and gives normal values.
		39. State the formula relating flow, pressure, and resistance in an organ.
		40. Describe sympathetic nerve supply of renal vessels & hormones affecting renal vessels
		41. Describe the effects of changes in afferent and efferent arteriolar resistances on renal blood flow
	10.Auto regulation of GFR and renal blood flow	42. Define auto regulation of renal blood flow and glomerular filtration rate
		43. Describe the myogenic and tubuloglomerular feedback mechanisms of auto regulation.
	11.Review of Transport Mechanisms across the Cell Membrane(Active	44. Define and state the major characteristics of diffusion, facilitated diffusion, primary active transport, secondary active transport (including symport and antiport) and endocytosis.

	and Passive transport)	
		45. Define osmolality and osmolarity, and states why osmolarity is commonly used to approximate osmolality.
		46. Describe what is meant by the expression "water follows the osmoles."
		47. Describe qualitatively the forces that determine movement of reabsorbed fluid from the interstitium into peritubular capillaries.
		48. Compare the Starling forces governing glomerular filtration with those governing peritubular capillary absorption.
		49. Compare and contrasts the concepts of T_m and gradient-limited transport.
		50. Describe 3 processes that can produce bidirectional transport of a substance in a single tubular segment; states the consequences of pump-leak systems.
		51. Contrast "tight" and "leaky" epithelia.
BIOCHEMISTRY		
	12.Acid-base balance & imbalance	52. Study the sources of Hydrogen Ion, pH & Anion Gap
		53. Describe Buffer Systems operating in the Body 54. Carbonic acid,protein,and phosphate buffer 55. Transporting acid and mitigating pH changes
		56. Describe Respiratory Regulation of Acid Base Balance
		57. Describe Renal Regulation of Acid Base Balance
		58. Describe Disorders of Acid Base Balance: their causes, mechanisms and compensations of Respiratory Acidosis & Alkalosis and Metabolic Acidosis & Alkalosis
PATHOLOGY		
	13.Smoky urine	59. List the common kidney symptoms 60. Discuss the pathophysiology of renal infections 61. Describe Symptoms associated with renal pathology 62. Classify renal diseases

		63. Explain Pathophysiology of renal infections 64. Describe Treatment of chronic pyelonephritis
	14.Renal disorders	65. Define the terms Nephrotic syndrome, nephritic syndrome, Azotemia. 66. Enlist the Causes types of renal stones.
		67. Enlist the causes and describe the pathogenesis of urinary tract infection.
	15.Systemic disease affecting kidneys	68. Explain how systemic diseases can affect renal function 69. Systemic diseases affecting renal function - Diabetes -Cardiovascular disorders (hypertension, CHF) -Immunological disorders (SLE, glomerulonephritis) -Cancers (myeloma) -Hematological disorders (sickle cell anemia, HUS)

LAB WORK		
ANATOMY		
	Surface anatomy of the urinary system and radiology	70. Identify the gross anatomic features the kidneys, renal pelvis, ureter, urinary bladder and urethra 71. Locate renal angle 72. Perform renal punch and its clinical significance 73. Develop Understanding of KUB 74. Identify different parts of urinary system on IVU
BIOCHEMISTRY		
	Titrable acidity of urine	Find out PH of urine

Theme-2 Edema and Urinary retention/ Scanty Urine		
S.No	Topic	Learning Outcomes
ANATOMY		
	18.Ureters	76. Describe the gross anatomy of ureters
		77. Describe the relations of right ureter in males and females
		78. Describe the relations of left ureter in males and females
		79. Highlight the clinical significance of relations of

		right and left ureters in both sexes
		80. Discuss constrictions in ureter and their clinical relevance.
	19.Urinary bladder	81. Describe the gross structure of urinary bladder 82. Discuss the Ligaments/supports.
		83. Discuss the blood supply and nerve supply of urinary bladder
		84. Discuss the relations of urinary bladder in males
		85. Discuss the relations of urinary bladder in females
	20.Prostate gland	86. Describe the structure of prostate gland 87. Describe Lobes, capsule, relations and structures within prostate.
		88. Discuss the common problems resulting from abnormal growth of the prostate. Relate the symptoms to structures
	21.Urethra	89. Describe the gross anatomy of urethra
		90. Enlist the differences between male and female urethra
EMBRYOLOGY		
	22.Development of the urinary system (Kidney and Ureter)	91. Enlist the stages of development of kidneys
		92. Describe the formation of pronephric, mesonephric and metanephric kidneys
		93. Enumerate the derivatives of metanephricblastema and describe their development
		94. Enumerate the derivatives of metanephric diverticulum/ureteric bud
		95. Describe the changes in position and blood supply of kidneys during development
		96. Enlist the various types of developmental anomalies of kidneys along with their embryological causes
		97. Enlist the various types of developmental anomalies of ureters along with their embryological causes
	23.(Bladder and urethra)	98. Describe the development of bladder 99. Discuss the developmental anomalies of bladder 100. Describe the development of male urethra 101. Describe the development of prostate and bulbourethral glands

		102. Describe the development of female urethra 103. Discuss the developmental anomalies of male and female urethra
	24. Prostate gland	104. Describe Embryological development of prostate gland
	25. Congenital anomalies of the urinary system	105. List and describe the common congenital anomalies of of bladder and urethra.
HISTOLOGY		
	26. Ureter	106. Describe the microscopic anatomy of ureter
	27. Bladder	107. Describe the histological features of urinary bladder
	28. Prostate	108. Describe the microscopic structure of prostate
	29. Urethra	109. Discuss the microscopic structure of male and female urethra
PHYSIOLOGY		
	30. Body fluid compartments	110. List the body fluid compartments 111. Recall the volumes of body fluid compartments 112. Discuss the interplay in fluid volumes between different fluid compartments 113. Describes principles of osmosis and osmotic pressure 114. Discuss the interplay between various pressures 115. Discuss principles of edema • Intracellular fluid compartment • Extracellular fluid compartment • Intravascular fluids • Blood • Plasma • Interstitial fluid • Constituents of intra- and extracellular fluid compartments • Calculating fluid volumes • Osmosis and osmotic fluid regulation
	31. Reabsorption /Secretion along Different Parts of the Nephron	116. List approximate percentages of sodium reabsorbed in major tubular segments. 117. List approximate percentages of water reabsorbed in major tubular segments. 118. Define the term *iso-osmotic volume* reabsorption. 119. Describe proximal tubule sodium reabsorption, including the functions of the apical

		membrane sodium entry mechanisms and the basolateral sodium-potassium-adenosine triphosphatase. 120. Explain why chloride reabsorption is coupled with sodium reabsorption, and lists the major pathways of proximal tubule chloride reabsorption. 121. State the maximum and minimum values of urine osmolality. 122. Define osmotic diuresis and water diuresis. 123. Explain why there is an obligatory water loss. 124. Describe the handling of sodium by the descending and ascending limbs, distal tubule, and collecting-duct system. 125. Describe the role of sodium-potassium-2 chloride symporters in the thick ascending limb. 126. Describe the handling of water by descending and ascending limbs, distal tubule, and collecting duct system
	32.mechanisms of regulation of tubular reabsorption	127. Discuss the mechanisms of regulation of tubular reabsorption •Reabsorption and secretion by the renal tubules •Active and passive transport mechanisms •Mechanism of reabsorption of specific substances (eg. •Water, electrolytes) •Reabsorption and secretion in different parts of the tubules •Glomerular balance •Peritubular and renal interstitial fluid physical forces •Effect of arterial pressure on urine output •Hormonal control of tubular reabsorption •Aldosterone •Angiotensin-II •ADH •Parathyroid hormone •Nervous regulation of tubular reabsorption
	33.Concept Of Renal Clearance	128. Define the terms clearance and metabolic clearance rate, and differentiates between general clearance and renal clearance. 129. List the information required for clearance calculation 130. State the criteria that must be met for a substance so that its clearance can be used as a measure of glomerular filtration rate; states which

		substances are used to measure glomerular filtration rate and effective renal plasma flow. 131. Predict whether a substance undergoes net reabsorption or net secretion by comparing its clearance with that of inulin or by comparing its rate of filtration with its rate of excretion. 132. Calculate net rate of reabsorption or secretion for any substance. 133. Calculate fractional excretion of any substance. 134. Describe how to estimate glomerular filtration rate from C_{Cr} and describes the limitations. 135. Describe how to use plasma concentrations of urea and creatinine as indicators of changes in glomerular filtration rate.
	34.Mechanism of diluted urine formation	136. Describe the process of "separating salt from water" and how this permits excretion of either concentrated or dilute urine. 137. Describe how antidiuretic hormone affects water reabsorption. 138. Describe the characteristics of the medullary osmotic gradient. 139. Explain the role of the thick ascending limb, urea recycling, and medullary blood flow in generating the medullary osmotic gradient. 140. State why the medullary osmotic gradient is partially "washed out" during a water diuresis 141. Describe the origin of antidiuretic hormone and the 2 major reflex controls of its secretion; define diabetes insipidus; state the effect of antidiuretic hormone on arterioles. 142. Distinguish between the reflex changes that occur when an individual has suffered iso-osmotic fluid loss because of diarrhoea as opposed to a pure water loss
	(ie, solute-water loss as opposed to purewater loss).	143. Describe the control of thirst. 144. Describe the pathways by which sodium and water excretion are altered in response to sweating, diarrhoea, haemorrhage, high-salt diet, and low-salt diet.
	35.Mechanism of concentrated urine	145. Discuss the mechanism of concentrated urine formation.

	formation	
	36. Renal regulation of Potassium	146. State the normal balance and distribution of potassium within different body compartments, including cells and extracellular fluid. 147. Describe how potassium moves between cells and the extracellular fluid, and how, on a short-term basis, the movement protects the extracellular fluid from large changes in potassium concentration. 148. Describe how plasma levels of potassium do not always reflect the status of total-body potassium. 149. State generalizations about renal potassium handling for persons on high- or low-potassium diets. 150. State the relative amounts of potassium reabsorbed by the proximal tubule and thick ascending limb of Henle's loop regardless of the state of potassium intake. 151. Describe how the cortical collecting duct can manifest net secretion or reabsorption; describes the role of principal cells and intercalated cells in these processes. 152. List the 3 inputs that control the rate of potassium secretion by the cortical collecting duct. 153. Describe the mechanism by which changes in potassium balance influence aldosterone secretion. 154. State the effects of most diuretic drugs and osmotic diuretics on potassium excretion. 155. Describe the association between perturbations in acid-base status and the plasma potassium level
	37.The prostate	156. Discuss the physiological functions of the prostate
	38.Physiochemical aspects	157. Discuss the physiochemical aspects (Diffusion, Adsorption, Viscosity, Colloid Osmotic pressure and role of Albumin in regulation of Osmotic pressure)
	39.Regulation of extracellular fluid osmolality and sodium concentration	158. Discuss the homeostatic function of the kidneys 159. Explain the mechanism by which kidneys are able to form diluted or concentrated urine 160. Describe Mechanism of formation of dilute urine

		161. Describe Mechanism of formation of concentrated urine 162. Describe requirements for excreting a concentrated urine 163. Describe the counter-current mechanism 164. Describe Role of distal tubules and collecting ducts 165. Describe Quantifying urine concentration and dilution 166. Describe Disorders of urine concentration ability
	40.Regulation of extracellular fluid osmolarity and sodium concentration-2	167. Discuss the homeostatic function of the kidneys 168. Discuss the principles of osmoregulation by the kidneys 169. Explain how the body regulated the osmolarity of fluid comparts 170. Describe Control of extracellular fluid osmolarity and sodium concentration 171. Describe Osmoreceptor-ADH feedback system 172. Describe Role of thirst in controlling extracellular fluid osmolarity and concentration 173. Describe Salt-appetite mechanism and Integrated response to sodium intake
	41.Regulation of concentration of potassium, calcium, phosphate and magnesium	174. Discuss the mechanisms of regulation of concentrations of various ions in the body 175. Describe the processes occurring at cellular level to maintain/excrete various ions in the kidneys -Regulation of potassium --Regulation of calcium -Regulation of phosphate -Regulation of magnesium
	42.Short and Long term control of Blood pressure by Kidneys	176. Describe the 3 temporal domains of blood pressure control and the major mechanisms associated with them. 177. Describe the relationship between renin and angiotensin II. 178. Describe the 3 detectors that can alter renin secretion. 179. Define pressure natriuresis and diuresis.

		180. Define tubuloglomerular feedback and describe the mechanism for tubuloglomerular feedback and auto regulation of glomerular filtration rate
BIOCHEMISTRY		
	43.Renal control of Calcium & Phosphorus	181. State the normal total plasma calcium concentration and the fraction that is free.
		182. Describe the distribution of calcium between bone and extracellular fluid and the role of bone in regulating extracellular calcium.
		183. Describe and compare osteocytes osteolysis and bone remodelling.
		184. Describe renal handling of phosphate.
		185. Describe how parathyroid hormone changes renal phosphate excretion.
	44.constituents of urine	186. Describe the normal and abnormal constituents of urine
GENERAL SURGERY/UROLOGY		
	45.Urinary retention	187. Describe the etiology, and management of urinary retention
		188. Describe the etiology, clinical features and treatment of Benign prostatic hyperplasia
PATHOLOGY		
	46.Renal failure	189. Enlist the causes of Renal failure/ uraemia and abnormalities related to micturition including incontinence 190. Discuss the causes and pathophysiology of Chronic Renal failure
	47.Urinary stones	191. Describe the pathophysiology of Urinary stones
	48.Glomerular diseases	192. Describe the etiology and pathogenesis of glomerulonephritis
	49.Classification of kidney disorders	193. Classify kidney disorders according to etiology, site of dysfunction and type of dysfunction - Acute/ chronic
		-Infectious -Immunological -Neoplastic -Vascular/interstitial /parenchymal - Primary/systemic

	50.Nephrotic syndrome	194. Describe Nephrotic syndrome and its etiology
PHARMACOLOGY		
	51.Nephrotoxic drugs	195. Describe the mechanism of drug excretion
		196. Enlist nephrotoxic drugs
		197. Describe the mechanism of action of diuretic drugs
	52.Drugs acting on the renal system (in NW module it's in theme of Scanty Urine)	198. Classify diuretics
COMMUNITY MEDICINE/PUBLIC HEALTH		
	53.Quality of life in problems of prostate	199. Discuss quality of life issues in patients with prostate problems 200. Overview of the concept of quality of life (QoL) 201. Discuss the significance of quality of life in disease and treatment settings 202. Discuss quality of life issues in geriatric population
LAB WORK		
PHYSIOLOGY		
	54.Intake output chart maintenance in bed ridden patients	203. Maintain Intake output chart maintenance in bed ridden patients
	55.Catheter insertion	204. Preform insertion of catheter on dummy
BIOCHEMISTRY		
	56.Urine analysis	205. Determine the normal/abnormal constituents in the urine -Urine sugar -Amino acids - Proteins -Hemoglobin -Uric acid -Urea -Creatinine and chloride

		-Calcium and phosphate -Ammonia -Ketone bodies -Benzidine test for blood in urine

Theme-3 Urinary incontinence		
SNo	**Topic**	**Learning Outcomes**
ANATOMY		
	57.The Perineum	206. Define the pelvis and the perineum Discuss the openings in the pelvis and what passes through them 207. List and describe the contents of the urogenital triangle -Contents of the male urogenital triangle -Urethral injuries 208. Injury to the perineum in childhood
PHYSIOLOGY		
	58.Urinary bladder and micturition	209. Describe the functional anatomy of urinary bladder 210. Explain the mechanism of micturition 211. Explain the micturition reflex and relate structures of the bladder with function 212. Explain basal cystometrogram 213. Describe the nervous control of bladder functions
	59.Urinary incontinence	214. Discuss the causes, symptoms and management of patients with urinary incontinence, urgency, frequency, burning micturition etc 215. Causes of urinary incontinence, urgency, frequency, burning micturition 216. Terms related to urinary obstruction and incontinence 217. Describe Clinical presentation of continence disorders Explain General management of incontinence
BIOCHEMISTRY		
	60.Water balance/metabolism	219. Mechanism & regulation of Water balance 220. Disorders of water balance, such as

		dehydration & over hydration 221. Electrolytes (intracellular & extracellular cations) & its metabolism 222. Disorders of electrolyte metabolism
RADIOLOGY		
	Radiological diagnosis of urinary pathologies	223. Identify and describe the various anatomic landmarks of the renal system on radiographs 224. Discuss special radiological tests to determine renal function and pathologies 225. Describe normal radiographs of abdomen and pelvis 226. Describe special radiological tests to show renal pathology and function 227. Abdominal ultrasound
CLINICAL (NEPHROLOGY/ MEDICINE)		
	Dialysis	228. Describe the types, indications and the process of dialysis for kidney disease 229. Describe Types of dialysis -Peritoneal dialysis -Hemodialysis -Hemofiltration -Haemodiafiltration -Intestinal dialysis -indications for dialysis 230. Discuss disorders of acid-base balance, electrolyte abnormalities uremia or fluid overload resulting from acute and chronic renal failure, and intoxication 231. Describe The process of hemodialysis and peritoneal dialysis 232. Describe Dialyzable substances
	Patient with excessive urination	233. Discuss the disorders associated with urine concentrating ability 234. Plan a line of investigation and management in renal disorders
		Disorders of renal concentration ability Comparison of excessive urine volume with increased frequency of micturition Describe the mechanism of secretion and action of ADH

		Describe Urine concentrating ability of the various parts of the nephron Proximal convoluted tubule o Descending limb of loop of Henle o Ascending limb of loop of Henle Collecting system
	Patient with continuous dribbling of urine	Discuss the causes of urinary incontinence Discuss the significance of radiological investigations in cases of urinary incontinence in children Define and describe Enuresis, its causes and treatment Describe Causes of urinary incontinence Describe the micturition reflex Discuss Tests for investigating urinary incontinence
PATHOLOGY		
	Common pathologies of perineal region	List and define the common pathologies of the perineal region Describe Urethral infection
Lab Work		
ANATOMY		
	Surface anatomy of the perineum and radiology	247. Identification of the various structures forming the perineum on models 248. Identify the radiographic landmarks of the perineum
	Histologic examination urinary system	Identify the characteristic microscopic features of the urinary system -Kidney -Ureter -Urinary bladder -Urethra
BIOCHEMISTRY		
	Creatinine in urine	Estimation of creatinine in 24 hour urine sample
PHYSIOLOGY		
	Arterial blood-gas analysis	Arterial blood sampling Analysis and interpretation of arterial blood gases

OSPE Blueprint Block E

SUBJECT	GIT	RENAL	VIVA STATIONS	TOTAL STATIONS
Anatomy	4	3	2	9
Histology				
Embryology				
Physiology	0	1	2	3
Biochemistry	3	1	2	6
TOTAL	7	5	6	18

PAPER Blueprint

Subject	GIT	Renal	Total
Anatomy	16	7	23
Embryology	4	3	7
Histology	9	4	13
Physiology	15	14	29
Biochemistry	22	8	30
PRIME	3	2	5
Pathology	3	1	4
Pharmacology	1	1	2
Community Medicine	1	0	1
Forensic Medicine	1	0	1
Medicine	1	1	2
Surgery	2	1	3
TOTAL	78	42	**120**

Block F

2nd Year MBBS Block F:

Endocrine Module

TOTAL WEEKS-4

S.No	Themes	Duration in weeks
1	Tall stature	1 week
2	Neck swelling with bulging eyes / tetany	1 week
3	Increased thirst and urination	1 week
4	Moon face	3 days

General Learning objectives

At the end of this module, the 2nd year students will be able to:

Knowledge

1) Development, structure, hormones and regulation of pituitary gland, thyroid gland, parathyroid gland, endocrine pancreas, and adrenal glands
2) Describe the etiology, pathophysiology, relevant clinical features and common investigations of disorders of these glands

Skills

3) Describe the steps of writing a research proposal

Attitude

4) Describe the basic concepts and components of medical professionalism

2nd Year MBBS Block F: Endocrine Module **Specific Learning Outcomes**		
Theme-1 (Tall stature)		
S.No	Topic	Learning outcomes
EMBRYOLOGY		
	Pituitary gland	Describe the development of Anterior and posterior pituitary gland
HISTOLOGY		
	Pituitary gland	Enlist the histological differences between anterior and posterior pituitary glands
PHYSIOLOGY		
	Introduction to endocrinology	Describe the chemical messengers in the body
		Describe the classification of hormones
		Describe mechanisms of synthesis of hormones
		Describe mechanisms of hormone Secretion, Transport and Clearance from the Blood
	Mechanisms of Action of Hormones	Explain mechanisms of Action of Hormones
		Describe second messenger mechanisms for mediating intracellular hormonal functions
		Describe measurement of Hormone Concentrations in the Blood
	Pituitary gland Physiological anatomy and its control	Describe physiological anatomy of pituitary gland
		Describe hypothalamus Control of Pituitary Secretion

	Physiological Functions of Growth Hormone	Describe Growth hormone's effect on growth and metabolism
		Explain the structure, mechanism of action and physiological effects of Insulin-Like Growth Factors
		Describe regulation of Growth Hormone
	Physiological Functions of Posterior Pituitary hormones	Describe formation and physiological functions of Oxytocin
		Describe formation and physiological functions of ADH
BIOCHEMISTRY		
	Hormones Introduction	Define hormones and differentiate between the terms-endocrine, paracrine & autocrine
		Classify hormones on various basis
		Discuss the mechanisms of action of hormones
		Define 2nd messengers and their roles
	Anterior Pituitary hormones	Enumerate the hormones of anterior pituitary gland
		Describe the chemistry, secretion, mechanism of action, regulation and metabolic effects of Growth hormone with its related clinical disorders
	Posterior Pituitary hormones	Enumerate the hormones of the posterior pituitary gland
		Describe the chemistry, secretion, mechanism of action, regulation and metabolic effects of the hormones of the posterior pituitary gland with its related clinical disorders
MEDICINE		
	Acromegaly	Describe the pathophysiology, clinical features and investigations of patient with Acromegaly and Gigantism
		Describe the etiology, clinical features and investigations of a patient with diabetes insipidus
NEUROSURGERY		
	Tumors of pituitary gland	Explain the types, clinical features, CT and MRI findings and management of pituitary tumors

PEDIATRICS		
	Growth charts	Describe the fundamentals of growth charts in pediatric practices

Theme-2 (Neck swelling with bulging eyes and Tetany)		
ANATOMY		
	Thyroid gland	Describe the gross structure, lobes, relations, bold supply, venous drainage, nerve supply and lymphatic drainage of thyroid gland
EMBRYOLOGY		
	Thyroid gland	Describe the developmental events and anomalies of thyroid gland
	Parathyroid gland	Describe the developmental events of parathyroid gland and its anomalies
HISTOLOGY		
	Thyroid gland	Describe the microscopic structure of thyroid gland
PHYSIOLOGY		
	Introduction of thyroid hormones	Describe formation, Secretion and transport of thyroid hormones
		Explain mechanism of action of thyroid hormones
		Explain the actions of thyroid hormones on cellular metabolism
	Physiological functions &regulation of thyroid hormone	Describe Physiological effects of Thyroid Hormone on Growth, metabolism and body systems
		Describe Regulation of Thyroid Hormone Secretion
	Physiological functions and Control of the Parathyroid hormone	Explain Mechanism of action PTH

		Describe Effect of Parathyroid Hormone on Calcium and Phosphate concentrations
		Describe Control of Parathyroid Secretion
	Physiological role of VIT D and Calcitonin in Calcium metabolism	Explain Role of Vit. D in Calcium and phosphorus metabolism
		Explain physiological functions of calcitonin
BIOCHEMISTRY		
	Thyroid gland	Enumerate the hormones secreted from thyroid gland
		Describe the chemistry, biosynthesis, secretion, mechanism of action, regulation and metabolic effects of thyroid hormone and calcitonin with its related clinical disorders
	Parathyroid gland	Enumerate the hormones secreted from parathyroid gland
		Describe the chemistry, biosynthesis, secretion, mechanism of action, regulation and metabolic effects of parathyroid hormone with its related clinical disorders
MEDICINE		
	Thyroid disorders	Explain the clinical features of hyperthyroidism
		Explain the clinical features of hypothyroidism
PHARMACOLOGY		
	Antithyroid drugs	Describe the types and mechanism of action of Antithyroid drugs
COMMUNITY MEDICINE		
	Diabetes mellitus	Describe the epidemiology, risk factors and prevention of Diabetes Mellitus

Theme-3 (Increased thirst and urination)		
HISTOLOGY		
	Pancreas	Describe the histological features of pancreas and differentiate between exocrine and endocrine parts of pancreas
PHYSIOLOGY		
	Mechanism of action of insulin &its control	Explain Mechanism of action of insulin
		Describe the Control of Insulin Secretion
	Physiological Effects of insulin on carbohydrates, protein, and Fats	Describe the effects of insulin on carbohydrates, proteins and Fats metabolism
	Physiology of Glucagon	Describe regulation of glucagon and its effects
		Describe the physiological actions of Somatostatins
	Physiological effects of Diabetes Mellitus	Describe Effects of hyperglycaemia /hypoglycaemia on body functions
		Explain Insulin resistance
BIOCHEMISTRY		
	Pancreas	Enumerate the hormones secreted by pancreas
		Describe the chemistry, biosynthesis, secretion, mechanism of action, regulation and metabolic effects of Insulin & Glucagon with its related clinical disorders
PHARMACOLOGY		
	Antidiabetic drugs	Explain the mechanism of action of oral antidiabetic drugs
		Explain the mechanism of action and complications of Insulin therapy
MEDICINE		
	Diabetes Mellitus	Explain the short-term and long-term complications of Diabetes Mellitus
		Describe the pathophysiology, clinical features and treatment of Diabetes Mellitus

Theme-4 (Moon face)		
S.No	**Topic**	**Learning Outcomes**
ANATOMY		
	Adrenal gland	Describe the gross anatomy and relations of adrenal glands on both sides
EMBRYOLOGY		
	Adrenal gland	Describe the development of adrenal gland
HISTOLOGY		
	Adrenal gland	Describe the microscopic picture of adrenal gland and differentiate between the various histological zones of adrenal gland
PHYSIOLOGY		
	Physiological functions of Aldosterone	Describe Types, Mechanisms and regulation of mineralocorticoids
		Describe the physiological Effects of Aldosterone (Renal, Circulatory and others)
	Physiological Functions of the Glucocorticoids	Describe Types and Mechanisms of Glucocorticoids actions
		Describe Effects of Cortisol on Carbohydrate, Proteins and Fat Metabolism
		Describe role of Cortisol in Stress, Inflammation and Allergy
	Physiological functions Adrenocorticotropic Hormone ACTH	Describe ACTH Secretion & mechanism of Action
BIOCHEMISTRY		
	Adrenal cortical hormones	Enumerate the hormones secreted from adrenal cortex
		Describe biosynthesis, secretion, mechanism of action, regulation and metabolic effects of Adrenal cortical hormones with its related clinical disorders

	Adrenal medullary hormones	Enumerate the hormones secreted from adrenal medulla
		Describe biosynthesis, secretion, mechanism of action, regulation and metabolic effects of Adrenal medullary hormones with its related clinical disorders
		Describe the structure and functions of Melanocyte-Stimulating Hormone, Lipotropin, and Endorphins
MEDICINE		
	Cushing`s syndrome	Describe the clinical features and complications of Cushing`s syndrome
	Addison`s disease	Describe the clinical features and complications of Addison`s disease
LAB WORK		
BIOCHEMISTRY		
	Urinary glucose	Detect glucose in urine
	Blood glucose	Detect glucose in blood
	Glucose tolerance test	Perform and interpret Glucose tolerance test
HISTOLOGY		
	Pituitary glands	Identify the structure of pituitary gland under microscope
	Thyroid gland	Identify the structure of thyroid gland under microscope
	Adrenal gland	Identify the structure of adrenal gland under microscope

2nd Year MBBS Block F:

Reproduction Module

S. No	Themes	Weeks
1	Pregnancy and child birth	02
2	Infertility	01

General learning outcomes

Knowledge

1) Describe the development, structure and functions of bony pelvis, uterus, ovaries and perineum
2) Describe the development, structure and functions of mammary glands
3) Explain the contents and mechanism of formation of milk
4) Describe the development, structure and functions of male genital organs
5) Explain the synthesis, mechanism of action, physiological effects and regulation of sex hormones in males and females and hormones released from placenta
6) Describe the physiology of gestation and parturition

Skills

7) Describe basic statistical tests and their significance

Attitude

8) Describe the concept of empathy as part of professionalism
9) Explain the steps of research evaluation, its validity and reliability

2nd Year MBBS Block F: Reproduction Module **Specific Learning Outcomes**		
Theme-1 (Pregnancy and child birth)		
S.No	**Topic**	**Learning Outcomes**
ANATOMY		
	Bony pelvis Uterus	Describe the general features of bony pelvis
		Differentiate between male and female pelvis
		Classify the differences between true and false pelvis
		Describe the gross structure, location and relations of uterus
		Describe the blood supply of uterus
		describe the boundaries of pouch of Douglas/recto-uterine pouch and its clinical significance
		Describe the gross structure, location and relations of Fallopian tubes
		Describe the blood supply of Fallopian tubes
		Enlist various support mechanisms of uterus
		Describe the formation and components of broad ligament
		Discuss the clinical correlates of uterus and fallopian tubes
	Ovary	Describe the gross structure, location and relations of ovaries.
		Describe the blood supply of ovaries
		Name ligaments supporting the ovaries
	Pelvic floor	Describe the general features of sacrum
		Describe the special features of sacrum
		Name the muscles making the pelvic floor
		Describe their origin, insertion, nerve supply and actions of muscles of pelvic floor
		Describe the boundaries and contents of superficial perineal pouch
		Describe deep perineal pouch
		List the boundaries and contents of ischio-rectal (anal) fossa
		Give the clinical significance of ischi-orectal fossa
EMBRYOLOGY		
	Uterus	Describe the development of uterus
		Enlist the various developmental Anomalies of uterus
		Describe the remnants of mesonephric and

		Parmesonephric ducts in females
	Ovaries	Describe the development of ovaries
	Mammary gland	Describe the development of mammary gland
		Enlist various developmental anomalies of mammary gland along with embryological reasons
HISTOLOGY		
	Uterus	Describe the microscopic structure of uterus
		Discuss the microscopic features of endometrium in different phases of menstrual cycle
	Ovary	Describe the microscopic structure of ovary
		Elaborate the different stages of ovarian follicle
	Mammary gland	Describe the microscopic features of inactive mammary gland
		Describe the microscopic features of mammary gland during pregnancy and lactation
PHYSIOLOGY		
	Overview of Reproductive System	Describe the spermatogenesis
		Explain the function of prostate gland
		Describe the composition of semen
	Functions of Testosterone	Relate the functions of testosterone with its secretion and metabolism
		Describe the intracellular mechanism of action of testosterone
		Relate the control of secretion of testosterone with its congenital and acquired abnormalities
	Hormonal cyclical changes of Female reproductive system	Describe the monthly ovarian cycle
		Describe the effects of gonadotropic hormones on the ovaries.
		Describe the functions of estrogens
		Describe the functions of progesterone
		Explain monthly endometrial cycle
		Describe the role of hypothalamic and Pituitary ovarian system in controlling the female hormones
		Define puberty, menarche and menopause.
		Enumerate the changes produced in puberty
	Physiological changes in Pregnancy	Describe the transport of fertilization ovum in the fallopian in the uterus.

		Explain the effects of HCG in causing persistence in pregnancy
		Describe the secretion of estrogen and progesterone by placenta
		Describe the functions of HCS
		Describe the maternal changes in pregnancy
		Describe the changes in maternal circulatory system during pregnancy.
		Describe the development of breast during pregnancy
	Parturition	Explain the process of parturition and involution of the uterus after parturition
	Milk production	Explain the functions of prolactin
		Describe the ejection or "let down" of milk.
		Explain the composition of milk
	Problems of prematurity	Describe Growth and Functional Development of the Fetus
		Describe adjustments of the newborn to Extra Uterine Life
		Discuss Special Functional Problems in the Neonates
		Discuss Special Problems of Prematurity
FORENSIC MEDICINE		
	Abortion	Define abortion
		Describe the type of abortion
		Discuss criminal abortion and its complications
		Explain the findings of abortion in victims
		Describe the indications of therapeutic abortion
	Diagnosis and medicolegal aspects of pregnancy	Describe the steps of diagnosis of pregnancy
		Explain the medicolegal aspects of pregnancy
COMMUNITY MEDICINE		
	Safe motherhood and its components	Describe the steps of antenatal and postnatal care, family planning and emergency obstetric care
	Maternal mortality	Describe the causes, impact and prevention of maternal mortality in Pakistan
	Breast feeding	Explain the importance of breast feeding
GENERAL SURGERY		
	Carcinoma of breast	Describe the etiology, pathological types and clinical presentation of carcinoma of breast

Theme-2: Infertility		
SNo	Topic	**Learning Outcomes**
ANATOMY		
	Scrotum, Testes and male genitalia	Describe the anatomy of scrotum
		Discuss the gross anatomy of testes
		Describe the coverings and contents of spermatic cord
		Describe epididymis, ductus deferens and seminal vesicles
		Describe the clinical correlates of male genital system
	Female external genitalia and vaginal canal	Give the gross Anatomy of female external genitalia and vagina
EMBRYOLOGY		
	Genitalia	Describe the development of external genitalia in males
		Describe the development of external genitalia in females
		Discuss the developmental anomalies of male and female genitalia
	Gonads and genital ducts	Describe the development of testis
		Name the factors responsible for decent of testis
		Discuss the decent of testis
		Describe the developmental anomalies of testes
		Discuss the development of epididymis, vas deferens and seminal vesical
		Describe the development of vagina
		describe the remnants of mesonephric and paramesonephric ducts in males
HISTOLOGY		
	Testes	Discuss general microscopic structure of testes
		Discuss seminiferous tubules
		Discuss different cells of seminiferous epithelium
		Define blood testes barrier
	Male genital ducts	Describe the microscopic structure of epididymis, ductus deferens and seminal vesicle
	Fallopian tube	Describe the microscopic structure of fallopian tube
PHYSIOLOGY		
	Male sex hormones	Describe the structure, secretion, mechanism of action, physiological actions and regulation of

		Testosterone
		Describe the hormonal changes occurring in puberty in males and females
	Female sex hormones	Describe the structure, secretion, mechanism of action, physiological actions and regulation of Estrogen and Progesterone
		Describe the mechanism of Ovulation
BIOCHEMISTRY		
	Sex Hormones • Testosterone • Estrogen • Progesterone	Discuss the chemistry of these hormones
		Describe the synthesis of these hormones
		Discuss the enzyme deficiencies and their manifestations
		Describe the diagnostic role of 17-ketosteroids' excretion in urine
		Describe the mechanism of action of these hormones and their receptors
		Describe the classical and non-classical target organs of these hormones
		Describe the metabolic functions of these hormones
		Describe the regulation of these hormones especially by FSH & LH
		Discuss the manifestations of deficiency and excess of these hormones
		Discuss the andropause and menopause
		Discuss the role of LHRH Agonists and antagonists as well as anti-androgens
		Discuss the role of 5a-Reductase Inhibitors
PHARMACOLOGY		
	Oral contraceptives	Describe the types, mechanism of action and physiological effects of Estrogens and Progesterone containing oral contraceptives
COMMUNITY MEDICINE		
	Sexually transmitted diseases	Describe the types of STDs
		Describe the guidelines for the prevention and management of STDs
GYNAECOLOGY		
	Female infertility	Describe the causes, and investigations of female infertility

GENERAL MEDICINE		
	Male infertility	Describe the etiology and investigations of male infertility
		Describe normal semen analysis
		Define oligo/azoospermia

LAB WORK		
PHYSIOLOGY		
	Pregnancy test	Perform pregnancy test
HISTOLOGY		
	Ovaries	Describe the microscopic structure of ovaries under microscope
	Fallopian tubes	Describe the microscopic structure of fallopian tubes under microscope
	Uterus	Describe the microscopic structure of uterus under microscope
	Mammary glands	Describe the microscopic structure of mammary glands under microscope
	Testes and Epididymis	Describe the microscopic structure of Testes and Epididymis under microscope

KMU MBBS 2nd YEAR (ENDORCINE AND REPRODUCTION MODULES)

THEORY BLUEPRINT BLOCK F

	ENDOCRINE SYSTEM	REPRODUCTION	BLOCK TOTAL MCQs
GROSS ANATOMY	1	12	13
EMBRYO	2	7	9
HISTO	5	6	11
PHYSIOLOGY	34	14	48
BIOCHEMISTRY	20	6	26
PRIME	3	0	3
MEDICINE	4	0	4
PHARMACOLOGY	2	0	2
COMMUNITY MEDICINE	1	2	3
FORENSIC MED	0	1	1
	72	48	120

OSPE BLUEPRINT BLOCK F

Subject	Endocrine module	Viva stations	Reproduction module	Viva stations	Total OSPE stations
Gross Anatomy	0	1	2	1	10
Histology	3		3		
Embryology	0		0		
Physiology	0	1	1	1	3
Biochemistry	3	1	0	1	5
Total	6	3	6	3	12 + 6 (viva) =18

3rd Year MBBS

THIRD YEAR BLOCK G: FOUNDATION II MODULE

S.No	Themes	Duration
1	Molecules, bacteria and cell injury	3 weeks
2	Ageing and death	2 weeks

General Learning Objectives

By the end of Foundation-2 Module, 3rd year MBBS students will be able to:

Knowledge:

1) Define pathology, its different branches and enumerate clinically important bacteria.
2) Describe the structure of bacterial cell and mechanisms by which they cause the disease.
3) Describe methods used to identify different microbes in laboratory and explain the interventions employed to prevent infections including vaccines.
4) Describe cell injury, its different mechanisms and sub cellular responses to cell injury.
5) Describe necrosis, apoptosis and adaptive changes seen in clinical settings and its identification in surgical specimens.
6) Define common terms related to Pharmacology.
7) Describe the basic principles of pharmacokinetics and pharmacodynamics and apply these principles to clinical practice as they relate to drug absorption, distribution, metabolism, excretion, mechanism of action, clinical action and toxicity.
8) Describe the cellular and biochemical sites where drugs bind to act.
9) Describe the general principles of drug interactions in relation to clinical practice.
10) Describe the process of new drug development.
11) Identify different dosage forms of drugs.
12) Demonstrate searching accurate information quickly in a formulary.
13) Demonstrate administration of a drug through intramuscular and intravenous routes.
14) Write down the basic format of drug prescription and describe the general principles of prescribing drugs.
15) Write correctly medical abbreviations used in clinical practice.

16) Identify commonly used equipments in pharmacy.
17) Describe Forensic medicine, its different branches and importance.
18) Describe law and its various components.
19) Explain medicolegal system and legal procedure for a doctor.
20) Describe the contents of medical jurisprudence.
21) Describe the diagnosis of death and WHO death certificate.
22) Describe different refractive errors and its management.
23) Explain causes of watery eyes in both infants and elders and its management.
24) Describe the basic concept of health, disease and primary health care.

Skills:

25) Demonstrate different pathological laboratory procedures and identify gross and microscopic features in the given specimens.

Attitude:

26) Demonstrate professionalism, respect, honesty and compassion by behaving in a courteous manner with colleagues and teachers during course activities like long lectures, SGDs and Practicals.
27) Describe the PMC code of Ethics
28) Describe the steps of process of developing a research protocol

Foundation-II Module 3rd Year MBBS

By the end of this module the students of first year MBBS should be able to:

Theme-1 (Molecules and Bacteria)

S.No	Topic	Learning Outcomes
PHARMACOLOGY		

	Introduction to the subject	Define basic terms like Pharmacology, Clinical Pharmacology, Therapeutics, drug, medicine, pro-drugs, prototype drugs, Materia medica, pharmacopoeia, formulary, national formulary, poisons, toxins, pharmacokinetics, pharmacodynamics, excipient, compounding and dispensing.
		Describe the branches of Pharmacology like Pharmacy, Pharmacognosy, pharmacogenetics, pharmacogenomics, toxicology and posology.
		Define prescription drugs, OTC drugs, WHO essential drugs and Orphan drugs with examples.
	Nomenclature of drugs	Describe how drugs are named, i.e. chemical, generic, approved, official and trade names of drugs with examples.
	Sources of drugs	Enlist various sources of drugs.
		Give examples of drugs obtained from plants, animals, mineral and synthetic sources.
		Describe the genetic engineering source of drugs with examples.
	Active principles of crude drugs	Enlist important principles of crude drugs with examples.
	Routes of drug administration	Enlist various routes of drug administration.
		Describe the merits and demerits of oral, sublingual, rectal, intramuscular, subcutaneous, intravenous, intra-arterial, inhalational, spinal, topical and transdermal routes of drug administration.
		Give examples of drugs given through oral, sublingual, rectal, intramuscular, subcutaneous, intradermal, intravenous, intra-arterial, inhalational, spinal, topical and transdermal routes of drug administration.
		Describe the difference between topical and transdermal routes of drug administration.

		Describe the difference between subcutaneous and intradermal routes of drug administration.
	Absorption of drugs	Define drug absorption.
		Describe various mechanisms of drug absorption like simple diffusion, facilitated diffusion, active transport, ion-pair transport, endocytosis and filtration with examples.
		Describe the concept of ionization of drug molecules and clinical significance of ion trapping.
		Describe factors affecting drug absorption.
	Bioavailability and Bioequivalence	Define bioavailability, bioequivalence and pharmaceutical equivalence.
		Explain Time-Concentration curve.
		Describe AUC (Area Under the Curve).
		Describe the factors affecting bioavailability.
	Hepatic firstpass effect (Pre-systemic elimination)	Describe hepatic first-pass effect (Pre-systemic elimination) and its clinical significance.
	Enterohepatic circulation	Define enterohepatic circulation.
		Describe enterohepatic circulation with examples and its clinical significance.
	Distribution of drugs	Define distribution of drugs.
		Define redistribution of drugs with example.

		Describe plasma protein binding and its clinical significance in diseased conditions.
		Describe factors affecting drug distribution.
	Volume of distribution	Define volume of distribution.
		Enlist drugs with small volume of distribution.
		Enlist drugs with large volume of distribution.
		Apply formula for calculating volume of distribution.
		Describe volume of distribution with reference to its clinical significance.
	Loading dose	Define loading dose of a drug.
		Enlist some drugs whereby loading dose is administered.
		Apply formula for calculating loading dose.
	Physiological barriers to transport of drugs	Enlist important physiological barriers to transport of drugs.
		Describe important physiological barriers to transport of drugs like bloodbrain barrier and placental barrier with reference to their clinical significance.
	Biotransformation (metabolism) of drugs	Define biotransformation.

		Define xenobiotics.
		Describe the objectives of biotransformation and fate of drugs after biotransformation.
		Name major sites of biotransformation.
		Describe major drug metabolizing enzymes i.e. microsomal (P450) and non-microsomal enzymes.
		Describe the phases and reactions of biotransformation.
		Describe the factors affecting drug biotransformation.
	Genetic influence on biotransformation of drugs	Define pharmacogenetics and pharmacogenomics.
		Define idiosyncrasy with examples.
		Describe the genetic factors influencing biotransformation of drugs with examples.
	Enzyme induction	Define enzyme induction.
		Enlist enzyme inducers.
		Describe enzyme induction and its clinical significance.
	Enzyme inhibition	Define enzyme inhibition.
		Enlist enzyme inhibitors.

		Describe enzyme inhibition and its clinical significance.
		Describe suicide inhibition (mechanism-based inhibition) with examples of drugs.
	Excretion of drugs and drug clearance	Define drug excretion and drug clearance.
		Enlist major and minor routes of drug excretion.
		Differentiate between excretion, elimination and clearance.
		Apply the formula for calculating drug clearance.
	Maintenance dose	Define maintenance dose of a drug.
		Apply the formula for calculating the maintenance dose.
		Apply Young's formula, Dilling's formula and Clark's formula for calculating doses of drugs.
	Plasma half life	Define plasma half-life.
		Enlist drugs with short half-life.
		Enlist drugs with long half-life.
		Apply the formula for calculating plasma half life.
		Explain the clinical significance of half life.

	Steady-state concentration of drugs	Define steady-state concentration of drugs.
		Describe the time to reach steady-state concentration of drugs.
		Describes the importance of steady-state concentration in clinical practice.
	First- and zero-order kinetics	Define first- and zero-order kinetics.
		Differentiate between first- and zero-order kinetics with examples.
		Explain the clinical significance of first- and zero-order kinetics
		Define bioassay and standardization.
	Bioassay and standardization	Describe the relative importance of bioassay compared with physical or chemical assays.
		Describe the most common type of bioassay, i.e. three-point assay.
	Pharmacodynamics	Define pharmacodynamics.
		Define agonist, antagonist, partial agonist and inverse agonist with examples.
		Describe receptors.
		Define orphan receptors, serpentine receptors and spare receptors.
		Describe the biochemical and cellular sites of drug targets.

		Describe intracellular Second-messenger system and enlist some important Second-messengers.
		Describe up regulation and down regulation of receptors with examples.
		Define drug selectivity and specificity.
	Dose-response curves (Graded and Quantal)	Define dose response curve, graded dose-response curve and quantal doseresponse curve.
		Describe graded dose-response curve and quantal dose-response curve.
		Describe the limitations of graded dose-response curve and its remedy in a quantal dose-response curve.
		Describe the significance of constructing dose-response curves.
		Explain the advantages of taking log dose values on the dose axis.
	Therapeutic index	Define therapeutic index.
		Describe therapeutic index with reference to its clinical importance.
		Apply formula for calculating therapeutic index
		Define median lethal dose, median toxic dose and median effective dose.
		Enlist some drugs with narrow therapeutic index.
		Enlist some drugs with broad therapeutic index.
	Protective index	Define protective index.

		Differentiate between therapeutic index and protective index.
	Therapeutic window	Define therapeutic window.
		Describe therapeutic window with reference to its clinical importance.
	Potency and efficacy	Define potency and efficacy.
		Describe potency and efficacy with examples.
		Describe the clinical importance of efficacy compared to potency.
	Drug antagonism	Define drug antagonism.
		Enlist types of antagonism.
		Describe chemical, physiological (functional) and pharmacological (competitive/surmountable and non-competitive) antagonisms with examples.
	Drug interactions	Define drug interaction.
		Define drug incompatibilities with examples.
		Describe pharmacokinetic drug interactions with examples and its clinical significance.
		Describe pharmacodynamics drug interactions with examples and its clinical significance.
		Describe drug-food interactions and drug-disease interactions with examples.
		Define summation, synergism and potentiation with examples.

	Tolerance and Tachyphylaxis	Define Tolerance, cross tolerance, reverse tolerance (sensitization), innate tolerance, tachyphylaxis and drug resistance.
		Describe the mechanisms of development of tolerance and tachyphylaxis.
		Define drug holidays with example.
	Adverse drug reactions	Define adverse drug effect, secondary effect and intolerance to a drug.
		Classify adverse drug reactions.
		Describe dose-related adverse effects (side effects and toxic effects) with examples.
		Describe non-dose-related adverse effects (idiosyncrasy and drug allergy) with examples.
		Describe causes of adverse drug reactions.
		Enlist some drugs causing hepatotoxicity.
		Enlist some drugs causing renal toxicity.
		Enlist some cardio toxic drugs.
		Enlist some drugs causing adverse effects on reproduction.
	New drug development	Describe the processes involved in drug discovery and development.
		Define lead compound and drug screening.
		Describe pre-clinical and clinical studies.

		Define placebo, placebo response and nocebo response.
		Define no-effect dose and minimum lethal dose.
		Describe 04 phases of clinical trials.
		Define post-marketing surveillance.
		Define single-blind, double-blind, crossover and ADME studies.
		Describe the role of Food and Drug Administration (FDA) in the drug development process.
		Differentiate between IND (Investigational New Drug) and NDA (New Drug Application).
PATHOLOGY		
	Introduction to the subject	Define pathology, microbiology and list its major branches
		Describe essential characteristics of five major groups of microorganisms
		Differentiate between prokaryotes and eukaryotic cells based on their structure and complexity of their organization
	Introduction to cell	Define cell
		Describe structure of cell membrane
		Describe cell organelles
	Classification of Bacteria	Describe classification of bacteria based on oxygen requirement as aerobes and anaerobes with examples.

		Describe classification of bacteria based on staining characteristics, nature of cell wall, ability to grow in the presence of oxygen and ability to form spores.
	Structure of bacterial cell	Describe structure and function of each of various parts of the bacterial cell including cell wall, cytoplasmic membrane, Mesosome, ribosomes, granules and nucleoid
		Describe specialized structures outside the cell wall including capsule, flagella, pilli and glycocalyx
		List the differences between cell wall characteristics of Gram Positive and Gram Negative Bacteria
		Describe classification and important functions of plasmids.
		Describe functions and arrangement of transposons.
		Describe structure, functions and medical importance of bacterial spores with examples.
	Bacterial growth curve	Describe various phases of bacterial growth curve
	Normal Flora	Describe medically important members of normal flora and their anatomic location
	Bacterial genetics	Define mutation
		Describe the classification of various types of mutations and their common causes.
		Describe methods of transfer of DNA within bacterial cells including process of conjugation, transduction, recombination and transformation.
	Lab diagnosis of bacterial infections	Describe the bacteriologic approach to diagnosis of bacterial infections including blood, throat, stool, sputum, spinal fluid, urine, genital tract and wound cultures.
		Describe general principals of various immunologic and nucleic acid based methods for identification of an organism.

	Bacterial pathogenesis	Define the term pathogen, infection, virulence, communicable, endemic, epidemic and pandemic diseases, carrier, pathogens, opportunists, commensals and colonizers.
		Describe stages/determinants of bacterial pathogenesis.
		Describe colonization, invasion, toxins, immune-pathogenesis.
		Differentiate between exotoxins and endotoxins.
		Describe the various modes of action of endotoxins and endotoxins produced by gram positive and gram-negative bacteria.
		Describe the four stages of a typical infectious disease and Koch's postulates for establishing the causal role of an organism in the disease.
	Antibacterial Vaccines	Define immunization and vaccination.
		Describe role of immunization in inducing active and passive acquired immunity.
		Enlist the current bacterial vaccines and their indications.
		Describe various types of bacterial vaccines in terms of composition, preparation, indications, route of administration and common side effects.
FORENSIC MEDICINE		
	Introduction to the subject of Forensic Medicine	Describe forensic medicine and its various branches
		Describe pillars of forensic medicine
		Describe the various terminologies used in forensic medicine

	Introduction to medicolegal system	Discuss different prevailing medicolegal systems in the world
	Introduction to Law	Define law. Describe its various types.
	Legal proceedings	Describe court procedures for a doctor
	Chain of evidence	Describe evidence, its types and recording of evidence
	PPC and CrPC	Describe the relevant sections of Pakistan penal code and CrPC
	Medical jurisprudence	Describe the components of medical jurisprudence (consent, negligence, secrecy, professional misconduct and privileged communication)
		Describe code of medical ethics
		Describe the duties of a registered medical practitioner
ENT		
	Introduction to the subject	Describe common ENT symptoms.
		Name common diseases of ENT.
		Name recommended books that students must read.
OPHTHALMOLOGY		
	Introduction to the subject; Career in Ophthalmology	Define Ophthalmology and its branches

		Highlight the scope of field of Ophthalmology as a future career
	Refractory errors	Describe refractive error and its effect on vision.
		Describe the concept of myopia and its correction.
		Describe the concept of hypermetropia and its correction.
		Describe the concept of astigmatism & cylindrical lens.
		Describe the concept of presbyopia, its possible causes and correction.
		Describe aphakia and possible methods of its correction.
	Watery Eyes	Explain the structural details, development and functions of lacrimal system.
		Correlate the clinical presentation of watery eye with anatomical structures.
		Correlate the clinical features with a disease entity.
		Describe the causes, clinical features and treatment of congenital nasolacrimal duct obstruction.
		Assess the time of probing.
		Describe the causes, clinical presentation and treatment modalities.
		Differentiate between acute and chronic dacryocystitis.
COMMUNITY MEDICINE		
	Introduction to the subject	Define Community medicine and Public health

		Describe the role of teaching of public health in prevention of diseases
	Health system of Pakistan: Introduction	Define health care system of Pakistan using WHO Health system frame work
	Health and disease	Define community medicine, public health and preventive medicine.
		Discuss the history and philosophy of public health as well as its concepts and functions regionally & globally.
		Describe the stages in the natural history of a disease.
		Describe epidemiological triad, web of causation and multifactorial causation
		Describe the dimensions and determinants of health
		Describe the indicators of health and its characteristics
		Discuss the concept of disease control
		Discuss the different levels of prevention and their modes of interventions.
		Explain the natural history of disease.
		Describe the iceberg phenomenon
		Describe mode of intervention of diseases with emphasis on health education.
	Primary Health Care	Define Primary health care (PHC).
		Describe the elements of PHC, its principles and strategies for implementation of PHC.

		Describe Health for all by the year 2000.
		Enumerate the MDGS & SDGS related to health.
		Describe the history of development of PHC
		Describe comprehensive & selective PHC
		Describe reasons for failure of PHC
		Describe Health Systems before & after PHC
		Describe district health care system
		Enumerate indicators for assessing PHC
PRIME		
	Personal identity	Describe personal identity in the context of medical education
	Professional identity	Define professional identity and Describe the basic pre-requisites of professional identity formation
	Patient safety, clinical governance and quality improvement	Explain the concept of patient safety, clinical governance and quality improvement in primary healthcare
	Professionalism-Trust	Explain the dynamics of professionalism and trust in health professional patient relationship
		Adheres to principles of trust in day to day professional interactions
	Professional identity formation- Types	Define professional identity formation and explain the Students' roles in terms of professional identity

	and Multiple identities	
	Motivation	Explain motivational skills for team members for clinical tasks

Theme-II (Aging and Death)		
S.No	**Topics**	**Learning Outcomes**
PATHOLOGY		
	Cellular injury, cell death	Define the following terms: Pathology, disease, etiology, pathogenesis, morphology, cell injury and homeostasis.
		Describe the causes of cell injury from gross physical trauma to single gene defect.
		Describe the nature and severity of cell injury with cellular responses.
		Enumerate different classes of pathology.
		Describe the following basic mechanisms of cell injury: General Biochemical mechanisms, Ischemic and hypoxic injury, Ischemic/reperfusion injury, Free radical induced cell injury and chemical injury.
		Differentiate between reversible and irreversible cell injury.
		Describe the mechanism, morphological and biochemical changes and functional alterations in reversible and irreversible cell injury.
		Define phagocytosis, endocytosis, pinocytosis, autophagy and heterophagy.
		Describe the subcellular responses to injury including lysosomal catabolism, heterophagy and autophagy.
	Cellular adaptation	Describe types of cellular adaptations.
		Differentiate between physiologic and pathologic adaptation.
		Define hypertrophy, hyperplasia, atrophy and metaplasia.
		Describe the causes and mechanism of hypertrophy, hyperplasia, atrophy and metaplasia.
		Describe hypertrophy of the smooth endoplasmic reticulum with examples and mitochondrial alterations.
		Describe cytoskeletal abnormalities in pathological states with examples.
	Necrosis	Define necrosis.

		Describe types of necrosis with examples.
		Describe the mechanism and morphology of necrosis.
	Apoptosis	Define apoptosis.
		Describe physiological and pathological causes of apoptosis with examples.
		Describe morphology with alterations in cell structure.
		Describe the biochemical features of apoptosis altering the cell structure.
		Describe the intrinsic and extrinsic pathways of apoptosis.
		Differentiate between necrosis and apoptosis.
		Describe role of apoptosis in health and disease.
		Describe the mechanism and causes of cellular ageing including genetic & environmental factors, structural & biochemical changes.
		Describe adaptive changes in clinical settings.
	Steatosis	Describe causes and mechanism of steatosis.
		Explain the morphology and consequences of steatosis.
	Intracellular accumulations	Describe three general pathways for abnormal intracellular accumulations.
		Define steatosis.
		Describe causes, mechanism, morphology and consequences of lipid accumulation.
		Describe causes, mechanism, morphology, consequences of protein and glycogen accumulation
		Describe types of pigments
		Differentiate between endogenous and exogenous pigments.
	Pathologic calcification	Define Pathologic calcification
		Describe types, morphology and functional alterations of pathologic calcification with examples.
		Differentiate between dystrophic and metastatic calcification.
FORENSIC MEDICINE		
	Introduction to Thanatology	Define death and describe its phases.
		Describe criteria of diagnosis of death.
		Enlist the importance of diagnosis of death
	Death	Describe the medicolegal aspects of brain stem death and suspended animation
		Define cause, mode, manner and mechanism of death
		Enlist various methods of disposal of dead body

	Death certificate	Define cause of death
		Describe the WHO format of death certificate
OPHTHALMOLOGY		
	Cataracts	Define cataract
		Describe the types of cataracts
		Describe the pathogenesis and complications of cataracts
		Describe the management of cataracts
PRIME /RESEARCH		
	Research Protocol	Describe the steps of developing a research protocol
	Health system research	Define research and health system research.
		List types of research.
		Describe characteristics of health system research.
		Describe building blocks of health system.
		Discuss key areas of concern in health system.
		Discuss briefly research methodology.
		Define and categorize types of health research
	Purpose and process of health research	Explain the purpose of health research
FAMILY MEDICINE		
	History and current structure of general practice	Describe the historical perspectives of general practice
		Explain the structure of general practice nationally and internationally
	Models of healthcare	Describe the models of healthcare
	Essential health service package (levels of health services in KP)	Describe the levels of health services in the province of KP.
LAB WORK		
PHARMACOLOGY		
	Lab protocols;	Identify and name common apparatus used in pharmacy laboratory.

	Introduction to Pharmacy; Apparatus used in Pharmacy	
		Identify and label common apparatus used in the field of Pharmacy.
	Metrology & Medical abbreviations	Define metrology.
		Describe metric and imperial systems of measurements.
		Calculate the equivalency of metric system with imperial system.
		Describe the common medical abbreviations.
		Apply these abbreviations correctly in medical documentations.
	Dosage forms of drugs	Define dosage form.
		Enlist the types of dosage forms.
		Describe the characteristic properties of each dosage form.
		Identify dosage forms administered through different routes.
	Searching information in a formulary	Define formulary.
		Describe National Formulary.
		Demonstrate searching accurate information quickly in a formulary.
		Describe the general protocols for IM and IV injection of a drug.
	To demonstrate IM and IV injection of drugs on a dummy (manikin)	Demonstrate standard protocols during administration of a drug through Intramuscular route.
		Demonstrate standard protocols during administration of an IV drug through Intravenous route.
	Prescription writing	Define a medical prescription.
		Describe the components of a prescription.
		Describe how to reduce medication errors.
		Define compliance to the prescribed treatment.
		Write down the basic format of drug prescription.

PATHOLOGY		
	Biosafety procedures/ Precautions in Microbiology Lab	Define sterilization and disinfection.
		Demonstrate steps of hand washing.
		Enlist various physical and chemical methods of sterilization and disinfection.
		Define biosafety and biosecurity.
	Tissue processing	Describe steps involved in tissue processing.
		Identify various tools/instruments involved in tissue processing and their indications.
		Demonstrate slide focusing.
	Gram staining	Describe principal and significance of Gram staining.
		Enlist steps of Gram staining.
		Demonstrate Gram staining procedure.
		Identify Gram positive and Gram-negative bacteria morphologically under the microscope.
	ZN staining	Describe principal and significance of ZN staining.
		Enlist steps of ZN staining.
		Demonstrate ZN staining procedure.
		Identify AFB and inflammatory cells microscopically.
	Culture media	Define terms like culture, bacterial colony, media, aerobe, anaerobe, agar, selective and differential.
		Describe classification of culture media.
		Describe basic and enriched media, transport media, selective media and differential media.
		Describe preparation/ inoculation of culture media.
		Enlist ingredients, indications, important properties and organisms grown on various culture media.
	Bacterial motility	Enumerate motile bacteria
		Identify motile bacteria under the microscope
	Hyperplasia (BPH)	Define hypertrophy and hyperplasia.
		Differentiate between hypertrophy and hyperplasia.
		Describe gross and microscopic morphology of BPH.

		Identify the slide of BPH.
	Atrophy (Testicular atrophy	Define atrophy
		Describe gross and microscopic features of atrophy over a slide of testicular atrophy as an example
	Pathologic calcification	Describe causes and various types of calcification.
		Identify the slide.
FORENSIC MEDICINE		
	Death certificate	Formulate death certificate based on WHO criteria
	Legal procedure	Doctor in a witness box- role play
	Recording of evidence	Recording of dying declaration
	Consent form	Take written informed consent for various procedures

THIRD YEAR MBBS, BLOCK G: INFECTION AND INFLAMMATION MODULE

Theme and Duration Table???

General Learning Objectives

- At the end of this module, the 3rd year students would be able to:

Knowledge

1. Describe the process of acute & chronic inflammation with their outcomes
2. Relate different aspects of healing and repair
3. Differentiate common pathogenic bacteria based on morphology, pathogenesis & lab diagnosis.
4. Relate bacterial pathogenic factors to clinical manifestations of common infectious diseases.
5. Describe the pharmacological details of anti-inflammatory drugs
6. Apply/relate the pharmacokinetics & pharmacodynamics of chemotherapeutic agents to their use in infectious diseases
7. Describe medico legal aspects of HIV patient.
8. Describe mechanism of wound causation.
9. Describe medico legal aspects of parameters used for personal identification in real life situation
10. Apply parameters of a person's identification in a simulated environment
11. Describe the epidemiology of common infectious diseases.
12. Explain the preventive and control measures for infectious diseases.
13. Explain the control & preventive measures for nosocomial infections.
14. Describe the risks associated with hospital waste and its management.

Skills:

15. Construct / Write prescriptions for various inflammatory and infectious diseases

Attitude:

3rd Year MBBS Block G: Infection and Inflammation Module		
Theme-1 (Pain and Fatigue)		
S.No	**Topic**	**Learning Outcomes**
PHARMACOLOGY		
	Overview to anti-inflammatory drugs	-Classify anti-inflammatory drugs -Describe the role of DMARDs and glucocorticoids as anti-inflammatory agents.
	NSAIDs (Non-selective cox inhibitors: Aspirin & commonly used NSAIDs)	-Classify NSAIDS -Differentiate between non-selective COX inhibitors and selective COX-2 inhibitors based on
		mechanism of action.
		-Name the prototype non-selective COX inhibitor.
		-Describe the pharmacokinetics of Aspirin
		-Describe the mechanism of action of aspirin as
		anti-platelet, analgesic, antipyretic
		inflammatory agent.
		-Give the dose of Aspirin as anti-platelet,
		analgesic/antipyretic and as anti-inflammatory
		drug.
		-Describe clinical uses of NSAIDs.
		-Describe the adverse effects of NSAIDs. -Describe the drug treatment of Aspirin poisoning
		Describe the pharmacokinetics with emphasis on dosage, duration of action and elimination of Diclofenac, Ibuprofen, Indomethacin, Mefanamic acid and Piroxicam in contrast to Aspirin -Relate pharmacokinetics and pharmacodynamics of NSAIDs to their clinical applications

	Selective COX 2 inhibitors	Describe the mechanism of action of selective COX-2 inhibitors. Describe the clinical uses of selective COX-2 inhibitors Describe the adverse effects of selective COX-2 inhibitors Describe the merits and demerits of selective COX-2 inhibitors and non-selective COX inhibitors.
	Paracetamol (Acetaminophen)	Describe the pharmacokinetics of Paracetamol Describe the mechanism of action of Paracetamol. Describe the clinical uses of Paracetamol. Describe the adverse effects of Paracetamol. Give therapeutic and fatal doses of Paracetamol. Describe the drug treatment of Paracetamol poisoning
	Anti-histamines	Classify anti-histamines Differentiate between first and second generation anti-histamines Describe the pharmacologic effects of H1- receptor antagonists. Describe the clinical uses of H1-receptor antagonists. Enlist the adverse effects of H1-receptor antagonists. Describe the drug interactions of H1-receptor antagonists.
	Serotonin agonist and antagonist	Enlist serotonin agonists Classify serotonin antagonists Describe the mechanism of action of serotonin Describe the organ system effects of serotonin.

		Describe the clinical uses of serotonin agonists and antagonists Describe the pharmacological basis of ondansetron in chemotherapy induced vomiting
PATHOLOGY		
	Cells of Inflammation	Describe different cells of inflammation Describe the functions of various cells of inflammation - Enumerate different causes of leukopenia and leucocytosis(each neutrophil, lymphocyte, monocyte, eosinophil, basophil seperately)
	Overview to Acute Inflammation and vascular phase	Define acute inflammation Describe causes of acute inflammation Describe the vascular events of acute inflammation
	Recognition of microbes	Describe various molecular patterns and appropriate receptors used by the inflammatory cells to identify microbes -Relate the recognition of microbes to the initiation of inflammation
	Cellular phase of acute inflammation	Describe the sequence of events and cellular changes involved in cellular phase of acute inflammation
	Plasma Derived Mediators	Enumerate plasma derived mediators Enlist the functions of each mediator Describe the different cascades involved in the generation of mediators
	Cell Derived Mediators	Enumerate cell derived mediators Enlist the functions of each mediator
	Morphological patterns, outcomes, defects of inflammation	Enumerate the different morphological patterns of inflammation Describe the histological changes in each pattern Enlist the outcomes of inflammation Enumerate the various defects of inflammation Describe the consequences of the defects of inflammation

	Overview to chronic inflammation	Define chronic inflammation Differentiate chronic from acute inflammation Describe the causes and morphological features of chronic inflammation
	Granulomatous inflammation	Define granulomatous inflammation
		Describe the morphological features and mediators involved in granulomatous inflammation
	Cells and mediators of chronic inflammation	Enlist the cells of chronic inflammation Enumerate the mediators of chronic inflammation Describe the function of the mediators Relate the functions of mediators to the morphological changes seen in chronic inflammation
	Systemic effects of inflammation	-Enumerate the systemic effects of inflammation -Describe the pathophysiology of the systemic effects of inflammation
FORENSIC MEDICINE		
	Antidotes	Define and classify antidotes Describe the mechanism of action of different antidotes
	Steps of management in a case of poisoning	Describe general steps of management in a case of poisoning
COMMUNITY MEDICINE		
	Infectious disease epidemiology	Define incubation period Explain the principles of disease eradication and control Define serial intervals Define infectivity period
	Infection control	Define the basic definition related to infectious disease epidemiology Review the role of susceptible host for successful parasitism, modes of transmission and the host defense system

		List and explain the various classifications of communicable diseases with special reference to the scope and purpose of the International classification of Disease (ICD -10). Enlist the common infectious diseases affecting the population of Pakistan as per National institute of Health Pakistan. Explain the effect of climate change and seasonal variation on specific diseases globally and in Pakistan. Explain the role of personal hygiene & PPE in infection control.
	Disease careers Reservoirs of infection Disinfection Communicable disease control measure (aimed at agent, host, others, administrative measures and vector control measures	Define disease careers Explain the reservoirs of infection Differentiate between sterilization and disinfection Explain the types and procedures of disinfection Discuss Communicable disease control measure (aimed at agent, host, others, administrative measures and vector control measures

Theme (Trauma and repair)		
S.no	**Topic**	**Learning Outcomes**
PATHOLOGY		
	Prostaglandins	Enlist various prostaglandins- Describe the mechanism of action of Prostaglandins. - Describe the organ system effects of Prostaglandins. Describe the clinical uses of Prostaglandins.
	Overview to tissue healing and repair	-Differentiate between regeneration and repair -Describe various steps involved in the process of tissue healing and repair
	Tissue regeneration	-Define regeneration -Enlist organs capable of regeneration -Describe the process and mediators involved in regeneration
	Cell Cycle and its role in repair	Define cell cycle -Describe the initiation, various phases and proteins involved in the cell cycle -Discuss cells capable of entering the cell cycle -Describe proliferative capabilities of various cells
	Repair by scarring	Describe the various steps involved in process of repair by scarring -Describe the various mediators involved in the steps of scarring
	Growth factors and receptors	-Enumerate various growth factors and their receptors -Describe the most common pathways by which growth factors affect tissue repair and regeneration
	ECM	Classify various components of ECM -Describe the role and importance of ECM in tissue repair
	Factors affecting wound healing/abnormal scarring	Enlist the various factors that influence wound healing -Describe the mechanism by which these factors affect wound healing -Describe the abnormalities of repair and their consequences
FORENSIC MEDICINE		
	Overview to medico-legal aspects of trauma (Wound causation)	Describe mechanism of wound causation

	Toxicity by analgesics	Describe the medico legal aspects of toxicity by aspirin and paracetamol
COMMUNITY MEDICINE		
	Nosocomial infection & its control	Describe the prevalence of the nosocomial infections globally and Specifically in Pakistan. Identify the cause of nosocomial infections in Pakistan. Enlist common nosocomial infections. Describe the importance of different modes of transmission for causation of the nosocomial infections. Explain the control & preventive measures for nosocomial infections

Theme (Fever and Infection)		
S.No	**Topic**	**Learning Outcomes**
PHARMACOLOGY		
	Introduction to Chemotherapy	• Define basic terms like chemotherapy, antibiotic, antimicrobial, MIC, MBC, chemoprophylaxis, empirical therapy and post-antibiotic effect, bacteriostatic and bactericidal antimicrobials. • Explain advantages of drug combinations. • Describe various mechanisms of bacterial resistance against antibiotics. • Differentiate between concentration and time dependent killing with examples. • Classify antimicrobials on the basis of mechanism of action (MOA)
	Penicillins	• Classify beta-lactam antibiotics

		• Enlist narrow and broad spectrum Penicillins. • Enlist anti-pseudomonal, anti- staphylococcal/ beta lactamase resistant Penicillin. • Enlist long- and short-acting Penicillins • Describe anti-bacterial spectrum of Penicillins. • • Describe pharmacokinetics in respect of emphasis on route of administration and excretion of Penicillins • Describe mechanism of action of Penicillins • Describe clinical uses of Penecillins • Describe adverse effects of Penicillins, • Describe contraindications of Penicillins. • Describe principal mechanism of bacterial resistance to Penicillins • Describe drug interactions of Penicillins • Apply formula for interconversion of milligrams and units of Penicillin G. • Relate pharmacokinetics and pharmacodynamics of Penicillin with their clinical applications / uses.
	Cephalosporins	• Classify Cephalosporins • Describe anti-bacterial spectrum of Cephalosporins. • Describe pharmacokinetics of Cephalosporins with special emphasis on route of administration and excretion. • Describe clinical uses of Cephalosporins

		• Describe the adverse effects of Cephalosporins. • Describe drug interactions of Cephalosporins with Ethanol. • Describe the principal bacterial mechanism of resistance to Cephalosporins. • Relate pharmacokinetics and pharmacodynamics of Cephalosporin with their clinical applications / uses.
	Beta lactamase inhibitors	• Enlist beta-lactamase inhibitors • Explain the rationale for using beta lactamase inhibitors in combination with β-lactam antibiotics.
	Monobactams & Carbapanem	• Describe the antibacterial spectrum of Monobactams and Carbapanem • Describe the clinical uses of Monobactams and Carbapanem
	Vancomycin	• Describe the MOA of Vancomycin. • Describe clinical uses of Vancomycin • Describe the use of vancomycin in MRSA (Methicillin-resistant Staph aureus). • Describe adverse effects of Vancomycin • Describe “Red man/Red neck” syndrome.
	Fosfomycin Bacitracin & Cycloserine	Enlist clinical uses of Fosfomycin, Bacitracin & Cycloserine
	Protein synthesis inhibitors	• Classify bacterial protein synthesis inhibitors
	Tetracyclines	• Classify Tetracyclines. • Describe anti-bacterial spectrum ofTetracyclines. • Describe the pharmacokinetics of Tetracycline with special emphasis on absorption of Tetracyclines. • Describe mechanism of action of Tetracyclines. • Describe the principal mechanism of resistance to Tetracyclines. • Describe clinical uses of Tetracyclines.

		• Describe adverse effects of Tetracyclines • Describe Black Bone disease. • Describe the teratogenic effects of Tetracyclines. • Describe drug interactions of Tetracyclines. • Describe the adverse effect related to the use of outdated (expired) Tetracycline products. • Relate pharmacokinetics and • Pharmacodynamics of Tetracycline with their clinical applications / uses.
PATHOLOGY		
	Bacteria: Pyrogenic Bacteria	• Define boil and furuncle • Enlist organisms responsible for pyrogenic infections • Describe important properties, pathophysiology, lab diagnosis of GPC & GNC
	Bacteria: Rickettsia	• Define Rickettsia • Describe the important properties, pathophysiology, lab diagnosis of diseases caused by Rickettsia
	Spore forming GP rods	• Enumerate spore forming GP rods- Describe the important properties, pathophysiology, clinical features and lab

		diagnosis of spore forming GP rods
	Non Spore forming GP rods	• Enumerate non spore forming GP rods • Describe the important properties, pathophysiology, clinical features and lab diagnosis of non-spore forming GP rods
	Chlamydia	• Describe the important properties, pathophysiology, clinical features and lab diagnosis of chlamydia.
	Miscellaneous: Sepsis and Septic Shock	• Define sepsis and septic shock • Enlist organisms capable of causing sepsis and inducing septic shock • Describe the pathophysiology and clinical features of septic shock
	Zoonotic Infections	• Enlist organisms causing zoonotic infections • -Describe the important properties, pathophysiology, clinical features and lab diagnosis of different zoonotic diseases
	General outlines of identification	Describe methods and parameters of identification
	Fetal age determination	Write important physical developmental stages of fetus for age estimation
	Age determination by skeletal study	Write important skeletal points of age estimation
	Age estimation by dental study	Write important dental points for age estimation
	Ages of medico legal significance	Enlist important ages of legal significance

Theme (Fever and Infection)		
S.No	**Topic**	**Learning Outcomes**
PHARMACOLOGY		
	Aminoglycosides	• Enlist Aminoglycosides. • Describe anti-bacterial spectrum of Aminoglycosides. • Describe the pharmacokinetics of Aminoglycosides with special emphasis on route

		of administration, concentration- dependent killing and post-antibiotic effect. • Describe mechanism of action of Aminoglycosides. • Describe the principal mechanism of resistance to Aminoglycosides. • Describe clinical uses of Aminoglycosides. • Describe adverse effects of Aminoglycosides. • Describe the drug interactions of Aminoglycosides. • Relate pharmacokinetics and pharmacodynamics of Aminoglycosides with their clinical applications / uses.
	Macrolides & other related drugs	• Enlist Macrolides. • Describe anti-microbial spectrum of Macrolides • • Describe pharmacokinetics of Macrolides • Describe the mechanism of action of Macrolides • Describe the principal mechanism of resistance to Macrolides • Describe clinical uses of Macrolides • Describe adverse effects of Macrolides. • Describe drug interactions of Macrolides • Differentiate the salient features of Erythromycin, Clarithromycin and Azithromycin in respect of dosing and clinical use. • Relate pharmacokinetics and pharmacodynamics of Macrolides with their clinical applications / uses.

	Linezolid	• Describe mechanism of action of Linezolid • Describe clinical uses of Linezolid with special emphasis on methicillin resistant staphylococci and vancomycin-resistant enterococci
	Clindamycin	• Describe mechanism of action of Clindamycin. • Enumerate clinical uses of Clindamycin. • Describe antibiotic-associated • (pseudomembranous) colitis.
	Streptogramins	• Enumerate Streptogramins. • Describe clinical use of Quinupristin- • Dalfopristin in VRE (Vancomycin- resistant enterococci).
	Chloramphenicol	• Describe anti-microbial spectrum of Chloramphenicol • Describe mechanism of action of Chloramphenicol • • Enlist clinical uses of Chloramphenicol • Describe the reason for obsoleting the systemic use of Chloramphenicol • Enlist adverse effects of Chloramphenicol • Describe Gray baby syndrome.
	Quinolones	• Classify Quinolones. • Describe the pharmacokinetics of Fluroquinolones with special emphasis on halflife of Moxifloxacin • Enlist respiratory Quinolones • • Describe anti-microbial spectrum of Fluoroquinolones. • Describe mechanism of action of Fluoroquinolones. • Describe the principal mechanism of resistance to Fluroquinolones,

		• Describe clinical uses of Fluroquinolones • Describe adverse effects of Fluroquinolones • Describe drug interactions of Fluroquinolones • Relate pharmacokinetics and pharmacodynamics of Fluoroquinolones with their clinical applications / use.
	Sulfonamides and Trimethoprim	• Classify Sulfonamides • Describe anti-microbial spectrum of Sulfonamides • Describe mechanism of action of Sulfonamides and Trimethoprim
		• Describe mechanism of resistance to Sulfonamides
		• Describe clinical uses of Sulfonamides and Trimethoprim
		• Describe adverse effects of Sulfonamides and Trimethoprim
		• Describe the advantages of combining sulfamethoxazole with trimethoprim (Co- • Trimoxazole)
		• Describe the drug interaction of
		• Sulphonamides with Phenytoin.
PATHOLOGY		
	Parasites: Hydatid Cyst	• Describe the life cycle and important properties of Echinococcus
		• Relate the pathogenesis to the clinical features and lab work up of Echinococcus
		• Identify cysts of Echinococcus in the lab
	Leishmania	• Describe the life cycle, and important properties of Leishmania
		• Relate the pathogenesis to the clinical features and lab work up of Leishmania
	Toxoplasma	• Describe the life cycle and important properties of Toxoplasma • Relate the pathogenesis to the clinical features and lab work up of Toxoplasma
	Malaria	• Describe the life cycle and important properties of Malarial parasite • Relate the pathogenesis to the clinical features and lab work up of Malaria

	Tenia	• Describe the life cycle, important properties, of Tenia saginata and solium • Relate pathogenesis to the clinical features and lab work up of Tenia saginata and solium
FORENSIC MEDICINE		
	Sex determination	Describe parameters of sex determination
	Race determination	Describe parameters of race determination
	Examination of hair	Describe medico legal aspects of hair
	Forensic odontology	Write the application of odontology in forensic medicine
	Forensic Anthropometry	Describe medico legal aspects of forensic anthropometry
COMMUNITY MEDICINE		
	• Epidemiology and control of vector borne diseases • Malaria • Dengue and other Viral haemorrhagic fevers and • Arboviral infections • Plague • Filariasis	• Describe the epidemiological determinants, frequency and distribution of Malaria • Compare the prevalence/incidence of malaria in different provinces of Pakistan. • Explain the preventive and control measures of Malaria • Describe the scope/function of Malaria control program. • Explain the types, risk factors, complications and control measures of viral hemorrhagic fevers including Dengue fever
	Epidemiology & control of Leishmaniasis	• Describe the epidemiological determinants, frequency and distribution of Leishmaniasis • Explain the preventive and control measures of Leishmaniasis
	Zoonotic and direct contagious diseases • Rabies • Anthrax • Plague • Brucellosis	• Explain the pre and post exposure prophylaxis of Rabies • Explain the epidemiology, types of Anthrax and its preventive measures

	• Tetanus • Scabies	• Discuss the history, types and prevention of Plague • Explain the etiology, risk factors, clinical features and prevention of Brucellosis • Explain the preventive measures of Scabies • Discuss the etiology, risk factors, clinical features and prophylaxis of pre and post exposure of Tetanus
	Leprosy Trachoma	Explain the etiology, risk factors, stages and preventive measures of Leprosy Explain the etiology, risk factors, complications and preventive measures of Trachoma
FAMILY MEDICINE		
	Malaria & Hepatitis control program teams	• Explain the etiology, clinical features, types, investigations and management of Malaria in family practice
		• Describe the red-flags in a patient with Malaria for referral to specialty care
		• Identify at risk patients of hepatitis and Malaria and offer them screening
Theme (Fever and Infection)		
S.No	**Topic**	**Learning Outcomes**
PHARMACOLOGY		
	Antimalarials	• Describe terms like chemoprophylaxis, causal prophylaxis, terminal prophylaxis and radical cure with examples of drugs.
		• Classify antimalarial drugs.
		• Enlist drugs used for chemoprophylaxis of malaria.
		• Enlist drugs used for radical cure of malaria.
		• Describe the pharmacokinetics of Chloroquine with special emphasis on volume of distribution and dosing

		• Describe mechanism of action of Chloroquine, Quinine, Mefloquine, Halofantrine, Primaquine, Pyrimethamine and Artemisinins.
		• Describe adverse effects of antimalarial drugs
		• Describe Cinchonism and Blackwater fever.
		• Enlist the antimalarial drugs relatively safe in pregnancy.
		• Describe the antimalarial drugs contraindicated in G6PD deficiency.
		• Relate pharmacokinetics and pharmacodynamics of antimalarial drugs with their clinical applications / use.
	Antifungal drugs	• Classify Antifungal drugs.
		• Describe the pharmacokinetics of Amphotericin B and Ketoconazole
		• Describe the advantages of liposomal preparation of Amphotericin B
		• Describe mechanism of action of Azoles, Amphotericin B, Griseofulvin, Turbinafine, and Nystatin.
		• Describe clinical uses of Azoles, Amphotericin B, Griseofulvin, Turbinafine, and Nystatin.
		• Describe adverse effects of Azoles, Amphotericin B, Griseofulvin, Turbinafine, and Nystatin.
		• Describe drug interactions of Ketoconazole and Amphotericin B
	Antivirals	• Classify antiviral drugs
	Anti-herpes	• Enlist anti- Herpes drugs
		• Describe the pharmacokinetics of Acyclovir
		• Describe mechanism of action of Acyclovir
		• Describe clinical uses of Acyclovir.
		• Describe adverse effects of Acyclovir Describe the role of Ganciclovir in CMV retinitis.
	Anti-HIV drugs	• Classify anti-HIV drugs. • Describe the role of entry inhibitors, integrase inhibitors, protease inhibitors, NRTIs and NNRTIs in HIV treatment • • Describe adverse effects of Zidovudine and Indinavir • Describe the rationale of HAART therapy
PATHOLOGY		

	Viruses: Corona	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of Corona Virus
	Viruses: HIV	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of HIV
	Viruses: Herpesviruses	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of Herpesviruses
	Viruses: Tumor Viruses	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of Tumor viruses
	Viruses: MMR	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of MMR viruses
	Fungi: Aspergillus	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of Aspergillus
	Fungi: Candida	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of Candida
	Tenia	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of Tenia
FORENSIC MEDICINE		
	Medico legal issues related to HIV patient	Describe legal issues related to HIV patient
	Dactylography	Describe medico legal aspects of dactylography
	DNA finger printing	• Define DNA finger printing • Write its application in forensic practice • Write methods of collection of samples and dispatch to laboratory
	Tattoos, scar marks, Superimposition	• Describe medico legal aspects of tattoo marks, Describe medico legal aspects of scar tissue, • Describe medico legal aspects of superimposition
	and facial reconstruction	• Describe medico legal aspects of facial reconstruction
	Polygraph	• Describe medico legal aspects of polygraph
	Narcoanalysis	• Describe medico legal aspects of

		arcoanalysis
FAMILY MEDICINE		
	TORCH infections	• Define TORCH infection
		• Describe the steps of investigations for TORCH infections
		• Describe the preventive strategies for TORCH infections and their complications
COMMUNITY MEDICINE		
	Epidemiology & control of airborne diseases	Describe the epidemiological distribution, determinants, frequency of measles, mumps, rubella, chickenpox Diphtheria, Pertussis and meningitis
		Explain the preventive and control measures of measles, mumps & rubella with reference to Pakistani context.
	Epidemiology & control of Corona virus infection	Describe the epidemiological determinants, frequency and distribution of corona Compare the prevalence/incidence of corona in different parts of the world.
		Describe the preventive and control measures of corona Describe the role of Pakistani government in corona control program.
	Epidemiology and	
	prevention of water borne diseases: • Cholera • Typhoid • AcuteDiarrhea and Dysentery • Polio • Hepatitis A and E • Food poisoning	• Enumerate common water borne diseases • Explain the epidemiology and prevention measures of these diseases describe the current situation of these diseases on Pakistan and worldwide
	• Amebiasis and • Giardiasis	
	• Brucellosis	
	• Leptospirosis	
	• Worm • infestations	

LAB WORK		
WEEK 1		
PATHOLOGY		
	Cell of inflammation	• Identify Cells of inflammation in the microscope
	Acute Appendicitis	• Identify the histopathological changes in acute appendicitis
FORENSIC MEDICINE		
	Gastric Lavage	• Demonstrate the steps of gastric lavage
WEEK 2		
PATHOLOGY		
	Chronic cholecystitis	Identify the morphological changes occurring in chronic cholecystitis
	Granuloma	Identify the various cells and their arrangement in a granuloma
WEEK 3		
PATHOLOGY		
	Granulation Tissue	Identify the histological features of granulation tissue
WEEK 4		
PATHOLOGY		
	Catalase test	Perform and interpret the result of catalase test by tube and slide method
	Coagulase test	Perform and interpret the result of coagulase test by tube method
	Oxidase test	Perform and interpret the result of coagulase test
	Culture media	Identify blood agar, Mannitol salt agar, Chocolate media, CaryBlair transport media in the lab Identify different types of haemolysis on blood agar
PHARMACOLOGY		
		Prescription Writing
	Acute Tonsillitis	Construct a prescription for a patient with acute tonsillitis.
FORENSIC MEDICINE		

	Sex determination through bones	Identify human sex through bones
	Hair, Fibre	Identify human hair through microscopy Differentiate between hair and fibre
WEEK 5		
PHARMACOLOGY		
		Prescription Writing
	Malaria	Construct a prescription for a patient with Malaria
WEEK 6		
PATHOLOGY		
	Hydatid Cyst	Identify cysts and ova of Echinococcus in the lab
	Leishmania	Identify leishmania in slides of bone marrow/ skin biopsies
	Malaria	Identify Malarial parasite trophozoites and gametocytes under microscope
	Taenia saginata/solium	Identify ova of Taenia in the lab
COMMUNITY MEDICINE		
	Communicable diseases models	Identify the models related to the communicable diseases
		Explain the complication, preventive measures and the identification signs of concerned disease

ASSESSMENT BLUEPRINT of BLOCK G

BLOCK G Paper: MCQs Distribution

Subject	Foundation 2 module	Infection and Inflammation module	Total MCQs
Pharmacology	19	20	39
Pathology	12	23	35
Forensic medicine	6	08	14
Community medicine	5	10	15
ENT	1	03	04
Eye	3	02	05
PRIME including Research	1+2 (3)	0	03
Medicine	0	01	01
Surgery	0	02	02
Gynaecology	0	01	01
Pediatrics	0	01	01
Total	**49**	**71**	**120**

BLOCK G OSPE Outline

Subject	OSPE/OSCE	Viva stations	Total *
Pharmacology	2	2	4
Pathology	5	2	7
Forensic medicine	2	2	4
Community medicine	1	2	3
Medicine (history and physical examination)	1	0	1
Surgery (history and physical examination)	1	0	1
Total	12	8	20

* A minimum of 20 stations will be used in final exams. Total marks will be 120 (6 marks for each station)

Block H Multisystem Module

3RD YEAR BLOCK H: MULTISYSTEM MODULE

S. No	Themes	Duration
1	Vomiting and blurred vision	1 week
2	Palpitation, fainting and death	1 week
3	Heredity and Cancers	2 Weeks

General Learning Objectives

By the end of this module 3rd year MBBS students will be able to

Knowledge

1) Explain the functional organization of Autonomic Nervous system (ANS)
2) Describe the basic and clinical pharmacology of drugs acting on the ANS
3) Describe anticancer drugs
4) Describe the basic and clinical pharmacology of Eicosanoids.
5) Describe the basic and clinical pharmacology of drugs used for common skin problems.
6) Describe the clinical uses of some popular herbal medications.
7) Describe single Gene Disorders, cytogenetic disorders and different mutations
8) Describe the molecular Genetics Diagnosis
9) Define neoplasia and nomenclature of tumors
10) Describe characteristics of benign and malignant tumors
11) Describe epidemiology of cancer
12) Describe carcinogens, their types and clinical aspects of neoplasia
13) Describe diagnosis of cancer, grading and staging of tumors 14) Describe pathways for tumor spread and tumor immunity 15) Describe the protocols and procedures of autopsy.
16) Describe Thanatology and its medicolegal implications.
17) Describe general principles of Toxicology and their role in medicolegal sciences.
18) Describe the fundamentals of Research Ethics

3rd Year MBBS Block H: Multisystem Module

Theme-1 (Vomiting and blurred vision)

S.No	Topic	Learning Outcomes
PHYSIOLOGY		
	Functional organization of ANS- and overview	Describe the functional organization of ANS and its related neurotransmitters and receptors
PHARMACOLOGY		
	Introduction to the pharmacology of Autonomic Nervous System (ANS)	Enlist major autonomic neurotransmitters.
		Enlist various types of cholinergic, adrenergic and dopaminergic receptors discovered so far.
		Describe the organ system distribution of autonomic receptors.
		Describe presynaptic receptors (autoreceptors and heteroreceptors).
		Describe inotropy, chronotropy and dromotropy.
	Cholinomimetic drugs (Parasympatho- mimetic drugs)	Classify cholinomimetic drugs.
		Enlist the naturally-occurring cholinomimetic alkaloids.
		Enlist major organophosphate compounds.
		Enlist the organophosphates used as “Nerve gases”.
		Describe the pharmacokinetics of cholinomimetics with emphasis on metabolism and duration of action.
		Describe the mechanism of action of directly-acting and indirectly- acting cholinomimetics.
		Describe the organ system effects of directly-acting and indirectly- acting cholinomimetics with special reference to their effects on receptors.

		Describe the clinical uses of cholinomimetics.
		Describe the cholinomimetics used in glaucoma and Alzheimer's disease.
		Describe the use of Edrophonium to differentiate between cholinergic crisis and Myasthenic crises.
		Describe the adverse effects of cholinomimetics.
		Describe the clinical manifestations of organophosphate poisoning.
		Describe the clinical manifestations of mushroom poisoning.
		Explain the pharmacological rationale of prophylactic use of Pyridostigmine in situations where chemical warfare with nerve gases is anticipated.
		Enlist the contraindications of cholinomimetics.
	Anticholinergic drugs (Parasympatholytics)	Classify anticholinergic drugs (Parasympatholytics/Cholinoceptor -blocking drugs).
		Describe belladonna alkaloids with reference to their natural sources.
		Describe the pharmacokinetics of antimuscarinic drugs with emphasis on metabolism and duration of action
		Describe the mechanism of action of antimuscarinic drugs.
		Describe the organ system effects of antimuscarinic drugs with special reference to their effects on receptors.
		Describe the clinical uses of antimuscarinic drugs.
		Describe the drug treatment of organophosphate poisoning.
		Enlist cholinesterase regenerating compounds.
		Describe "aging" of the phosphorylated enzyme complex and its clinical importance regarding the management of organophosphate poisoning.
		Describe the drug treatment of mushroom poisoning.
		Describe the adverse effects of antimuscarinic drugs.
		Describe atropine fever.
		Name the antidote for atropine poisoning.
		Describe the contraindications of antimuscarinic drugs.
	Ganglion-blocking drugs	Enlist major ganglion-blocking drugs.
		Describe the mechanism of action of ganglion-blocking drugs.

		Describe the organ system effects of ganglion-blocking drugs.
		Enlist the clinical uses of ganglion- blocking drugs.
		Enlist the adverse effects of ganglion-blocking drugs.
FORENSIC MEDICINE		
	Poison & related laws	Define a poison
		Describe laws related to poisoning or drug use.
	Legal duties of a Registered Medical Practitioner in a case of poisoning	Explain legal, ethical, and moral duties of Registered Medical Practitioner in a case of poisoning.
	Fate of Poison	Enumerate different routes of administration of poisons.
		Describe Biotransformation.
		Enlist the route of excretion of Poisons
	Diagnosis of poisoning in living and dead	Describe the protocols of diagnosing poisoning in living and dead
	Antidotes	Define and classify antidotes
		Describe the mechanism of action of different antidotes
	Steps of management in a case of poisoning	Describe general steps of management in a case of poisoning
	Organophosphate group	Describe the mechanism of action of commonly used organophosphate poisons.
		Describe the characteristics finding for organophosphate group in postmortem examination.
		describe different signs and symptoms for organophosphate group.
		Describe the medico-legal importance for organophosphate group.
		Explain fatal dose, fatal period, and treatment for organophosphate poisons.
COMMUNITY MEDICINE		
	Smoking	Describe the global distribution and increase of smoking
		Discuss the causes of smoking
		Discuss the effects of smoking on Health

		Describe preventive and control Measures
	International Health	Describe International health regulations and their importance
		Describe preventive measures for travelers visiting disease endemic areas
	Role of international health agencies in public health	Enumerate international health agencies working in health sector
		Discuss structure and function of WHO & UNICEF
		Explain the roles of WHO & UNICEF in Pakistan
PRIME/ RESEARCH		
	Research Ethics	Define ethics in research
		Discuss importance of research Ethics
		Discuss principles of ethics
		Describe the theories of ethics
		Discuss research misconduct
	Referencing	Differentiate between references, citation & bibliography
		List different styles of referencing
		Select appropriate referencing style for a research project
Theme-2: (Palpitation, fainting and death)		
S.No	**Topic**	**Learning Outcomes**
PHARMACOLOGY		
	Sympathomimetic drugs	Classify sympathomimetic drugs according to the spectrum of adrenoceptors they affect and on the basis of their mode of action (directly-acting and indirectly-acting).
		Define Catecholamines with examples.
		Describe the pharmacokinetics of sympathomimetic drugs with emphasis on their metabolism.
		Describe the mechanism of action of sympathomimetics.

		Describe the organ system effects of sympathomimetics with special reference to their effects on receptors.
		Compare the effects of Adrenaline, Noradrenaline, Phenylephrine and Isoprenaline on heart rate and blood pressure.
		Describe the clinical uses of sympathomimetics.
		Describe the drug treatment of Anaphylactic shock.
		Describe the dose-dependent effects of Dopamine and its clinical importance.
		Describe the sympathomimetic drugs used in the management of glaucoma.
		Describe the role of mannitol and acetazolamide in the treatment of Glaucoma
		Describe the adverse effects of sympathomimetics.
		Describe hypertensive cheese Reaction
		Enlist the foods with high Tyramine content.
		Describe the drug interactions of sympathomimetics with Monoamine oxidase inhibiting drugs.
		Describe the treatment of accidental overdose of adrenaline.
	Sympatholytic drugs (Adrenoceptor antagonists)	Classify sympatholytic drugs (adrenoceptor antagonists) on the basis of spectrum of adrenoceptors they affect.
		Name the prototype α-blocker.
		Name the α-blocker having more specificity for prostate muscle.
		Describe the mechanism of action of α-blockers.
		Describe the organ system effects of α-blockers with special reference to their effects on receptors.
		Describe the phenomenon of epinephrine reversal.
		Describe the clinical uses of α- blockers.
		Describe the adverse effects of α- blockers.
		Name the prototype β-blocker.
		Enlist the β-blockers with intrinsic sympathomimetic activity (partial agonist activity).
		Enlist the β-blockers with membrane stabilizing activity (Na channel-blocking activity).
		Enlist the β-blockers which have proved to be inverse agonists.

		Enlist the β-blockers which are relatively safe in chronic stable heart failure.
		Enlist the β-blockers which are relatively safe in asthmatic patients.
		Describe the pharmacokinetics of propranolol.
		Describe the mechanism of action of β-blockers.
		Describe the organ system effects of β-blockers with special reference to their effects on receptors.
		Describe the clinical uses of β- blockers.
		Describe β-blockers used in the management of glaucoma.
		Describe stage fright and name the β-blocker used for its management.
		Describe the adverse effects of β- blockers.
		Name the antidote for β-blockers' toxicity.
		Enlist the contraindications of β- blockers.
		Describe the limitations of beta- blockers in patients with Diabetes Mellitus, Hyperlipidemias, Bronchial Asthma and peripheral arterial disease.
		Enlist mixed adrenoceptor antagonists (Labetalol and Carvedilol).
		Describe the clinical uses of mixed adrenoceptor antagonists.
FORENSIC MEDICINE		
	Thanatology/Death	Describe death.
		Describe phases of death.
		Define brain death.
		Describe the criteria of brain death.
		Describe the role of EEG/ECG in death.
		Explain apparent death.
		Describe human tissue act.
		Describe medicolegal importance of death.
	Postmortem changes	Define Post Mortem changes.
		Classify Post-mortem changes.
		Describe immediate, early and late changes of post-mortem.
		Describe Post-mortem lividity.

		Describe the steps to report changes due to post-mortem Lividity
	Rigor mortis	Define Rigor Mortis.
		Describe the mechanism of formation of Rigor mortis
		Describe the special features of Rigor Mortis.
		Describe time consumed to develop Rigor mortis.
		Describe chemical basis of Rigor Mortis.
		Describe factors affecting Rigor Mortis.
		Describe the conditions that simulate Rigor Mortis.
		Describe procedure of its confirmation.
		Describe medico legal importance of Rigor Mortis.
	Cooling of dead body (Algor Mortis)	Define Algor Mortis?
		Describe different methods of recording the temperature of dead body.
		Describe the PM body cooling curve?
		Describe the formula/calculation used for time since death.
	Late P.M. changes & putrefaction	Define putrefaction?
		Describe the process of Putrefaction
		Describe stages of putrefaction.
		Describe order of progression in putrefaction.
		Describe factors affecting Putrefaction.
		Describe Casper dictum.
		Describe medicolegal importance of putrefaction.
	Maceration	Define maceration.
		Describe features of maceration.
		Discuss differentiation point for maceration
		Discuss medicolegal importance of maceration.
	Adipocere formation (Saponification)	Define Adipocere formation.
		Describe features of Adipocere formation.
		Discuss medicolegal importance of Adipocere formation.
	Mummification	Define Mummification.

		Describe features of Mummification.
		Discuss medicolegal importance of Mummification.
	Introduction to autopsy	Define Autopsy.
		Describe the modified continental system and compare it with other medicolegal systems in the world.
		Classify types of Autopsy.
		Describe the role of Autopsy in Criminal offences.
		Describe section 174 and 176 of the Criminal Procedure Code (CrPC), 1973
	Modern autopsy suite	Describe the components of modern autopsy suite
		Describe the precautions taken while working in modern autopsy suites
		Explain the hazards encountered in modern autopsy suites
	Autopsy Protocol	Describe pre-examination in Autopsy.
		Describe the protocol of examination of clothes, and external examination in autopsy.
		Classify and describe different autopsy incisions.
		Describe internal examination in an autopsy.
		Describe the procedure to collect different autopsy samples.
		Describe the chain of custody.
		Describe the steps of writing an autopsy report
		Describe autopsy procedure for death due to heat and cold.
	Exhumation	Define exhumation.
		Describe authorisation of autopsy surgeon for exhumation.
		Describe protocol of exhumation.
		Describe time limit for exhumation.
		Describe the precautions for exhumations.
		Describe the procedure to collect samples.
		Describe the limitations of exhumations.
		Describe the scope of exhumation.
	Skeletonized body	Describe the steps of examination of a skeletonized body to assess its race, age, sex and stature
		Describe the protocol for autopsy of a skeletonized body

		Describe cause of death in such cases.
		Describe nature of injury and type of weapon used in such cases.
		Describe time since death in such cases.
	Negative autopsy	Define negative autopsy.
		Describe causes of the negative autopsy.
		Describe concealed trauma.
	Autopsy artifacts and hazards	Describe autopsy artefacts.
		Describe the importance of forensic artefacts.
		Describe effect of artefacts on the opinion of post-mortem report.
	Infanticide	Describe infanticide and its related law.
		Describe the Age of viability and its medico legal significance.
		Describe the concept of live birth and separate existence.
		Describe the Hydrostatic test and its importance.
		Explain Cause of death, i.e. acts of commission and acts of omission
		Describe sudden infant death syndrome (SIDS)
	Autopsy of an infected body	Describe the protocols for autopsy of the infected dead body.
		Describe the precautions required for autopsy of an infected person.
		Enlist the diseases transferred from during autopsy infected dead body
	Autopsy of fragmentary remains	Describe autopsy of a fragmentary remains and mutilated body.
		Discuss the protocols adopted for autopsy of fragmentary remains
		Describe the samples needed for autopsy of fragmentary remains.
	Embalming	Define Embalming.
		Enlist the chemical used for Embalming.
		Describe the procedure for Embalming.
		Describe the used of Embalming.
COMMUNITY MEDICINE		
	Child labor and Child Abuse	Define child labor

		Describe different types of child labor and its effects
		Describe statistics of child labor
		Describe governments` actions against child labor
		Define IPEC 2011 (international program on elimination of child Labor
		Define child abuse
		Describe different forms of child abuse and its effects
		Describe statistics of child abuse
		Describe the preventive strategies regarding child abuse
Theme-3: (Heredity and Cancers)		
S.No	**Topic**	**Learning Outcomes**
PATHOLOGY		
	Genetics	Define the term mutation, hereditary, congenital, genotype, phenotype, codon, Mendelian Disorder
	Mutations	Describe various types of mutations
		Describe trinucleotide-repeat Mutations
		Enlist few examples of trinucleotide-Repeat Disorders
		Describe mutations in mitochondrial genes
	Transmission pattern of single Gene disorders	Enumerate transmission patterns of single gene disorders
		Describe biochemical and molecular basis of Autosomal Dominant Disorders
		Enlist few examples of Autosomal Dominant Disorders
		Describe biochemical and molecular basis of Autosomal Recessive disorder
		Enlist few Examples of Autosomal Recessive Disorders
		Describe mechanism of transmission of X-Linked disorders

		Enumerate examples of X-Linked Disorders
	Biochemical and molecular basis of single gene disorders	Discuss enzyme defects and their consequences
		Describe defects in receptors and transport system
		Describe alterations in structure, functions or quantity of non- enzyme proteins
		Describe genetically determined adverse reactions to drugs
	Complex multigeneic disorders	Describe multigeneic disorders with Examples
	Cytogenetic Disorders involving Autosomes	Discuss Trisomy 21 and its molecular basis
		Describe diagnostic clinical features of Trisomy 21
	Molecular genetic diagnosis	Describe the basic principles of various molecular techniques including PCR, FISH and Southern/Western blotting
		Enumerate indications of these techniques.
	Introduction to Neoplasia	Define the terms: neoplasia, neoplasm, oncology, tumor, benign tumor, malignant tumor, anaplasia, metaplasia, differentiation and dysplasia.
	Nomenclature of Tumors	Describe the basic principle of nomenclature of tumors with respect to tissue of origin, benign and malignant nature
	Characteristics of Benign and Malignant Tumors	Describe characteristics of benign and malignant tumors
		Differentiate between benign and malignant tumors
		Describe characteristics of benign and malignant neoplasms in terms of differentiation, anaplasia, rate of growth, local invasion and Metastasis
	Epidemiology of Cancer	Describe the epidemiology of cancer with respect to overall incidence of cancer and various host factors (age and hereditary) that predisposes to cancer
		Discuss the epidemiology of cancer with respect to geographical and environmental factors that predispose to cancer
	Molecular Basis of Cancer	Describe the molecular/genetic basis of carcinogenesis

		Describe genetic lesions in cancer
		Define oncogene, proto-oncogene and Oncoproteins.
	Carcinogenesis	Enumerate carcinogens
		Describe the process of carcinogenesis
		Describe the hallmarks of cancer cells and process involved
		Describe the role of p53
	Types of Carcinogens	Discuss properties of chemical Carcinogens
		Describe direct and indirect chemical carcinogens and their mechanism of action
		Describe the mechanism of radiation carcinogenesis
		Enumerate viral and bacterial Carcinogens
		Describe mechanism of carcinogenesis by viral and microbial oncogenes
	Clinical Aspects of neoplasia	Define cachexia
		Describe the clinical features of neoplasia including effects of tumor on host cancer cachexia
		Describe the clinical significance of paraneoplastic syndromes
		Describe clinical syndromes with respect to its causal mechanism and major forms of underlying Cancer
	Diagnosis of Cancer	Describe morphologic, biochemical and molecular methods employed for diagnosis of cancer
	Pathways for tumor spread	Describe the pathways for spread of tumors like local invasion and metastasis
	Grading and Staging of tumors	Describe grading and staging of Tumors
	Tumor immunity	Discuss host defenses against Tumors
		Describe tumor antigens and anti- tumor effect mechanisms
		Describe tumor surveillance and Immune evasion by the tumors
PHARMACOLOGY		
	Anticancer drugs	Describe terms like cell cycle- specific drugs and cell cycle- nonspecific drugs.

		Describe the role of P-glycoprotein in relation to the development of resistance to cytotoxic drugs.
		Classify anticancer drugs.
		Describe general adverse effects of anticancer drugs.
		Describe the mechanism of action of alkylating agents.
		Describe the clinical uses and adverse effects of Busulfan and Cyclophosphamide.
		Describe the mechanism of action, clinical uses and adverse effects of Cisplatin.
		Describe in general the mechanism of action of antimetabolites.
		Describe the mechanism of action, clinical uses, adverse effects and contraindications of Methotrexate, Azathioprine, 6-Mercaptopurine and 5-Fluorouracil.
		Describe the drug interaction of Azathioprine and 6-Mercaptopurine with Allopurinol.
		Describe the natural source of plant alkaloids Vinblastine and Vincristine.
		Describe the mechanism of action, clinical uses and adverse effects of Vinblastine and Vincristine.
		Describe the mechanism of action, clinical uses and adverse effects of Doxorubicin, Daunorubicin, Dactinomycin and Bleomycin.
		Enlist the anticancer mechanism of action and uses of hormonal agents like Tamoxifen, Flutamide, Goserelin and Aminoglutethimide.
		Enlist the drugs of choice for ALL, AML, CLL, CML, Hodgkin's disease, Non-Hodgkin's lymphoma, Ca breast, Ca lung, Ca prostate and Ca stomach.
		Describe cancer treatment modalities (primary induction, adjuvant, neo-adjuvant and maintenance chemotherapy)
		Describe the antidotes of Methotrexate, Cyclophosphamide and Doxorubicin toxicity.
	Eicosanoids-Prostaglandins	Classify eicosanoids.
		Describe the mechanism of action of Prostaglandins.
		Describe the organ system effects of Prostaglandins.

		Describe the clinical uses of Prostaglandins.
		Describe the prostaglandins used in the management of glaucoma.
		Describe the pharmacologic effects of Thromboxane's2.
	Dermatologic preparations	Describe dermatologic formulations like creams, ointments, gels, lotions, pastes, powders, tinctures and wet dressings.
		Describe the choice of dermatologic formulation with reference to the nature of the lesion.
	Drug treatment of scabies	Enlist the drugs used for the treatment of Scabies
		Describe the method of application of Permethrin, Crotamiton and Benzyl benzoate for treating scabies.
	Drug treatment of Acne vulgaris	Enlist the drugs used for treating Acne (including antibiotics and hormonal agents).
		Describe the mechanism of action and adverse effects of Benzoyl peroxide, Tretinoin and Isotretinoin.
		Describe the teratogenicity of Isotretinoin.
	Drug treatment of Psoriasis	Enlist the drugs used for treating Psoriasis.
		Describe the teratogenicity of Acitretin.
	Herbal medications	Describe the terms like herbal medications, botanicals and nutritional supplements with special reference to drug regulatory factors.
		Describe the pharmacologic effects and intended uses of Garlic (Allium sativum).
		Describe the drug interactions of Garlic with Warfarin and Aspirin.
		Describe the possible medicinal use of Kalonji (Nigella sativa).
		Describe the pharmacologic effects and intended uses of Ginseng.
		Describe the drug interactions of Ginseng with antipsychotic and hypoglycemic medications.
		Describe the intended clinical uses of Coenzyme Q10.
		Describe the drug interactions of Coenzyme Q10 with Warfarin.
COMMUNITY MEDICINE		
	Cancers	Enlist the common cancers prevalent in Pakistan
		Describe the burden and epidemiology of common cancers prevalent globally and in Pakistan
		Describe the prevention and control of cancers

		Describe various governmental programs and strategies for the prevention of cancers
FAMILY MEDICINE		
	Cancer screening	Identify red-flags in patient which need referral for cancer screening
		Explain the psychosocial impact of disease on patient and their families
		Describe the indications, rationale and common diseases which require routine cancer screening
LAB WORK		
PATHOLOGY		
	Lipoma	Identify the morphological changes occurring in lipoma
	Squamous cell carcinoma	Identify morphological changes of squamous cell carcinoma
	Fibro adenoma	Enlist points of identification of gross and microscopic features of fibro adenoma of breast
	Karyotyping	Demonstrate preparation of Karyogram
		Identify gender on the basis of Karyogram
		Identify common numerical chromosomal abnormalities on Karyogram
PHARMACOLOGY		
	Introduction to experimental Pharmacology (experiments on isolated piece of rabbit's Ileum)	Differentiate between Qualitative and Quantitative experiments.
		Recognize various parts of Tissue Organ Bath and describe their functions.
		Describe the ingredients and their quantities required for preparing the Tyrode's Solution.
		Describe the technique of slaughtering of rabbit and removal of a piece of ileum.
		Describe the fixation of piece of ileum in the inner organ bath.
		Enumerate the causes of tissue death.
	Ceiling effect for Parasympathomimetic drug (Acetylcholine)	Demonstrate ceiling effect for Acetylcholine on the isolated piece of rabbit's ileum by adding proper doses of the drug into the inner organ bath.
		Interpret the recording of acetylcholine-induced ileal

		activity on the revolving drum.
		Demonstrate washing of the inner organ bath for the subsequent doses of Acetylcholine.
		Construct tables and graphs for inference of the results
	Antagonism between acetylcholine and atropine	Demonstrate surmountable antagonism between acetylcholine and atropine on piece of rabbit's ileum by adding proper doses of the drugs into the inner organ bath.
		Interpret the recording of acetylcholine- and Atropine-induced ileal activity on the revolving drum.
		Construct tables and graphs for inference of the results.
	Ceiling effect for Histamine	Demonstrate ceiling effect for Histamine on the isolated piece of rabbit's ileum by adding proper doses of the drug into the inner organ bath.
		Interpret the recording of Histamine -induced ileal activity on the revolving drum.
		Demonstrate washing of the inner organ bath for the subsequent doses of Histamine.
		Construct tables and graphs for inference of the results.
	Antagonism between Histamine and antihistamine	Demonstrate surmountable antagonism between Histamine and antihistamine on piece of rabbit's ileum by adding proper doses of the drugs into the inner organ bath.
		Interpret the recording of Histamine- and antihistamine-induced ileal activity on the revolving drum.
		Construct tables and graphs for inference of the results.
	To identify an unknown drug on rabbit's ileum with the help of two known antagonists	Demonstrate ceiling effect for the known agonist drug (Acetylcholine or Histamine) on the isolated piece of rabbit's ileum by adding proper doses of the drug into the inner organ bath.
		Demonstrate surmountable antagonism between the agonist drug and the unknown antagonists (Atropine and antihistamine) on piece of rabbit's ileum by adding proper doses of the drugs into the inner organ bath.
		Interpret the recording of drug- induced ileal activity on the revolving drum.
		Construct tables and graphs for inference of the results.
	Introduction to experimental Pharmacology (effects of drugs on rabbit's Eye)	Demonstrate measuring the pupil size.
		Demonstrate corneal reflex.

		Demonstrate light reflex.
	Effects of Parasympathomimetic drug (e.g., Pilocarpine) on rabbit's eye	Demonstrate the effect of Pilocarpine on the size of the pupil in the test eye in comparison with the control eye.
		Demonstrate the effect of Pilocarpine on the colour of the conjunctiva in the test eye in comparison with the control eye.
		Demonstrate the effect of Pilocarpine on the corneal reflex in the test eye in comparison with the control eye.
		Demonstrate the effect of Pilocarpine on the light reflex in the test eye in comparison with the control eye.
	Effects of Sympathomimetic drug (e.g., Ephedrine) on rabbit's eye	Demonstrate the effect of Ephedrine on the size of the pupil in the test eye in comparison with the control eye.
		Demonstrate the effect of Ephedrine on the colour of the conjunctiva in the test eye in comparison with the control eye.
		Demonstrate the effect of Ephedrine on the corneal reflex in the test eye in comparison with the control eye.
		Demonstrate the effect of Ephedrine on the light reflex in the test eye in comparison with the control eye.
	Effects of Parasympatholytic drug (e.g.,Tropicamide) on rabbit's eye	Demonstrate the effect of Tropicamide on the size of the pupil in the test eye in comparison with the control eye
		Demonstrate the effect of Tropicamide on the colour of the conjunctiva in the test eye in comparison with the control eye.
		Demonstrate the effect of Tropicamide on the corneal reflex in the test eye in comparison with the control eye.
		Demonstrate the effect of Tropicamide on the light reflex in the test eye in comparison with the control eye.
	Effects of Local anaesthetic (e.g.,	Describe the mechanism of action of Proparacaine regarding its effects on the eye.

	Proparacaine) on rabbit's eye	
		Demonstrate the effect of Proparacaine on the size of the pupil in the test eye in comparison with the control eye.
		Demonstrate the effect of Proparacaine on the colour of the conjunctiva in the test eye in comparison with the control eye.
		Demonstrate the effect of Proparacaine on the corneal reflex in the test eye in comparison with the control eye.
		Demonstrate the effect of Proparacaine on the light reflex in the test eye in comparison with the control eye.
	To identify an unknown drug on rabbit's eye	Demonstrate the effect of the unknown drug on the size of the pupil in the test eye in comparison with the control eye.
		Demonstrate the effect of the unknown drug on the colour of the conjunctiva in the test eye in comparison with the control eye.
		Demonstrate the effect of the unknown drug on the corneal reflex in the test eye in comparison with the control eye.
		Demonstrate the effect of the unknown drug on the light reflex in the test eye in comparison with the control eye.
		Interpret the results.
		Identify the unknown drug.
FORENSIC MEDICINE		
	Autopsy report	Construct a full autopsy report including all components after thorough examination.
	Toxicology Sample collection	Explain the procedures, organ needed, and preservation used in sample collection.
	Toxicology Report Analysis	interpret the toxicology report received and then incorporate it in final opinion.
	Thanatology	Identify and describe various models of post-mortem changes
	Stomach wash	Perform stomach wash on a manikin

3rd Year MBBS Block H: Blood and Immunology - II Module

S.No	Theme	Duration
1	Pallor and Fatigue	1 week
2	Fever	1 week
3	Bleeding	1 week

General Learning Objectives

By the end of Blood & Immunology II Module, 3rd year MBBS students will be able to:

Knowledge

1. Describe the pathophysiology and diagnosis of different types of anemia.
2. Explain the pathogenesis of different hematological malignancies.
3. Discuss the diagnostic approach to malignant hematological disorders.
4. Discuss the pathophysiology and diagnosis of bleeding disorders.
5. Explain the immune system of the body and its components.
6. Describe the mechanism of defense from infection.
7. Explain hypersensitivity and allergy.
8. Discuss the rationale for immunomodulation and its impact on improving the therapeutic dynamics of autoimmune disorders and malignancies.
9. Describe the drugs for treating various types of anemia.
10. Write prescription for the prevention and treatment of iron-deficiency anemia.
11. Describe the application of blood groups in Forensic work
12. Describe the examination of blood stains
13. Describe the medico legal importance of blood as trace evidence
14. Describe the EPI schedule of Pakistan and the basic principles of Immunization.
15. Describe the most prevalent anemia's that affect the population of Pakistan, and the risk factors for vulnerable population.
16. Describe the most prevalent blood borne infections that affect the population of Pakistan, and the appropriate preventive strategies including safe blood practice.

Skills:

Attitude:

Theme 1: Pallor and Fatigue		
S.No	**Topic**	**Learning Outcomes**
PHYSIOLOGY		
	Red blood cells	Discuss the steps of erythropoiesis with correlation to red cell indices and its clinical implications.
PATHOLOGY		
	Anemia	Discuss physiologic basis of anemia.
		Classify anemia's according to underlying Mechanism
	Blood loss	Describe the pathogenesis of blood loss Anemia
	Hereditary Spherocytosis	Discuss the pathogenesis of Hereditary Spherocytosis
		Describe morphological changes in peripheral Smear of HS patient
		Explain how will you diagnose a case of HS?
	Sickle cell Anemia	Discuss the morphology of RBCS in Sickle cell Anemia
		Describe the etiology and pathogenesis in SA
		Explain how will you diagnose a case of SA?
	Thalassemia	Describe Thalassemia
		Discuss the conditions contributing to the Pathogenesis of beta- thalassemia
		Explain the genetics of thalassemia
		Describe the morphological changes physically And on peripheral smear
		Explain how will you diagnose a case of alpha Or beta thalassemia?
	Glucose 6 phosphate dehydrogenase deficiency	Classify G6PD
		Discuss the pathogenesis of G6PD with Reference to oxidative injury of RBCS
		Describe the morphology of rbcs in G6PD Explain how will you diagnose a case of G6PD Deficiency
	Paroxysmal Nocturnal	Describe the pathophysiology of Paroxysmal Nocturnal

	Hemoglobinuria	Hemoglobinuria
		Explain the diagnosis of a case of PNH?
	Immune Hemolytic Anemia	Classify immune hemolytic anemia's
		Discuss the etiological mechanism of warm and cold antibody immune anemia's hemolytic anemia
		Explain the diagnostic workup of immune hemolytic anemia
	Iron deficiency anemia	Discuss the pathophysiological mechanism of Iron deficiency anemia
		Describe the clinical course and morphological changes in IDA
		Explain laboratory investigations for the diagnosis of IDA
	Megaloblastic Anemia	Describe Megaloblastic Anemia
		Describe the pathogenesis of MA with respect to Vitamin B12 and Folic acid
		Discuss the morphological changes in RBCs, WBCs and platelets in MA
		Explain how will you diagnose the cause of MA
	Aplastic Anemia	Enumerate causes of Aplastic anemia
		Describe the pathophysiology of aplastic anemia Diagnose a case of aplastic anemia
	Polycythemia Vera	Discuss the pathophysiology of polycythemia vera
		Describe the clinical course and morphological features of Polycythemia vera Explain how will you diagnose a case of polycythemia vera
PHARMACOLOGY		
	Drug Used In Anemia	Classify the drugs used in anemia
		Describe pharmacokinetics of Iron
		Describe various oral and parenteral formulations of Iron
		Describe the adverse effects of iron therapy
		Describe the drug treatment of Iron toxicity
		Describe the various oral and parenteral preparations of cyanocobalamin (Vit B12)
		Describe the clinical use of cyanocobalamin (Vit: B12)
		Describe the clinical use of Folic acid
		Describe the pharmacological rationale of combining cyanocobalamin with folic acid and iron
		Describe the role of granulocyte colony stimulating factors (Filgrastim) and granulocyte monocyte colony stimulating factors in the treatment of leucopenia.

		Describe the role of thrombocyte colony stimulating factor (Oprelvekin) in the treatment of thrombocytopenia.
FORENSIC MEDICINE		
	Forensic evidence	Describe trace evidence
		Classify trace evidence.
		Describe Locard's exchange principle.
		Describe composition of blood and characteristics of different blood cells.
		Describe basic genetic principles related to blood groups and blood groups as hereditary factors.
	Blood Group Systems	Describe different blood groups systems. ▪ Grouping based on red cell antigens ▪ Grouping based on blood proteins ▪ Grouping based on enzymes ▪ Grouping based on white cell antigens. ▪ Describe different methods for blood group determination. ▪ Direct agglutination ▪ Ring test ▪ Gel diffusion ▪ Immune-electrophoresis ▪ Indirect agglutination
		Describe the application of blood in forensic work. (medico legal importance) ▪ Inheritance claims ▪ Rh hazards ▪ Transfusion errors and adverse reactions ▪ DNA profiling ▪ Disputed paternity and maternity
COMMUNITY MEDICINE		
	Epidemiology of nutritional anemias	Classify nutritional anemias
		Describe the population at risk of nutritional anemia in Pakistan.
		Explain effective public health strategies for prevention of nutritional anemias in in Pakistan
		Describe risk factors for different nutritional anemia's.
		Describe effective public health strategies for prevention of different types of anemia's in Pakistan
PAEDIATRICS		
	Thalassemia	Describe Classification, Laboratory Investigation and management of Thalassemia
MEDICINE		

	Sickle Cell Anemia	Discuss the pathophysiology, investigations and management of Sickle Cell Anemia.

Theme 2: Fever

S.No	Topic	Learning Outcomes
PHYSIOLOGY		
	White blood cells	Classify the different types of white blood cells, Polymorph's, Lymphocytes and Plasma cells and their disorders.
PATHOLOGY		
	Acute myelogenous leukemia	Classify acute myelogenousleukemias according to FAB.
		Discuss the pathophysiology of AML.
		Describe the morphological features of AML.
		Explain how will you proceed for diagnosis of AML?
	Chronic myelogenous leukemia	Discuss the pathophysiology of CML.
		Describe the peripheral blood findings in CML
		Explain how will you proceed for diagnosis of CML?
	Myelodysplastic syndrome (mds)	Enlist types of MDS.
		Discuss causes, pathogenesis and Morphology.
		Interpret blood and bone marrow changes in patient with MDS.
		Discuss symptoms and diagnostic strategies for patient with MDS.
	Lymphoid neoplasms	Enumerate Lymphoid neoplasm
		Classify lymphoid neoplasms according to WHO classification.
	Acute lymphocytic leukemia	Discuss the pathophysiology of Acute lymphocytic leukemia
		Discuss the morphological features of ALL
		Explain how will you diagnose a case of ALL?
	Chronic lymphocytic leukemia	Discuss the pathophysiology of Chronic lymphocytic leukemia
		Describe the distinguishing morphological features of CLL
		Explain the diagnostic workup for a case of CLL
	Plasma cell disorder	Describe the pathogenesis of multiple myeloma
		Describe the molecular genetics involved in multiple

		myeloma
	Hodgekin' s lymphoma	Discuss the type of multiple myeloma
		Enlist the clinical features
		Classify Hodgkin's lymphoma
		Discuss the etiology and pathogenesis of Hodgkin's lymphoma
		Describe the morphological changes and clinical course of the disease in Hodgkin's Lymphoma
	Non-hodgekin' s lymphoma	Enlist Non-Hodgkin's lymphoma
		Describe the basic pathologic classification of NHL (the WHO classification).
		Describe the predisposing factors to developing NHL, including infectious agents associated with development of specific lymphomas.
		Describe the morphologic features of lymph nodes involved in Non-Hodgkin Lymphoma
		Enlist the lab investigations required for diagnosis of NHL
	Immunity	Describe the functions and types of immunity.
		Enlist the three lines of defenses and outline their properties
		Describe the characteristics, origin and functions of cells of immune system
		Compare innate and acquired immunity
		Compare the mechanism of active and passive immunity
	Humeral immunity	Describe the role of T and B lymphocytes in immunity
		Describe the role of B lymphocytes in humeral immunity
		Describe humeral immunity
		Explain how helper T cells regulate the immune system
		Differentiate between humeral and cell mediated immunity
	Cell mediated immunity	Explain the Specificity of immune response
		Describe cell mediated components of Cell mediated immunity (CMI),
		Explain types of cells in CMI system
		Describe T-cell activation and diversity
		Illustrate Schematic representation of T cell activation and diversity
		Differentiate between Primary and secondary immune response
	Antibodies	Describe antigen and antibodies.
		Differentiate B/W Monoclonal and polyclonal antibodies.
		Classify immunoglobulin
		Illustrate structure (diagram) of immunoglobulin A.

		Describe important functions of immunoglobulin
		Explain How antibodies neutralize toxins, microbes and viruses
		Illustrate class switching of immunoglobulin
		Explain transfer of immunity from mother to fetus and from mother to infant during breast-feeding
	Allergy & hypersensitivity	Describe the pathophysiology of allergy and hypersensitivity with examples
		Compare immediate and delayed hypersensitivity reactions
		Enlist the diseases associated with hypersensitivity reactions
	Immune tolerance	Describe Immunotolerance.
		Describe Immunological unresponsiveness of the body especially to self-antigens.
		Explain the role of immune system in protecting the human body.
		Distinguishing between types of immunotolerance
		Explain the mechanism of graft rejection and graft vs host disease.
	Autoimmune diseases	Describe Autoimmunity.
		Discuss Pathogenesis of Autoimmune diseases.
		Explain the factors leading to Autoimmune Diseases.
	Immunodeficiency diseases	Describe immunodeficiency
		Differentiate between Autoimmune and immunodeficiency diseases.
		Classify Congenital and acquired Immunodeficiency diseases.
		Describe the pathogenesis of HIV.
	Complement	Describe complement.
		Describe components of the Complement System
		Describe the synthesis of complements
		Describe pathways of activation and inactivation of complement
		Describe important functions of each component of complement system
		Describe the diseases associated with deficiency of the complement proteins
PHARMACOLOGY		
	Immune modulator drugs	Classify immunomodulating drugs
		Describe the role of corticosteroids as immunosuppressant agents.

		Describe mechanism of action of immunophilin ligands.
		Describe clinical uses and adverse effects of immunophilin ligands.
		Describe mechanism of action of enzyme inhibitors.
		Describe clinical uses and adverse effects of enzyme inhibitors.
		Describe mechanism of action of cytotoxic agents as immunosuppressant
		Describe clinical uses and adverse effects of cytotoxic agents
		Describe mechanism of action of immunosuppressive antibodies used as immunosuppressant
		Describe clinical uses and adverse effects of immunosuppressive antibodies
		Describe mechanism of action of monoclonal antibodies
		Describe clinical uses and adverse effects of monoclonal antibodies
		Describe mechanism of action of immunostimulant drugs
		Describe clinical uses and adverse effects of immunostimulant drugs
		Describe the advantages and disadvantages of various combinations of Immunomodulating drugs
		Describe Forensic Lab Systems
PRIME/RESEARCH		
	Academic writing and plagiarism	Emphasize the role of academic writing in research
		Explain the role of "Grammarly" for use in academic writing
		Define plagiarism
		Enlist plagiarism detection software
FORENSIC MEDICINE		
	Forensic Lab Procedures	Describe Forensic Lab Procedures · Forensic histopathology · Naked eye examination · Histological examination · Forensic histochemistry · Steam distillation · Micro-diffusion analysis · Stas-Otto method · Colour reaction method · Chromatography · Spectroscopy · Electrophoresis · Radio-activation technique
		Detection of insecticide compounds

COMMUNITY MEDICINE		
	Immunization	Define immunity
		Explain the types of immunity
		Discuss immunizing agents
		Explain the hazards of immunization
		Explain the cold chain in the context of immunization
	Vaccination	Explain the importance of vaccination in the control of infectious diseases
		Describe the basic principles of vaccination
		List the main types of vaccine and illustrate them with examples
		Describe vaccines that are associated with adverse reactions
		Explain the difference between live attenuated and inactivated vaccines
		Describe the role of vaccines in preventing disease.
		Differentiate between vaccination and immunization
		Describe the strategies used from community medicine's perspective to promote vaccination in communities. (EPI)
		Explain various programs of vaccination in Pakistan with particular reference to EPI.
		Describe the factors responsible for success and failure of vaccination programs in Pakistan.
	Epidemiology of blood borne diseases/infections	List the important blood borne diseases in Pakistan as prioritized by the National Institute of health (NIH)
		Discuss the global burden of blood borne diseases & compare with Pakistan
		Describe important blood borne pathogens
		Explain the evidence based public health practices to reduce transmission of blood borne infectious disease
		Explain the evidence based best practices and procedures for safe blood transfusion and prevention of needle stick injury
MEDICINE		
	Myeloproliferative Disorders (MPN)	Classify myeloproliferative neoplasms.
		Discuss the investigations & management steps of CML.

Theme 3: Bleeding

S.No	Topic	Learning Outcomes
PHYSIOLOGY		
	Platelets	Enumerate the causes of thrombocytopenia.
		Explain the intrinsic and extrinsic pathways of Coagulation
PATHOLOGY		

	Thrombocytopenia & von willebrand disease	Enlist causes of Thrombocytopenia
		Describe the pathogenesis of immune thrombocytopenic purpura
		List thrombotic microangiopathies
		Explain the diagnostic plan for ITP
		Classify VWD
		Enlist investigations required for diagnosis of VWD
	Hemophilia	Discuss the pathogenesis of hemophilia A and B
		Describe the clinical course of the disease.
		Enlist the laboratory investigation for diagnosing a case of hemophilia
	Disseminated intravascular coagulopathy	Enlist major disorders associated with DIS
		Discuss the pathophysiology of DIC
		Explain the morphological changes in DIC
		Explain how will you diagnose DIC?
	Transfusion medicine	Describe various blood component preparation
		Identify indications for different blood components
		Describe transfusion reactions associated with blood transfusion
PHARMACOLOGY		
	Anti-plasmin (antifibrinolytic) drugs	Describe mechanism of action of Anti- plasmin (antifibrinolytic) drugs
		Describe clinical uses and adverse effects of Anti-plasmin (antifibrinolytic) drugs
	Drug treatment of Haemophilia	Describe the drug treatment for various types of Haemophilia
		Describe the role of Desmopressin in the treatment of haemophilia
FORENSIC MEDICINE		
	Blood stains	Describe examination of blood stains. · Physical examination · Chemical examination · Physicochemical examination · Micro chemical examination · Spectroscopic examination · Immunological and enzymological methods for species determination
		Describe the medico legal importance of blood stains.
	Collection And Preservation Of Biological	Describe the collection and preservation of biological material · Blood

	Material	· Swabs and smears · Saliva . Semen
MEDICINE		
	Platelets (itp)	Describe Clinical features, investigations and management of a patient with Immune Thrombocytopenia (ITP).
PRIME/MEDICAL EDUCATION		
	Principles of medical ethics	Explain the pillars of medical ethics
		Explain the privacy and confidentiality of the patients and its medico-legal and cultural aspects
	Confidentiality	Exhibit Confidentiality of colleagues and patients
		Appropriately use of social media
LAB WORK		
S.No	Topic	Learning Outcomes
PATHOLOGY		
	Normal complete Blood count	Differentiate between a normal blood cells of different lineages
	ABNORMAL PERIPHERAL SMEAR IN DIFFERENT ANEMIAS	Differentiate between a normal and an abnormal RBC
		Identify different shapes of RBCs.
		Identify the common types of Anemia on the basis of RBC morphology
PHARMACOLOGY		
	Iron- deficiency anemia	Write prescription for a patient at risk of developing iron-deficiency anemia
		Write Chart order for treating an in-door patient with iron-deficiency anemia
FIELD VISIT		
	Visit to blood bank of a tertiary care hospital	Explain safe blood transfusion practices
		List the common pathogens that cause blood borne infections which may be acquired from unsafe blood transfusion practices.
		List the most common transfusion reactions seen in a blood bank in a local teaching hospital in Pakistan

		Communicate with health care staff effectively
		Describe the standard operating procedures (SOP's) of blood transfusion
PATHOLOGY		
	Normal white cell smear	Describe causes of leukocytosis
		Differentiate different types of white blood cells under microscope
FORENSIC MEDICINE		
	Microscopic examinatio n of animal and human blood	Perform Microscopic examination of animal and human blood.
	Examinatio n of blood stains under ultraviolet light	Perform examination of blood stains under ultraviolet light.
	Different pattern of stains	Identify different pattern of stains.
FIELD VISIT		
	Visit to basic health care unit EPI Center	Observe administration of different vaccines as part of Expanded Program of immunization
		(EPI) schedule of Pakistan at the vaccination center.
		List and explain the route of administration and mechanism of storage and maintenance of cold chain of each vaccine in the EPI schedule (support with images where possible)
		List the different components of each vaccine in the EPI schedule including the adjuvants, preservatives and explain their relevance to the vaccine.
		Differentiate between live attenuated vaccines, conjugate vaccines, subunit vaccines, and toxoid vaccines in the EPI schedule and their mode of action
		Identify the contraindications for vaccination that may present an additional risk
		Describe the organ gram of EPI center
		Explain the role of EPI center.
		Observe the process of vaccination on a case.
PATHOLOGY		
	Coagulation tests	Interpret Prothrombin time and activated partial thromboplastin time
		Interpret bleeding time and clotting time

3rd Year MBBS Block H: MSK II Module

S.NO	Themes	Duration
1	Aching Bones	2 week (1st& 2nd Week)
2	Joint Stiffness	1 week (3rd Week)
3	Muscle weakness and Trauma	1 week (4th Week)
4	Skin Rash and Itching	1 week (5th Week)

General Learning Objectives

At the end of this module, students will be able to

Knowledge

Reinforcement

- Explain important anatomical and physiological characteristics of musculoskeletal system

Pathology

- Explain essential pathological concepts of diseases involving

  - Joints
  - Bones
  - Muscles
  - Cartilages
  - Soft tissues
  - Skin

Pharmacology

- Describe the clinical applications of NSAIDs in the treatment of musculoskeletal disorders
- Describe the basic and clinical pharmacology of drugs affecting bone and Mineral Homeostasis
- Describe the basic and clinical pharmacology of drugs used to treat Gout and Rheumatoid Arthritis
- Describe the basic and clinical pharmacology of skeletal muscles relaxants
- Describe the drugs used for dermatological disorders.

Community medicine

- Classify accidents and injuries, burden of RTAs, prevention and control strategies of RTAs
- Define poliomyelitis and discuss the epidemiology, prevention, and control of poliomyelitis
- Define Ergonomics, Principles of Ergonomics, Epidemiology of MSK disorders and their prevention
- Discuss burden and prevention of Osteoporosis, Osteomalacia and Rickets

Forensic medicine

- Define and classify wounds
- Describe types of hurt according to Qisas and Diyat Act
- Describe firearm and explosives injuries
- Describe RTAs, Railway and Aircraft injuries
- Describe the Medico legal aspects of wounds

Medicine

- Describe Osteoporosis and Osteomalacia and develop its management plan
- Discuss Rheumatoid Arthritis and Ankylosing Spondylitis • Discuss Myopathies

Orthopedic

- Describe types of fracture and explain the open fractures
- Explain the emergency treatment of an injured limb.
- Identify and describe common benign and malignant bone tumours.
- Describe common ligamentous, tendon injuries and common spinal fractures

Dermatology

- Describe the pathological lesions of skin and their clinical presentation with differential diagnosis.

Radiology

- Interpret normal X-Rays and X-Rays showing structural deformities

Paediatrics

- Explain bone pains and aches in children
- Discuss Congenital/Hereditary Myopathies

Eye

- Describe the basic Anatomy of Eye

ENT

- Discuss anatomy of Ear, Nose, Para nasal Sinuses and Oral Cavity

Prime:

Communication Skills

- Dealing with patients

Behavioral Sciences / Professionalism

- Attributes of Professionalism

Research

- Study Designs
- Research question **Skills:**

Special Pathology

- Identify morphological features of Basal cell carcinoma and Squamous cell carcinoma
- Identify morphological features of Tuberculous osteomyelitis

Pharmacology

- Writing a prescription for a patient with Rheumatoid arthritis
- Writing a prescription for a patient with Gout

Forensic Medicine

- Identify types of mechanical wound
- Identify the causative weapon
- Identify the manner of wound causation
- Issue a medico legal certificate for the given wound

Orthopedic/Medicine

- Acquire a thorough history in relevance to MSK and take focused general examination of musculoskeletal system.
- Identify, evaluate and interpret the X-ray to diagnose fractures/musculoskeletal conditions
- Discuss the radiological characteristics of fractures and radiological characteristics of dislocations

Attitude:

While not necessarily taught explicitly, students are expected to develop following attitudes throughout the course:

1. Demonstrate teamwork, leadership, punctuality and good manners
2. Demonstrate humbleness and use socially acceptable language during academic and social interactions with colleagues and teachers.
3. Make ethically competent decisions when confronted with an ethical, social or moral problem related to MSK in professional or personal life
4. Discuss ethical issues, social and preventive aspect of health care in the context of MSK system.

3rd Year MBBS Block H: MSK II Module Theme I: Aching Bones		
S.No	**Topic**	**Learning Outcomes**
ANATOMY		
	Important Anatomical Characteristics of MSK	Discuss important anatomical characteristics of musculoskeletal system
PHYSIOLOGY		
	Important Physiological Characteristics of MSK	Discuss important Physiological characteristics of musculoskeletal system
PATHOLOGY		
	Metabolic diseases of bone	Describe the following metabolic diseases of bone from pathological point of view: • Osteopenia and Osteoporosis • Paget Disease (Osteitis Deformans) • Osteomalacia and Rickets
	Fracture and Osteonecrosis	Classify fractures and describe healing process in fractures
		Enlist aetiologies of osteonecrosis (Avascular Necrosis)
		Describe clinical features and morphological findings in osteonecrosis
	Osteomyelitis	Classify osteomyelitis and delineate its etiology, pathogenesis, common clinical features, morphological findings, and complications related to osteomyelitis
	Bone Tumors	Classify bone tumors
		Describe the frequency of different bone tumors in general population
		Enlist common clinical features found in common types of bone tumors.
		Enlist key morphological features of Osteosarcoma, Osteoid osteoma and Osteoblastoma
	Cartilage-Forming Tumors	Discuss the frequency of different cartilaginous tumors in general population
		Enlist common clinical features of common cartilaginous tumors
	Tumors of Unknown Origin	Describe etiology, pathogenesis, and key clinico-morphological features of Ewing's Sarcoma and Giant

		Cell Tumor
	Lesions Simulating Primary Neoplasms	Describe key clinico-morphological features and essential points in the pathogenesis of Fibroma
PHARMACOLOGY		
	NSAIDs	Describe the clinical applications of NSAIDs in the treatment of musculoskeletal disorders
	Drug affecting Bone & Mineral Homeostasis	Classify drugs used in metabolic bone disorders
		Enlist calcium preparations
		Describe clinical uses of calcium salts
		Enlist vitamin D preparations
		Describe actions of vitamin D on intestine, Kidney and Bone
		Describe clinical uses of vitamin D
		Describe the mechanism of action, clinical uses and adverse effects of Bisphosphonates
		Describe the mechanism of action, clinical uses and adverse effects of calcitonin
		Classify drugs used to treat osteoporosis
		Explain the mechanism of action of SERM (Raloxifene) and RANK ligand (Denosumab)
FORENSIC MEDICINE		
	Mechanism of production of wound	Define and classify wound
		Describe mechanism of action of wound production associated factors, appearance and complications.
	Abrasion	Define and classify abrasion
		Explain types of abrasion and mechanism of wound production associated factors, appearance, and complication.
		Differentiate between antemortem & postmortem abrasion.
		Describe the medico legal aspects of abrasion
	Bruise	Define and classify bruise

		Describe types of bruise and mechanism of wound production associated factors, appearance, and complication.
		Differentiate between ante mortem & postmortem Bruise.
		Describe the medico legal aspects of Bruise
	Lacerated wound	Define and Classify lacerated wound
		Describe types of lacerated wound and Mechanism of wound production associated factors, appearance and complication.
		Difference between ante mortem & postmortem Laceration.
		Describe the medico legal aspects of Lacerated wound
	Incised Wound	Define and classify incised wound
		Describe types of incised wound and mechanism of wound production associated factors, appearance, and complication.
		Difference between ante mortem & postmortem Incised Wound
		Differentiate between incised & lacerated wound.
		Describe the medico legal aspects of Incised wound
	Stab wounds	Define and classify Stab wound
		Describe types of Stab wound and mechanism of wound production associated factors, appearance, and complication.
		Difference between ante mortem & postmortem stab wound
		Describe the medico legal aspects of stab wound
	Battered baby syndrome	Explain the salient features of diagnosing Battered baby syndrome
COMMUNITY MEDICINE		
	Ergonomics	Describe Ergonomics
		Describe the principles & importance of Ergonomics at work place
		Explain the epidemiology of musculoskeletal disorders
		Discuss prevention and control strategies for Musculoskeletal disorders
	Public health aspects of disability limitations:	• Explain the types of rehabilitation and public health issues faced by the disabled person, and

	(Osteoporosis, Osteomalacia and Rickets)	measures to be taken for rehabilitation • Discuss epidemiology and prevention of Osteoporosis, Osteomalacia and Rickets
MEDICINE		
	Osteoporosis and Osteomalacia	Describe Osteoporosis and Osteomalacia
		List common causes and risk factors of Osteoporosis and Osteomalacia
		Discuss clinical features , differential diagnosis of Osteoporosis and Osteomalacia
		Enlist the Investigations for patient presenting with Osteoporosis and Osteomalacia
ORTHOPEDICS		
	Fractures	Describe and illustrate types of fracture, fracture patterns, displacement and angulation of fractures in children and adults.
		Explain open fractures Discuss the basic principles of wound debridement.
	Bone Tumours	To recognize, investigate and describe the radiological features of common benign and malignant Bone Tumours.
RADIOLOGY		
	X-Ray Interpretation	Identify and interpret different types of fractures
EYE		
	Anatomy of Eye	Describe anatomy of Orbit
		Describe anatomy of Eye Ball
ENT		
	Ear	Explain anatomy of ear
PAEDIATRICS		
	Bone pains and aches in children	Common causes of bones aches and pains including Growing pains in children
		Discuss nutritional Rickets causation, clinical presentation, Lab and Radiological findings and prevention
	Skeletal dysplasia's	Discuss clinical feature and differential diagnosis of the following • Achondroplasia • Osteopetrosis • Osteogenesis Imperfecta
PRIME/RESEARCH		

	Proposal writing	Write a proposal for research project using KMU or CPSP guidelines or any other standard guidelines
PRIME/MEDICAL EDUCATION		
	Attributes of professionalism-Empathy	Discriminate empathy and sympathy
		Demonstrate empathy in patient health professional interaction

Theme II: Joint Stiffness		
S.No	**Topic**	**Learning Outcomes**
PATHOLOGY		
	Osteoarthritis	Describe aetiology and pathogenesis of osteoarthritis
		Discuss clinical and morphological features of osteoarthritis
		Enumerate complications of osteoarthritis
	Rheumatoid Arthritis	Describe aetiology and pathogenesis of Rheumatoid Arthritis
		Discuss clinical and morphological features of Rheumatoid Arthritis
		Enumerate complications of Rheumatoid Arthritis
	Seronegative Spondyloarthropathies	Classify and explain Spondyloarthropathies
		Discuss pathogenesis and clinical features of Ankylosing Spondylitis
		Discuss pathogenesis and clinical features of Reactive Arthritis
		Discuss pathogenesis and clinical features of Psoriatic Arthritis
	Infectious Arthritis	Describe etiology and pathogenesis of Suppurative Arthritis
		Discuss clinical featuresand morphological features of Suppurative arthritis.
		Enumerate complications of Suppurative arthritis
		Describe etiology and pathogenesis of Mycobacterial Arthritis
		Discuss clinical features and morphological features of Mycobacterial Arthritis
		Enumerate complications of Mycobacterial Arthritis

	Rheumatic Fever	Describe key structural features, virulence factors, modes of pathogenesis and diagnosis of Streptococcus pyogenes
		Explain etiology, pathogenesis, clinical features, diagnosis, and complications of Rheumatic Fever.
	Crystal-Induced Arthritis	Enlist different types of crystalInduced arthritis
		Describe key points of aetiology, pathogenesis, clinical features, morphological features, and complications of: • Gout • Calcium Pyrophosphate Crystal deposition Disease (Pseudo-Gout)
PHARMACOLOGY		
	Pharmacotherapy of Gout	Classify drugs used to treat gout
		Describe the role of NSAIDs in the treatment of gout
		Describe the role of Glucocorticoids in the treatment of gout
		Describe the mechanism of action of various drugs (Colchicine, Probenecid, Allopurinol, Febuxostat) used in the treatment of Gout
		Discuss the adverse effects of antigout drugs
		Describe the drug interactions of Allopurinol and Probenecid
		Enlist the drugs causing hyperuricemia
		Discuss the mechanism by which drugs causes hyperuricemia
	Pharmacotherapy of Rheumatoid Arthritis	Classify drugs used in Rheumatoid arthritis
		Discuss the role of NSAIDs in Rheumatoid Arthritis
		Discuss the role of Glucocorticoids in Rheumatoid Arthritis
		Define and classify DMARDs
		Enlist biological and non-biological agents used to treat rheumatoid arthritis
		Describe pharmacokinetics mechanism of action, clinical uses and adverse effects of methotrexate.
		Enlist adverse effects and therapeutic uses of DMARDs
FORENSIC MEDICINE		
	Age of Wound & Complication	Describe events associated with wound healing
		Differentiate between old and fresh wound

		Describe injury zone on the basis of histo-chemical changes and Biochemical events taking place.
	Qisas & Diyat	Define hurt, Wound & injury
		Classify hurt according to International law
		Types of hurt according to Qisas & Diyat Act
		Explain Punishments (tazir), compensation and Fine (Diyat)
	Injured person medical aid act	Describe the salient features of injured person medical aid act
	Work-men compensation laws	Describe the salient features of Work-men compensation laws
MEDICINE		
	Rheumatoid Arthritis	Describe Rheumatoid Arthritis with its clinical presentation and differential diagnosis.
	Ankylosing Spondylitis	Describe Ankylosing Spondylitis with its clinical presentation and differential diagnosis.
ORTHOPEDICS		
	Bone and Joint Infections	Descirbe the aetiology, pathology, clinical presentation and investigations of Bone and Joint infections
ENT		
	Nose, Para Nasal Sinuses & Oral Cavity	Discuss anatomy of Nose, Para nasal sinuses & oral cavity
PAEDIATRICS		
	Juvenile Idiopathic arthritis (JIA)	Discuss criteria for classification of JIA
		Discuss its clinical features and differential diagnosis.
PRIME/MEDICAL EDUCATION		
	Communication Skills: Dealing with Patients	Explain importance of answering questions and giving explanation and/or instructions

Theme III: Muscle weakness and Trauma		
S.No	**Topic**	**Learning Outcomes**
PATHOLOGY		
	Tumors of adipose tissue	Classify soft tissue tumors and provide a brief description of their salient clinical features
		Enlist key morphological features of lipoma and liposarcoma
	Fibrous Tumors	Describe important clinicopathological and morphological features of:

		• Nodular Fasciitis • Fibromatoses
	Muscle tumors	Classify muscle tumors
		Describe etiology, clinicomorphological features, and complications of Rhabdomyosarcoma
		Describe etiology, clinicomorphological features, and complications of Leiomyoma
		Describe etiology, clinicomorphological features, and complications of Leiomyosarcoma
		Describe etiology, clinicomorphological features, and complications of Fibrosarcoma
	Skeletal muscle atrophy and myopathies	Describe pathological features of Skeletal Muscle Atrophy
		Describe pathological features of Neurogenic and Myopathic changes in Skeletal Muscle
		Describe pathological features of Inflammatory Myopathies
		Describe pathological features of Dermatomyositis
		Describe pathological features of Polymyositis
		Describe pathological features of Inclusion Body Myositis
		Describe pathological features of Toxic Myopathies
	Inherited Diseases of Skeletal Muscle	Describe genetic abnormality, morphology and clinical features of Muscular Dystrophies
PHARMACOLOGY		
	Skeletal muscle relaxants	Classify skeletal muscle relaxants.
		Describe the mechanism of action of Non-depolarizing and depolarizing neuromuscular blockers.
		Discuss the differences between depolarizing and non-depolarizing skeletal muscle relaxants
		Describe the therapeutic uses and adverse effects of skeletal muscle relaxants
		Describe centrally acting skeletal muscle relaxants (Spasmolytics)
		Name drugs causing malignant hyperthermia
		Discuss the rationale for use of Dantrolene in the treatment of malignant hyperthermia
		Discuss succinylcholine apnea and its management
FORENSIC MEDICINE		
	Transportation Accidents	Discuss injuries to the driver & front seat occupant and

		rare seat occupant.
		Discuss spinal injuries including Whiplash injury and railway spine
		Explain Railway injuries with medico legal significance
		Discuss Air crash accidents.
	Firearm Injuries	Describe wound ballistics and its types.
		Describe terms /Definition used in firearm injuries, types of bullets.
		Explain basic mechanism of firearm.
		Explain ranges of fire in firearm injuries, beveling phenomenon, wound production mechanism.
		Identify types of gun powders and ammunition used.
		Interpret findings of injuries produced by different weapons.
		Explain pattern of identification of entry and exit wound.
		Explain information inferred from examination of firearm entry wound.
	Injuries By Explosives	Describe mechanism of production of injuries by bomb blast.
		Explain different causes of death in blast injuries.
		Interpret Autopsy findings in explosion fatalities.
	Thermal Injuries	Describe Thermal Injuries
		Describe their classifications
		Describe Burns and Scalds
	Electrical Injuries	Explain electrocution
		Types of electrical injuries
		Describe PM findings
		Explain Lightning
COMMUNITY MEDICINE		
	Rehabilitation of disabilities: Poliomyelitis	Define disabilities and its types, and concepts, and distinguish between impairment, disability and handicapped, and significance of DALYs and QALYs.
		Describe the Epidemiology, determinants & distribution of poliomyelitis
		Describe the prevention and control measures and rehabilitation of Poliomyelitis

	Accidents and its prevention	Describe of types of accidents and their mechanisms and their prevention (Haddon`s model)
		Describe Road Traffic Accidents
		Classify different types of road traffic accidents and injuries?
		Describe and compare the burden of road traffic accidents in a developed country with a developing country like Pakistan
		List and Explain the risk factors of road traffic accidents
		Explain effective public health strategies used at individual and national level to prevent for road traffic accidents
MEDICINE		
	Myopathies	Define Myopathy
		Enlist Myopathies (Hereditary & Acquired Myopathies)
		Describe the etiology and clinical features of Myopathies
		Plan investigations for Myopathies
ORTHOPEDIC		
	Application of Cast	Explain the emergency treatment of an injured limb.
		Explain emergency immobilization techniques of the Neck, Spinal column and limbs.
		Describe and discuss the basic principles pertaining to application of a cast, the complications of cast application.
		Discuss the principles of a threepoint pressure system in a cast.
	Soft Tissue Injuries, Spinal Injuries	Describe the common ligamentous and tendon injuries and advise appropriate management
		Recognize common Spinal fractures, and provide appropriate initial management
PAEDIATRICS		
	Congenital/Hereditary Myopathies	Discuss common congenital and hereditary myopathies, their genetics, causation, clinical presentation, diagnosis.
	Duchene Muscular dystrophy (DMD)	Describe DMD, its clinical presentation and differential diagnosis.

Theme IV: Skin Rash and Itching		
S.No	**Topic**	**Learning Outcomes**
PATHOLOGY		

	Important pathological terms	Define the following skin lesions and describe these with respect to their etiologies and gross morphological features. • Macule • Papule • Nodule • Plaque • Vesicle • Bulla • Blister • Pustule • Scale • Lichenification • Excoriation
		• Hyperkeratosis • Parakeratosis • Acanthosis • Dyskeratosis • Acantholysis • Papillomatosis • Lentiginousspongiosis • Urticaria • Pemphigus • Bullous pemphigoid • Warts
	Eczematous dermatitis	Classify eczematous dermatitis
		Describe the morphological and clinical features of acute eczematous dermatitis
		Describe the etiology and pathogenesis of • Contact dermatitis • Atopic dermatitis • Drug related eczematous dermatitis • Photoeczematus eruption • Primary irritant dermatitis
	Erythema multiforme	List the conditions which are associated with erythema multiforme and describe its clinical features
	Psoriasis	Describe the etiopathogenesis, morphological and clinical features of psoriasis
	Pre-malignant epithelial lesions	List the pre-malignant epithelial lesions (Epidermal) • List the predisposing factors for squamous cell carcinoma of skin • Differentiate squamous cell carcinoma from basal cell carcinoma on the basis of morphology and clinical

		features
	Nevocellular Nevi and Malignant Melanoma	List types of Nevocellular Nevi (Congenital Nevus, blue nevus, Spitz's Nevus, halo nevus dysplastic nevus) along with their clinical significance. (Dermal) • Describe the clinical and morphological features of dysplastic nevi • Describe malignant melanoma with respect to frequent site of origin, clinical and morphological features.
	Viral skin infections	Describe the following viral skin infections in context of etiopathogenesis: • Herpes simplex virus • Herpes zoster virus
	Fungal skin infections	Classify and describe the following fungal skin infections in context of etiopathogenesis: • Tinea • Candida
	Skin and soft tissue infections	Describe the following skin lesions in context of ethiopathogenesis and diagnosis • Impetigo • Cellulitis / Erysipelas • Folliculitis • Skin Abscess (Furuncle & Carbuncle) • Necrotizing Soft Tissue Infections
PHARMACOLOGY		
	Drugs used for dermatological disorders	Classify dermatological preparations
		Enlist topical antibacterial, antifungal &antiviral preparations.
		Describe clinical uses and adverse effects of topical antibacterial, antifungal and antiviral drugs.
		Discuss oral treatment of candidiasis dermatophytosis and onychomychosis.
		Describe various acne preparations and antibiotics used to treat acne.
		Enlist clinical uses of immunomodulators (Imiquimod, Tacrolimus) related to skin diseases.
		Enlist ectoparasiticides
		Enlist clinical uses and adverse effects of Permethen.
		Discuss drug treatment of Scabies & Pediculosis.
		Describe the mechanism of action and adverse effects of various agents used for pigmentation disorders

		Describe the clinical uses and adverse effects of drugs used for the treatment of psoriasis.
		Describe clinical uses and adverse effects of topical corticosteroids
		Enlist dermatological disorders responsive to topical corticosteroids ranked in order of sensitivity.
		Discuss keratoytic agents, antipruritic agents, trichogenic and antitrichogenic agents and use of antineoplastic agents in topical conditions
MEDICINE/DERMATOLOGY		
	Important pathological terms with Clinical presentations	Enlist and explain the clinical presentation of the following skin Lesions: • Macule • Papule • Nodule • Plaque • Vesicle • Bulla • Blister • Pustule • Scale • Lichenification • Excoriation • Hyperkeratosis • Parakeratosis • Acanthosis • Dyskeratosis • Acantholysis • Papillomatosis • Lentiginousspongiosis • Urticaria • Pemphigus • Bullous pemphigoid • Warts
	Pre-malignant skin conditions	Enlist the pre-malignant skin conditions Explain their differential diagnosis on the basis of clinical presentations Enlist the relevant investigations
	Malignant conditions of skin	Enlist the malignant conditions of skin (squamous and basal cell carcinoma) Explain their differential diagnosis on the basis of clinical presentations
		Enlist the relevant investigations

	Nevocellular Nevi	List the types of Nevocellular Nevi and discuss their differential diagnosis on the basis of their clinical presentations. Enlist the relevant investigations
FAMILY MEDICINE		
	Leishmaniasis	Explain the clinical features and management of cutaneous Leishmaniasis in primary healthcare
PAEDIATRICS		
	Juvenile Dermatomyocytis (JDM)	Discuss diagnostic criteria of JDM
		Discuss its clinical features differential diagnosis
PRIME/RESEARCH		
	Qualitative and quantitative study 3	Write a proposal for research project using KMU or CPSP guidelines or any other standard guidelines
LAB WORK		
S.No	**Topic**	**Practical**
PATHOLOGY		
	Tuberculous osteomyelitis	Identify gross and microscopic morphological features of tuberculous osteomyelitis
	Osteogenic sarcoma, Osteoclastoma and chondrosarcoma	Identify gross and microscopic morphologic features of osteogenic sarcoma, osteoclastoma and chondrosarcoma
	ASO (Anti Streptolysin O) test	Perform ASO (Anti Streptolysin O) test by latex agglutination technique
	Tumors of Skin	Identify gross and microscopic features of • Squamous cell carcinoma • Basal cell carcinoma
PHARMACOLOGY		
	Gout	Write prescription for Gout
	Rheumatoid Arthritis	Write prescription for Rheumatoid Arthritis
	Drugs used to treat Dermatological Disorders	Write down prescription for scabies.
		Write down prescription for Psoriasis
FORENSIC MEDICINE		
	Examination of wound and	• Abrasion

	weapon	• Bruise • Laceration • Incised wound • Qisas and Diyat models/ • Dura prints of injuries
	Examination of wound and weapon	• Stab wound • Fracture • Displacement • Qisas and Diyat models of injuries/ multimedia slides remaining
	Examination of wound and weapon	Firearm injuries / Weapons Identification of bullets
	Writing a medico legal certificate	Medicolegal report writing in case of firearm Injuries

ASSESSMENT BLUEPRINT of BLOCK H

BLOCK H Paper: MCQs Distribution

Subject	Multisystem-1 module	Blood and Immunology-2	Musculoskeletal (MSK)-2 module	Total MCQs
Pharmacology	12	03	05	20
Pathology	16	22	13	51
Forensic medicine	09	02	09	20
Community medicine	03	04	03	10
ENT			01	01
Eye			01	01
PRIME			01	01
Research			05	05
Medicine	01	02	02	05
Orthopedics			02	02
Pediatrics		01	03	04
Total	**41**	**35**	**44**	**120**

Paper-H OSPE Outline

Subject	OSPE/OSCE	Viva stations	Total*
Pharmacology	5	2	7
Pathology	3	2	5
Forensic medicine	2	2	4
Community medicine	0	2	2
Paeds (history and physical examination)	1	0	1
Medicine (history and physical examination)	1	0	1
Total	12	8	20

A minimum of 20 stations will be used in final exams. Total marks will be 120 (6 marks for each station).

Paper-I (CVS II and Respiratory Module)

3rd Year MBBS Block I: CVS II Module

S. No.	Theme	Week
1	Chest Pain	2 (1)
2	Blood pressure	1

3	Shortness of breath	2 (1)

General Learning Objectives???

3rd Year MBBS Block I: CVS II Module **Specific Learning Outcomes** **Theme:1 Chest Pain**		
S.No	**Topic**	**Learning Outcomes**
ANATOMY		
	Gross anatomy of heart, valves and coronary arteries	Describe surface anatomy of the heart and heart valves
		Describe the anatomy of coronary circulation
		Enumerate heart valves and describe their gross morphology
BIOCHEMISTRY		
	Lipoproteins and cholesterol	Classify and Describe types of lipoproteins
		Summarize cholesterol synthesis

PATHOLOGY		
	Atherosclerosis	Discuss the risk factors, Morphology, pathological changes and consequences of Atherosclerotic plaque
	Ischemia and infarction	Define Ischemia and infarction, and differentiate it from infarction
		Discuss Classification and pathophysiology of ischemic heart disease
		Discuss pathophysiology of myocardial infarction
PHARMACOLOGY		
	Antianginal drugs	Classify antianginal drugs
		Explain mechanism of action, pharmacokinetics and adverse effects of organic nitrates and calcium channel blockers
		Explain the rationale for use of **β**-adrenergic blockers and sodium channel blocker in the management of angina pectoris
	Lipid lowering drugs	Briefly describe the types of dyslipidemias
		List the lipid lowering drug classes
		Explain the mechanism of action, effect on serum lipid profile and adverse effects of each of the five drug classes
		Discuss drug-drug interaction of lipid lowering drugs
	Anticoagulant drugs	Classify anticoagulant drugs
		Discuss mechanism of action, uses of Unfractionated heparin
		Compare low molecular weight and unfractionated heparin
		Describe adverse effects of heparin and treatment of heparin overdose
		Describe mechanism of action and uses of direct Xa and IIa inhibitors
		Describe mechanism of action and uses of warfarin
		Describe adverse effects of warfarin and treatment of warfarin overdose
		Compare heparin and warfarin in terms of mechanism and onset of action
		Explain monitoring of anticoagulant therapy
		Describe important diet and drug interactions of warfarin
	Antiplatelet and thrombolytic drugs	Classify antiplatelet drugs

		List indications of antiplatelet therapy
		Explain the mechanism of action and adverse effects of each antiplatelet drug group
		Name thrombolytic drugs and explain their mechanism of action, uses and adverse effects
FORENSIC MEDICINE		
	Chest trauma	Describe heart injuries caused by regional injuries
		Discuss chest wall injuries in general
		Enumerate the complications of rib fracture
	Sudden death	Define sudden death
		Explain the causes of sudden death
		Describe autopsy findings in sudden death
		Describe the medicolegal importance of sudden death
COMMUNITY MEDICINE		
	Noncommunicable diseases: Cardiovascular diseases of public health importance	Define Cardiovascular disease (CVD)
		Elaborate the concept of CVD risk stratification
		Describe the epidemiology of cardiovascular diseases and explain cardiovascular diseases of Public Health importance globally and in Pakistan
		Explain the known risk factors of CVD and cultural, racial and gender difference in CVD prevalence and incidence
	Hypertension	Describe the epidemiology of hypertension and its public Health importance globally and in Pakistan
GENERAL MEDICINE/CARDIOLOGY		
	Coronary Heart disease	Discuss CAD risk factors and strategies to reduce them
		Discuss strategies for primary and secondary prevention of CHD in outpatient setting
		Define chronic stable angina, its clinical signs and symptoms, laboratory findings, imaging techniques for assessment of it and management protocols
		Discuss coronary vasospasm and angina with normal coronary angiograms
	Acute coronary syndrome	Define Acute coronary syndrome

		Explain the spectrum of illness in ACS and relevant management steps
		Describe the clinical features and steps of the management of Myocardial infarction
		Describe risk stratification in myocardial infarction
		Describe complications of acute MI
	Hypertrophic cardiomyopathy	Discuss clinical features, imaging protocols, risk stratification and short/long-term management of hypertrophic cardiomyopathy
PRIME/MEDICAL EDUCATION		
	Informed consent	Obtaining informed consent from a patient before an invasive procedure

Theme II: Blood pressure		
S.No	**Topic**	**Learning Outcomes**
PATHOLOGY		
	Blood pressure	Describe the mechanisms of blood pressure regulation
		Classify shock
	Shock	Describe the pathophysiology and types of shock
		Describe the stages pf shock
		Define sepsis and septic shock
		Discuss causes, pathogenesis, and laboratory findings in shock
		Discuss Disseminated intravascular coagulation in the context of sepsis
		Describe classification and pathophysiology of Hemorrhage
	Hypertension	Describe the causes, pathogenesis, morphology and complications of Hypertension
	Aneurisms	Discuss pathophysiology of hypertension in pregnancy
		Describe the etiology, morphology and manifestations of vascular aneurisms
		Describe the causes, Pathogenesis and types of Aortic Aneurysm
	Aortic dissection	Describe the pathogenesis, morphology and clinical features of Aortic Dissection
	Vasculitis	Define vasculitis

		Classify vasculitides
		Describe the immunological mechanisms of non-infectious vasculitis
		Describe the morphology and clinical features of Giant cell arteritis
		Describe the morphology and clinical features of Takayasu arteritis
		Describe the morphology and clinical features of Polyarteritis nodosa
		Describe the morphology and clinical features of Kawasaki disease
		Describe the morphology, serological markers and clinical features of Wegener granulomatosis
		Describe the morphology and clinical features of Thromboangitis obliterans
	Diseases of veins	Differentiate between thrombophlebitis and Phlebothrombosis
		Describe the etiology and clinical features of varicose veins
		Enlist the benign and malignant tumors of the arteries and veins
PHARMACOLOGY		
	Antihypertensive drugs	Classify antihypertensive drugs
		Discuss role of diuretics in the management of hypertension
		Discuss the role of ACE inhibitors, Angiotensin receptor-blocking agents, Renin inhibitor in hypertension
		Explain the rationale for the use of β-blockers, α-adrenoceptor blocking agent, centrally acting sympatholytic drugs in hypertension
		Describe the direct vasodilators (mechanism of action and drug toxicity) in relation to antihypertensive drug therapy
		Describe the role of Calcium channel blockers in hypertension
GENERAL MEDICINE/CARDIOLOGY		
	Hypertension	Define and classify hypertension
		Discuss drug treatment protocols for hypertension
		Describe the risk factors and complications of hypertension
		Describe the management of hypertensive emergencies and urgencies
FORENSIC MEDICINE		
	Cardiac poisons	Classify Cardiac Poisons
		Describe the characteristic, clinical signs/symptoms, treatment and medicolegal aspects of cardiac glycosides

		Discuss cardiac effects of methylphenidate, cocaine and Ice
		Describe the characteristic, clinical signs/symptoms, treatment and medico legal aspects of Oleander
PRIME/MEDICAL EDUCATION		
	Counselling skills	Develops counselling skills in professional life

Theme III: Shortness of breath		
S.No	Topic	Learning Outcomes
PHYSIOLOGY		
	Cardiac cycle	Outline major events in cardiac cycle
		Discuss physiology of heart sounds and murmurs
PATHOLOGY		
	Congestive heart failure	Describe the types, etiology, pathogenesis, and clinical features of congestive heart failure
	Cardiomyopathies	Describe the Pathological patterns, causes, morphological changes and clinical features of Cardiomyopathies
	Congenital heart diseases	Describe the Etiology, Pathogenesis and clinical features of Tetrology of Fallots, ASD, VSD and pulmonary stenosis
	Valvular heart diseases	Describe the Etiology, pathogenesis and clinical features of Aortic stenosis, Aortic regurgitation, Mitral stenosis and Mitral regurgitation
	Rheumatic fever	Discuss pathophysiology and laboratory findings in rheumatic fever
	Rheumatic heart disease	Discuss pathological changes and morphology of rheumatic heart disease
	Thrombosis and Embolism	Describe the mechanism and pathogenetic mechanisms of vascular thrombosis
		Enlist hypercoagulable states
		Define embolism
		Discuss types of embolism
		Describe the etiology, pathogenesis, morphology and clinical features of pulmonary embolism
	Endocarditis	Discuss Etiology, Pathogenesis, Morphology, diagnostic criteria, clinical features and complications of infective endocarditis
		Discuss the types of non-infected vegetation
PHARMACOLOGY		
	Drugs used in heart failure	Define the different classes of the drug used in the treatment of heart failure
		Explain the pharmacological effects, clinical uses, adverse

		effects and drug interactions of digitalis glycosides
		Explain the signs symptoms and treatment of digoxin overdose
		Enlist positive inotropic drugs (other than digoxin) that are used in heart failure
		Classify the five major groups of diuretic drugs and relate them to their site of action
		Discuss the mechanism of action, clinical applications and adverse effects of carbonic anhydrase enzyme inhibitors, osmotic diuretics, thiazide diuretics, loop diuretics and potassium sparing diuretics
		Enlist potassium sparing and potassium losing diuretics
	Antiarrhythmic drugs	Classify antiarrhythmic drugs
		Describe the effect of different classes of antiarrhythmic drugs on membrane potential of cardiomyocytes
		Explain the mechanism of action of all the classes of antiarrhythmic drugs
		Discuss the adverse effects and clinical uses of antiarrhythmic drugs
		Discuss workup and management of pulmonary edema
GENERAL MEDICINE/CARDIOLOGY		
	Heart failure	Enlist and explain causes of heart failure
		Describe workup and management of heart failure
	Disorders of heart rate and rhythm	Classify arrhythmias and heart blocks
		Describe the etiology, ECG findings and management of Atrial fibrillation
		Discuss types, workup and management of ventricular arrhythmias
	Pulmonary embolism	Describe the etiology, clinical features and diagnostic workup of pulmonary embolism
		Discuss risk stratification and management of pulmonary embolism
	Pulmonary hypertension	Discuss cardiac causes of pulmonary hypertension and outline their management
	Myocarditis	Discuss causes and management of myocarditis
	Pericardial diseases	Define and classify pericarditis
		Discuss clinical findings and treatment of pericarditis

		Describe the etiology and management of pericardial effusion
PAEDIATRICS		
	Cyanotic and acyanotic congenital heart disease	Delineate the difference between the acyanotic and cyanotic heart disease conditions
		Enumerate the various defects, involving both conditions
	Rheumatic fever	Describe the etiology of rheumatic fever
		Describe Duckett Johns criteria for diagnosis of RF
		Discuss about primary and secondary prophylaxis of rheumatic heart disease
PRIME/MEDICAL EDUCATION		
	SWOT Analysis	Perform SWOT analysis for a particular task

LAB WORK

S.No	Topic	Learning Outcomes
PHARMACOLOGY		
	Myocardial Infarction	Construct a prescription for a patient with Myocardial Infarction
	Hypertension	Construct a prescription for a patient with Hypertension
	Congestive Cardiac Failure	Construct a prescription for a patient with Congestive Cardiac Failure
PATHOLOGY		
	Lipid Profile	Demonstrate Estimation of total cholesterol
	Hemangioma	Identify the morphological changes occurring in hemangioma
FORENSIC MEDICINE		
	Cardiac toxins	Identify the following cardiogenic toxins: • Digitalis • Cannabis • Heroin

3rd Year MBBS Block I: Respiratory II Module

S.No	Theme	Duration
1	Cough with sputum, and fever.	Two weeks
2	Wheezy Chest and Shortness of breath	Two weeks

General Learning Outcomes

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

Knowledge:

1) Explain various lower respiratory tract infections
2) Explain obstructive respiratory diseases.
3) Describe various Granulomatous lung diseases
4) Describe medico legal aspect of asphyxial death.
5) Describe respiratory tract diseases of public health importance with emphasis on agent factors, epidemiology, preventive and control measures.
6) Describe management of common respiratory problems.

Skills:

7) Prescribe medication according to guidelines for common respiratory disorders.

Attitude:

3rd Year MBBS Block I: Respiratory II Module **Theme I: Cough with sputum, and fever**		
S.No	**Topics**	**Learning Outcomes**
ANATOMY		
		Describe clinical anatomy of thorax including thoracic wall, lungs and trachea-bronchial tree anatomy
		Correlate the different developmental stages of lung with its congenital anomalies
		Describe the surface marking of clinically relevant areas of the respiratory system
PHYSIOLOGY		
		Describe the mechanics of ventilation and different volumes and capacities of lungs
		Describe respiratory gas exchange.
BIOCHEMISTRY		
		Describe the effects of hyperventilation (e.g. Anxiety) and hypoventilation (e.g. COPD) on pH and blood gases, HCO3 and electrolytes.
MICROBIOLOGY		
	Legionella	Describe Pathogenesis, Structure, Clinical Findings & Laboratory Diagnosis of Legionella infection
	Mycoplasma	Describe Pathogenesis, Structure, Clinical findings & Laboratory Diagnosis of mycoplasma infection.
	H-Influenza	Describe Pathogenesis, Structure, Clinical Findings & Laboratory Diagnosis of H-Influenza infection.
	Bordetella	Describe Pathogenesis, Structure, Clinical Findings & Laboratory Diagnosis of Bordetella infection
	Mycobacterium Tuberculosis	Describe Pathogenesis, Important Properties, Clinical Findings & Laboratory Diagnosis of Mycobacterium Tuberculosis.
	Pulmonary Infections	Describe community acquired pneumonia and its different types.
		Describe community acquired atypical Pneumonia.
		Describe etiology, pathogenesis & clinical features of nosocomial pneumonia.
		Describe etiology, pathogenesis & clinical features of

		pneumonia.
		Describe etiology, pathogenesis & clinical features of chronic pneumonia.
		Describe etiology, pathogenesis, clinical & radiologic features of Pulmonary Tuberculosis.
		Describe pneumonia in immunocompromised host.
	Granulomatous diseases	Describe sarcoidosis its etiology, pathogenesis, morphology and clinical course.
		Describe etiology, pathogenesis, clinical & radiologic features of hypersensitivity pneumonitis.
		Describe etiology, pathogenesis, clinical & radiologic features of pulmonary eosinophilia.
	Lung abscess	Define Lung Abscess
		Describe Pathogenesis, morphology & Clinical Course of Lung abscess
	Empyema	Describe empyema & its pathogenesis
	Laryngeal tumors	Describe the risk factors, morphology, clinical features and staging of laryngeal tumors.
PHARMACOLOGY		
	Anti-tussives	Classify Anti-tussives
	Cough Suppressants	Describe the pharmacology of Cough suppressants
	Expectorants	Describe the pharmacology of Expectorants, Mucolytic agents in cough
	Tuberculosis	Classify Anti tuberculous drugs
		Describe the pharmacology of First line antituberculous drugs
		Describe the pharmacology of 2nd line antituberculous drugs
		Discuss the drug treatment & duration of susceptible newly diagnosed pulmonary tuberculosis patient
		Discuss the development of resistance to mycobacterium tuberculosis against conventional antibiotics
		Discuss the classification & duration of therapy in patients having MDR tuberculosis
		Discuss the drug treatment & duration of antitubercular therapy in pregnant woman & patients having Hepatic & Renal insufficiency
		Describe the rationale for the use of Multi Drug therapy against pulmonary tuberculosis.
COMMUNITY MEDICINE		

	Tuberculosis	Describe agent, host and environmental factors for the disease.
		Describe DOTS strategy for Tuberculosis
		Explain different preventive and control measures for Tuberculosis including "stop TB" and "End TB" strategies
	Influenza and COVID infection	Describe types of influenza
		Describe agent, host and environmental factors for the disease.
		Explain the antigenic drift and antigenic shift
		Describe various preventive and control measures for influenza
		Describe the epidemiology, clinical features, control measures and vaccination for COVID-19 infection
FAMILY MEDICINE		
	Social determinants of health	Describe the social determinants of health
	Environmenta l and climate factors in disease causation	Explain the role of environmental and climate factors in disease causation
	Principles of prevention and health promotion	Describe the Principles of prevention and health promotion
		Describe, the role of counselling and patient education in health promotion and disease prevention
	Tuberculosis (individuals` identifications , routine contact tracing, and linking to care)	Explain the types of Pulmonary Tuberculosis
		Explain the pathophysiology, clinical features, complications, and management of a patient with pulmonary Tuberculosis
		Describe the technique of contact tracing in a patient with non-MDR and MDR tuberculosis
		Describe the indications of specialist referrals in patients with Pulmonary Tuberculosis
FORENSIC MEDICINE		

	Asphyxia (General Aspects)	Define asphyxia
		Define anoxia
		Enlist causes of anoxia
		Explain causes of asphyxia
		Classify mechanical asphyxia
		Describe patho physiology of asphyxia
		Describe general signs of asphyxia
	Hanging	Define hanging
		Describe causes of death in hanging
		Explain mechanism of death in hanging
		Describe the procedure of neck dissection in hanging
		Describe autopsy findings in hanging
		Explain medico legal aspects of hanging
	Mechanical asphyxia (Strangulation)	Define strangulation
		Describe causes of death in strangulation
		Explain mechanism of death in strangulation
		Describe the procedure of neck dissection in strangulation
		Describe autopsy findings in strangulation
		Explain medico legal aspects of strangulation
	Drowning	Define drowning
		Describe causes of death in drowning
		Explain mechanism of death in drowning
		Describe types of drowning

		Describe autopsy findings in drowning
		Differentiate between ante and post mortem drowning
		Explain medico legal aspects of drowning
	Suffocation	Define suffocation and explain its medico legal aspects.
	Smothering	Define smothering
		Explain medico legal aspects of smothering
	Chocking	Define chocking
		Explain medico legal aspects of chocking
	Gagging	Define Gagging
		Explain medico legal aspects of Gagging
	Overlaying	Define overlying
		Explain medico legal aspects of overlying
	Traumatic asphyxia	Define traumatic asphyxia
		Describe autopsy findings of traumatic asphyxia
		Explain medico legal aspects of traumatic asphyxia
	Sexual asphyxia	Define sexual asphyxia
ENT		
	Larynx anatomy	Describe clinical anatomy of larynx.
	Laryngitis	Describe etiology, clinical feature, management of acute and chronic laryngitis.
MEDICINE		
	Respiratory symptoms	Describe approach to a patent of respiratory symptomatology
	Differential diagnosis	Discuss the differential diagnosis of granulomatous inflammation including TB
	Pulmonary TB	Describe the signs & symptoms, investigations, clinical diagnosis, management protocol & prognosis for TB and MDRTB according to WHO categories.
PEDIATRICS		
	Childhood Pneumonia	Classify pneumonia according to IMNCI (integrated management of neonatal and childhood illnesses)
		Describe the risk factors for recurrent pneumonia in childhood.
		Describe the etiological agents for Pneumonias according to the age of the child.

		Describe the indication for hospitalization of child with pneumonia.
RADIOLOGY		
		Describe the common radiological abnormalities on chest x-rays

Theme II: Wheezy chest & shortness of breath		
S.No	**Topic**	**Learning Outcomes**
PATHOLOGY		
	Atelectasis	Define Atelectasis
		Describe different types of atelectasis
	Acute Lung injury	Define Acute Respiratory distress Syndrome (ARDS)
		Describe Pathogenesis and morphological features of ARDS
	Obstructive Pulmonary disease	Define obstructive pulmonary disease and enlist its different types
		Define Emphysema
		Describe different types of emphysema
		Describe the pathogenesis morphology and underline course of emphysema
		Define chronic bronchitis
		Describe its pathogenesis and morphology
		Describe asthma and its pathogenesis
		Differentiate between types of asthma
		Describe morphology and clinical course of asthma
		Define bronchiectasis, describe the causes, morphology and pathogenesis of bronchiectasis
	Restrictive or infiltrative lung diseases	Define diffuse interstitial lung disease.
		Describe pathogenesis of diffuse interstitial lung disease.
		Enlist major categories of chronic interstitial lung disease
		Describe the fibrosing lung diseases.

		Describe pneumoconiosis, its morphology and different types.
		Describe drug and radiation induced pulmonary diseases.
	Diseases of vascular origin	Describe pulmonary embolism, hemorrhage and infarction.
		Describe pulmonary Hypertension.
		Describe diffuse alveolar hemorrhage syndromes.
	lung tumors	Describe carcinoma of lung, its etiology pathogenesis, morphology and clinical course.
		Differentiate between small cell lung carcinoma and non-small cell lung carcinoma.
		Describe bronchial carcinoids
		Describe malignant mesothelioma and its morphology
	Pleural lesions	Describe pleural effusion and pleuritis.
		Describe pneumothorax, Hemothorax and chylothorax
PHARMACOLOGY		
	Asthma	Classify the Drugs used in the treatment of asthma
		Describe the role of beta 2 agonists used in Asthma
		Describe the role of Methylxanthine drugs used in Asthma
		Describe the role of Antimuscarinic agents used in Asthma
		Describe the role of Corticosteroids used in Asthma
		Describe the pharmacokinetic & pharmacodynamic aspects of Mast cell stabilizers used in Asthma
		Describe the pharmacokinetic & pharmacodynamic aspects of Leukotriene antagonist used in Asthma
		Describe the pharmacokinetic & pharmacodynamic aspects of Anti-IgE antibodies used in Asthma
		Describe drug treatment of acute and chronic asthma and status asthmatics
COMMUNITY MEDICINE		
	Asthma	Describe the epidemiology & preventive measures of asthma.
		Define occupational asthma and describe its preventive measures.
	Pneumoconiosis	Describe various pneumoconiosis diseases

		Describe the control and preventive measures of pneumoconiosis
	Diphtheria and Pertussis	Describe the epidemiological determinants of Diphtheria and Pertussis
		Describe preventive and control measures.
		Explain their current public health importance in Pakistan.
FORENSIC MEDICINE		
	Asphyxiant (CO)	Explain medico legal aspects of sexual asphyxia
		Enlist sources of CO poisoning
		Describe signs and symptoms of CO poisoning
		Explain treatment plan of CO poisoning
		Describe autopsy findings of CO poisoning
		Explain ML aspects of CO poisoning
	CO2	Enlist sources of CO2 poisoning
		Describe signs and symptoms of CO2 poisoning
		Explain treatment plan of CO2 poisoning
		Describe autopsy findings of CO2 poisoning
		Explain ML aspects of CO2 poisoning
		Enlist sources of H2S poisoning
		Describe signs and symptoms of H2S poisoning.
	H2S	Explain treatment plan of H2S poisoning
		Describe autopsy findings of CO poisoning
		Explain ML aspects of H2S poisoning
	War gases	Define war gases
		Classify war gases
		Describe medico legal aspects of war gases
ENT		
	Non –Neoplastic laryngeal lesions	Describe clinical features and management of different non neoplastic layrangeal lesions (Vocal cords nodules, polyps, and laryngocele)
	Neoplastic laryngeal lesions	Describe the clinical feature and management of neoplastic laryngeal lesions.
	Vocal cord Palsy	Describe the clinical feature and management of vocal cord palsy

	Emergency Tracheotomy	Describe the indication, contraindication, complications, and operative steps to perform emergency tracheotomy.
MEDICINE		
	COPD	Describe the epidemiology, patho-physiology and etiology of COPD
		Explain the clinical presentation of COPD
		Describe the investigations required for the diagnosis of COPD
		Describe the management plan of COPD
	Asthma	Describe the epidemiology, pathophysiology, etiology, and contributing factors related to the development of asthma
		Describe the clinical presentation, diagnosis and treatment of asthma
		Classify asthma on the basis of clinical presentation into mild, moderate, life threatening and near fatal asthma
		Explain the stepwise pharmacologic approach for the treatment of asthma status asthmaticus
		Describe long-term asthma management plan including pharmacological, physical and occupational health education.
	Respiratory failure	Describe the long term Oxygen therapy in COPD
	Pneumothorax	Describe the etiology, classification, diagnosis and management of pneumothorax
	Pleural effusion	Describe the causes of exudates and transudate effusion.
		Differentiate between exudate and transudate effusion.
FAMILY MEDICINE		
	COPD	Explain the management strategies of a patient with COPD in general practice
		Describe the strategies for prevention of complications of COPD
		Describe the methods of home oxygen therapy
		Perform routine annual health checkup of an Asthmatic and COPD patient under supervision
		Identify the red-flags in a patient with COPD and appropriately refer to speciality care when required
	Bronchial Asthma	Discuss the risk factors for Asthma in our population

		Explain the risk assessment for Asthma
		Interpret spirometry results
		Discuss the primary and secondary prevention of Asthma in a primary health setting
		Identify the guidelines that should be followed in a patient with Asthma
		Identify the red-flags in a patient that need referral for specialist care
	ARIs (Croup and Epiglottitis)	Differentiate Croup and epiglottitis based on etiology and clinical features.
		Explain the management of croup and epiglottitis.
		Explain the most effective ways to prevent and control ARIs
	Respiratory distress syndrome(RDS)	Describe the risk factors, clinical features, investigation and management for RDS.
	Reactive air way disease.	Describe the different types of wheezers in pediatric population
		Discuss the risk factor for persistent wheezing /asthma.
		Describe management of bronchiolitis
	Cystic fibrosis and bronchiectasis	Define bronchiectasis and its risk factors.
		Describe diagnostic criteria for cystic fibrosis.
		Describe the GI, respiratory and other systemic manifestations of cystic fibrosis.
PRIME/MEDICAL EDUCATION		
	Power dynamics	Explain the concept of power dynamics and delegate powers to juniors and team mates

LAB WORK

S.No	**Topic**	**Practical**
PHARMACOLOGY		
		Write the proper prescription for Pulmonary Tuberculosis
FORENSIC MEDICINE		

		Demonstrate the differences between hanging and strangulation on a model
		Demonstrate the differences between different types of hanging on a model
COMMUNITY MEDICINE		
	Visit	Visit to TB control program center
	Mask wearing.	Demonstrate Identification of different types of masks and its uses.
		Demonstrate the proper protocol for wearing a mask
PHARMACOLOGY		
		Demonstrate the proper stepwise use of metered dose inhaler along with spacer.
		Write the proper prescription for Acute & Chronic Asthmatic patients
		Write the proper prescription for patients with Status Asthmaticus

ASSESSMENT BLUEPRINT OF BLOCK I

Subject	CVS	Respiratory module	Total MCQs
Pharmacology	12	5	17
Pathology	20	22	42
Forensic medicine	4	9	13
Community medicine	2	6	8
ENT	0	6	6
PRIME	2	1	3
Research	1	1	2
Medicine	13	2	15
Pediatrics	3	5	8
Anatomy	1	1	2
Physiology	1	1	2
Biochemistry	1	1	2
Total	**60**	**60**	**120**

BLOCK I Paper: MCQs Distribution

BLOCK-I (CVS and Respiratory Module) OSPE Outline

Subject	OSPE/OSCE	Viva stations	Total*
Pharmacology	5	2	7
Pathology	2	2	4
Forensic medicine	3	2	5
Community medicine	0	2	2
Medicine (history and physical examination)	1	0	1
Pediatrics (history and physical examination)	1	0	1
Total	**12**	**8**	**20**

4th Year MBBS

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BLOCK-J
(NEUROSCIENCES-II)

NEUROSCIENCES-II MODULE

Themes

S. No	Themes	Duration in days
1	Disturbed sleep	5
2	Disturbed mood & behavior	5
3	Right-sided weakness and inability to speak	3
4	Loss of consciousness and Fits	5
5	Tremors	2
6	Headache	5
7	Paraplegia	2
8	Numbness and tingling	3

General Learning Objectives

By the end of NS II Module, 4th year MBBS students will be able to:

Knowledge:

1) Describe anxiety disorders and their pharmacological management.
2) Explain the concepts of Mood disorders and their pharmacological management.
3) Explain psychotic disorders and their pharmacological management.
4) Describe the pathophysiology and management of Dementias.
5) Elaborate the pathophysiology, clinical features, management, and prevention of cerebrovascular diseases.
6) Classify epilepsy and describe the pharmacological management of epilepsy in children and adults.
7) Describe the types and protocols of anesthesia and explain the drugs used as anesthetics.
8) Explain the pathology and clinical features of cerebellar diseases.
9) Elaborate the clinical features and pharmacological management of Parkinson`s disease.
10) Explain the clinical features and management of Motor neuron disease and Friedrich`s ataxia. 11) Describe the pathology and management of head injury.
12) Describe the pathogenesis, clinical features, and management of common CNS infections.
13) Classify brain, spinal cord, and peripheral nerves tumors, and describe their clinical features and management.
14) Explain the pathophysiology, clinical features, investigations and management of Multiple sclerosis, transverse myelitis, and Guillain Barre Syndrome.
15) Classify peripheral neuropathies and elaborate their etiologies and clinical presentations.
16) Explain the clinical features and forensic approach to a patient with neurotoxic poisons.
17) Explain the forensic aspects of insanity and head injury.

Skills:

1) Describe the pathophysiology and management of Dementias.
2) Elaborate the pathophysiology, clinical features, management, and prevention of cerebrovascular diseases.
3) Classify epilepsy and describe the pharmacological management of epilepsy in children and adults.
4) Describe the types and protocols of anesthesia and explain the drugs used as anesthetics.
5) Elaborate the clinical features and pharmacological management of Parkinson`s disease.
6))Describe the pathology and management of head injury.

7) Describe the pathogenesis, clinical features, and management of common CNS infections.
8) Explain the pathophysiology, clinical features, investigations and management of Multiple sclerosis, transverse myelitis, and Guillain Barre Syndrome.
9) Explain the clinical features and forensic approach to a patient with neurotoxic poisons.

Attitude:

1) Describe anxiety disorders and their pharmacological management.
2) Explain the concepts of Mood disorders and their pharmacological management.
3) Explain psychotic disorders and their pharmacological management.
4) Describe the pathophysiology and management of Dementias.
5) Explain the forensic aspects of insanity and head injury.

Specific Learning Objectives

Theme Wise Learning objectives

Theme I: Disturbed sleep		
S No	**Topics**	**Learning Outcomes**
Psychiatry		
1	Sleep disorders	Describe the types of sleep disorders
		Explain the pharmacological and non-pharmacological management of sleep disorders
		Describe the ways of improving healthy sleep
2	Non-organic insomnia	Define non-organic insomnia
		Explain the management of non-organic insomnia
3	Sleep wake cycle disorders	Describe the concept of sleep-wake cycle disorder
		Describe the pharmacological and non-pharmacological
		management of sleep-wake wake cycle disorder
Pharmacology		
1	Introduction to the Pharmacology of CNS	Describe basic terms like neurotransmitters, neuromodulator/neurotropic factors, withdrawal symptoms (abstinence syndrome), cross-tolerance, reverse tolerance (sensitization) and cross-dependence
		Describe the blood-brain barrier and its clinical

		significance
		Enlist the principal neurotransmitters and their receptors in the CNS
		Describe voltage-gated, ligand-gated (ionotropic), ion channels and metabotropic receptors on the neuronal membrane
		Classify the drugs acting on the CNS
2	Sedative-hypnotics (Minor tranquilizers)	Classify broadly the Sedative-Hypnotics
3	Benzodiazepines	Classify Benzodiazepines
		Describe the pharmacokinetics of Benzodiazepines
		Describe the mechanism of action of Benzodiazepines
		Describe the pharmacological effects of Benzodiazepines
		Describe the clinical uses of Benzodiazepines
		Describe the adverse effects of Benzodiazepines
		Describe the tolerance and dependence on Benzodiazepines
4	Barbiturates	Describe the drug interactions of Benzodiazepines
		Name the antidote (competitive antagonist) to Benzodiazepines
		Classify barbiturates
		Describe the mechanism of action and clinical uses of barbiturates
		Describe the difference regarding the mechanism of action of Barbiturates in comparison to Benzodiazepines
5	Buspirone	Describe the mechanism of action and clinical use of Buspirone
		Describe the merits and demerits of Buspirone in comparison to Benzodiazepines
6	Ramelteon	Describe the mechanism of action and clinical use of Ramelteon
7	CNS stimulants	Classify CNS stimulants
8	Respiratory analeptics (Doxa pram, Nikethamide)	Describe the mechanism of action, clinical uses and adverse effects of Respiratory analeptics
9	Methyl xanthine/Theophylli	Describe the mechanism of action, clinical uses and adverse effects of Methyl

	ne, Caffeine, Theobromine)	xanthine
10	Sibutramine	Describe the mechanism of action and clinical use of Sibutramine
Forensic Medicine		
1	Classification of neurotoxins	Define and classify neurotoxins
2	Cerebral Poisons- Somniferous Poisons (Morphine, Opium)	Describe and enlist Somniferous poison. Describe the mechanism of action for the Somniferous poison.
3	Heroin	Describe different signs, symptoms and autopsy appearance in a typical of Somniferous poisons.
		Describe fatal dose, treatment, and diagnosis for the Somniferous poisons.
		Describe medico-legal importance for the Somniferous poisons.
		Describe and enlist Somniferous poison.
4	Inebriant Poisons (Ethyl Alcohol, Methyl Alcohol)	Describe and enlist Inebriant poison.
		Describe mechanism of action for the Inebriant poison.
		Describe different sign, symptoms, and autopsy appearance in a typical of Inebriant poisons.
		Describe fatal dose, treatment, and diagnosis for the Inebriant poisons.
		Describe medico-legal importance for the Inebriant poisons.
5	Sedative & Hypnotics (Chloral hydrate, Barbiturates)	Describe and enlist sedative and hypnotics
		Describe mechanism of action for the Sedative and hypnotics.
		Describe different sign, symptoms, and autopsy appearance in a typical of Sedative and hypnotics.
		Describe fatal dose, treatment, and diagnosis for the Sedative and hypnotics.
		Describe medico-legal importance for the Sedative and hypnotics.
6	Fuels, stimulants	Describe and enlist fuels, stimulants and

	and hallucinogens • Agrochemical poisons • Kerosene • Hallucinogens- LSD • Stimulants- Amphetamines	hallucinogens.
		Describe mechanism of action of fuels, stimulants and hallucinogens.
		Describe different sign, symptoms and autopsy appearance in a typical case of fuels, stimulants and hallucinogens poisoning.
		Describe fatal dose, treatment, and diagnosis of fuels, stimulants and hallucinogens.
7	Drug Dependence	Describe medico-legal importance of fuels, stimulants and hallucinogens.
		Describe Drug dependence and its psychological effects.
		Describe drug abuse and outline the procedure to investigate a case due to narcotics.
Community medicine/epidemiology		
1	Epidemiology	Define epidemiology
		Explain the basic concepts of epidemiology
2	Study design	Classify and elaborate study designs
3	Screening	Explain the screening in epidemiology
4	Measures of mortality and morbidity	Explain the measures of morbidity and mortality

Theme II: Disturbed Mood & Behavior

S NO	Topics	Learning Outcomes
Psychiatry (Mood and anxiety disorders)		
1	Depressive disorders	Classify depressive disorders
		Describe the aetiology, clinical features and management protocols of different depressive disorders
2	Bipolar Affective Disorder	Describe the clinical features and management protocols of Bipolar affective disorders
3	Suicide	Describe the preventive measures of suicide
4	Anxiety Disorders	Classify anxiety disorders
		Differentiate between medical and psychiatric causes of anxiety
		Differentiate between anxiety and phobia
		Describe the pharmacological and non-pharmacological management of different anxiety disorders including relaxation techniques and

		breathing exercises
5	Dissociative disorders	Explain the different behavioral and neurological presentations of dissociative disorders
		Describe the pharmacological and non-pharmacological management of dissociative disorders
6	Stress related disorders	Classify stress related disorders
		Explain the concept of stress in stress related disorders
		Explain the pharmacological and non-pharmacological management of stress related disorders
7	Somatoform disorders	Classify somatoform disorders
		Describe the concept of medically unexplained symptoms
		Counsel a patient with medically unexplained symptoms
8	Atypical depression and seasonal affective disorder	Describe the clinical presentation of atypical depression
		Recognize the symptoms of atypical depression
		Describe the management of atypical depression and seasonal affective disorders
Psychiatry (Psychotic illnesses)		
1	Personality disorders	Classify personality disorders
		Describe the clinical features, diagnostic criteria and management of personality disorder
2	Psychotic disorders	Differentiate between organic and non-organic psychosis
		Explain the concept of psychosis
		Classify psychotic disorders
3	Schizophrenias	Describe the clinical features, diagnostic criteria and management of Schizophrenias
		Explain the role of psychotherapy and Electroconvulsive therapy in Schizophrenias
		Describe the rehabilitations strategies with patients of Schizophrenias
4	Delusional disorders	Describe the types and management of delusional disorders
		Describe the ways of differentiating delusional disorders from Schizophrenias
5	Substance abuse disorder	Describe the concept of drug dependence
		Classify of drug abuse
		Describe the principles of management of substance abuse

		Explain the concept of harm reduction
General Medicine		
1	Alzheimer`s disease and Dementias	Explain the pathophysiology, clinical features and management of Alzheimer`s disease
		Describe the reversible and irreversible causes of Dementia
Pharmacology		
1	Depression	Describe the Monoamine hypothesis of depression
2	Antidepressants	Classify antidepressants
3	SSRIs (Selective Serotonin Reuptake Inhibitors)	Enlist SSRIs
		Enlist the most selective SSRIs
		Describe the pharmacokinetics, mechanism of action, clinical uses, adverse effects and drug interactions of SSRIs
		Classify antidepressants
4	TCAs (Tricyclic Antidepressants)	Enlist TCAs
		Describe the mechanism of action, clinical uses, adverse effects and drug interactions of TCAs
		Enlist TCAs
5	MAOIs (Monoamine Oxidase Inhibitors)	Enlist MAOIs
		Describe the pharmacokinetics,
6	Psychoses (Schizophrenia and others)	mechanism of action, clinical use, adverse effects and drug interactions of MAOIs
		Describe Serotonin syndrome
		Describe Hypertensive Cheese reaction
		Describe St John's Wort
		Describe the procedure of switching-over from one category of antidepressants to another one
		Describe "Augmentation" of antidepressant therapy
		Describe Electroconvulsive Therapy (ECT) for depression
		Describe the Dopamine hypothesis of Schizophrenia
		Classify Antipsychotics
7	Antipsychotics (Anti-schizophrenic drugs)	Describe the advantages of atypical antipsychotics over the Typical Classical/Traditional/Old) agents
		Describe the mechanism of action of Antipsychotics
		Describe the pharmacological effects of Antipsychotics
		Describe the clinical uses of Antipsychotics
		Describe the drug interactions of Antipsychotics
		Describe the adverse effects of Antipsychotics
		Explain the drug treatment of extrapyramidal

		syndrome
8	Bipolar affective disorder (Manic Depressive illness)	Describe the concept of “mood-stabilization” in Bipolar affective disorder (Manic Depressive illness)
9	Mood-stabilizing drugs	Enlist Mood-stabilizing drugs
10	Lithium carbonate	Describe the pharmacokinetics, mechanism of action, clinical uses, adverse effects and drug interactions of Lithium carbonate
11	Alcohols	Describe alcoholism
		Describe the pharmacokinetics of Ethanol
		Describe the mechanism of action of Ethanol
		Describe the pharmacological effects of Ethanol
		Describe the clinical uses of Ethanol
		Describe the adverse effects of Ethanol
		Describe Disulfiram-like reaction with example of drugs causing it
		Describe the management of Ethanol intoxication
		Describe the management of Ethanol withdrawal symptoms
		Describe the treatment of alcoholism
		Describe briefly Methanol poisoning
12	Opioids (Morphine, Diamorphine, Codeine, Pethidine, Methadone, Pentazocine,	Differentiate between Opioids and Opiates
		Describe the term “narcotic”
		Describe the source of Opium
13	Buprenorphine, Dextromethorphan)	Enlist the “brain’s own Morphine” (endogenous Opioids)
		Classify Opioids
		Enlist Opioids with mixed agonist-antagonist properties
		Enlist Opioids with partial agonist activity
		Describe the pharmacokinetics, mechanism of action, pharmacological effects, clinical uses, adverse effects and drug interactions of Opioids
		Describe the use of opioids as palliative care in terminal illness
		Describe opioid rotation
		Describe the treatment of Opioid over dosage
		Describe the Opioid antagonists (antidotes)
		Describe Opioid dependence
		Describe the management of Opioid dependence
		Describe the contraindications of Opioids
		Enlist the drugs used for pain in opioid addicts
14	Tramadol	Describe the mechanism of action and clinical use of

		Tramadol
15	Drugs of abuse	Describe substance abuse, drug dependence, addiction and habituation
		Describe the Dopamine hypothesis of addiction
		Enlist the drugs causing addiction
		Enlist the non-addictive drugs of abuse
		Describe "Club drugs"
		Enlist the drugs having high- risk of addiction (scored 5 on the list of relative-risk of addiction)
		Enlist the drugs having moderate-risk of addiction (scored 4 on the list of relative-risk of addiction)
		Describe the drug treatment of Nicotine, Alcohol, Cannabis and Opioid abuse
		Describe the drug abuse in sports with examples
Forensic Medicine		
1	Insanity and relationship to criminal charges	Define insanity.
		Classify insanity and explain its sub-types
		Describe relationship of insanity with criminal charges.
		Describe different pleas and its legal exception based on unsoundness of mind.
		Describe McNaughten rules, Durham`s rule and Impulse along with its application and criticism.
		Differentiate between true and feigned insanity
2	Forensic Psychiatry	Define and describe Forensic Psychiatry.
		Describe different terms used in Forensic Psychiatry: a) Affect b) Confabulation c) Delirium d) Delusion e) Fague f) Hallucination g) Illusion h) Intelligent Quotient i) Lucid Interval j) Neurosis k) Psychopath l) Psychosis m) Stupor
3	Mental health act	Define mental disorders based on mental health act
		Describe procedure of admission and discharge of mentally ill patient based on mental health act
		Describe procedure of handling a wandering lunatic
4	Will	Define testamentary capacity
		Enlist conditions required for a valid Will

		Describe the role of a doctor in taking a Will from a sick person
5	Civil and criminal responsibility of mentally ill patients	Explain the concept of civil and criminal responsibility of mentally ill patients
Community Medicine		
1	Mental health	Describe classification of mental health illnesses
		Define mental health
		Discuss global perspectives and epidemiology of mental health disorders
		Discuss risk factors leading to mental health problems
		Discuss prevention and control of mental health disorders
PRIME/MEDICAL EDUCATION		
1	Conflict resolution	Explain the prerequisites for conflict resolution as a leader
		Show the ability to solve problems regarding difficult patients/attendant.
Community medicine/biostatistics		
1	Biostatistics: Introduction	Describe the significance of biostatistics in health and epidemiology
2	Data and variable types	Define and classify variables
3	Sampling	Define sampling
		Discuss types of sampling
4	Biases in epidemiological studies	Define Bias
		Discuss different types of biases
		Discuss how bias can be prevented

Theme III: Right-sided weakness and inability to speak

S NO	Topic	Learning Outcomes
Pathology		
1	Hypoxia, ischemia, and infarction	Define hypoxia, ischemia, and infarction, and describe its morphology and consequences in the context of CNS involvement
2	Intracranial hemorrhage	Describe the aetiology, risk factors and morphology of intracranial hemorrhage
	Strokes syndromes	Describe the aetiology, risk factors, morphology, and clinical and radiological features of stroke
	Subarachnoid hemorrhage (SAH)	Explain the aetiology, risk factors and clinical features of SAH
General Medicine		
1	Stroke	Describe the risk factors of stroke
		Explain the types of strokes

		Describe the clinical features, radiological features, and management of a patient with intracerebral bleed
		Describe the clinical features, radiological features, and management of a patient with stroke due to an infarction
Community Medicine		
1	Non-communicable diseases: Strokes	Discuss the epidemiological determinants of stroke in community
		Discuss the prevention and rehabilitation of strokes
Neurosurgery		
1	Stroke	Describe the neurosurgical management of stroke and Subarachnoid hemorrhage
Community Medicine/biostatistics		
1	Measures of central tendency	Classify measures of central tendency
		Interpret and signify the results
		Describe the advantages and disadvantages of different measures
2	Measures of dispersion	Classify measures of dispersion
		Calculate measures of dispersion
		Interpret the results of measures of dispersion
		Explain the advantages and disadvantages of measures of dispersion
		Explain the use of different measures in specific circumstances
3	Normal distribution	Define normal distribution
		Describe normal distribution
		Calculate and graphically represent normal distribution
		Explain its use & significance in relation to data
		Describe percentile and interquartile range
		Calculate and depict percentile and interquartile range
		Explain use and significance of these in different situations
4	Confidence Interval, Confidence level, Standard error	Define confidence level and interval
		Describe confidence level and interval
		Calculate confidence level and interval
		Explain their use and significance in different situations
5	P value, critical region, rejection	Define P value, critical region, rejection region, α ß errors
7	Region, alpha beta	Describe P value, critical region, rejection region, α ß errors

	errors	Calculate P value, critical region, rejection region, α β errors
		Describe their use and significance in different situations

Theme IV: Loss of consciousness and Fits

S#	Topics	LEARNING OUTCOMES
General Medicine		
1	Seizures	Define seizures
		Differentiate between a seizure and syncope
		Classify epilepsy
		Explain the pathophysiology, clinical features, risk factors, investigations and treatment of Tonic-Clonic epilepsy
		Explain the pathophysiology, clinical features, investigations and treatment of absence seizures
		Explain the pathophysiology, clinical features, investigations and treatment of psychomotor epilepsy
		Explain the management of a patient with status epilepticus
Anesthesia		
1	Anesthesia	Define anesthesia
2	Introduction to the subject	Describe different types of anesthesia
3	General anesthesia	Describe the methods of induction of anesthesia
4	Neuroaxis block	Describe the following terms: Spinal block Epidural block • Caudal block Combined spinal /Epidural
5	Regional anesthesia	Describe the following terms: Nerve block Single shot • Continuous infusion Local infiltration
6	Preoperative evaluation and risk assessment	Explain the purpose of preoperative evaluation
		Perform risk assessment of patient undergoing general anesthesia
		Describe the steps of history taking in preoperative evaluation for anesthesia
		Describe the plans of general and regional anesthesia techniques
		Describe the ASA classification for pre-operative risk assessment
7	Monitoring in Anesthesia	Describe the non-invasive and invasive techniques of patients` monitoring for the following parameters during general anesthesia Non-invasive: Oxygenation

		Hemodynamic Temperature Electrical activity Neuromuscular activity
Pharmacology		
1	Anti-seizure drugs (Anti-epileptics)	Classify anti-seizure drugs
		Enlist the "Broad-spectrum" anti-epileptics (Valproate and Lamotrigine)
2	Carbamazepine	Describe the mechanism of action, clinical uses, adverse effects and drug interactions of Carbamazepine
3	Phenytoin	Describe the pharmacokinetics of Phenytoin with reference to the phenomenon of zero-order kinetics
		Describe the mechanism of action, clinical uses, adverse effects and drug interactions of Phenytoin
4	Valproate	Describe the mechanism of action, clinical uses, adverse effects and drug interactions of Valproate
5	Ethosuximide	Describe the mechanism of action, clinical uses and adverse effects of Ethosuximide
6	Phenobarbitone	Describe briefly the historic role of phenobarbitone in the management of epilepsy
7	Benzodiazepines	Name the benzodiazepines used in the management of epilepsy
8	Lamotrigine, Topiramate and others Status epilepticus General anesthetics	Name the new antiepileptic drugs
		Describe the mechanism of action, clinical uses and adverse effects of Lamotrigine and Topiramate
		Describe the use of antiepileptics during pregnancy
		Describe drug interaction of antiepileptics with oral contraceptive pills
		Describe the management of status epilepticus
		Describe the stages of general anesthesia
		Describe balanced anesthesia
9	Inhaled anesthetics (N_2O, Halothane, Isoflurane, Sevoflurane, Desflurane)	Describe the pharmacokinetics of Inhaled anesthetics
		Discuss the clinical significance of Blood: Gas partition coefficient of Inhaled anesthetics
		Describe the mechanism of action of Inhaled anesthetics
		Define MAC_{50} (minimum Alveolar Concentration- 50%)
		Describe the significance of MAC_{50}
		Describe the pharmacological effects of Inhaled anesthetics
		Describe the adverse effects of Inhaled anesthetics
		Describe second gas effect
		Describe diffusion hypoxia
		Describe Malignant hyperthermia and its management
		Describe the properties of an ideal inhaled anesthetic
10	IV anesthetics	Describe the mechanism of action, clinical use and

	(Thiopentone, Propofol, Etomidate, Ketamine, Midazolam, Fentanyl)	adverse effects of Intravenous anesthetics
		Describe re-distribution of Thiopentone
		Define neuroleptanalgesia and neuroleptanaesthesia
		Describe dissociative anesthesia
		Name the anesthetic agent that causes dissociative anesthesia
		Describe TIVA (Total Intravenous Anesthesia) technique
	Pre-anesthetic medications Obstetric analgesia	Describe Pre-anesthetic medications
		Describe the drugs used as Pre-anesthetic medications
		Describe the drugs for obstetric analgesia
Forensic Medicine		
1	Deliriant Poisons • Dhatura • Hyoscyamus nigra Cannabis indica	Describe and enlist Deliriant poisons.
		Describe mechanism of action of the Deliriant poisons.
		Describe different sign, symptoms and autopsy appearance in a typical of Deliriant poisons.
		Describe fatal dose, treatment, and diagnosis of the Deliriant poisons.
		Describe medico-legal importance of the Deliriant poisons.
		Describe and enlist Deliriant poisons.
Community Medicine/biostatistics		
1	Z test & it's application, Types / Shapes of frequency distribution	Define & describe 'z' test
		Describe its use in different statistical settings
		Calculate 'z' test
		Explain its application in hypothesis testing
		Interpret and apply to clinical settings
		Discuss various shapes of frequency distribution
		Describe the applications of parametric and non-parametric tests

Theme V: Tremors

S NO	Topics	Learning Outcomes
Pathology		
1	Neurodegenerative disorders: • Alzheimer`s disease • Parkinson`s	Describe the aetiology, risk factors, morphology and clinical features of Alzheimer`s disease
		Describe the ethology, risk factors, morphology and clinical features of Parkinson`s disease
		Describe the aetiology, risk factors, morphology and clinical features of Huntington`s disease

	disease • Huntington's Disease and Spinocerebellar ataxias Motor Neuron disease	Describe the clinical features of spinocerebellar ataxias
General Medicine		
1	Parkinson`s disease	Describe the aetiology, risk factors, morphology and clinical features of Motor Neuron Disease
		Describe the types, clinical presentation and management of Motor neuron disease
Pharmacology		
1	Drugs for Parkinsonism	Classify drugs for Parkinsonism
2	Levodopa (with Carbidopa)	Describe the pharmacokinetics, mechanism of action, adverse effects, contraindications and drug interactions of Levodopa
		Discuss the rationale of combining Carbidopa (or Benderizine) with levodopa
		Describe the on-off phenomenon
		Describe the end-of-dose akinesia
3	Bromocriptine	Describe "drug holidays" for Levodopa
		Describe the mechanism of action, clinical uses and adverse effects of Bromocriptine
4	Selegiline	Describe the mechanism of action and clinical uses of Selegiline
		Describe the differentiating point regarding the use of Selegiline as antiparkinsonian drug and its use as an antidepressant drug
5	Apomorphine	Describe the mechanism of action and clinical use of Apomorphine
6	Drug-induced Parkinsonism	Enlist the drugs causing Parkinsonism-like symptoms
		Enlist the drugs used in the management of drug-induced Parkinsonism
		Describe the rationale of avoiding Levodopa in drug-induced Parkinsonism
Paediatric		
	Cerebellar ataxias	Describe the clinical features and management of Friedreich's Ataxia
Community medicine/biostatistics		
1	"t" test & its application	Define & describe 't' test
		Explain its use in different statistical settings
		Calculate 't' test
		Describe its application in hypothesis testing

		Interpret and apply to clinical settings
		Calculate degree of freedom
		Chi square test & its application
		Describe its use in different statistical settings
		Calculate ‘x2’ test
		Explain its application in hypothesis testing
		Interpret and apply to clinical settings
2	Correlation, regression	Describe Correlation & Regression
		Interpret and apply to clinical settings
	Practical Problems in biostatistics	Discuss practical problems encountered in the application of biostatistics and SPSS

Theme VI: Headache		
S No	**Topics**	**Learning Outcomes**
Pathology		
1	Meningitis	Explain the aetiology, clinical features, investigations and complications of acute pyogenic meningitis
		Explain the aetiology, clinical features, investigations and complications of Tuberculous meningitis
2	Encephalitis	Explain the aetiology, clinical features, investigations and complications of viral encephalitis
3	Brain abscess	Explain the aetiology, clinical features, investigations and complications of brain abscess
4	Cerebral Toxoplasmosis	Explain the aetiology, clinical features, investigations and complications of Cerebral Toxoplasmosis
5	Tumours of CNS Gliomas Embryonal neoplasms Meningioma Other neoplasms	Describe the classification of brain tumours on the basis of primary and secondary origin and benign and malignant
		Describe the classification, gross and microscopic morphology and clinical features of Gliomas
		Describe the classification, gross and microscopic morphology and clinical features of embryonal neoplasms of brain
		Describe the gross and microscopic morphology and clinical features of Meningioma
		Enlist brain neoplasms other than gliomas, meningioma and embryonal cell neoplasms
		Enlist the metastatic bra neoplasms
Pharmacology		
1	Migraine and Cluster headaches	Classify drugs used for the treatment of Migraine and Cluster headaches
		Enlist the drugs used for the prophylaxis of Migraine and Cluster headaches
2	Triptans (Sumatriptan and others)	Describe the mechanism of action, clinical use and adverse effects of Sumatriptan
3	Ergot alkaloids	Enlist Ergot alkaloids
		Describe the pharmacological effects of Ergot alkaloids
4	Ergotamine	Describe the mechanism of action, clinical use and adverse effects of Ergotamine
Forensic Medicine		
1	Head Injury	Describe head injury in relation to scalp and skull injuries.
		Classify different varieties of skull fractures.
		Explain commonest site of skull fracture.
		Describe mechanism of cerebral injury including coup and counter coup mechanism.
		Describe injuries to cranial content and its medicolegal importance.
		Describe intracranial hemorrhages and its types in detail as

		per medicolegal point of view.
		Describe the medicolegal aspects of Punch-drunk syndrome
General Medicine		
1	Meningitis	Explain the aetiology, pathogenesis, clinical presentation, investigations and management of Acute pyogenic meningitis
		Explain the aetiology, pathogenesis, clinical
		presentation, investigations and management of Tuberculous meningitis
Community medicine		
1	Rabies	Explain the aetiology, clinical presentation of a patient with Rabies
		Describe post-exposure prophylaxis of Rabies
Family medicine		
1	Rabies prophylaxis	Describe the types of wounds inflicted by rabid dog bite
		Explain the types of active and passive immunization for Rabies post-exposure prophylaxis
		Describe the indications of Rabies vaccine and immunoglobulins
Paediatric		
1	Meningitis	Explain the aetiology, pathogenesis, clinical presentation, investigations and management of Acute pyogenic meningitis in children and neonates
2	TBM	Explain the aetiology, pathogenesis, clinical presentation, investigations and management of Acute pyogenic meningitis in children
Psychiatry		
1	Chronic daily headache	Differentiate between neurological and psychological headache (chronic tension headache)
		Identify the red signs in patients with headache
		Describe the principles of management of acute and chronic headaches
PRIME/RESEARCH		
1	Data analysis	Use MS Excel for data analysis / Use SPSS for data analysis
		Use Endnote for reference management
		Compile, analyze and write a dissertation
Theme VII: Paraplegia		
S No	**Topic**	**Learning Outcomes**
Pathology		
1.	Multiple sclerosis and other demyelinating disorders of CNS	Explain the pathogenesis, morphology and clinical features of multiple sclerosis
		Describe the morphology of the Acute demyelinating encephalomyelitis Acute necrotizing hemorrhagic encephalitis
Forensic Medicine		
1	Neurotoxins	Describe and enlist spinal poison.

		Describe mechanism of action for the spinal poison.
		Describe different sign, symptoms and autopsy appearance in a typical case of spinal poisons.
		Describe fatal dose, treatment, and diagnosis for the spinal poisons.
		Describe medico-legal importance for the spinal poisons.
		Describe vertebral and spinal injuries
2	Snake bite neurotoxins	Describe different sign, symptoms and autopsy appearance in a typical case of snake bite poisons
3	Botulism toxins	Describe different sign, symptoms and autopsy appearance in a typical case of botulism
General Medicine		
	Multiple sclerosis	Explain the pathophysiology, clinical features and management of Multiple sclerosis
	Transverse myelitis	Describe the aetiology, pathophysiology, clinical features and management of Transverse myelitis
	Caries spine	Explain the pathophysiology, clinical features, investigations and management of Caries spine
Orthopedics		
		Describe the general management of a patient with traumatic paraplegia
Neurosurgery		
		Describe the general management of a patient with traumatic paraplegia
		Describe the types, clinical features and surgical management of spinal Tumours

Theme VIII: Numbness and tingling		
S#	**Topics**	**LEARNING OUTCOMES**
Pathology		
1	Patterns and types of peripheral nerves injury	Describe the patterns and types of neuronal injury
2	Acute and chronic demyelinating neuropathies	Describe the pathophysiology and clinical features of Guillain Barre syndrome
		Explain the pathophysiology of Chronic demyelinating polyneuropathies
3	Myasthenia Gravis	Describe the pathophysiology and clinical features of Myasthenia Gravis
4	Tumors of Peripheral nerve	Enlist the tumours of peripheral nerves
		Describe the clinical features, of Neurofibromatosis
Pharmacology		
1	Local an aesthetics (Lignocaine and others)	Classify Local anaesthetics
		Enlist the Local anaesthetics used for surface anaesthesia
		Enlist the Local anaesthetics used for infiltration anaesthesia, nerve block, spinal anaesthesia and epidural anaesthesia
		Describe EMLA (Eutectic Mixture of Local Anaesthetics) and its clinical use
		Describe the pharmacokinetics of Local anaesthetics
		Describe the mechanism of action of Local anaesthetics
		Describe the pharmacological effects of Local anaesthetics on nerves
		Describe the differential blockade of peripheral nerves by Local anaesthetics
		Describe the pharmacological effects of Local anaesthetics on other excitable membranes
		Describe the clinical uses of Local anaesthetics
		Describe the major advantages of adding Adrenaline to Lignocaine for infiltration anesthesia
		Calculate the quantity of Adrenaline/ml in the traditionally used combinations of Adrenaline and Lignocaine (i.e. 1:200,000 & 1: 80,000)
		Describe the adverse effects of Local anaesthetics
		Classify Local anaesthetics
Forensic Medicine		
1	Neurotoxins: Peripheral poison	Describe and enumerate peripheral poisons.
		Describe mechanism of action for the peripheral poisons.
		Describe different sign, symptoms and autopsy appearance in a typical of peripheral poisons.
		Describe fatal dose, treatment, and diagnosis for the peripheral

		poisons.
		Describe medico-legal importance for the peripheral poisons.
General Medicine		
1	Guillain Barre syndrome	Explain the pathophysiology, clinical features and management of Guillain Barre syndrome
2	Neuropathies	Describe the causes, types, distribution and clinical features of different neuropathies
3	Myasthenia Gravis	Explain the pathophysiology, clinical features and management of Myasthenia Gravis
		Describe the clinical features, types and management of Neurofibromatosis
Paediatric		
1	Hereditary neuropathies	Describe the types, clinical features and management of hereditary neuropathies
Orthopedics		
1	Peripheral nerve injury	Describe the types and management of peripheral nerve injury
		Explain entrapment neuropathies
		Describe the risk factors, clinical features and management of Carpal tunnel syndrome

Practical Work		
S#	**Topics**	**LEARNING OUTCOMES**
Pathology		
1	CSF	Describe the chemical, cytological composition of CSF
		Estimate the following analysis of CSF: • Chemistry • Cytology • Gram stain • Microbiology
2	Histopathological specimens of brain Tumours	Identify the gross structure and microscopic features of: • Meningioma • Glioma/Astrocytoma
Pharmacology		
1	Depression	Formulate a prescription for a newly diagnosed case of depression
2	Epilepsy	Formulate prescriptions for patients with Tonic-Clinic and Petit-mal epilepsy
3	Migraine headache	Formulate prescription for a patient with migraine headache
Forensic medicine		

1	Somniferous poisons	Recognition of Opium and Heroin
2	Inebriant poisons	Recognition of Ethyl Alcohol and its examination
3	Fuel	Recognition of Kerosene oil
4	Deliriant	Recognition of Dhatura and Cannabis
5	Spinal poison	Recognition of Nux Vomica seeds
Community medicine		
1	Data presentation pie chart histogram bar chart and its types Venn diagram scatter plot	Identify and interpret the charts
2	Application and Interpretation of statistical data	Apply a statistical test on a given scenario
3	Data interpretation	Interpret the normal distribution curve, skewed distribution, bi and poly-modal distribution & Standard Normal Curve

Paper-J (Neurosciences-2)

Table-1: MCQs

Subject	Total MCQs
Pharmacology	20
Pathology	22
Forensic medicine	18
Community medicine	27
PRIME	02
Medicine	11
Psychiatry	09
Neurosurgery	02
Pediatrics	05
Anaesthesia	03
Family medicine	01
Total	**120**

Subject	Viva stations	Total OSPE/OSCE stations	Total stations
Pharmacology	2	3	5
Pathology	2	2	4
Forensic medicine	2	2	4
Community medicine	2	3	5
Medicine (Neurological examination)	X	1	1
Psychiatry (counselling)	x	1	1
Total	8	12	20

Table-2: OSPE/OSCE

* A minimum of 20 stations will be used in final exams. Total marks will be 120 (6 marks for each station).

BLOCK-K

(GIT & HEPATOBILIARY-II)

GIT & HEPATOBILIARY-II

Themes

S. No	Themes	Duration Weeks
1	Difficulty in swallowing	1
2	Pain epigastrium	1
3	Pain right upper abdomen	2
4	Diarrhea and constipation	3
5	Bleeding Per Rectum	1

General Learning Objectives

By the end of GIT-II Module, 4th year MBBS students will be able to:

Knowledge:

1. Describe the etiology, pathogenesis, morphology, clinical features, laboratory diagnosis, medical and surgical management of diseases of GIT & hepatobiliary system.
2. Interpret the liver function tests in different hepatic diseases.
3. Describe the basic and clinical pharmacology of drugs used in GIT & hepatobiliary diseases.
4. Describe medico legal aspects of abdominal trauma.
5. Describe medico legal aspects of vegetable acid, corrosive and irritants poisoning.
6. Describe the epidemiology and prevention of malnutrition and viral hepatitis.
7. Analyze demographic processes in context of public health care.

Skills:

1. Describe the etiology, pathogenesis, morphology, clinical features, laboratory diagnosis, medical and surgical management of diseases of GIT & hepatobiliary system.
2. Interpret the liver function tests in different hepatic diseases.

3. Write prescriptions for common GIT & hepatobiliary disorders.
4. Describe medico legal aspects of abdominal trauma.
5. Analyze demographic processes in context of public health care.

Attitude:

1. Write prescriptions for common GIT & hepatobiliary disorders.
2. Describe medico legal aspects of abdominal trauma.
3. Describe medico legal aspects of vegetable acid, corrosive and irritants poisoning.
4. Describe the epidemiology and prevention of malnutrition and viral hepatitis.

Specific Learning Objectives

Theme-1 (Difficulty in swallowing)		
S No	**Topic**	**LEARNING OUTCOMES**
Pathology		
1	Salivary Gland (Inflammation and tumors)	Classify the inflammatory and neoplastic diseases of salivary gland.
		Describe the etiology, morphology, and clinical presentation of inflammatory and neoplastic diseases of salivary gland.
2	Esophagus	Classify esophagitis.
		Describe the etiology, pathophysiology, morphology, clinical presentation, and complications of esophagitis
		Classify esophageal tumors.
		Describe the etiology, pathogenesis, morphology, clinical presentation, diagnosis, and complications of esophageal tumors
Medicine		
1	Oral Cavity Diseases	Discuss the etiology of stomatitis and Aphthous ulcers
		Discuss the clinical features of stomatitis and Aphthous ulcers
		Discuss the investigations of stomatitis and Aphthous ulcers
		Devise a management plan for stomatitis and Aphthous ulcers
2	Esophagus:	Discuss the causes of esophageal motility disorders
		Discuss the clinical features of esophageal motility disorders
3	Esophageal motility disorders	Discuss the relevant investigations of esophageal motility disorders
		Devise a management plan of esophageal motility disorders
4	Esophagitis	Discuss the etiology of esophagitis
		Discuss the clinical features of esophagitis
		Discuss the appropriate diagnostic testing for esophagitis
		Devise a management plan for esophagitis
5	Cardia achalasia	Discuss the etiology, clinical features, investigations, and management of Cardia achalasia
6	Gastro Esophageal reflux disease (GERD)	Discuss the risk factors, etiology, clinical features, investigations, complications, and management of GERD
ENT		
1	Cleft lip and palate	Discuss the etiology, clinical features, investigations, complications and management of cleft lip and palate
2	Pharyngitis and	Discuss the etiology, clinical features,

	Tonsillitis	investigations, complications and management of Pharyngitis and acute Tonsillitis
		Explain the clinical features, and management of peritonsillar abscess
		Discuss the classification, etiology, clinical features, investigations, and management of Chronic Tonsillitis
3	Oropharyngeal cancer	Discuss the classification, etiology, clinical features, investigations, and management of oropharyngeal cancers
4	Salivary glands	Classify diseases of the salivary glands
		Explain the etiology, clinical features, investigations, and management of Mumps, and Sialadenitis
		Explain the etiology, clinical features, investigations, and management of salivary ducts stones
5	Dysphagia	Explain the types, etiology, clinical features, investigations, and management of a patient with dysphagia
Surgery		
1	Tumors of the esophagus	Discuss the classification, etiology, clinical features, investigations, staging and management of Esophageal cancers
2	Para-esophageal hiatus hernia	Explain the etiology, clinical features, investigations, and management of Para-esophageal hiatus hernia
PRIME/MEDICAL EDUCATION		
1	Social accountability	Explain the concept of social accountability
		Differentiate between different social accountability issues

Theme-2 (Epigastric pain)		
S No	**Topic**	**LEARNING OUTCOMES**
Pathology		
1	Gastritis	Explain the types, etiology, microscopic morphology, and clinical features of Gastritis
2	Peptic ulcers	Discuss the etiology, pathophysiology, morphology, complications, and lab. diagnosis of peptic ulcer disease
		Discuss the role of H. Pylori & campylobacter in the causation of Peptic ulcer disease
		Discuss the morphology, virulence factors and lab diagnosis of H. Pylori & campylobacter
3	Gastric polyps and tumors	Classify gastric polyps and tumors
		Describe the pathogenesis, morphology, lab diagnosis and complications of gastric polyps and tumors.
Medicine		
1	Gastritis	Explain the types, etiology, clinical features, investigations, management, and complications of Gastritis
2	Peptic ulcer disease	Explain the types, etiology, clinical features, investigations, management, and complications of Gastritis
		Describe H.pylori eradication therapy protocols in
3	Upper GI Bleeding	Explain the etiology, clinical features, investigations, and management of a patient with upper GI bleeding
		Describe the indications and procedures of pharmacological and endoscopic treatment of variceal bleeding
Pharmacology		
1	Anti-emetics	Classify anti-emetic drugs
		Describe the mechanism of serotonin antagonists as anti-emetic agents.
		Enlist the clinical uses (anti-emetic) and adverse effects of serotonin antagonists.
		Describe the pharmacological basis of serotonin antagonists in chemotherapy induced vomiting
		Describe the mechanism of H1-antagonists as anti-emetic agents.
		Enlist the clinical uses (anti-emetic) of H1-antagonists.
		Describe the mechanism of anticholinergic drugs as anti-emetic agents.
		Enlist the clinical uses (anti-emetic) of anticholinergic drugs.
		Describe the pharmacological basis of scopolamine in motion sickness
		Describe the anti-emetic mechanism of D2-receptor blockers (Metoclopramide & Domperidone).
		Enlist the clinical uses (anti-emetic) and adverse effects of D2- receptor blockers.

		Compare the pharmacological features of metoclopramide & Domperidone.
		Describe the drug interaction of metoclopramide
		Describe the mechanism of neuroleptics as anti-emetic agent.
		Enumerate the clinical uses (anti-emetic) of neuroleptic drugs.
		Describe the antiemetic mechanism of benzodiazepines.
		Describe the antiemetic mechanism of glucocorticoids.
		Enumerate the indications (anti-emetic) of glucocorticoids.
		List anti-emetic drugs used in morning sickness.
		List anti-emetic drugs used in chemotherapy induced vomiting.
2	Drugs used in the treatment of variceal bleeding	Enlist the drugs used in variceal hemorrhage
		Describe the mechanism of somatostatin and octreotide in variceal hemorrhage
		Describe the mechanism of Vasopressin & Terlipressin in variceal hemorrhage
		Describe the mechanism of beta-blockers in variceal hemorrhage
3	Drugs used in the treatment of Peptic ulcer disease and Gastritis	Classify the drugs used in Peptic ulcer disease
		Describe the mechanism of action, indications, and adverse effects of proton pump inhibitors (PPIs).
		Describe the pharmacokinetics of PPIs with special emphasis on time of administration
		Describe the drug interaction of Omeprazole & H2 blockers with Sucralfate
		Describe the drug interaction of Omeprazole with Clopidogrel
		Describe the mechanism of action, indications, and adverse effects of H-2 blockers.
		Compare/differentiate H2-blockers in terms of bioavailability and involvement in drug interactions
		Describe the mechanism of action, indications, and adverse effects of Antacids.
		Enumerate the properties of an ideal antacid.
		Describe the pharma kinetics of antacids with special emphasis on time of administration
		Describe the drug interactions of antacids with tetracyclines, iron and fluroquinolones.
		Describe the mechanism of sucralfate in the treatment of peptic ulcer
		List the indications of sucralfate.
		Discuss the drug interaction of sucralfate with digoxin, ketoconazole and tetracyclines.
		Describe the pharmacokinetics of sucralfate with special emphasis on time of administration.
		Describe the mechanism, indications, and adverse effects of bismuth compounds.
		Describe the role of anticholinergic drugs in peptic ulcer.
		List the indications (anti-peptic ulcer) of anticholinergic drugs.

		Discuss the pharmacological basis for the use of prostaglandin analogues (Misoprostol) in the treatment of peptic ulcer.
		List the contraindications of misoprostol.
		Describe triple therapy for the eradication of H.pylori infection.
		Describe quadruple therapy for the eradication of H.pylori infection
4	Common house-hold poisons	Enlist, domestic, medicinal, and garden poisons commonly used
5	Corrosives/Mineral acids	Enlist different commonly used mineral acids
		Enumerate physical appearance and uses of Sulphuric acid
		Describe mechanism of action, fatal dose & period of Sulphuric acid
		Describe clinical features and treatment of Sulphuric acid burns
		Describe postmortem appearance and forensic importance of Sulphuric acid burns
		Enumerate physical appearance and uses of nitric acid
		Describe mechanism of action and fatal dose & period of nitric acid
		Describe clinical features and postmortem appearance of nitric acid burns
		Enumerate physical appearance and uses of hydrochloric acid
		Describe clinical features and postmortem appearance of hydrochloric acid burns.
6	Corrosives/ Alkali	Enlist different commonly used alkali.
		Enumerate physical appearance and uses of alkali
		Describe mechanism of action, clinical features, and treatment of alkali burns.
		Describe postmortem appearance and forensic importance of alkali burns.
7	Corrosive/ organic acid	Enlist different commonly used organic acids.
		Enumerate physical appearance and uses of carbolic acid.
		Describe mechanism of action, fatal dose & period of carbolic acid.
		Describe clinical features and treatment of carbolic acid poisoning.
		Describe postmortem appearance and forensic importance of carbolic acid poisoning.
		Enumerate physical appearance and uses of oxalic acid.
		Describe mechanism of action, fatal dose & period of oxalic acid.
		Describe clinical features and treatment of oxalic acid poisoning.
		Describe postmortem appearance and forensic importance of oxalic acid poisoning.
8	Corrosive/vegetable acid and cyanides	Enumerate physical appearance, sources, and uses of cyanides.
		Describe mechanism of action, fatal dose & period of cyanides.

		Describe clinical features and treatment of cyanide poisoning.
		Describe postmortem appearance and forensic importance of cyanide acid poisoning.
		Enumerate physical appearance, sources, and uses of cyanides.

Surgery		
1	Gastric cancer	Describe the types, etiology, risk factors, lab diagnosis and management of a patient with gastric cancer.
2	Gastric outlet obstruction	Describe the etiology, diagnosis, and management of a patient with gastric outlet obstruction.
Community medicine and public health		
1	Health system of Pakistan: Introduction	Describe health care system of Pakistan using WHO Health system framework.
2	Primary health care (PHC)	Define PHC.
		Describe the history of development of PHC.
		Describe the concepts and components of PHC.
		Describe comprehensive & selective PHC.
		Describe reasons for failure of PHC.
		Describe Health Systems before & after PHC.
		Describe district health care system.
		Enumerate indicators for assessing PHC.
3	Health education	Define health education.
		Describe objectives and functions of health education.
		Describe the components of health education.
		Describe the methods of health education.
		Describe the communication channel in health education.
		Describe the constraints in health education.
		Describe classification of theories of health education
		Describe the stages in health education
		Describe the principles of health education
		Describe the strategies for an effective health education program
		Explain the methods of evaluation and effectiveness of a health education project
4	Health management information system (HMIS)	Define concept of HMIS
		Enumerate the components of HMIS
		Describe its importance in health care delivery system
		Enumerate the principles of HMIS
		Give the causes of failure of HMIS
5	Hospital administration	Define health care delivery system
		Describe the need of a specialized hospital administration
		Describe the attributes of a good hospital administrator
		Describe functions involved in hospital administration
		Describe the levels of hospitals and management levels in a hospital

6	Health plans - Longitudinal, horizontal, integrated, 5 year, ADP, SAP, Short term, long term	Describe different health plans
		Describe characteristics of health plans
7	Health plans - MDGs	Enumerate MDGS
		Describe targets & indicators of various health related MDGs
		Describe reasons for failure to achieve MDGS
8	Health plans – SDGs	Enumerate SDGs related to health
		Describe targets & indicators of various health related SDGs
		Describe Pakistan progress on set targets
9	Health planning	Define health planning
		Describe importance & use of planning in health
		Explain the reasons for ineffective health planning in Pakistan
		Describe health planning cycle
		Describe the types of health planning
10	Health economics	Define Health economics
11	Health policy	Explain the importance of economic studies in health
		Describe different tools used in economic evaluations
		Define health policy
		Describe its role in health system
		Describe different stages in policy making
		Describe the different types of policies
		Describe the constraints in policy making
		Describe health policy of Pakistan
12	Role of international health agencies in public health	Enumerate international health agencies working in health sector
		Discuss structure and function of WHO & UNICEF
		Explain the roles of WHO & UNICEF in Pakistan

Theme-3 (Pain right upper abdomen)		
S NO	**Topic**	**Learning Outcomes**
Anatomy		
1	Gross anatomy	Explain the lobes and segments of the liver
		Discuss the gross structure of gall bladder and biliary channels
		Explain the gross and microscopic structure of the pancreas
2	Liver histology	Explain the microscopic structure of the liver and gall bladder
3	Liver Function Tests	Enumerate the functions of the liver. Explain the significance of different liver function tests. Interpret the Liver function tests in different diseases.
4	Mechanisms of liver injury and repair	Describe the etiology and morphology of liver injury and repair
5	Acute Liver failure	Describe the etiology, pathogenesis, clinical and biochemical and other features of acute liver failure
6	Chronic Liver disease and liver cirrhosis	Describe the etiology, pathogenesis, clinical and biochemical and other features of chronic liver disease
		Explain the complications of liver cirrhosis
7	Portal hypertension	Describe the etiology, pathogenesis, clinical features and complication of portal hypertension
8	Viral hepatitis A and E	Explain the Etiology, pathogenesis, morphology and clinical features of Acute viral hepatitis A and E infection
9	Viral hepatitis B	Explain the Etiology, risk factors, pathogenesis, morphology and clinical features of Acute viral hepatitis B infection
		Explain the pathogenesis, morphology and clinical features of Chronic viral hepatitis B infection
		Discuss the stages of viral hepatitis B infections
		Discuss the complications of chronic Hepatitis B virus infection
		Discuss the serological markers of hepatitis B Virus infection
		Explain the preventive strategies of Hepatitis B virus infection
10	Viral Hepatitis C	Explain the Etiology, risk factors, pathogenesis, morphology and clinical features of viral hepatitis C infection
		Discuss the complications of chronic Hepatitis C virus infection
11	Autoimmune hepatitis	Define autoimmune hepatitis
		Explain the serological and morphological features of autoimmune hepatitis
12	Toxin and Drug induced hepatitis	Explain the etiology and morphological features of toxins and drug induced hepatitis
13	Alcoholic liver disease	Discuss the morphology, pathogenesis and complications of Alcoholic liver disease
14	Metabolic liver diseases Non-Alcoholic liver disease (NAFLD) Hemochromatosis Wilson`s disease Alpha-1 antitrypsin deficiency	Describe the morphology, clinical features and complications of NAFLD, Hemochromatosis, Wilson`s disease and Alpha-1 Anti-Trypsin deficiency
		Describe the etiology, morphology, clinical features and complications of Hemochromatosis
		Describe the etiology, morphology, clinical features and complications of Wilson`s disease
		Describe the etiology, morphology, clinical features

		and complication of Alpha-1 Anti-Trypsin deficiency
15	Liver abscess	Describe the etiology, pathogenesis, morphology, clinical presentation, complications and lab diagnosis of Liver abscess
16	Tumors of the liver	Classify liver tumors
		Explain the benign tumors of the liver
		Discuss the risk factors, etiology, morphology, clinical features, staging and complications of hepatocellular carcinoma
17	Gall bladder Gall stones Cholecystitis Gallbladder cancer	Discuss the types, risk factors, etiology, morphology, clinical features and complications of gall stones
		Discuss the risk factors, etiology, morphology, clinical features and complications of acute cholecystitis
		Discuss the risk factors, etiology, morphology, clinical features and complications of Chronic cholecystitis
		Discuss the risk factors, etiology, morphology, clinical features, staging and complications of carcinoma gall bladder
18	Pancreas	Enlist and define the congenital anomalies of pancreas
		Discuss the risk factors, etiology, morphology, clinical features and complications of acute pancreatitis
		Discuss the risk factors, etiology, morphology, clinical features and complications of chronic pancreatitis
		Describe the pathogenesis and complications of pancreatic pseudocyst
		Discuss the risk factors, etiology, morphology, clinical features, staging and complications of carcinoma of pancreas
Pediatrics		
1	Hereditary hyperbilirubinemias	Classify hereditary hyperbilirubinemias
		Explain the types, clinical features, investigations, and management of different hereditary hyperbilirubinemias
2	Acute hepatitis A	Explain the Etiology, pathogenesis, clinical features, investigations, and treatment of Acute viral hepatitis A infection
Medicine		
1	Hepatitis B virus infection	Explain the Etiology, pathogenesis, clinical features, investigations, and treatment of Acute viral hepatitis B infection
		Explain the Etiology, pathogenesis, clinical features, investigations, and treatment of chronic viral hepatitis B infection
2	Hepatitis C virus infection	Explain the Etiology, pathogenesis, clinical features, investigations, and treatment of chronic viral hepatitis C infection
		Explain the clinical features, investigations, management,

		and complications of liver cirrhosis
		Explain the treatment of a patient with hepatic encephalopathy
3	Metabolic liver diseases	Discuss the management of a patient with Wilson`s disease
		Discuss the management of a patient with Hemochromatosis
		Discuss the management of a patient with primary biliary cirrhosis
		Discuss the management of a patient with autoimmune hepatitis
4	Hepatic vein obstruction	Discuss the etiology, clinical features, investigations and management of a patient with hepatic vein obstruction
5	Hepatocellular carcinoma	Explain the etiology, clinical features, investigations, treatment and complications of hepatocellular carcinoma
6	Carcinoma of the pancreas	Discuss the risk factors, etiology, clinical features, staging and complications of carcinoma of pancreas
Surgery		
1	Gall bladder and pancreas	Explain the etiology, clinical features, investigations, treatment and complications of gall stones
		Explain the etiology, clinical features, investigations, treatment and complications of acute and chronic cholecystitis
		Explain the etiology, clinical features, investigations, treatment and complications of acute and chronic pancreatitis
2	Carcinoma of the gall bladder	Discuss the risk factors, etiology, clinical features, staging and complications of carcinoma of gall bladder
3	Liver abscess	Explain the etiology, clinical features, investigations, treatment, and complications of liver abscesses
4	Hydatid liver cysts	Explain the etiology, clinical features, investigations, treatment, and complications of Hydatid liver cysts
Pharmacology		
1	Hepatotoxic drugs	Describe first pass hepatic metabolism
		Enlist common hepatotoxic drugs
		Explain the drug treatment of paracetamol poisoning
2	Drugs used in the treatment of hepatitis B	Classify the drugs for hepatitis B virus infection
		Describe the duration and adverse effects of drugs used in the treatment of chronic hepatitis B
3	Drugs used in the treatment of hepatitis C	Classify the drugs for hepatitis C virus infection
		Describe the duration and adverse effects of drugs used in the treatment of chronic hepatitis C
Community medicine		
1	Viral Hepatitis	Describe the epidemiological determinants of Hepatitis B & C

		Describe the prevalence and incidence with reference to local context
		Describe the preventive & control measures for Hepatitis B & C
Family Medicine		
1	Acute and chronic hepatitis	Explain the etiology and clinical features of acute hepatitis
		Explain the management strategies of acute hepatitis in family practice
		Explain the aetiology, clinical features, and complications of Chronic hepatitis
		Explain the management strategies of chronic hepatitis in family practice
		Describe the red flags in a patient with acute and chronic hepatitis for referral to specialty care

Theme-4: (Diarrhea and Constipation)		
Pathology		
1	Intestinal obstruction	Define hernia, adhesions, volvulus, and intussusception
2	Ischemic bowel disease	Describe the etiology, pathogenesis, morphology, and complications of small bowel ischemia
3	Diarrheas	Define malabsorption syndrome
		Classify diarrheas
		Explain the etiology, morphology, clinical features and complications of Celiac disease
4	Bacterial enterocolitis	Explain the etiology, pathogenesis, and clinical features of bacterial enterocolitis
		Explain the etiology, pathogenesis, morphology and clinical features of Salmonellosesis
5	Parasitic enterocolitis	Classify the parasites invading the small gut
6	Entamoeba histolytica	Discuss the life cycle, morphology, pathogenesis, clinical features, and complications of Amebiasis
7	Giardia lamblia	Discuss the life cycle, morphology, pathogenesis, clinical features, and complications of Giardiasis
8	Hymnologies nana	Discuss the life cycle, morphology, pathogenesis, clinical features, and complications of H. nana infestation
9	Diphyllobothrium latum	Discuss the life cycle, morphology, pathogenesis, clinical features, and complications of Diphyllobothrium latum
10	Schistosoma haematobium, mansoni and japonicum	Enlist physical characteristics of Trematodes.
		Classify Schistosoma based on organ systems affected
		Describe the routes of infection, pathophysiology life cycle, clinical features, and lab diagnosis of Schistosoma hematobium, mansoni and japoncum.
		Compare the morphological characteristics of eggs of different species of Schistosoma.
11	Ascaris lumbricoides	Discuss the life cycle, morphology, pathogenesis, clinical features, and complications of Ascaris lumbricoides
12	Strongylidae's	Discuss the life cycle, morphology, pathogenesis, clinical features, and complications of Strongyloides
13	Ankylostoma duodenale	Discuss the life cycle, morphology, pathogenesis, clinical features, and complications of Ankylosstoma duodenale
14	Enterobius vermicularis	Discuss the life cycle, morphology, pathogenesis, clinical features, and complications of Enterobius vermicularis
Medicine		
	Intestinal tuberculosis	Discuss the etiology, pathogenesis, clinicalfeatures, investigations, treatment, and complications of intestinal tubercuLearning Outcomesis
Surgery		
1	Acute appendicitis	Discuss the etiology, risk factors, pathogenesis,

		clinical features, differential diagnosis, investigations, treatment, and complications of acute appendicitis
2	Intestinal obstruction	Discuss the etiology, clinical features, investigations, management, and complications of intestinal obstruction
Pharmacology		
1	Antidiarrheal agents (Opioids, Colloidal bismuth compounds, Kaolin & Pectin, etc	Define and classify antidiarrheal agents
		Describe the mechanism of action of different antidiarrheal agents
2	Laxatives (Bulk-forming, stool softeners, osmotic laxatives, stimulant laxatives, etc.	Define and classify laxative drugs
		Describe the mechanism of action of different laxatives
3	Lactulose	Describe the pharmacological basis of Lactulose in the treatment of hepatic encephalopathy
4	Anti-amoebic drugs	Classify anti-amoebic drugs
		Describe mechanism of actions of Metronidazole & Dialoxanide. Furoate Describe the drug interaction of Metronidazole with Alcohol.
5	Anthelmintics	Classify Anti-Helminthic drugs
		Enumerate clinicaluse(s), adverse effects and contraindications of Albendazole, Mebendazole, Pyrantal Pamoate, Ivermectin, Praziquantel & Niclosamide
		Describe mechanism of action of Albendazole, Mebendazole, Pyrantal Pamoate, Ivermectin, Praziquantel & Niclosamide
6	Anti-Salmonellosis drugs	List the drugs used in enteric fever.
		Describe the basis for selection of antibiotics in enteric fever based on age, pregnancy, and resistance
		Describe the clinical applications of fluroquinolones in the treatment of gastrointestinal disorders
7	Irritants	Classify irritants poisons
8	Irritants: Metallic poisons	Enlist common metallic irritant poisons
		Describe physical appearance, uses, mechanism, fatal dose, fatal period and signs and symptoms of Copper and Mercury poisons
		Describe the treatment, postmortem appearance and medicolegal importance of common Copper and Mercury poisons
		Describe the signs and symptoms, treatment, postmortem appearance and medicolegal importance of acute and chronic Arsenic poisoning
		Describe the signs and symptoms, treatment, postmortem appearance and medicolegal importance of acute and chronic

		Lead poisoning
9	Irritants /mechanical poisons/ powder glass Irritants/nonmetallic poisons	Enlist commonly encountered mechanical poisons
		Enumerate symptoms and signs, treatment, postmortem appearance and forensic importance of powder glass
		Enlist commonly encountered inorganic elements poisoning
		Enumerate physical appearance and uses of phosphorus
		Describe mechanism of action, fatal dose & period of phosphorus
		Describe clinical features and treatment of phosphorus poisoning
		Describe postmortem appearance and forensic importance of phosphorus poisoning
		Describe physical appearance, uses, mechanism of action, clinical features, treatment, postmortem appearance, and forensic importance of aluminum phosphide
		Describe physical appearance, uses, mechanism of action, clinical features, treatment, postmortem appearance, and forensic importance of chlorine
		Describe physical appearance, uses, mechanism of action, clinical features, treatment, postmortem appearance, and forensic importance of iodine
11	Irritants/vegetable poisons	Enlist commonly encountered inorganic elements poisoning.
		Describe characteristics, active principles, and
		Enumerate uses, fatal dose and fatal periods of vegetable poisons
		Describe treatment, postmortem appearance, and forensic importance of vegetable poisons
12	Irritants/animal poisons	Differentiate between poisonous and non-poisonous snakes
		Classify snakes based on their venom.
		Describe the characteristics of snake venoms
		Classify different snakes' venoms
		Describe steps of management of snake bite
		Describe postmortem appearance and medico legal aspects of venomous snake bite
		Describe sign and symptoms of scorpion bite
Community Medicine		
1	Overview of common intestinal worms' infestation and their control	Describe the common intestinal worm infestation in our local context
		Describe the epidemiological determinants of common worm infestation with reference to local context
		Describe the preventive & control measures for common worm infestation
2	Control of dysentery	Describe the epidemiology of Dysentery.
		Describe the prevention & control measures of Dysentery

3	Food hygiene	Describe the term food Hygiene
		Describe the importance of food hygiene
		Describe the process of Food hygiene
Family Medicine		
1	Enteric infections	Classify enteric infections
		Describe the etiology, clinical features, investigations, and management of Salmonellosis
		Describe the red flags in a patient with Salmonella infections for referral to specialty care
		Explain the etiology, and management of acute gastroenteritis
		Discuss the primary and secondary prevention of acute gastroenteritis in a primary healthcare setting
		Describe the red flags in a patient with acute gastroenteritis for referral to specialty care
Pediatrics		
1	Lactase deficiency	Describe the clinical features, investigations, complications, and management of Lactase deficiency
2	Infectious diarrhea	Describe the etiology, clinical features, investigations, complications, and management of infectious diarrhea in children
3	Celiac disease	Describe the etiology, clinical features, investigations, complications, and management of Celiac disease

Theme- 5 (Bleeding per Rectum)		
Pathology		
1	Inflammatory bowel disease (IBD)	Classify IBD
		Discuss the risk factors and etiology of IBDs
		Explain the pathogenesis clinical presentation of IBD
		Differentiate between Ulcerative colitis and Crohn`s disease
		Discuss the investigations and management of IBDs
		Explain the intestinal and extra-intestinal manifestations/complications of IBDs
		Explain the role of surveillance colonoscopy in patients with Ulcerative colitis
2	Diverticular disease	Explain the etiology, pathogenesis, morphology, and clinical features of Colonic diverticulosis
3	Colonic polyps	Classify colonic polyps.
		Describe the pathogenesis, morphology, clinical presentation, complications, and diagnosis of different types of colonic polyps
4	Hemorrhoids	Define hemorrhoids
		Explain the morphology, pathogenesis, and clinical features of Hemorrhoids
5	Colorectal carcinoma	Describe the adenoma carcinoma sequence
		Describe the pathogenesis, morphology, clinical presentation, complications and staging of colorectal

		Carcinoma
Surgery		
1	Ulcerative colitis	Explain the etiology, pathogenesis, clinicalfeatures, complications, and surgical management of Ulcerative colitis
2	Crohn`s disease	Explain the etiology, pathogenesis, clinicalfeatures, complications, and surgical management of Crohn`s disease
3	Diverticular disease	Explain the etiology, pathogenesis, clinical features, complications and management of Diverticulosis and Diverticulitis
3	Anal diseases: • fistula • fissures • hemorrhoids	Define perianal fistula and anal fissure
		Explain the risk factors and management of anal fistula and anal fissures
		Explain the risk factors and management of hemorrhoids
4	Colorectal cancers	Classify colorectal cancers
		Describe the staging of colorectal cancers
		Explain the pathogenesis, risk factors and clinical features of colorectal cancers
		Explain the complications, management, and prognosis of colorectal cancers
5	Ischemic Colitis	Explain the etiology, pathogenesis, clinicalfeatures, complications, and management of Ischemic colitis
Medicine		
1	Irritable bowel syndrome	Explain the risk factors, clinical features, and management of irritable bowel syndrome
2	Ulcerative colitis	Explain the etiology, pathogenesis, clinical features,complications, and surgical management of Crohn`s disease
3	Crohn`s disease	Explain the etiology, pathogenesis, clinical features, complications, and management of Crohn`s disease
4	Ano-rectal infections	Classify anorectal infections.
		Explain the risk factors, clinical features and management of anorectal infections including sexually transmitted infections
Pharmacology		
1	Drugs used in the treatment of irritable bowel syndrome (IBS)	Enlist the drugs used in IBS
		Describe the mechanism of action of antispasmodics (anticholinergics), 5-HT receptor antagonisms (Alosetron) in IBS
2	Drugs used in the treatment of IBD	Classify the drugs used in IBD
		Describe the mechanism of actions of aminosalicylates, glucocorticoids, purine analogues, methotrexate, monoclonal antibodies, and anti-integrin in IBDs
		Explain the adverse effects of drugs used in the treatment of IBD

Forensic Medicine		
1	Abdominal injuries	Describe injuries to abdominal wall
		Describe injuries to esophagus, intestine, and stomach
		Describe injuries to liver and spleen.

Practical Work		
Pathology		
1	Ascaris Lumbricoides	Identify the important morphological and staining characteristics of the ova
2	Enterobius vermicularis	Identify the important morphological and staining characteristics of the ova
3	Ancylostoma duodenale	Identify the important morphological and staining characteristics of the ova
4	Liver Function Tests	To interpret normal and abnormal liver function tests in different clinical scenarios
Pharmacology		
1	Peptic ulcer disease	construct prescription for Helicobacter-associated peptic ulcer disease (Triple therapy & Quadruple therapy)
2	Anti-emetics	construct prescriptions for motion sickness, morning sickness, post-operative patient
		construct prescriptions for cancer chemotherapy-induced vomiting
		construct a prescription for a patient suffering from amoebic dysentery
3	Enteric fever	construct a prescription for a patient suffering from Enteric fever
		Write a prescription for a patient suffering from Ascariasis
Forensic Medicine		
1	Poisons	Identify corrosives
2	Corrosives	Case presentation of vitriol age
3	Irritants	identify common irritant poisons
3	Metallic poisons	identify common Metallic and non-metallic poisons
4	Vegetable and animal poisons	identify common Vegetable and animal poisons
Community Medicine		
1	Protein calorie malnutrition	Identify the model
		Differentiate between the clinical features of 2 models
		Justify its public health importance
		Signify the concept of food fortification and food adulteration
2	My food plate/ The pyramid	Identify the model
		Describe different components of the model
3	Health education	identify a health education message on the problem/scenario provided

		Formulate a health education message on the problem/scenario provided
4	House fly /arthropods	Identify the model
		Explain the disease caused by this vector and its control
5	Aedes Egypt	Identify the model
		Explain the disease caused by this vector and its control
6	Autoclave	Identify the model
		Explain the types of items for which autoclaves are used
		Explain the steps of instruments sterilization

Paper-K (GIT and Hepatobiliary-II)

Table: MCQs

Subject	Total MCQs
Pharmacology	16
Pathology	41
Forensic medicine	16
Community medicine	18
PRIME	01
Medicine	11
Surgery	12
Pediatrics	03
Family medicine	02
Total	**120**

Table: OSPE

Subject	Viva stations	OSPE/OSCE stations	Total
Pharmacology	2	2	4
Pathology	2	2	4
Forensic medicine	2	2	4
Community medicine	2	4	6
Medicine (GIT examination)	x	1	1
Surgery (GIT/local examination)	x	1	1
Total	8	12	20

* A minimum of 20 stations will be used in final exams. Total marks will be 120 (6 marks for each station).

BLOCK-L

(RENAL-II, Endocrine & Reproduction-II)

RENAL-II

Themes

S#	Theme	Duration in Weeks
1	Facial swelling	1 week
2	Scanty Urine	2 weeks
3	Loin pain and dysuria	
4	Urinary retention	

General Learning Objectives

By the end of Renal Module, 4th year MBBS students will be able to:

Knowledge:

1) Describe applied anatomy of Urinary System with video demonstration
2) Discuss physiology of the renal system
3) Describe the different Acid-base Disorders and the Mechanism for maintaining Acid-base Balance
4) Classify the diseases involving glomeruli, tubules, interstitium, renal blood vessels, Chronic nephron loss, Cystic, urine out flow obstruction, congenital-developmental and neoplastic diseases of renal system
5) Describe the etiology, pathogenesis, clinical manifestations, diagnosis, and prognosis of the renal system diseases.
6) Describe the Pharmacology of drugs used in the treatment of Renal System Diseases.
7) Describe ethics of Organ Transplantation.
8) Describe prevalence of renal diseases.

9) Describe the clinical features of renal diseases.
10) Enumerate/Describe various renal diseases primarily effecting pediatrics age group.
11) Describe pathogenesis and management of renal stones.
12) Describe pathogenesis and management of bladder outlet obstruction (BOO).

Skills:

1) Describe applied anatomy of Urinary System with video demonstration
2) Perform various practical's used in laboratory diagnosis of renal diseases.
3) Diagnose & manage Acute &Chronic Kidney Disease, Nephrotic, Nephritic Syndromes, Urinary Tract Infections.
4) Management of Urinary Tract Infections, Chronic Kidney Diseases & Renal Transplant patients during Pregnancy.
5) Describe pathogenesis and management of renal stones.
6) Describe pathogenesis and management of bladder outlet obstruction (BOO).

Attitude:

1. Describe ethics of organ transplantation.
2. Management of urinary tract infections, chronic kidney diseases, and renal transplant patients during pregnancy.

Specific Learning Objectives

Theme I: Facial Swelling		
S No	**Topic**	**LEARNING OUTCOMES**
Anatomy		
1	Describe applied anatomy of renal system	Discuss the gross anatomical features (internal and external) of kidney.
		Describe the structures entering and leaving the hilum of kidney along with their relations.
		Discuss the lympho-vascular supply of kidney.
Physiology		
1	GFR	Describe glomerular filtration rate (GFR), determinants of GFR and estimation of GFR.
2	Absorption of water and Solutes	Describe the absorption of water and solutes along different parts of nephron
Biochemistry		
1	Acid-base Balance	Describe the mechanisms for maintaining the Acid-base Balance.
2	Acid-base Disorders	Describe different Acid-base Disorders.
Pathology		
1	Basic terms	Define the terms: Azotemia, uremia, Nephrotic syndrome, Nephritic syndrome, asymptomatic hematuria, rapidly progressive glomerulonephritis
		Acute kidney injury, chronic kidney disease, end-stage renal disease (ESRD),
		Renal tubular defects, Nephrosclerosis, UTI,
		urolithiasis, Hydronephrosis, Oncocytoma and carcinoma
		Describe the pathogenesis of Nephrotic and Nephritic syndrome
2	Glomerular Disease	Describe the pathological responses, pathogenesis and mediators of glomerular injury
		Classify Glomerular diseases.
		Differentiate between major Primary Glomerular diseases in Terms of clinicopathological features and different microscopic findings
		Discuss the etiologies, clinicopathological features and morphology of the diseases presenting as Nephritic syndrome and Nephrotic syndrome
		Explain the pathogenesis and morphology of minimal change disease
		Describe the etiology, pathogenesis, morphology and clinical presentation of focal segmental glomerulosclerosis

		Describe the etiology, pathogenesis, morphology and clinical presentation of membranoproliferative glomerulonephritis
		Describe the etiology, pathogenesis, morphology and clinical presentation of IgA nephropathy
		Describe the pathogenesis, morphology of diabetic and other types of secondary nephropathies
3	Acute Tubular Injury (ATI)	Define Acute Tubular Injury (ATI).
		Describe the etiology, clinico-pathological features and morphology of ischemic and toxic ATI.
		Compare the pattern of tubular damage in ischemic and toxic injury
4	Vascular events	Discuss the etiology, pathogenesis, and morphology of Nephrosclerosis, malignant hypertension and Renal Artery stenosis.
Medicine		
1	Interpretation of urinalysis	explain various abnormalities and their interpretation and importance regarding specific diagnoses
		Highlight the importance of urine abnormalities in other systemic diseases apart from kidney and urogenital tract abnormalities
2	Nephrotic syndrome	Define Nephrotic Syndrome.
		Interpret the criteria for diagnosing Nephrotic Syndrome
		Recognize symptoms and signs of Nephrotic Syndrome
		Identify the complication of nephrotic syndrome
		Interpret the important investigations
		Discuss the management plan for Nephrotic syndrome
3	Nephritic syndrome	Interpret the criteria for diagnosing Nephritic Syndrome
		Identify symptoms and signs of Nephritic Syndrome
		Identify important causes
		Enumerate important investigations
		Discuss the treatment plan
	Electrolytes abnormalities • Hyponatremia • Hypernatremia • Hypokalemia • Hyperkalemia	Define Hyponatremia
		Discuss Types of Hyponatremias
		Describe clinical features
		Enlist/ interpret the diagnostic lab investigations
		Calculate the sodium deficit and free water deficit
		Calculate rate of sodium replacement
		Discuss complications
		Define Hypernatremia
		Describe clinical features
		Enlist diagnostic lab investigations
		Calculate the sodium deficit and free water deficit
		Calculate rate of fluid replacement
		Describe management plan.
		Define Hypokalaemia

		Describe clinical features
		Interpret diagnostic lab investigations
		Discuss complications.
		Describe/JUSTIFY management plan
		Define Hyperkaliemia
		Describe clinical features
		Enlist diagnostic lab investigations
		Discuss complications Describe management plan
Pediatrics		
1	Acute post streptococcal glomerulonephritis (ApGN)	Define AGN and APGN
		Describe the pathogenesis of Nephritic syndrome
		Know clinical features and differential diagnosis of ApGN
		Describe investigations required to reach a diagnosis of ApGN
		Effectively describe the treatment requires for patients with ApGN
		Define nephrotic syndrome.
2	Nephrotic syndrome (NS)	Describe pathophysiology of nephrotic syndrome
		Classify NS in to its subtypes
		Describe clinical features of NS
		Enumerate and describe tests required to reach diagnosis of NS
		Outline treatment steps in the management of NS
		Know the complications of NS and describe its prognosis.

Theme II: Scanty Urine		
S no	**Topic**	**Learning Outcomes**
Pathology		
1	Renal function test	Describe the normal ranges of Blood urea, creatinine, and electrolytes
2		Explain creatinine clearance and other radiological and Biochemical renal function tests and their clinical significance
3	Acute kidney injury	Explain the etiology, pathogenesis, morphology and clinical presentation and complications of acute kidney injury
4	Chronic Renal Failure	Explain the etiology, pathogenesis, morphology and clinical presentation and complications of chronic renal failure.
5	Interstitial and glomerulonephritis	Explain the etiology and pathogenesis of interstitial nephritis
		Explain the etiology, pathogenesis, and morphology of glomerulonephritis.
Medicine		
1	Acute Kidney Injury (AKI	Define AKI.
		Enlist/Interpret the criteria for diagnosing AKI
		Discuss/ Differentiate prerenal & post renal causes
		Identify symptoms and signs of AKI
		Identify /Interpret the important complications
		Enumerate/DISCUSS important investigations
		Construct a management plan for a patient with AKI
2	Chronic Kidney Disease (CKD)	Define CKD
		Enlist criteria for diagnosing CKD
		Identify important causes
		Identify symptoms and signs of CKD
		Identify the important complications
		Enumerate important investigations Discuss the treatment plan
3	Renal Replacement Therapy (RRT)	Define RRT
		Enlist the different types of RRT
		Identify/Enumerate important indications of dialysis
		Identify/Enlist the important complications of dialysis
		Discuss the Renal transplant
		Enlist and discuss the types of transplant rejection
Forensic Medicine		
1	Ethics of Organ Transplantation	Describe Ethics of Organ Transplantation
		Describe current legislation of HOTA (Human Organ Transplant Act)
		Identify loop holes in existing system of

		human organ transplant.
Surgery/Urology		
1	Renal transplant surgery	Enlist diagnostic indicators of renal transplant
		Describe pre-requisite for successful renal transplant
		Discuss post renal transplant care of patient
		Describe common complications of renal transplant surgery
		Enlist immunosuppressive drugs used in Renal transplant
Family Medicine		
1	Acute renal presentations-primary care management and Red flags	Explain the etiology, clinical features and presentation of acute renal failure
		Describe the steps of management of a patient with anuria and oliguria
		Identify patients that need urgent and proper referral for specialist care in primary health with anuria and acute and chronic renal disease
Community Medicine		
1	Environmental health: Introduction	Explain the importance of environmental health
		Define and classify environmental degradation
2	Water pollution	Define water pollution and describe its importance for health
		Describe the different types of water pollution as simple bio degradable, complex biodegradable and complex non- degradable
3	Water quality management	Explain the importance and daily requirements of water.
		Describe the qualities and criteria of different sources of water including surface water, ground well, shallow wellz deep well.
		Classify different methods of purification of water
		Describe natural methods of purification of water
		Describe physical methods.
		Describe chemical methods.
		Describe filtration methods both small scale and large scale
		Describe purification of water in special circumstances
		Enumerate different water quality parameters
		Describe physical parameters
		Describe different chemical parameters and its interpretation.

		Explain the permissible limits of chemical parameters.

Theme III: Loin pain and Dysuria		
S No	Topic	Learning Outcomes
Pathology		
1	Pyelonephritis	Discuss the etiology, clinico-pathological presentation, morphology, and complications of Acute Pyelonephritis,
		Discuss the etiology, clinico-pathological presentation, morphology and complications of, chronic pyelonephritis
		Discuss the etiology, clinico-pathological presentation, morphology, and complications of drug induced nephritis
2	Cystic Diseases of the Kidney	Classify the cystic diseases of Kidney.
		Describe the inheritance Pathological features, Complications, and prognosis of polycystic diseases of Kidneys.
		Differentiate between the inheritance, pathological features, typical outcomes and clinical features of Adult and Childhood Polycystic Kidney Diseases
		Differentiate between the inheritance, pathological features, typical outcomes, and clinical features of Child hood Polycystic Kidney Diseases.
3	Urolithiasis	Enlist the types of Renal stones.
		Discuss the etiology and pathogenesis of Renal stones
		Co-relate the occurrence of renal stones with different metabolic diseases
		Differentiate between the different renal stones based on frequency, predisposing factors, urine PH and morphology.
4	Neoplasms of the Kidneys Renal cell carcinoma	Classify the benign and malignant tumors of the Kidney.
		Discuss the etiology, morphology, and prognosis of Renal cell carcinoma
5	Wilm's Tumor	Discuss the genetics, clinico-pathological features, morphology, and prognosis of Wilm's tumor
6	Diagnosis and management of renal tumors	Describe the various investigations to diagnose renal tumors albumin/creatinine ratio, urine for micro albumin)
		Discuss management of renal tumors
7	Congenital anomalies of bladder	Describe the congenital anomalies of bladder and urethra
8	Acute Cystitis	Discuss the etiology, morphology clinico-pathological features and complications of Acute
9	Chronic Cystitis	Discuss the etiology, morphology clinico-pathological

		features and complications of Chronic Cystitis.
Pharmacology		
1	Urinary Tract Infection (UTI)	Describe the clinical pharmacology of drugs used in the management of acute and chronic UTI (Co-trimoxazole, Nitrofurantoin, Cephalosporins, Amoxacillin-clavulanic acid, etc).
Community Medicine		
1	HIV/AIDS, Syphilis	Describe HIV/AIDS considering Risk groups, pathology,Diagnosis, treatment, and Prevention
		Describe Syphilis in terms of causative agent, incubation period, transmission, manifestation, diagnosis treatment and prevention.
	Chlamydia, Genital warts, Gonorrhea	Describe Chlamydia in terms of etiology, transmission, symptoms, treatment, and prevention.
		Describe Genital warts in terms of causes, transmission, symptoms, treatment, and prevention.
		Describe Gonorrhea in terms of causes, transmission, symptoms, treatment, and prevention.
	Human Papilloma virus,	Describe Human Papiloma Virus (HPV) in terms of causes, types, transmission, symptoms, screening, and prevention.
Medicine		
1	Autosomal Dominant Polycystic Kidney Disease (ADPKD)	Define ADPKD.
		Enlist/Interpret the criteria for diagnosing ADPKD.
		Identify/interpret the genetic causes.
		Identify/ symptoms and signs of ADPKD.
		Identify/Interpret the important complications.
		Enumerate& interpret important investigations.
		Construct a management plan.
2	Urinary Tract Infections (UTIs)	Define UTIs.
		Enlist the criteria for diagnosing UTIs.
		Identify/Differentiate the complicated and uncomplicated UTIs.
		Identify symptoms and signs of UTIs.
		Identify the important complications.
		Enumerate/discuss/ interpret/ important investigations.
		Construct a management plan for a patient with UTI.
Radiology		
3	Urological Investigation	Uses of plain X-ray KUB (Kidney, ureter, bladder).
		Discuss role of CT in Urology.
		Discuss role of nuclear scans.
		Discuss DTPA Scan, DMSA Scan, MAG 3 Scan.

		Investigate renal system during pregnancy.
Surgery/Urology		
1	Kidney Stones	Enlist factors predisposing to specific stone types
		Discuss evaluation of stone formers
		Discuss clinical features and Diagnosis of renal stone
		Describe renal stone treatment options
2	Renal trauma	Describe Initial resuscitation of renal trauma patient
		Classify mechanism and grading of renal trauma
		Discuss clinical and radiological assessment of renal trauma
3	Pelvic Ureteric junction obstruction in adult (PUJO)	Discuss management plan of renal trauma.
		Define PUJ obstruction.
		Enlist etiology (congenital and acquired causes).
		Describe clinical presentation of PUJO.
		Interpret Investigations (renal ultrasound, IVU (Intravenous urography), MAG-3 renography, retrograde pyelography).
		JUSTIFY Management PLAN options (Endopyelotomy, Pyeloplasty).
4	Anomalies of renal fusion and ascent	Describe various anomalies of renal tracts like Horseshoe kidney, Ectopic kidney, Renal agenesis, Malrotated kidney, Urinary tract duplication.
	Renal Cell Carcinoma (RCC)	Describe clinical presentation and investigation of RCC.
		Enlist Treatment of localized RCC.
		Construct Management of metastatic RCC.
Obs & Gynae		
1	Asymptomatic bacteriuria	Define asymptomatic bacteriuria.
		Describe the effects of asymptomatic bacteriuria pregnancy.
		Management plan of asymptomatic bacteriuria
2	Acute symptomatic urinary tract infections	Define Acute Cystitis
		Describe effects of asymptomatic bacteriuria
		Plan management of Acute Cystitis in pregnancy
		Describe the effects of acute Pyelonephritis on pregnancy.
		Plan Management of acute Pyelonephritis.
Pediatrics		
1	Urinary tract infection (UTI)	Describe the types of UTI.
		Discuss prevention and management of UTI in children.

Theme IV: Urinary retention		
S No	**Topic**	**Learning Outcomes**
Anatomy		
1	Describe applied anatomy of ureters, urinary bladder, prostate and urethra	Describe gross structure of kidney, ureter, bladder, and urethra.
		Describe the microscopic structure of prostate
		Discuss the microscopic structure of urethra
Pathology		
1	Obstructive Uropathy	Discuss the obstruction in urogenital tract at different levels.
		Discuss the effects of obstruction on function morphology of kidney.
		Describe clinico-pathological features and morphology of Hydronephrosis
2	Tumors of urinary bladder	Classify tumors of urinary bladder.
3	BPH	Discuss the etiology, pathogenesis, morphology, staging and prognosis of urothelial (Transitional Cell) Tumors
		Describe pathophysiology of Benign prostatic hypertrophy and risk factors
4	Carcinoma prostate	Describe pathogenesis, risk factors and staging.
Pharmacology		
1	Drugs for benign prostatic hyperplasia	Classify the drugs used in the management of BPH
		Enlist the alpha-adrenergic blocking drugs with special reference to those having specific affinity for prostate muscle.
		Describe the role of alpha blockers, 5-alpha reductase inhibitors (Finasteride) and combination therapy in BPH.
		Enlist the adverse effects of the drugs used to treat BPH.
2	Carcinoma of prostate	Enlist the hormonal agents used in the management of Prostatic carcinoma.
		Describe the mechanism of action of Gonadotropin-releasing hormone (Goserelin) and anti-androgens (Cyproterone acetate and Flutamide) in the management of Prostatic

		carcinoma.
		Enlist the anticancer chemotherapeutic agents used in the management of Prostatic carcinoma.
Community Medicine		
1	Air Pollution & air quality management	Define air pollution.
		Enumerate criteria pollutants.
		Describe the sources and limits of air pollutants.
		Describe the adverse effects of air pollutants on health.
		Explain the measures for control of air pollution
		Describe the global adverse effects of air pollution- ozone depletion, greenhouse effect, smog, acid rain.
2	Noise pollution, radiation pollution and its control	Define noise pollution.
		Explain adverse effects of noise pollution on health.
		Describe factors effecting hearing loss.
		Enumerate acceptable noise standards.
		Discuss the measures for prevention of adverse effects of noise.
		Classify different types of radiations to which humans are exposed.
		Describe the adverse effects and preventive measure of different type of nonionizing radiations.
		Describe the adverse effects and preventive measure of ionizing radiations.
3	Waste management	Explain the importance of waste management in health
		Describe management of waste [organic of human and animal origin] as per water carriage system
		Describe the management of waste [organic of human and animal origin] as per conservancy system
		Describe management of solid waste [refuse]
		Define hospital waste management
4	Hospital waste management	Explain the importance of hospital waste management in health
		Classify hospital waste
		Know the impacts of improper hospital waste management on health
		Describe the methods to minimize hospital waste
		Describe the methods of treatment of hospital waste
		Explain the waste management trends in developing countries
5	Disasters and health	Define disaster management
		Describe classification of disasters
		Describe the mortality & morbidity due to disaster

		itself & mismanagement of disaster relief activities
		Describe pre-disaster management
		Describe post disaster management in immediate, intermediate, and long-term stages.
		Discuss management and preventive measures from previous disasters.
		Describe the history of disasters in Pakistan.
Surgery/Urology		
1	carcinoma of urinary bladder	Discuss clinical Presentation of bladder cancer.
		Describe diagnosis and clinical staging of bladder cancer.
		Construct management Plan of bladder cancer.
2	Enlarged Prostate	Define IPSS (International prostate symptoms scoring) for enlarged prostate.
		Describe watchful waiting for enlarged prostate.
		Enlist medical management of BPH.
		Minimal invasive management of BPH.
		Invasive surgical surgeries
		TURP (transurethral resection of prostate)
		Open prostatectomy
3	Carcinoma prostate	Describe clinical presentation and management
4	Urinary Incontinence	Define urinary incontinence
		Discuss urinary incontinence
		Classify urinary incontinence
		Discuss nocturnal enuresis
		Enlist causes and pathophysiology
		Describe evaluation of incontinence
		Enumerate Investigation of incontinence
		Describe conservative treatment options surgical options
5	Urethral strictures	Describeetiology, Presentation, investigation, and management of urethral stricture
6	Posterior urethral valve	Discuss clinical presentation and management of Posterior urethral valves (PUV).
Practical work		
S No	**Topic**	**Learning Outcomes**
Pathology		
1	Urine collection methods, physical examination of urine specimen	Demonstrate the procedure of urine collection, physical examination volume, color, appearance, pH of specimen.
2	Microscopic examination of	Perform the physical examination of urine and prepare report of an abnormal urine with pyuria and hematuria

	centrifuge specimen	Interpret the results.
3	Chemical examination of non-centrifuged urine specimen	Demonstrate substances for chemical examination and the different procedures of detection of protein in urine.
		Demonstrate the Principle of protein detection by heat method in urine
		Perform the heat and acetic acid test and the test for Bence Jones protein. Interpret the results
		Demonstrate the tests for detection of reducing substances in urine and the principle of Benedict's test
		Perform the Benedict's test. Interpret the results
		Demonstrate the substances seen in urine under microscope i.e. cells (Pus cells, RBCs, Epithelial cells and other different cells), Crystals, castes etc
		Prepare the sediment for urine examination.
		Detect various substances in a slide prepared from sediment under the microscope Interpret the results.
4	Urine staining, and culture	Demonstrate the Staining methods and their principles for urine specimens of acute and chronic UTI
		Identify the uropathogens shown in the slide
		Demonstrate sterilized methods for collections of specimens for culture and sensitivity.
		Perform a practical for culture and sensitivity by disc diffusion method for any uro pathogen.
Pharmacology		
	Prescriptions for acute and chronic UTI	Formulate prescriptions for acute and chronic UTI
Community Medicine		
1	Incinerator/waste disposal models	Identify the model
		Explain the steps of waste disposal
2	Water sources	Identify the model related sources of water
3	Sand filters	Identify the model
		Identify its different layers and mechanism of purification
		Calculate the dose of bleaching powder required for disinfection of water in a domestic tank
		Assess the quality of water sample on the basis of physical parameters (color, turbidity, suspended particles, temperature and Ph.)
		Interpret the bacteriological quality of water on the basis of presumptive coliform test

Endocrine & Reproduction-II

Themes

S. No	Theme	Duration in days
1	Tall/short stature	3
2	Neck swelling and Muscle cramps	6
3	Excessive thirst and urination	6
4	Moon face	5
5	Infertility and pregnancy	15
6	Breast lump	3

General Learning Objectives

By the end of Endocrine & Reproduction Module, 4th year MBBS students will be able to:

Knowledge:

1) Describe the pathology, clinical features, investigations, and treatment of Hyper and hypopituitarism
2) Describe the pathology, clinical features, investigations, and treatment of Hyper and hypothyroidism, and hyper and hypoparathyroidism
3) Describe the classification, pathogenesis, clinical features, investigations, and treatment of Diabetes mellitus
4) Explain the pathology, clinical features, investigations, and treatment of Hyper and hypoadrenalism
5) Explain the causes of male and female infertility and its management
6) Explain the classification, pathology, and management of testicular tumors
7) Explain benign and malignant breast disease
8) Discuss the etiology, risk factors, clinical features, investigations, and treatment of carcinoma of breast
9) Describe the pharmacokinetics and pharmacodynamics of pituitary, gonadal, pancreatic, thyroid, and adrenocortical hormones, their synthetic analogues and antagonists, and their role in the management of relevant disease conditions
10) Discuss the laws related to sexual offenses, and management of a rape victim in forensic aspects
11) Explain the pathophysiology and surgical management of benign prostatic hyperplasia and carcinoma of the prostate

Skills:

1) Describe the pathology, clinical features, investigations, and treatment of Hyper and hypopituitarism
2) Describe the pathology, clinical features, investigations, and treatment of Hyper and hypothyroidism, and hyper and hypoparathyroidism
3) Explain the pathology, clinical features, investigations, and treatment of Hyper and hypoadrenalism
4) Explain the classification, pathology, and management of testicular tumors
5) Explain benign and malignant breast disease
6) Describe the pharmacokinetics and pharmacodynamics of pituitary, gonadal, pancreatic, thyroid, and adrenocortical hormones, their synthetic analogues and antagonists, and their role in the management of relevant disease conditions
7) Discuss the laws related to sexual offenses, and management of a rape victim

in forensic aspects

Attitude:

1) Explain the causes of male and female infertility and its management.
2) 1Formulate prescriptions for patients with Graves' disease and diabetes mellitus.
3) Discuss the laws related to sexual offenses and management of a rape victim in forensic aspects.

Specific Learning Outcomes

Theme-1: Tall / short stature		
Subject	**Topic**	**Learning outcomes**
Pathology		
1	Pituitary gland- Physiological anatomy	Explain the gross and microscopic structure of pituitary gland
		Explain the functions of hormones of the anterior and posterior pituitary gland and their regulation by the Hypothalamus
2	Hyperpituitarism/Pituitary adenomas: • Prolactinomas • Somatotrophic tumors • Corticotrophic tumors • others	Explain the causes of hyperpituitarism
		Discuss the gross and microscopic structure of pituitary adenomas, and the hormones secreted from these
		Explain the clinical manifestations of different types of pituitary adenomas
3	Hypopituitarism	Describe the etiology and clinical manifestations of hypopituitarism
Medicine		
1	Acromegaly/Gigantism	Explain the etiology, clinical features, investigations, treatment, and complications of Acromegaly/gigantism
2	Hyperprolactinemia	Discuss the etiology, clinical features, investigations, and treatment of hyperprolactinemia
3	Hypopituitarism/Sheehan`s syndrome	Explain the etiology, clinical features, investigations and treatment of Hypopituitarism and Sheehan`s syndrome
Pharmacology		
1	Growth hormone	Describe the sources of Growth hormone (old and new sources)
		Describe the mechanism of action, clinical uses and adverse effects of Growth hormone
2	Growth hormone antagonists (Octreotide and others)	Enlist Growth hormone antagonists
		Describe the clinical role of Octreotide in acromegaly
		Describe the route of administration, dosage, and adverse effects of octreotide in acromegaly and gigantism
3	Bromocriptine	Describe the mechanism of action, clinical uses, and adverse effects of Bromocriptine
Pediatrics		
1	Short stature	Describe the method to measure and plot height; and calculate height velocity. and midparental, target height

		to allow early diagnosis of growth disorders in pediatric patients
		Explain the diagnostic criteria that allow to differentiate causes of growth deficiency
		Discuss the tools for better communication with patients and families and coordination of multidisciplinary care
		Discuss treatment of growth hormone deficiency or other diseases responsible for short stature and their appropriate management
Neurosurgery		
1	Surgical management of pituitary adenoma	Explain the surgical treatment and complications of pituitary macro/microadenomas
2	Occupational Health:	Define occupational health
Community Medicine		
1	Introduction	Discuss importance of occupational health
		Describe ergonomics
		Describe principles and responsibilities of occupational health officer [OHO]
2	Physical hazards	Enumerate physical hazards (heat, cold, noise, light, vibrations, pressure effect, Radiations)
		Discuss its ill effects on health
		Discuss its preventive measures
3	Chemical hazards	Enumerate chemical hazards (inorganic dust diseases, organic dust diseases, metals & chemicals)
		Discuss its ill effects on health
		Discuss preventive measures
4	Mechanical, Biological & Psychosomatic hazards	Describe mechanical hazards
		Discuss control measures of mechanical hazards
		Discuss control measures of mechanical hazards
		Discuss control measures of biological hazards
		Describe psychosomatic stressors
		Discuss control measures of psychosomatic stressors
5	Animal hazards	Describe types, prevalence, and statistics of snake bite
		Discuss prevention and management of snake bite
		Discuss causes of poor management with respect to awareness and vaccination
6	Preventive measures, health insurance, social security schemes	Describe various preventive measures of occupational hazards (Medical engineering and legal measure)
		Discuss role and benefits of health insurance
		Discuss social security and its benefits
7	Demography: Introduction	Define demography and various related terms
		Explain and interpret population pyramid
		Explain demographic transition

		Describe the causes of high and low fertility and mortality
8	Growth rate	Define population growth rate, CDR, CBR
		Describe growth rate
		Describe population explosion & its implications
		Explain advantages of population control
9	Demographic indicators	Describe the demographic indicators of Pakistan
PRIME/MEDICAL EDUCATION		
1	Dealing with patients	Serve the patient as an individual, considering lifestyle, beliefs, and support system
2	Community Need analysis	Identify the health care needs of community
3	Gender based violence	Classify gender-based violence
		Explain the reasons for gender-based violence
		Discuss the outcomes of gender-based violence
		Explain the preventive strategies for gender-based violence
		Discuss the legal implications of gender-based violence in Pakistani context.

Theme-2: Neck swelling and muscle cramps

S No	Topic	Learning Outcomes
Physiology		
1	Physiologic anatomy of the Thyroid gland	Explain the gross and microscopic structure of Thyroid gland
		Explain the synthesis and functions of hormones of the thyroid gland and their regulation by the anterior pituitary
Pathology		
1	Hyperthyroidism including Grave`s disease	Discuss the etiology, pathogenesis and morphology of Hyperthyroidism and Grave`s disease
2	Hypothyroidism	Discuss the etiology, pathogenesis, morphology, and clinical features of Hypothyroidism
3	Thyroiditis	Discuss the classification, morphology, and presentations of Thyroiditis
4	Multinodular goiter	Explain the etiology, clinical features, and complications of multinodular goiter
5	Thyroid malignancies	Classify thyroid malignant disorders
		Explain morphology, clinical features, and prognosis of thyroid malignancies
Medicine		
1	Hyperthyroidism including Grave`s disease	Discuss the etiology, clinical features, investigations and treatment and prognosis of Hyperthyroidism and Grave`s disease
		Explain the pathogenesis, clinical features, and management of Grave`s Ophthalmopathy
2	Hypothyroidism	Discuss the types, etiology, clinical features, investigations, and treatment of Hypoparathyroidism
3	Thyroiditis	Describe the classification, etiology, clinical features, investigations, and treatment of Thyroiditis
4	Multinodular goiter	Discuss the etiology, clinicalfeatures, investigations, and management approach to a patient with multinodular goiter

5	Thyroid malignancies	Classify thyroid malignant disorders
		Discuss the pathogenesis, clinical features, investigations, and management of Thyroid malignancies
6	Hyperparathyroidism	Discuss the types, etiology, clinical features, investigations, and treatment of Hyperparathyroidism
7	Hypoparathyroidism	Discuss the types, etiology, clinical features, investigations, and treatment of Hypoparathyroidism
Pharmacology		
	Thyroid hormones	Enlist thyroid preparations (used clinically as well as older-obsolete ones)
		Describe the mechanism of action, pharmacological effects, clinical use and adverse effects of Thyroxine (T4) and Tri-iodothyronine (T3)
	Antithyroid drugs	Classify Antithyroid drugs
		Describe the mechanism of action, clinical use, and adverse effects of Thioamides
		Describe the mechanism of action, clinical use, and adverse effects of Potassium iodide
		Describe Lugol's iodine solution
		Describe the mechanism of action, clinical use, and adverse effects of Radioactive iodine (131I)
		Describe the use of ß-blockers in hyperthyroid patients
Pediatrics		
1	Congenital hypothyroidism	Discuss the types and clinical features of hypoparathyroidism
		Discuss investigations and treatment of Hypoparathyroidism
Community Medicine		
1	Iodine deficiency / Goitre	Discuss sources of iodine and goitrogens
		Discuss iodine deficiency disorders and daily requirement of Iodine
		Explain the epidemiological determinants and control strategies for iodine deficiency/goiter

Theme-3: Excessive thirst and urination		
S No	**Topic**	**Learning Outcomes**
Pathology		
1	Diabetes Mellitus • Classification • Diagnosis • Insulin resistance • Betacell dysfunction • Complications ○ Acute ○ Chronic	Classify Diabetes mellitus
		Explain the diagnostic criteria of DM
		Explain the mechanisms of insulin resistance
		Explain the mechanisms of beta cell dysfunction
		Explain the acute and chronic complications of DM
2	Pancreatic neuroendocrine tumors	Describe the types and clinical presentations of pancreatic neuroendocrine tumors
Medicine		
1	Diabetes mellitus • Types • Insulin resistance syndromes • Clinical features investigations	Explain the different types of DM
		Discuss the mechanism presentation, and management of insulin resistance
		Discuss the clinical features of DM
		Explain the diagnostic workup of a patient with DM
		Classify the pharmacological treatment of DM
		Explain life style modifications in the management of DM
2	• Treatment • Complications	Discuss the acute and chronic complications of DM
3	Hypoglycemic coma	Explain the etiology, clinical features, and management of hypoglycemic coma
4	Diabetic ketoacidosis	Explain the precipitating factors, diagnostic work up, and treatment of a patient with diabetic ketoacidosis
5	Hyperosmolar non-kenotic diabetic coma	Explain the precipitating factors, diagnostic work up, and treatment of a patient with Hyperosmolar non-ketotic diabetic coma
6	Lactic acidosis	Explain the precipitating factors, diagnostic work up, and treatment of a patient with Lactic acidosis
7	Posterior pituitary gland	Discuss the functions of hormone Vasopressin secreted by the posterior pituitary gland
		Explain the etiology, clinical features, investigations, and treatment of Diabetes insipidus
8	SIADH	Explain the etiology, and pathogenesis of SIADH secretion
Pharmacology		
1	Insulin	Classify Insulins
		Describe the sources of Insulin
		Describe the differences between the human, bovine and

		porcine Insulins
		Describe the mechanism of action and clinical uses of Insulin
		Describe the complications of Insulin therapy
		Describe the management of hypoglycemia caused by Insulin
		Describe the management of diabetic ketoacidosis
2	Oral hypoglycemic drugs	Classify oral hypoglycemic drugs
		Enlist euglycaemic drugs
		Describe the mechanism of action and adverse effects of Sulphonyl Reas
		Describe the mechanism of action and clinical use of Meglitinides
		Describe the mechanism of action, clinical use, and adverse effects of Biguanides
		Describe the mechanism of action, clinical use, and adverse effects of Thiazolidinediones
		Describe the mechanism of action, clinical use, and adverse effects of α-glucosidase inhibitors
		Describe the mechanism of action and clinical use of Pramlintide,Exenatide and Sitagliptin
3	Glucagon	Describe the mechanism of action and clinical use of Glucagon
4	Vasopressin/Desmopressin	Describe the mechanism of action, clinical use, and adverse effects of Desmopressin
		Enlist the drugs used in nephrogenic diabetes insipidus
Pediatrics		
1	Management of Type 1 Diabetes mellitus in children	Enumerate the blood glucose parameters and the clinical signs for an early diagnosis of diabetes in a child.
		Recognize how diabetes may present in young children or babies, to make the diagnosis and prevent coma or death
		Plan investigations and management plan for a newly diagnosed and a known diabetic child.
		Enumerate the different types of insulins.
Community Medicine		
1	Non-communicable diseases: Prevention of diabetes mellitus	Discuss Prevalence of diabetes mellitus globally and in Pakistan
		Discuss modifiable and non-modifiable risk factors for diabetes mellitus
		Describe epidemiological determinants of diabetes mellitus
		Discuss screening methods for diabetes mellitus
		Discuss the prevention (Primary, secondary, and tertiary) and care of diabetes mellitus

Theme-4: Moon face		
S No	**Topic**	**Learning Outcomes**
Physiology		
1	Physiology of the Adrenal cortical hormones	Explain the gross and microscopic structure of Adrenal gland
		Explain the synthesis and functions of hormones of the adrenal cortex and their regulation by the anterior pituitary
Pathology		
1	Hypercortisolism and Cushing`s syndrome	Discuss the etiology of Hypercortisolism
		Explain the etiology and clinical features, of Cushing`s syndrome
2	Hyperaldosteronism	Explain the etiology, and presentation of primary Hyperaldosteronism
3	Adrenogenital syndrome	Explain the etiology, clinical features, of Adrenogenital syndrome
4	Adrenal insufficiency • Primary (Acute and Chronic) • Secondary	Classify adrenal insufficiency in the context of its etiology
		Discuss the clinical presentations and complications of adrenal insufficiency
5	Adrenal neoplasms	Discuss the types of adrenal neoplasms
		Explain the morphology and clinical features of adrenal neoplasms
6	Pheochromocytoma	Explain the morphology and clinical features of Pheochromocytoma
7	Multiple Endocrine Neoplasia syndromes (MEN)	Classify Multiple endocrine neoplasia syndrome
		Explain the morphology and clinical features of MEN
Medicine		
1	Hypercortisolism and Cushing`s syndrome	Explain the etiology, clinical features, diagnostic workup, and management of Hypercortisolism/Cushing`s syndrome
2	Primary Hyperaldosteronism	Explain etiology, clinical features, diagnostic workup, and management of Primary Hyperaldosteronism
3	Adrenogenital syndrome	Explain the etiology, clinical features, diagnostic workup, and management of Adrenogenital syndrome
4	Adrenal insufficiency • Primary (Acute and Chronic) • Secondary	Classify adrenal insufficiency
		Explain the etiology, clinical features, investigations, and treatment of primary Addison`s disease
		Explain the etiology, clinical features, investigations, and treatment of pituitary adrenal insufficiency
5	Adrenal neoplasms	Explain the types of adrenal tumors
		Discuss the clinical presentations, diagnostic workup, and treatment of adrenal tumors
6	Pheochromocytoma	Explain the clinical features, investigations, management, and complications of Pheochromocytoma
	Gastro-entero-pancreatic endocrine tumors (GEP-NETs) including Carcinoid tumors	Explain the clinical features, investigations, management of GEP- NETs/Carcinoid tumors.

Pharmacology		
1	Glucocorticoids	Classify Glucocorticoids
		Describe the mechanism of action, pharmacological effects, clinical uses, and adverse effects of glucocorticoids
		Describe dexamethasone suppression test
2	Glucocorticoid antagonists /synthesis inhibitors	Enlist Glucocorticoid antagonists/synthesis inhibitors
		Describe the mechanism of action, clinical uses and adverse effects of Mifepristone, Ketoconazole, Metyrapone and Aminoglutethimide
3	Aldosterone antagonists	Describe the mechanism of action, clinical uses, and adverse effects of Spironolactone (apart from being used as diuretic)
Community Medicine		
1	Introduction to nutrition, basic measurements & allowances	Classify nutrients
		Discuss quality of nutrients in diet
		Discuss the balanced diet
		Discuss energy value of different nutrients
2	Macronutrients	Describe classification of macronutrients
		Discuss the functions and importance of various macronutrients
		Discuss daily allowance of macro nutrients
		Discuss the diseases caused by their deficiency and excess
3	Micronutrients -Vitamin deficiencies allowances & control	Describe classification of micronutrients
		Discuss the function and importance of various vitamins
		Discuss daily allowances of vitamins
		Discuss diseases caused by their deficiency
		Discuss the function and importance of various minerals essential for health
4	Micronutrients -mineral deficiencies allowances and control	Discuss daily allowance of minerals intake
		Discuss diseases caused by their deficiency
5	Undernutrition–Protein calorie malnutrition and control	Define undernutrition and its classification.
		Discuss protein calorie malnutrition & its causes
		Describe the various classifications for assessment of PEM
		Discuss control strategies of malnutrition
6	Over-nutrition / obesity and it's control	Define obesity
		Calculate BMI
		Discuss Epidemiology of obesity.
		enumerate Causes of obesity.
		Explain the Complications of obesity
		Formulate a management plan for obesity
		Discuss Prevention of obesity

Theme-5: Infertility and pregnancy		
S NO	**Topic**	**Learning Outcomes**
Pathology		
1	Testicular tumors	Classify testicular tumors
		Explain the gross and microscopic morphology of benign and malignant testicular tumors
		Discuss the staging and prognosis of testicular malignant tumors
2	Prostatic disorders Prostatitis	Explain the etiology and morphology of Prostatitis
		Explain the gross and microscopic morphology and complications ofBPH
3	• Benign prostatic hyperplasia (BPH) • Prostatic carcinoma	Explain the clinical features, types and staging of prostatic carcinoma
4	Sexually transmitted diseases (STDs) • Syphilis • Gonorrhea	Explain the types of STDs
		Explain the stages, morphology, clinical features, and complications of Syphilis
		Name the organisms causing Gonorrhea and its clinical features
5	Introduction to gynecological cancers	Enlist different types of gynecological cancers
6	Cervical carcinoma	Explain the gross and microscopic morphology, clinical features and staging of Cervical carcinoma
7	Endometritis	Explain the etiology and pathogenesis of endometritis
8	Uterine fibroids	Explain the etiology and morphology of uterine fibroids
9	Endometriosis	Explain the etiology, pathogenesis and morphology of endometriosis
10	Endometrial hyperplasia and endometrial carcinoma	Explain the etiology, pathogenesis, morphology of Endometrial hyperplasia /carcinoma
11	Polycystic ovarian disease	Explain the etiology, risk factors, clinical features and morphology of Polycystic ovary syndrome
12	Tumors of the ovary • Benign • malignant	Classify benign and malignant tumors of the ovary
		Explain the gross and microscopic morphology, clinical features, staging and complications of ovarian carcinoma.
Gynecology		
1	Anatomy of the reproductive tract	Describe the anatomy of the perineum, the vagina, cervix and uterus, the adnexa and ovary
2	Menopause	Define Menopause.
		Describe physiological and non-physiological menopause
		Explain the clinical effects of menopause on women
		Outline the assessment of menopausal women, based on modifiable and non-modifiable risk factors.

		Explain the management of menopause
		Describe the types, side-effects, relative and absolute contraindications of hormone replacement therapy (HRT)
3	Contraception	Define contraception.
		Classify contraceptive methods
		Explain their mechanisms of action, efficacy, and failure rates
		Explain the risks and benefits of each method
		Identify the complications of different contraceptive methods
4	Polycystic ovary syndrome	Explain the risk factors, aetiology, clinical features, investigations, treatment, complications, and prognosis of polycystic ovary syndrome
5	Uterine fibroids	Explain the risk factors, clinical features, and management of uterine fibroids
6	Endometrial cancers	Explain the risk factors, clinical features, investigations, prognosis, and management of endometrial carcinoma
7	Cervical carcinomas	Explain the risk factors, clinical features, investigations, prognosis, and management of cervical carcinoma
8	Female infertility	Define infertility
		Discuss the causes and management of female infertility
9	Malignant diseases of the ovaries	Classify benign and malignant diseases of the ovaries
		Explain the clinical features, diagnosis, serological markers, staging, management, and complications of ovarian carcinoma
10	Uterovaginal prolapse	Describe the etiology, clinical features, complications, management of Uterovaginal prolapse
11	Urinary incontinence	Classify urinary incontinence
		Explain the etiology, clinical features, management, and prevention of urinary incontinence
12	Endometriosis	Define endometriosis
		Explain the etiology, clinical features, investigations, management of Endometriosis
13	Abnormal uterine bleeding	Explain the etiology of abnormal uterine bleeding
		Describe the diagnostic approach to a patient with abnormal uterine bleeding
14	Miscarriage	Define miscarriage
		Explain the etiology, risk factors, management, and prevention of miscarriage
15	Ectopic gestation	Describe the etiology, clinical features, diagnosis, and management of ectopic gestation
16	Gestational trophoblastic diseases (GTDs)	Classify GTDs
		Explain the etiology, clinical features, diagnosis, management, and complications of H. Mole
		Explain the etiology, clinical features, diagnosis, management, and complications of Choriocarcinoma
17	Vaginal discharge and STDs	Explain the etiology and diagnostic workup of vaginal discharge
		Describe the risk factors, etiology, clinical features, management, complications, and prevention of STDs

Pharmacology		
1	Gonadotropins (FSH & LH) and human chorionic gonadotropin	Describe the mechanism of action, clinical uses, and adverse effects of Gonadotropins (FSH & LH) and human chorionic gonadotropin (hCG)
		Describe the role of gonadotropins in male infertility
2	Gonadotropin-releasing hormone and analogues (Gonadorelin and others)	Describe the mechanism of action, clinical uses and adverse effects of Gonadotropin-releasing hormone and analogues (Gonadorelin and others)
3	Oxytocin	Describe the mechanism of action, clinical uses, and adverse effects of Oxytocin
4	Oestrogens	Classify Oestrogens
		Describe the mechanism of action, organ system effects, clinical uses, adverse effects, and contraindications of Oestrogens
		Describe Premarin
5	Progestins	Classify Progestins
		Describe the mechanism of action, organ system effects, clinical uses, adverse effects, and contraindications of Progestins
6	Oral contraceptives	Classify Oral contraceptives
		Describe the mechanism of action, organ system effects, clinical uses, adverse effects, and contraindications of oral contraceptive pills.
		Describe mini pills with their advantages and disadvantages
		Describe post-coital contraceptives
7	Parenteral and implantable contraceptives	Describe the use of Parenteral (Medroxyprogesterone) and implantable (Norplant system) contraceptives
8	Ovulation-inducing agent (Clomiphene)	Describe the mechanism of action, clinical use, and adverse effects of Clomiphene
9	Mifepristone	Describe the mechanism of action, clinical uses, and adverse effects of Mifepristone
10	Danazol	Describe the mechanism of action, clinical uses, and adverse effects of Danazol
11	Androgens and anabolic steroids	Enlist Androgens and anabolic steroids
		Describe the mechanism of action, clinical uses, and adverse effects of androgen preparations
12	Antiandrogens	Classify antiandrogens
		Describe the role of Ketoconazole as steroid synthesis inhibitor, its clinical uses, and adverse effects
		Describe the mechanism of action and clinical use of Finasteride
		Describe the mechanism of action and clinical use of Cyproterone acetate
		Describe the role of Spironolactone as androgen receptor blocker and its use in this context
13	Male contraception	Enlist the drugs used for male contraception

		Describe the role of Gossypol as male contraceptive agent
Forensic Medicine		
1	Impotence and sterility	Define impotence
		Define sterility
		Examine under supervision a case of sterility and impotence
		Describe important causes leading to sterility and impotence in males as well as in females
		Appreciate difference between sterility and impotence
		Medicolegal importance of sterility and impotence
2	Sterilization	Define sterilization
		Medicolegal importance of sterilization
		Discuss the technique of sterilization in males and females
		enumerate legal formalities before sterilization
3	Artificial insemination	Define artificial insemination
		Enumerate its different types
		Describe medicolegal aspects of artificial insemination
		Define test tube baby
		Define surrogate motherhood and enumerate its medicolegal importance
4	Virginity	Define virginity
		Discuss signs of virginity
		Enumerate different types of hymen.
5	Pregnancy	Define pregnancy
		Describe presumptive signs of pregnancy
		Discuss probable signs of pregnancy
		Appreciate conclusive signs of pregnancy
		Enumerate signs of pregnancy in dead
		Discuss Medicolegal aspects of pregnancy
		Describe Isqat e Haml & Isqat E Janin as per PPC
6	Delivery	Define delivery
		Appreciate signs of recent delivery in living
		Appreciate or identify signs of recent delivery in dead
		Identify signs of remote delivery in living and dead
		Enumerate medicolegal aspects of delivery
7	Legitimacy & dissolution of marriage	Define legitimacy
		Define illegitimate child
		Enumerate medicolegal aspects of legitimacy
		Define superfetation
		Enumerate medicolegal aspects of affiliation/ adoption
		Enlist legal grounds for nullity and dissolution of marriage
8	Natural sexual offences: Rape & Incest	Define rape as per CrPC
		Enumerate medicolegal aspects of rape
		Examine under supervision a case of rape victim
		Examine under supervision examination of the accused
		Define incest
9	Zina	Define Muhsan as per Hudood ordinance 1979.
		Define Zina according to the Hudon ordinance 1979.
		Enumerate the conditions required for liability in case of Zina.
		Enlist punishment of Zina
		Enumerate steps of proof of Zina in the court
		Describe steps of complaint in case of Zina as per Cr PC

10	Unnatural sexual offences Sodomy	Define sodomy
		Enumerate steps of examination of passive agent in sodomy
		Enumerate steps of examination of active agent
		Define and describe buccal coitus
		Define and describe tribadism
		Define bestiality
11	Sexual perversions	Define sexual perversions
		Enumerate its different types
		Define and describe sadism
		Define and describe masochism
		Define and describe fetishism
		Define and describe exhibitionism
		Define and describe transvestism
		Define and describe uranism
		Define and describe voyeurism
		Define and describe frotteurism
		Define and describe urolagnia
12	Abortion	Define abortion
		enumerate its different types
		enumerate salient features of natural abortion
		enumerate salient features of artificial abortion
		differentiate between natural and criminal abortion
		examine under supervision a case of criminal abortion and legal formalities to be fulfilled in such a case
Urology/Surgery		
1	Causes of male infertility	Discuss the causes of male infertility
		Explain the diagnostic workup of a male infertile patient
Surgery		
1	Cryptorchidism	Define Cryptorchidism
		Explain the etiology, complications, and management Cryptorchidism
2	Hydrocele and varicocele	Explain the cause, clinical features, complications and surgical management of hydrocele and varicocele
3	Benign prostatic hyperplasia	Explain the etiology, clinical features, complications, management of BPH
4	Carcinoma of prostate	Explain the etiology, clinical features, complications, staging, management, and prognosis of carcinoma of the prostate
Community Medicine		
1	Safe motherhood	Define reproductive health
		Describe components of reproductive health
		Define safe motherhood
		Discuss pillars of safe motherhood
1	Antenatal care	Discuss antenatal care
		Discuss antenatal visits as per WHO
2	Family planning and post abortion care	Define family planning & different methods of family planning
		Discuss contraceptive prevalence rate and factors responsible for low CPR

		Discuss Post abortion care
3	Child promotion and development strategies (IMNCI, IMCI and growth monitoring)	Define IMNCI & IMCI
		Describe components of IMNCI
		Enumerate principles of IMNCI
		Discuss growth monitoring
4	Prevention of reproductive health diseases	Discuss different reproductive health diseases
		Discuss STIs in detail
		Discuss risk factors and Prevention of CA cervix
Family medicine		
1	Menstrual disorders	Enlist menstrual disorders
		Explain the etiology, investigations, and management of menstrual disorders in primary care
2	Menopause	Explain the clinical features, and management of menopausal symptoms and complications in primary care
3	Contraception	Explain the types of contraception methods
		Explain the merits and demerits of different contraceptive techniques
		Describe the complications associated with the use of oral and injectable contraceptives
4	Vaginal discharge and STDs	Explain the etiology of vaginal discharge
		Describe the diagnosis and management of vaginal discharge in primary care
		Classify Sexually transmitted infections in females
		Describe the clinical features, investigations, and management of STDs in females in primary care

Theme-6: Breast Lump		
S NO	**Topic**	**Learning Outcomes**
Pathology		
1	Fibrocystic changes • Cysts and fibrosis • Epithelial hyperplasia • Adenosis	Explain the fibrocystic changes in breast including cysts, fibrosis, epithelial hyperplasia and adenosis
2	Fibro-adenoma	Explain the morphology of Fibro-adenoma of the breast
3	Papilloma	Explain the morphology of papilloma of the breast
4	Carcinoma of the breast	Explain the risk factors, etiolopathogenesis, clinical features, staging, and complications of carcinoma of the breast
5	Gynecomastia	Discuss the causes and morphology of Gynecomastia
Surgery		
1	Investigations of breast diseases	justify the investigations of a patient with a breast lesion
2	Benign breast diseases	Classify benign breast diseases
3	Malignant breast diseases	Classify malignant breast diseases
		Discuss the risk factors, etiology, clinical features, investigations, management, and prognosis of a patient with breast cancer
		Describe the role of hormone receptors in breast cancer
		Explain the complications of breast cancer surgery
		Discuss the role of pharmacological treatment options in breast cancer management
		Explain the role of selective estrogen receptors modulators in the prevention of breast cancer in high-risk women
Pharmacology		
1	Selective Estrogen Receptor Modulators (SRMs)- Tamoxifen and others	Enlist Selective Estrogen Receptor Modulators (SERMs)
		Describe the mechanism of action and clinical uses of Tamoxifen
Community Medicine		
1	Breast feeding	Discuss advantages of breast feeding
		Discuss artificial feeding
		Discuss baby friendly hospital initiative
		Discuss guidelines on infant and child feeding
2	Screening and prevention of breast cancer	Discuss different methods of screening for breast cancer
		Discuss levels of prevention of breast cancer
Radiology		
1	Radiological approaches to breast cancer screening	Explain the indications, procedure, and interpretation of ultrasound and mammography in the investigation of breast lumps
PRIME/MEDICAL EDUCATION		
1	Counselling- Breaking	Explain the concept of SPICES model of breaking bad news

	bad news.	

Practical work		
S NO	**Topic**	**Learning Outcomes**
Pharmacology		
1	Graves' disease	Formulate prescription for a patient with Graves' disease
2	Diabetes mellitus	Formulate prescription for a patient with type 1 and type 2 Diabetes mellitus
Pathology		
1	Glucose estimation	Check glucose in urine
		Check blood glucose in a given sample.
2	Goiter	Identify the microscopic features of multinodular goitre
3	Pap smear	Interpret a pap smear slide
4	Fibroids	Identify the microscopic features of uterine fibroids
5	Carcinoma breast	Identify the microscopic features of carcinoma of the breast
Forensic Medicine		
1	Examination of a rape victim and assailant	Take consent from a rape victim
		Examine a rape victim/manikin
		Describe the procedure of taking sample from the victim/manikin/item
		Describe the procedure of Sealing and preservation of the specimen
2	Examination of sodomy victim and assailant	Describe the procedure of Examining a victim of sodomy
		Describe the procedure of Taking sample from the victim/manikin/item
		Describe the procedure of Sealing and preservation of the specimen
Community Medicine		
1	Contraception	Identify the contraceptive device/drug
		Explain the merits and demerits
		Discuss the method of administration of the given device/drug
2	Mother and child health	Identify the chart
		Devise a schedule plan for antenatal visits as per WHO criteria
3	EPI schedule	Counsel the mother for EPI schedule
4	Vaccination and immunization	Identify the vaccine
		Explain its uses
		Discuss its schedule of administration
		Discuss the results of VVM (vaccine voile monitor) and its uses in epidemics
5	IMCI- anthropometric measures / Shakir`s tape	Identify the model
		Measure the mid-arm circumference
		Calculate the weight and height of the child
		Interpret the results
6	Growth chart	Identify the chart

		Plot the graph using a scenario
		Interpret different parts of the chart
7	Demographic indicators	Interpret the given demographic indicator (population pyramid, HDI, PQLI, Growth rate and dependency ratio)

Paper-L (Renal-II, and Endocrine and Reproduction-II)

Table: MCQs

Subject	Renal-2	Endocrine and Reproduction-2	Total MCQs
Community medicine	11	6	17
Pharmacology	02	07	09
Pathology	11	12	23
Forensic medicine	01	06	07
Surgery	06	03	09
Gynaecology	01	39	40
Medicine	05	05	10
Pediatrics	02	01	03
Family medicine	01	01	02
Total	**40**	**80**	**120**

Table: OSPE/OSCE

Subject	Viva stations	OSPE/OSCE stations	Total
Pharmacology	2	1	3
Pathology	2	2	4
Forensic medicine	2	1	3
Community medicine	2	4	8
Research viva	2**	x	
Gynecology	1	2	3
Medicine (Endocrinology/DM)	0	1	1
Total	11	11	22

* A minimum of 22 stations will be used in final exams. The total marks will be 120 (6 marks for each station).
**there will be 2 allocated stations for research viva (one internal and one external) at one time for which the number of marks for each station will be 10 (with a total of 20 marks) allocated for research viva plus 15 marks for conducting research). A total of 35 marks have been allocated for the thesis (research project).

BLOCK-M-1

ENT Module

Teaching Hours Allocation

Themes	Total Hours	In class teaching (Hours)	Clinical (Hours)
Theme 01: Foundation of Otorhinolaryngology & Head and Neck	11	---	11
Theme 02: Sore Throat	21	15	06
Theme 03: Difficulty in Swallowing	09	05	04
Theme 04: Hoarseness & Stridor	36	19	17
Theme 05: Deafness, Ear Discharge & Dizziness	27	19	08
Theme 06: Nasal Obstruction	29	19	10
Theme 07: Swelling Neck	14	06	08
Total	**147**	**83**	**64**

General Learning Objectives

By the end of ENT Module, 4th year MBBS students will be able to:

Knowledge:

1. Describe the anatomy and physiology of Ear, Nose, Throat & Neck.
2. Describe benign and malignant tumors involving the ENT and Head & Neck.
3. Prescribe hematological investigations, x-ray paranasal sinuses, CT/MRI scan of paranasal sinuses, temporal bone and Head & Neck & interpret it.
4. Describe the ABC protocol for resuscitation of traumatic patients.
5. Discuss differential diagnosis of membrane on the tonsils and describe diphtheria.
6. Describe sialadenitis, sialolithiasis and enumerate the benign and malignant salivary tumors.
7. Discuss a treatment plan for the patients with various common diseases of the ENT and Head and Neck region.
8. Describe dysphagia and its causes, Plummer-Vinson Syndrome and malignant tumors of hypopharynx that could lead to dysphagia and hoarseness along with their management.
9. Describe the management of corrosive ingestion and foreign body in the esophagus.
10. Describe various congenital and acquired disorders of the ENT and Head & Neck region.
11. Describe the significance of hoarseness and stridor & enumerate their causes and clinical features of respiratory obstruction.
12. Describe tracheostomy and indications for this procedure.
13. Describe squamous cell carcinoma of the larynx and the impact of stage of disease on management and survival of patient.
14. Explain the mutual association of hearing and balance disorders & the various conditions that give rise to these disorders.
15. Describe the clinical features and course of otosclerosis, Meniere's disease, vestibular neuronitis & BPPV.
16. Diagnose suppurative otitis media & describe its intracranial and extra cranial complications.
17. Describe rhinosinusitis, its various types of rhino-sinusitis and its complications.
18. Describe the diseases of the nasal septum & define DNS and enumerate its various types.
19. Describe the pathophysiology, types, and management of Sino nasal polyposis.
20. Enumerate various conditions resulting in nasal obstruction & discharge.
21. Describe various types of allergic & non-allergic rhino-sinusitis.

22. Enumerate fungal and other granulomatous diseases of the nose & paranasal sinuses and describe their management.
23. Categorize various conditions benign & malignant neoplasms of the nose & paranasal sinuses.
24. Classify various types of neck swellings and describe clinical differentiating features of benign & malignant neck masses.
25. Describe a classification of various lymph nodes levels in the neck and describe the lymphatic drainage of the head and neck.
26. Describe the anatomy and physiology of salivary glands
27. Describe benign & malignant diseases of the salivary glands

Skills:

1. Obtain appropriate history, examine Ear, Nose, oral cavity, pharynx, larynx and Neck including mirror examinations and functional examinations of these areas.
2. Assist in diagnostic procedures and take swab for culture and sensitivity from ear, Nose & throat under supervision.
3. Prescribe hematological investigations, x-ray paranasal sinuses, CT/MRI scan of paranasal sinuses, temporal bone and Head & Neck & interpret it.
4. Perform clinical tests of hearing, tuning fork tests and balance independently
5. Interpret pure tone audiogram & tympanogram.
6. Describe the ABC protocol for resuscitation of traumatic patients.
7. Discuss a treatment plan for the patients with various common diseases of the ENT and Head and Neck region.
8. Describe the management of corrosive ingestion and foreign bodies in the esophagus.
9. Differentiate clinically between various types of stridor and possible site of obstruction.
10. Describe tracheostomy and indications for this procedure.
11. Diagnose suppurative otitis media & describe its intracranial and extra cranial complications.
12. Classify various types of neck swellings and describe clinical differentiating features of benign & malignant neck masses.
13. Obtain informed consent from patients and communicate with the patients, their families and community regarding diseases & their relevant issues.

Attitude:

1. Describe the ‘rehabilitation of deaf and mute children and the impact of hearing impairment in children.
2. Obtain informed consent from patients and communicate with the patients, their families and community regarding diseases & its relevant issues.

Specific Learning Objectives

Theme I – Sore Throat		
S No	**TOPIC**	**LEARNING OBJECTIVES**
1	Anatomy & physiology of oral cavity, Pharynx & salivary glands	Discuss the anatomy of oral cavity and site classification of oral cavity. Discuss applied anatomy of pharynx & mechanism of deglutition Discuss applied anatomy of nasopharynx and anatomy and physiology of adenoids Discuss applied anatomy of oropharynx and anatomy and physiology of pharyngeal tonsils Discuss the anatomy of minor and major salivary glands
2	Acute Pharyngitis	Discuss classification, types, aetiology, clinical features, diagnosis and treatment of acute pharyngitis
3	Chronic Pharyngitis	Discuss classification, types, aetiology, clinical features, diagnosis and treatment of chronic pharyngitis
4	Acute Tonsillitis/ Peritonsillar abscess (Quinsy)	Discuss classification, types, aetiology, clinical features, diagnosis and treatment of acute tonsillitis Discuss the aetiology, clinical features and treatment of quinsy
5	Chronic Tonsillitis	Discuss classification, types, aetiology, clinical features, diagnosis and treatment of chronic tonsillitis
6	Oral ulceration	Enumerate differential diagnosis of oral ulcers and discuss management of Aphthous ulcers
7	Trauma to the palate and Oropharynx	Discuss the principles of soft tissue & bone repair in palatal and pharyngeal trauma.
8	Carcinoma of oral cavity	Discuss the aetiology , clinical features and treatment of oral carcinoma
9	Approach to a patient with sore throat	Enumerate differentials of sore throat and discuss important differentiating points
10	Anatomy & physiology of salivary glands	Describe the anatomy & physiology of parotid, submandibular, sublingual & minor salivary glands
11	Non neoplastic	Describe non neoplastic disorders of salivary glands, its

	disorders of the salivary glands	management and treatment
12	Sialolithiasis and sialectasis	Describe stone formation and stasis of secretions in the salary glands and its management
13	Neoplasm of salivary glands	Describe the features, course and management of benign and malignant, submandibular, sublingual and minor salivary glands
14	Complications of salivary gland surgeries	Describe in detail different surgical procedures of salivary glands and its complications

Theme II - Difficulty in Swallowing		
Topic	**Hours**	**Learning Objectives**
Dysphagia & Plummer Vinson Syndrome	1 hour	Discuss Dysphagia & the anatomy and physiology of Esophagus and the appropriate medical and surgical treatment of dysphagia. Discuss PVS & the predisposing factors for causation & management
Pharyngeal and esophageal Pouches	1 hour	Discuss Pharyngeal pouch & the predisposing factors, clinical features, and treatment.
Oropharyngeal Tumors	1 hour	Enumerate oropharyngeal tumors. Discuss the types, aetiology and treatment of oropharyngeal carcinoma.
Hypo pharyngeal Tumors	1 hour	Enumerate oropharyngeal tumors. Discuss the aetiology and treatment of hypo pharyngeal carcinoma.
Tumors of Esophagus.	1 hour	Classify esophageal tumors & describe the etiology, clinical features, and treatment options.

Theme III - Hoarseness & Stridor		
Topic	**Hours**	**Learning Objectives**
Applied anatomy of potential spaces in & around the larynx and neck	2 hours	Discuss applied anatomy of larynx. Discuss the pre-piglottic, paraglottic & Rinke's space.
Anatomy of Potential neck spaces	3 hours	Discuss anatomy of deep fascia of neck & anatomy of potential pharyngeal and neck spaces.
		Discuss surgical anatomy of peritonsillor, parapharygeal &

		submandibular spaces. Discuss anatomy of retro pharyngeal space.
Applied anatomy & physiology of Larynx/neck , Voice physiology	2 hours	Discuss applied anatomy of Larynx, Discuss the physiology of larynx. Discuss the physiology of voice, speech production & its regulation
Acute Laryngitis	1 hour	Discuss etiology, clinical features, diagnosis, and treatment of acute simple laryngitis
Chronic Laryngitis	1 hour	Discuss chronic laryngitis including chronic granulomatous conditions of the larynx, its clinical features, diagnosis, and treatment.
Vocal nodules & vocal polyps	1 hour	Discuss differentiating points between vocal nodules & polyps, its aetiology, clinical features, diagnosis, and treatment.
Vocal cord paralysis	1 hour	Discuss paralytic causes of hoarseness, its types, clinical features, diagnosis, and treatment.
Stridor	1 hour	Enumerate causes of stridor. Explain types of stridor. Discuss management of congenital stridor
Apyrexial causes of stridor	1 hour	Discuss the etiology and management of acquired apyrexial causes of stridor
Pyrexial causes	1 hour	Discuss the etiology and management of pyrexial causes of stridor
Laryngeal trauma	1 hour	Discuss the management of laryngeal trauma
Acute Respiratory obstruction	1 hour	Discuss signs of respiratory obstruction. Enumerate alternate airways & discuss tracheostomy.
Laryngotracheal Foreign body	1 hour	Discuss the etiology, types & treatment of Laryngotracheal Foreign bodies.
Malignant Tumours of the Larynx / Carcinoma of Larynx	1 hour	Discuss incidence, epidemiology, risk factors, Pathology & classification of carcinoma larynx. Discuss UICC classification of laryngeal sites & subsites. Discuss management of carcinoma of all the subsites
Approach to a patient with hoarsesness	1 hour	Discuss the differentials diagnosis of hoarseness and explain management approach to a patient presenting with hoarseness

Theme IV - Deafness, Ear Discharge & Dizziness		
TOPIC	**HOURS**	**LEARNING OBJECTIVES**
Applied Anatomy and Physiology of Ear	2 hours	Describe the applied anatomy of the external, middle & internal ear. Discuss the functions of the ear. Discuss basic principles & interpretation of various tuning fork tests. Discuss the interpretation of PTA & impedance audiometry
Trauma to External Ear and the Temporal	1 hour	Classify the trauma to external ear and the temporal bone.

Bone		Describe the appropriate imaging investigations & treatments.
Otitis Externa	1 hour	Discuss Otitis Externa, its clinical features, differential diagnosis and relevant clinical & radiological investigations and treatment.
Acute Suppurative otitis media	1 hour	Discuss acute suppurative otitis media. Describe its clinical features, differential diagnosis and relevant clinical & radiological investigations and treatment
Chronic Suppurative Otitis Media without chloesteatoma	1 hour	Discuss Chronic Suppurative Otitis Media and its clinical features, differential diagnosis and relevant clinical & radiological investigations and treatment.
Chronic Suppurative Otitis Media with Cholesteatoma	1 hour	Discuss cholesteatoma and its clinical features, differential diagnosis and relevant clinical & radiological investigations and treatment.
Complications of Suppurative Otitis Media.	1 hour	Discuss intracranial & extracranial otogenic complications and enumerate the appropriate clinical & radiological investigations and treatment.
Mastoiditis: Acute and Chronic	1 hour	Discuss mastoiditis, its clinical features, differential diagnosis and relevant clinical & radiological investigations and treatment.
Acoustic Neuroma	1 hour	Discuss acoustic neuroma & the appropriate clinical, audiological, and imaging studies used in diagnosis and treatment of acoustic neuroma.
Approach to patient with a Conductive hearing loss	1 hour	Discuss the differential diagnosis of hearing loss & the medical and surgical management of CHL. Discuss otosclerosis & its medical & surgical treatment of otosclerosis. Discuss OME & its medical and surgical treatment
Approach to patient with a Sensorineural Hearing loss (SNHL)	2 hours	Discuss SNHL & its differential diagnosis. Discuss tinnitus & its management. Discuss Ototoxicity & its management.
Vertigo Vestibular Neuronitis Meniere's Diseases BPPV	1 hour	Discuss true vertigo & its types, pathophysiology, investigations & management. Discuss Meniere's disease & its treatment. Discuss BPPV & its clinical features, diagnoses & treatment.
Approach to a deaf patient	1 hour	Discuss the approach to a deaf patient.
Approach to Management of Deaf Child	1 hour	Differentiate congenital, developmental, and acquired hearing loss & describe the impact of hearing impairment at various ages and their management.

Theme V - Nasal Obstruction		
Topic	**Hours**	**Learning Objectives**
Applied Anatomy, Physiology of Nose & Paranasal Sinuses	2 hours	Discuss the surgical anatomy, physiology & congenital disorders of the nose & PNS. Discuss the congenital disorders of the nose, palate & choanal atresia
Diseases of the Nasal Septum	1 hour	Discuss DNS, its types, the clinical features, medical & surgical treatment of nasal obstruction.
Sino-Nasal Polyposis	1 hour	Discuss Sino-nasal polyposis, its types and describe the clinical features, medical & surgical treatment of nasal polyps.
Fungal Rhinosinusitis	1 hour	Discuss various fungi implicated in fungal rhinosinusitis and the appropriate clinical, radiological investigations and treatment of fungal rhinosinusitis.
Sino-Nasal Tumors	1 hour	Discuss various benign and malignant tumors affecting the nose and paranasal sinuses and their clinical features, step involved in diagnosis and treatment options.
Trauma to Nose and Face and CSF rhinorrhea	1 hour	Discuss the Le Forte classification of mid face fractures & the appropriate clinical and radiological investigations & management of these fractures. Discuss CSF rhinorrhea and the predisposing factors, types, clinical features, investigations and treatment.
Headaches and Facial Pain	1 hour	Discuss rhinogenic headaches and the appropriate clinical, radiological investigations and treatment.
Granulomatous Diseases of the Nose	1 hour	Discuss various granulomatous disorders affecting the nose & the clinical features, investigations & treatments.
Adenoids	1 hour	Discuss anatomy diseases of adenoids and treatment
Juvenile Nasopharyngeal Angiofibroma	2 hours	Enumerate diseases of the nasopharynx. Discuss Juvenile nasopharyngeal angiofibroma, clinical features, investigations and treatment.
Nasopharyngeal Carcinoma	1 hour	Discuss the risk factor, clinical features, investigation, treatment and follow up nasopharyngeal carcinoma
Acute Sinusitis	1 hour	Discuss acute sinusitis & the appropriate clinical, radiological investigations and steps involved in treatment of patients.
Chronic Sinusitis	1 hour	Discuss chronic sinusitis & the appropriate clinical, radiological investigations and steps involved in treatment of patients.

Complications of Sinusitis	1 hour	Enumerate the predisposing factors for development of complications due to sinusitis. Discuss treatment.
Allergic Rhinitis (AR) and Non-allergic	1 hour	Discuss allergic rhinitis and its types, pathophysiology, investigations & the medical and surgical treatment. Discuss non -allergic rhinitis and the appropriate clinical and radiological investigations and its treatment.
Infective Rhinitis: Acute. & Chronic.	1 hour	Discuss infective rhinitis and the medical and surgical treatment of various types of acute and chronic infective rhinitis.
Foreign Body, Rhinolith, Maggots Nose	1 hour	Discuss Rhinolith and maggots in the nose and the appropriate medical and surgical treatment of patients with these conditions.
Approach to a patient with Epistaxis	1 hour	Approach to a patient with epistaxsis. Discuss epistaxis & the appropriate clinical, radiological & hematological investigations & treatment of the condition.

Theme VI - Neck Swelling		
Topic	**Hours**	**Learning objectives**
Para pharyngeal Abscess	1 hour	Discuss the etiology and management of each Para pharyngeal abscess.
Retropharyngeal Abscess	1 hour	Discuss the types, etiology, treatment and complications of each retropharyngeal abscess.
Submandibular Abscess	1 hour	Discuss the causes and treatment of submandibular abscess.
Trauma of the Larynx and Neck	1 hour	Classify the nature of trauma to the neck & larynx. Discuss clinical features, investigations and treatment.
Approach to a neck swelling	1 hour	Discuss the approach to neck swelling.
Evaluation of metastatic lymph nodes and occult primary in Neck (Occult Primary).	1 hour	Discuss Occult primary & the predictable nodal drainage in head and Neck region. Discuss the signs and symptoms of occult primary & the appropriate clinical and radiological investigations & different treatment options.

Clinical Schedule

Theme I - Foundation of Otorhinolaryngology & Head and Neck			
Topic	**Hours**	**Learning objectives**	**Assessment method**
History taking	01	Obtain detailed history of sore throat	OSCE
Examination	02	Perform Examination in a sore throat patient including general physical, local and systemic examination	OSCE
Nasopharyngeal examination	02	Perform mirror examination of nasopharynx	OSCE
Examination of oral cavity and oropharynx	02	Examine oral cavity and oropharynx in a systematic way	OSCE
Hypopharyngeal Examination	01	Perform Indirect hypopharyngoscopy with mirror	OSCE
Mouth Gauge and other instruments	01	Assemble mouth gauge and name the instrument used in tonsillectomy with utility of each instrument.	OSCE
Examination of Neck	02	Perform systematic examination of Neck	OSCE
Theme II - Sore Throat			
Topic	**Hours**	**Learning objectives**	**Assessment method**
Communicate with patient of tonsillectomy	01	Obtain a pre-operative informed consent from a patient of tonsillectomy	OSCE

Tonsillar surgery & its instruments	02	Observe tonsillectomy surgery and identify instruments used	OSCE
Conservative management of sore throat	01	Discuss a conservative management plan for inpatient acute follicular tonsillitis	OSCE
Scrubbing technique	01	Demonstrate scrubbing hands using proper solution & take proper time by proper method	OSCE
Biopsy from oral ulcer	01	Assist to take a biopsy from tongue ulcer	OSCE

Theme III - Difficulty in Swallowing			
Topic	**Hours**	**Learning objectives**	**Assessment method**
Rigid Endoscopy system	01	Identify instruments & equipment used in rigid endoscopy system, describe rigid endoscopies.	OSCE
Oral & oropharyngeal mass palpation	01	How to palpate a mass in the oral cavity and oropharynx	OSCE
Oesophagoscopy	02	Observe rigid oesophagoscopy done for pharyngeal growth or dysphagia	OSCE

Theme IV - Hoarseness and Stridor			
Topic	**Hours**	**Learning objectives**	**Assessment method**
History taking	02	Obtain detailed history of hoarseness & stridor	OSCE
Examination	02	Perform Examination in a patient with hoarseness & stridor, including general physical, local and systemic examination	OSCE
Indirect laryngoscopy examination	01	Perform mirror examination of Laryngopharynx	OSCE
Examination of Neck	01	Perform systematic	OSCE

		examination of Neck	
Investigations of Laryngeal diseases	01	Fill requisition form for different types of investigations into Laryngeal diseases.	OSCE
Video laryngoscopy	01	Observe a video of laryngoscopy for the diagnosis of hoarseness in clinical setting	OSCE
Conservative management of Hoarseness	01	Discuss a conservative management plan for a patient of hoarseness due to voice abuse.	OSCE
Laryngoscopy	02	Observe rigid system laryngoscopy under general anesthesia and identify instruments used in the procedure	OSCE
Communicate with a patient for voice rest	01	Counsel a patient on voice rest	OSCE
Stridor in bilateral abductor vocal paralysis	02	Council bilateral abductor paralysis patient & its management in a post thyroidectomy patient	OSCE
Biopsy from laryngeal growth.	01	Observe the procedure for taking biopsy from laryngeal growth.	Formative
Tracheostomy	01	Demonstrate the procedure of tracheostomy	Formative
Communicate with patient on laryngectomy	01	Demonstrate the procedure how to Obtain informed consent from a patient for total laryngectomy	OSCE

Theme V - Deafness, Ear Discharge & Dizziness

Topic	Hours	Learning objectives	Assessment method
History taking	02	Obtain detailed history from a patient with ear discharge/deafness/dizziness	OSCE
Local Examination	01	Perform clinical examination of the hearing & balance system.	OSCE

Otoscopy Tuning fork test Balance testing Examination under microscope	03	Perform otoscopic examination of the ear Perform tuning fork tests Perform test of balance, peripheral & central Assist in performing EUM	OSCE
Investigations of ear diseases	01	Discuss & fill requisition form for different types of investigations for ear diseases.	OSCE
Interpretation of audiogram and Impedance	01	Discuss the interpretation of audiogram and impedance.	OSCE
Theme VI - Nasal Obstruction			
Topic	**Hours**	**Learning objectives**	**Assessment Method**
History taking	02	Obtain detailed history from a patient with nasal obstruction	OSCE
Local Examination	01	Perform clinical examination of the nose & paranasal sinuses.	OSCE
Anterior & posterior Rhinoscopy		Perform anterior & posterior Rhinoscopies with mirror	
Probe test		Perform probe test	
Nas endoscopy	01	Assist in performing Nas endoscopy.	OSCE
Pus culture / sensitivity	01	Perform Take swab from nose for different purpose	
X – Rays nasopharynx /PNS		interpret X – Rays nasopharynx/PNS for enlarged soft tissues shadow	OSCE
Nasal patency & adenoid facies in enlarged adenoids	01	Perform examination for nasal patency in enlarged adenoids.	OSCE
Adenoid surgery	01	Observe adenoid surgery being done in operating room	Formative

CT scan nose & nasopharynx	01	Interpret CT scan in nasopharyngeal angiofibroma, describe bowing sign.	Formative
Nasopharyngeal Biopsy	01	Observe surgery for nasopharyngeal biopsy	Formative
Investigations of nose & paranasal sinuses diseases	01	Document Fill requisition form for different types of investigations for nose & paranasal sinuses diseases.	Formative

Theme VII - Swelling Neck			
Topic	**Hours**	**Learning objectives**	**Assessment method**
Examination of Neck Nodes	02	Perform systematic examination of all groups of neck nodes	OSCE
Examination of lump in the neck	01	Perform examination of lump in the neck in a systematic way.	OSCE
Surgery on a pharyngeal abscess	01	Observe surgery on a pharyngeal abscess & describe drainage of peritonsillar abscess	OSCE
Thyroid examination	01	Perform Thyroid Examination both anatomically & functionally	OSCE
Pharyngeal abscess surgery related instruments	01	Identify instruments used in drainage of pharyngeal abscess surgery	OSCE
Examination of parotid	01	Perform examination of parotid swelling	OSCE
Examination of thyroid	01	Perform examination of thyroid gland	OSCE

Paper M-1 (ENT module)

Table-7: MCQs

Module	Total MCQs
ENT	90

Table-8: OSCE

Module	Total OSCE stations
ENT	15

BLOCK-M-2

(EYE Module)

EYE Module

Teaching Hours Allocation

heme	In class teaching (Hours)	Clinicals (Hours)	Total (Hours)
Theme 1: Foundation of Ophthalmology	08	25	33
Theme 2: Lid Abnormalities & Bulging Eyes	10	21	31
Theme 3: Red Eye	17	14	31
Theme 4: Visual loss	18	15	33
Theme 5: Childhood Blindness & Crossed Eyes	09	21	30
Total	62	96	158

General Learning Objectives

By the end of Eye Module, 4th year MBBS students will be able to:

Knowledge:

1. Describe the visual standards.
2. Define and classify blindness.
3. Describe the anatomy and physiology of visual pathway and different visual field defects.
4. Describe the basics and usage of optical coherence tomography (OCT), visual fields and ultrasonography in common eye disorders.
5. Discuss ptosis, ectropion and entropion and describe the treatment options.
6. Describe the differential diagnosis of red eye.
7. Explain the pathophysiology, and management of different conjunctival inflammations.
8. Explain the pathophysiology, and management of different corneal inflammations.

9. Discuss the pathophysiology, and management of uveal inflammations.
10. Describe the aqueous humor dynamics and its role in glaucoma.
11. Enumerate different causes of gradual visual loss and propose their management plan.
12. Enumerate different causes of sudden visual loss (painful/painless) and propose their management plan.
13. Describe squint, its presentation and principles of management.
14. Enumerate different causes of double vision and propose their management plan.
15. Enumerate different causes of childhood blindness and propose their management plan.
16. Discuss the clinical importance of white pupil in children.
17. Define amblyopia, describe its causes and management.
18. Differentiate between different terms used in ocular trauma.

Skills:

1. Differentiate different types of lid bumps and propose a management plan for it.
2. Examine bulgy eyes and investigate different causes of it.
3. Propose the management plan of ocular injuries.

Specific Learning Objectives

Theme 1: Foundation of Ophthalmology		
Topic	**Learning objectives**	**Hours**
Standards Of Vision and Blindness	Discuss visual standards and blindness according to WHO classification.	01
Pupil Reflexes and Drugs Used In Common Eye Conditions	Describe the normal and abnormal pupil reflexes. Discuss drugs used in common eye diseases.	01
Visual Pathway and Visual Field Defects	Describe the visual pathway. Describe the common visual field defects.	01
Optical Coherence Tomography (OCT) and Visual fields (VF)	Discuss the uses of OCT and VF in ophthalmology.	01
Fundus Fluorescein Angiography (FFA) and Ultrasonography	Discuss the uses of FFA and Ultrasonography in ophthalmology.	01

Optics & Eye	Discuss visual functions (visual acuity, color vision, contrast sensitivity, light brightness), Refraction, Pseudophakia, Aphakia, and Anisometropia	01
Refractive Errors	Discuss pathophysiology and clinical presentation of myopia, hypermetropia, astigmatism and presbyopia	01
Correction of Refractive Errors	Describe management of myopia, hypermetropia, astigmatism and presbyopia.	01

Theme 2: Lid abnormalities & Bulging Eyes		
Topic	**Learning objectives**	**Hours**
Differential Diagnosis of Lid Bumps	Discuss overview of different causes of lid bumps.	01
Chalazion, Stye	Describe pathophysiology and management of chalazion and stye.	01
Tumors of Eyelids	Discuss different eyelid tumors and its pathogenesis.	01
Management of Lid Bumps	Describe management plan of lid bumps.	02
Ptosis	Discuss causes of ptosis, assessment and their management.	01
Trichiasis, Entropion and Ectropion	Discuss Trichiasis, Entropion and Ectropion, assessment and their management.	01
Proptosis – Basics	Discuss the etiology, clinical features, investigation and management of proptosis in children and adults	01
Pre-septal and Orbital Cellulitis	Discuss the etiology, clinical features, investigation and management of proptosis in children and adults. Enumerate Differential diagnosis / causes of proptosis in children and adults.	01
Thyroid Eye disease (TED)	Discuss the etiology, clinical features, investigation and management of TED.	01
Myasthenia Gravis & Migraine	Discuss the etiology, clinical features, investigation, and management of Myasthenia Gravis. Discuss the etiology, clinical features, investigation, and management of Migraine.	01

Theme 3: Red Eye		
Topic	**Learning objectives**	**Hours**

Red eye	Enumerate causes of red eye. Describe pathophysiology and management of different conjunctival (Bacterial /Viral /Fungal/Allergic) inflammations.	02
Corneal Inflammations/Infections	Discuss the etiology, clinical features, investigation, and management of non-infectious corneal inflammations. Discuss investigations for corneal ulcers.	01
Bacterial Keratitis	Discuss the etiology, clinical features, investigation, and management of different bacterial corneal ulcers.	01
Fungal, Viral & Acanthamoeba Keratitis	Discuss the etiology, clinical features, investigation, and management of different fungal, viral & acanthamoeba corneal ulcers.	02
Dacryocystitis	Discuss the etiology, clinical features, investigation, and management of congenital nasolacrimal duct obstruction. Assess the time of probing in children. Differentiate between acute, acute on chronic and chronic Dacryocystitis. Discuss the etiology, clinical features, investigation, and management of Dacryocystitis.	01
Dry Eyes	Discuss the etiology, clinical features, investigation, and management of Dry Eyes with special emphasis on Vit. A deficiency and Sjogren's syndrome.	01
Blepharitis	Discuss the etiology, clinical features, investigation, and management of blepharitis.	01
Pterygium, Pseudo-Pterygium, Episcleritis & Scleritis	Describe differences between Pterygium, Pseudo-pterygium, Episcleritis & Scleritis and their management.	01
Basic Concepts In Ocular Trauma	Discuss definitions, classification & clinical evaluation of ocular injuries and principles of management. Discuss corneal and conjunctival foreign bodies and their treatment.	01
Open Globe Injury (OGI) / IOFB / Sympathetic Ophthalmia (SO)	Classify OGI. Discuss the etiology, clinical features, investigation, and management of OGI and IOFB. Discuss the etiology, clinical features, investigation, and management of SO.	01
Closed Globe Injury (CGI) Orbital Floor Injury	Discuss the etiology, clinical features, investigation, and management of CGI. Classify CGI.	01
Radiation, Thermal, Chemical Injuries	Discuss etiology, clinical features, investigation, and management of radiation injury. Discuss the etiology, clinical features, investigation, and management of thermal injury Discuss the etiology, clinical features, investigation,	01

	and management of chemical injury.	
Visual Rehabilitation	Discuss various options of visual rehabilitation after ocular trauma. Discuss rehabilitation services for blind people in our setup.	01
Uveitis – Basics	Discuss Definitions, classifications, history & workup of uveitis.	01
Anterior & Posterior Uveitis	Discuss the etiology, clinical features, investigation, and management of Anterior uveitis. Discuss the etiology, clinical features, investigation, and management of Posterior Uveitis.	01

Theme 4: Visual Loss

Topic	Learning objectives	Hours
Visual Loss & Intraocular Pressure (IOP)	Classify causes of visual loss in following order: Visual loss associated with Anterior segment. Visual loss associated with Posterior segment. Discuss Aqueous humor dynamics and its role in IOP. Enumerate causes of gradual & sudden visual loss. Define and Classify Glaucoma.	01
Open angle glaucoma	Discuss the differences between POAG, NTG and OHT. Discuss the etiology, clinical features, investigation, and management of POAG. Discuss the etiology, clinical features, investigation, and management of NTG. Discuss the etiology, clinical features, investigation, and management of OHT.	01
Primary Angle Closure Glaucoma (PACG)	Discuss the stages of PACG. Discuss the etiology, clinical features, investigation, and management of Acute angle closure.	01
Neovascular Glaucoma & Lens Induced Glaucoma	Discuss the etiology, clinical features, investigation, and management of Neovascular glaucoma.	01
	Discuss the etiology, clinical features, investigation, and management of lens induced glaucoma.	
Treatment Options In Glaucoma	Enumerate different treatment options in glaucoma. Discuss the indications of each treatment option.	01
Cataract	Define cataract. Describe the types of Age-related cataract. Describe the pathogenesis and complications of cataract. Describe the management of cataract.	01

Cataract Surgery Complications	Discuss the etiology, clinical features, investigation, and management of Endophthalmitis. Discuss the etiology, clinical features, investigation, and management of Panophthalmitis.	01
Corneal Ectasia, Dystrophy & Degeneration	Discuss the etiology, clinical features, investigation, and management of keratoconus. Give overview of corneal dystrophies and degenerations.	01
Diabetic Eye Disease	Discuss the effects of diabetes on eye. Discuss the etiology, clinical features, investigation, and management of Diabetic Eye Disease (Diabetic Retinopathy and maculopathy).	01
Hypertensive Retinopathy	Discuss the effects of hypertension on eye. Discuss the etiology, clinical features, investigation, and management of Hypertensive Retinopathy.	01
Central Retinal Vein Occlusion (CRVO) And	Discuss the etiology, clinical features, investigation, and management of CRVO.	01
Central Retinal Artery Occlusion (CRAO)	Discuss the etiology, clinical features, investigation, and management of CRAO.	01
Retinal Detachment (RD)	Discuss the etiology, clinical features, investigation, and management of RD.	01
Choroidal Melanoma	Discuss the etiology, clinical features, investigation, and management of choroidal melanoma. Describe the importance of this condition on mortality.	01
Night Blindness – Retinitis Pigmentosa, Vit. A Deficiency	Discuss the etiology, clinical features, investigation, and management of Retinitis pigmentosa. Discuss the etiology, clinical features, investigation, and management of Vit. A deficiency.	01
Optic neuritis	Classify optic neuritis. Discuss the etiology, clinical features, investigation, and management of optic neuritis.	01
Hereditary, Nutritional & Toxic Optic Neuropathies	Discuss the etiology, clinical features, investigation, and management of these optic neuropathies.	01
Papilledema	Describe the difference between papilledema and disc swelling. Discuss the etiology, clinical features, investigation, and management of papilledema.	01
Theme 5: Childhood Blindness & Crossed Eyes		

Topic	Learning objectives	Hours
White pupil (leukocoria) and Retinoblastoma (RB)	Describe the importance of white pupils in children. Differentiate different causes of white pupil in children. Discuss investigations in white pupils. Discuss the etiology, clinical features, investigation and management of RB.	01
Congenital Cataract	Define congenital cataract. Describe the types of congenital cataracts. Describe the pathogenesis and complications of congenital cataracts. Describe the management of congenital cataracts.	01
Congenital Glaucoma	Discuss the etiology, clinical features, investigation and management of Congenital Glaucoma.	01
Amblyopia	Define Amblyopia. Discuss the etiology, clinical features, investigation, and management of amblyopia.	01
Squint – Basics	Discuss definitions, clinical evaluation of squint and principles of management	01
Concomitant Squint	Define concomitant squint.	01
Esotropia	Discuss the etiology, clinical features, investigation, and management of esotropia.	01
Exotropia	Discuss the etiology, clinical features, investigation, and management of exotropia.	01
Diplopia & Incomitant Squint	Discuss differential diagnosis/causes of diplopia. Define incomitant squint. Discuss the etiology, clinical features, investigation, and management of 3rd nerve palsy. Discuss the etiology, clinical features, investigation, and management of 4th nerve palsy. Discuss the etiology, clinical features, investigation, and management of 6th nerve palsy.	01

Clinical Schedule

Theme 1: Foundation of Ophthalmology			
Topic	**Learning objectives**	**Assessment method**	**Hours**
1. History Taking 2. Visual Acuity	Take detailed history in ocular conditions	OSCE	03 + 02

	Check visual acuity.		
3. Pupil Examination	Perform pupillary examination.	OSCE	03
4. Visual Fields (Confrontation)	Perform visual fields examination by confrontation methods.	OSCE	03
5. Slit-Lamp Examination	Identify parts of slit-lamp	OSCE	01
6. Anterior Segment Examination	Examine anterior segment on slit lamp	OSCE	01
7. Direct Ophthalmoscopy	Perform direct ophthalmoscopy	OSCE	02
8. Retinoscopy	Identify trial lenses used in refraction.	OSCE	03
9. Indirect Ophthalmoscopy	Perform indirect ophthalmoscopy	OSCE	02
Investigations 10. OCT 11. Visual Fields 12. Biometry 13. B-Scan 14. FFA 15. Corneal Topography	Describe/interpret the results of: OCT Visual fields Biometry B-scan FFA & Corneal topography	OSCE	03 + 02

Theme 2: Lid Abnormalities & Bulging Eyes

Topic	Learning objectives	Assessment method	Hours
Eversion Of Upper Lids	• Observe Eversion of upper lids	OSCE	01
Ptosis Examination	• Perform ptosis examination.	OSCE	03

Ptosis And Its Surgeries	• Observe ptosis surgery	OSCE	03
Lids Abnormalities	• Examine common lid abnormalities (Ectropion, Entropion, Chalazion, Stye)	OSCE	03
Lids Surgery Related Instruments	• Identify instruments used in lids surgery	OSCE	03
Lid Reconstruction Procedures	• Observe lid reconstruction procedures	OSCE	05
Proptosis	• Observe proptosis	OSCE	03

Theme 3: Red Eye

Topic	Learning objectives	Assessment Method	Hours
Use Of Topical Anesthesia and Staining	• Perform topical anesthesia and staining.	OSCE	01
Removal Of Superficial Foreign Bodies	• Observe corneal foreign body removal.	OSCE	01
Corneal Scrapping	• Observe corneal scrapping.	OSCE	02
Keratoplasty Surgery	• Observe keratoplasty.	OSCE	03
Lacrimal Regurgitation Test	• Perform lacrimal regurgitation test.	OSCE	01
Dacryocystorhinostomy (DCR) Surgery & Its Instruments	• Observe DCR surgery and identify instruments used	OSCE	03
Ocular Trauma	• Observe first aid to Ocular trauma • Perform eye washing in chemical injury.	OSCE	03
Globe Repair Surgery	• Observe OGI surgery.	OSCE	03

Theme 4: Visual Loss

Topic	Learning objectives	Assessment Method	Hours
Normal Disc Disc Abnormalities Swollen Disc(S)	• Examine normal disc • Examine glaucomatous disc. • Examine swollen disc	OSCE	03
Detection Of Retinal Lesions Retinal Vascular Diseases	• Detect common retinal conditions • Differentitate different retinal vascular conditions.	OSCE	03
Retinal Detachment	• Identify RD in pictures • Observe Retinal detachment surgery	OSCE	03
Use Of Lasers In Eye Intravitreal Injections	Discuss • Use of lasers in eye • Intravitreal injections	OSCE	02
Tonometry	Observe goldman tonometery	OSCE	01
Glaucoma Filtration Surgery	Observe Glaucoma filtration surgery	OSCE	03

Table 11: Childhood Blindness

Theme 5: Childhood Blindness & Crossed Eyes			
Topic	**Learning objectives**	**Assessment method**	**Hours**
Congenital Glaucoma	• Observe congenital glaucoma examination (EUA) and surgery	OSCE	03
Cataract (Adult and Congenital)	• Detect cataract on ocular examination	OSCE	03
Cataract surgery	• Observe types of Adult and Congenital cataract surgery	OSCE	03 + 03
Extraocular Mmovements	• Perform extraocular movements and squint examination	OSCE	03
Squint Eexamination	• Perform cover / uncover / alternate cover tests	OSCE	03

	• Identify the pattern of squint (Esotropia vs. Exotropia)		
Squint Surgery	• Observe squint surgery	OSCE	03

Paper M-2 (Eye module)

Table: MCQs

Module	Total MCQs
Eye	90

Table: OSCE

Module	Total OSCE stations
Eye	15

Final Year MBBS

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BLOCK-N

(Foundation-3, Blood-3 and MSK-3)

FOUNDATION – III MODULE

Themes

S#	Theme	Duration in Weeks
1	The In-Patients	1
2	Peri-operative Care	1

General Learning Objectives

By the end of Foundation-III modules, Final Year MBBS students will be able to:

Knowledge:

1) Discuss the process of Evidence-based medicine/practice.
2) Explain the concepts and processes of patient safety and types of medical errors.
3) Explain the objectives and process of clinical audit and governance.
4) Discuss the principles of communications skills, counseling, and breaking bad news.
5) Discuss the psychological aspects of patient care in hospital and ambulatory care settings.
6) Explain the concepts of surgical skills, perioperative, intraoperative, and postoperative care.
7) Discuss the concepts of palliative and end-of-life care.
8) Explain the concepts of developmental assessment in pediatrics.

Skills:

1) Explain the objectives and process of clinical audit and governance.
2) Discuss the principles of communications skills, counseling, and breaking bad news.
3) Explain the concepts of surgical skills, perioperative, intraoperative, and postoperative care.
4) Explain the concepts of developmental assessment in pediatrics.

Attitude:

1) Explain the concepts and processes of patient safety and types of medical errors.
2) Discuss the principles of communications skills, counseling, and breaking bad news.
3) Discuss the psychological aspects of patient care in hospital and ambulatory care settings.
4) Discuss the concepts of palliative and end-of-life care.

Theme-wise Specific Learning Objectives

Theme-1: The in-patient		
S NO	**TOPIC**	**LEARNING OBJECTIVES:**
Medical Education		
1	Clinical decision making (Evidence- based Medicine)	Define Evidence Based Medicine.
		Explain the steps of evidence-based medicine/practice
		Discuss the levels of evidence.
2	Patient safety	Explain the concepts of patient safety.
		Discuss the types, etiology, and prevention of medical errors.
3	Clinical governance and clinical audit	Explain the components of clinical governance.
		Explain the steps of clinical audit.
4	Patient and family counselling/ breaking bad news.	Explain the steps of SPIKES model of breaking bad news and counselling.
Psychiatry		
1	Family health education	Explain the care of a patient at home especially for chronic illnesses
		To enhance the compliance of both pharmacological and onpharmacological management in acute and chronic illnesses
		Explain strategies to reduce follow up tertiary care visits
2	Initial psychiatric assessment	Discuss the initial psychiatric assessment of a patient admitted.
Surgery		
1	Basic surgical skills	Explain the principles of patient care and safety in operation theatre / surgical safety checklists
		Explain the principles of skin and abdominal incisions
		Explain the principles of wound closure and drain usage and diathermy
2	Laparoscopic and robotic surgery	Explain the principles, advantages, disadvantages, indications, and complications of Laparoscopic and Robotic surgery.
3	Surgical informed consent	Explain the types and components of informed consent in surgical practice.
4	Nutrition and fluid therapy	Assess the fluid and electrolytes requirements in pre-and post-operative patients.

		Explain the different methods of providing nutritional support and their complications.
5	Postoperative care	Explain the standards of postoperative care.
		Discuss the general and system specific postoperative complications.
Radiology		
1	Diagnostic imaging	Describe the basic principles of radiation protection
		Explain the types and principles of different imaging techniques and their indications.
Medicine		
1	End-of-Life and palliative care	Discuss the steps and prerequisites of end of life and palliative care.
2	Geriatric Care	Explain the concepts of geriatric care and problems associated with it.
Pediatrics		
1	Pediatric history taking and physical examination	Take history from parents from neonatal age to pediatric age.
		Perform physical examination in a neonate and pediatric age group patient including growth parameters.
2	Developmental assessment	Perform development assessment of a child
		Explain the components of developmental assessment in children of different age groups

Theme-2: Perioperative Care

S NO	TOPIC	LEARNING OBJECTIVES:
Surgery		
1	Enhanced Recovery after Surgery (ERAS)	Describe the ERAS protocol
		Discuss the components of ERAS protocol
		Explain the benefits of ERAS
2	Pain Management	Evaluate a patient with postoperative pain
		Manage a patient with pain during perioperative phase
		Discuss the pathophysiological consequences of postoperative pain
Medicine		
1	Preoperative evaluation and fitness for anesthesia and surgery	Evaluate a patient for fitness for surgery and anesthesia.

BLOOD & IMMUNOLOGY – III

Themes

S. No	Themes	Duration in Hours
1	Pallor	7
2	Fever	8
3	Bleeding	5

General Learning Objectives

By the end of Blood & Immunology-III Module, Final year MBBS students will be able to:

Knowledge:

1) Explain the etiology, clinical features, diagnostic workup, and management of a patient with Anemia.
2) Explain the etiology, clinical features, diagnostic workup, and management of a patient with anemia of pregnancy.
3) Explain the etiology, clinical features, diagnostic workup, and management of a patient with Leukopenia.
4) Explain the etiology, clinical features, diagnostic workup, and management of a patient with Leukocytosis.
5) Explain the management and complications of a patient with hematological malignancies.
6) Discuss the diagnostic workup of a patient with splenomegaly.
7) Explain the etiology, clinical features, diagnostic workup, and management of a patient with bleeding and clotting disorders.
8) Explain the etiology, clinical features, diagnostic workup, and management of a patient with anemia of pregnancy

Skills:

1) Explain the etiology, clinical features, diagnostic workup, and management of a patient with Anemia.
2) Explain the etiology, clinical features, diagnostic workup, and management of a patient with anemia of pregnancy.
3) Explain the etiology, clinical features, diagnostic workup, and management of a patient with Leukopenia.
4) Explain the etiology, clinical features, diagnostic workup, and management of a patient with Leukocytosis.
5) Discuss the diagnostic workup of a patient with splenomegaly.

6) Explain the etiology, clinical features, diagnostic workup, and management of a patient with bleeding and clotting disorders.
7) Explain the etiology, clinical features, diagnostic workup, and management of a patient with anemia of pregnancy

Attitude:

1) Explain the etiology, clinical features, diagnostic workup, and management of a patient with anemia of pregnancy.
2) Explain the management and complications of a patient with hematological malignancies.
3) Explain the etiology, clinical features, diagnostic workup, and management of a patient with anemia of pregnancy

Theme-wise Specific Learning Objectives

Theme-1: Pallor		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Pediatrics		
1	Anemia	Evaluate a neonate, infant and child with anemia (congenital/acquired).
		Explain the diagnostic workup needed for different age group in Pediatric patients with anemias of inadequate production and Hemolytic Anemia.
		Classify anemias based on history, physical examination and relevant investigations considering different age groups
		Manage an infant and child with iron deficiency anemia and megaloblastic anemia
		Manage a neonate and infant with hereditary anemias
		Manage a child with hemolytic Anemia: • 7Thalassemia • Sickle cell anemia • Hereditary spherocytosis • G6PD deficiency
		Manage a child with anemia resulting from bone marrow failure (Aplastic anemia)
		Perform physical examination of a neonate, infant and child with anemia

		Perform general physical and systemic examination keeping in mind the hematological problem for a specific Pediatric age group
		Counsel a parent of a neonate, infant and child with Thalassemia major
Medicine		
1 Anemias		Evaluate a patient with anemia
		Explain the diagnostic workup of a patient with anemias
		Classify anemias based on history, physical examination and relevant investigations
		Manage a patient with iron deficiency anemia
		Manage a patient with hereditary anemias
		Manage a patient with hemolytic anemias (hereditary and acquired)
		Manage a patient with anemia resulting from bone marrow failure
		Take history from a patient with anemias
		Perform physical examination of a patient with anemia
		Perform hematological examination
		Counsel a patient with different types of anemias
Gynecology		
1	Anemia in pregnancy	List the various causes of anemia in pregnancy.
		Describe Feto-maternal complications of anemia in pregnancy.
		Interpret the blood picture of a pregnant patient with anemia
		Outline diagnostic workup and management plan of a patient with anemia in pregnancy.
		Take history and perform physical examination of a patient with anemia in pregnancy.
		Counsel a pregnant patient with anemia.

Theme-2: Fever

S NO	TOPIC	LEARNING OBJECTIVES
Pediatrics		
1	Leukopenia	Evaluate a report of peripheral blood film

		Explain the diagnostic approach to a child with Leukopenia
		Take a history of a child/infant with leukopenia / aplastic anemia
2	Leukemias	Explain the diagnostic approach to a child with leukocytosis
		Classify Leukemias
		Explain the diagnostic approach to a patient with suspected leukemia
		Explain the management of a child with acute Leukemias
		Take history and perform physical examination of a patient with leukocytosis
		Counsel a parent with a child with ALL.
3	Splenomegaly	Classify the causes of splenomegaly in Pediatric age group
		Explain the diagnostic approach to a child with splenomegaly
Medicine		
1	Leukopenia	Evaluate a peripheral blood film
		Explain the diagnostic approach to a patient with Leukopenia
		Take history from a patient with leukopenia and aplastic anemia
2	Leukemias	Explain the diagnostic approach to a patient with leukocytosis
		Classify Leukemias
		Explain the management of a patient with acute Leukemias
		Explain the management of a patient with chronic Leukemias
		Take history and perform physical examination of a patient with leukocytosis
3	Splenomegaly	Classify the causes of splenomegaly
		Explain the diagnostic approach to a patient with splenomegaly
4	Lymphadenopathy	Classify the causes of generalized lymphadenopathy
		Explain the diagnostic approach to a patient with generalized lymphadenopathy
		Classify lymphomas

		Explain the management of a patient with Lymphoma (Hodgkin`s and non-Hodgkin`s)
		Explain tumor lysis syndrome and its management
		Explain the common adverse effects of chemotherapeutic agents used in hematological malignancies and their management and prevention.
		Counsel a patient with newly diagnosed hematological malignancy

Theme-3: Bleeding		
S NO	**Topic**	**Learning objectives**
Pediatrics		
1	Definition of terms	Define Petechiae, purpura, ecchymosis
2	Bleeding and clotting disorders	Explain the diagnostic approach to a child/infant with bleeding disorder
		Classify clotting disorders and explain their etiologies
		Explain the coagulation screen
		Interpret the common hematological parameters in a child with bleeding disorder (Platelets count, BT, CT, PT, APTT, Fibrinogen levels, FDPs)
		Explain the management of Von Willebrand disease
		Explain the management of a child with Hemophilia A
		Explain the management of a child with Idiopathic Thrombocytopenic Purpura
		Explain the dosage and administration of factor VIII in a child/infant in different situations like accidents, fall of deciduous teeth, surgery etc.
		Take history and perform physical examination of a child with history of bleeding disorder
Medicine		

1	Bleeding and clotting disorders	Explain the diagnostic approach to a patient with bleeding disorder
		Classify hypercoagulable states and their management and prevention of thrombosis

MUSCULOSKELETAL SYSTEM-III

Themes

S. No	Themes	Duration in Hours
1	Joint pains	12
2	Aching bones	6
3	Muscle weakness	5
4	Skin rashes and burns	8

General Learning Objectives

By the end of Musculoskeletal-III Module, Final year MBBS students will be able to:

Knowledge:

1. Discuss the diagnostic and therapeutic approach to children and adult patients with arthritides.
2. Explain the surgical management of different arthritic disorders.
3. Elaborate on the management of osteoporosis, Rickets, and Osteomalacia.
4. Explain the types of spine diseases and their management.
5. Explain the types, etiology, clinical features, and management of primary muscle diseases including poliomyelitis
6. Discuss different dermatological conditions in terms of etiology, classification, investigations, and management.

Skills:

1. Discuss the diagnostic and therapeutic approach to children and adult patients with arthritides.
2. Take history and examine a patient with an arthritic condition
3. Counsel a patient with chronic arthritic condition, psoriasis, and muscular dystrophies.

Attitude:

1. Counsel a patient with chronic arthritic condition, psoriasis, and muscular dystrophies

Specific Learning Objectives

Theme-1: Joint pains		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Introduction to arthritides: • Classification • Serological tests	Classify autoimmune diseases of joints based on the pattern of joint involvement: A) Peripheral • Symmetrical • Oligoarticular • Monoarticular B) Axial
		Explain the types, and indications of autoimmune markers in different Rheumatological disorders
		Describe different modalities of investigations and their indications used in different arthritic disorders
		Explain the extra-articular manifestations of inflammatory arthritides
2	Management of adult arthritides	Explain the differential diagnosis, diagnostic and therapeutic approaches to an adult patient with mono-arthritis
		Explain the differential diagnosis, diagnostic and therapeutic approaches to an adult patient with symmetrical polyarthritis
		Explain the differential diagnosis, diagnostic and therapeutic approaches to an adult patient with oligoarticular arthritis
3	Management of common arthritic disorders	Discuss the management of patients and complications with Rheumatoid arthritis
		Discuss the management, complications, and prognosis of a patient with SLE
		Explain the management and complications of a patient with Ankylosing spondylitis
		Discuss the clinical features and diagnosis of Reiter`s

		syndrome, Reactive arthritis and Psoriatic arthritis
		Discuss the management of patients and complications with Osteoarthritis
		Discuss the management of patients and complications with acute Gout and Gouty Arthritis
		Take history and perform a physical examination of a patient with symmetrical arthritis
		Counsel a patient with new onset Rheumatoid arthritis.
Pediatrics		
1	Orthopedic evaluation of a child Management of pediatric arthritides	Perform orthopedic evaluation of a neonate and child
		Explain the differential diagnosis, diagnostic workup, and therapeutic approaches to a pediatric patient with mono-arthritis
		Explain the differential diagnosis, diagnostic workup and therapeutic approaches to a pediatric patient with symmetrical polyarthritis
		Explain the differential diagnosis, diagnostic workup, and therapeutic approaches to a pediatric patient with oligoarticular arthritis
2	Management of common arthritic disorders in children	Discuss the management of patient and complications with Juvenile idiopathic arthritis
		Take history and perform a physical examination of a child with Arthritis
		Counsel a child and his parents with new onset Juvenile Chronic arthritis
Orthopedics		
1	Surgical management of disabling Rheumatoid arthritis	Explain the surgical interventions and their indications in the management of disabling Rheumatoid arthritis • Rheumatic hand disorders • Rheumatic foot disorders
2	Tuberculous/	Discuss the etiology, risk factors, Clinical presentation,

	Septic arthritis	Diagnostic approach, and management of tuberculous and septic hip and knee arthritis.

Theme-2: Aching Bones		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Osteoporosis	Explain the etiology, risk factors, complications, management, and prevention of Osteoporosis
Pediatrics		
1	Rickets and Osteomalacia	Discuss the diagnostic approach to a child with Rickets
		Discuss the etiology, clinical, radiological, and laboratory features of Rickets and Osteomalacia and their treatments
		Take history and perform a physical examination of a patient with Rickets
Orthopedics		
1	Deformities and congenital disorders	Classify common deformities and congenital disorders of bones
		Discuss the pathophysiology, clinical features and complications of Achiondroplasia
		Discuss the pathophysiology, clinical features and complications of Osteogenesis imperfecta
		Discuss the pathophysiology, clinical features and complications of Paget`s disease
2	Structural spine abnormalities	Classify and explain structural spine abnormalities in terms of clinical features, complications, and management
3	Osteomyelitis	Explain the etiology, clinical presentation, investigations, and medical and surgical management of Osteomyelitis
4	Caries Spine	Explain the etiology, clinical presentation, investigations, and medical and surgical management of Caries spine

Theme-3: Muscle weakness		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Proximal myopathy	Elaborate on the etiology and diagnostic workup of a patient with proximal muscle weakness
2	Polymyositis and dermatomyositis	Discuss the pathogenesis, clinical features, investigations, differential diagnosis and management of Polymyositis and Dermatomyositis
Pediatrics		
1	Muscular dystrophies	Classify muscular dystrophies
		Explain the pathogenesis, clinical features, differential diagnosis, management and prognosis of Duchenne muscular dystrophy
		Explain the pathogenesis, clinical features, differential diagnosis, management and prognosis of myotonic dystrophy
		Compare the clinical features and prognosis of Becker, limb-girdle, and facioscapulohumeral dystrophies
		Take history and perform a physical examination of a child with muscular dystrophy
		Counsel the parents of a child suffering from Muscular dystrophy
Orthopedics		
1	Poliomyelitis	Explain the Orthopedic complications of poliomyelitis their Diagnostic workup and Management
Psychiatry		
1	Somatoform disorders	Classify somatoform disorders
		Explain the criteria for the diagnosis of pain somatoform disorders
		Explain the clinical presentation, psychiatric assessment, pharmacological and psychological management of a patient

		with fibromyalgia and other somatoform disorders
		Take psychiatric history from a patient suffering from somatoform disorder
		Counsel a patient with somatoform disorder

Theme-4: Skin rashes and burns		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Dermatology		
1	Cutaneous manifestations of Systemic diseases	Explain the common cutaneous manifestations of metabolic, endocrine, autoimmune, and neoplastic diseases
2	Drugs rash	Classify the different types of drug rashes
		Explain the clinical manifestations, differential diagnosis, and management of erythema multiforme/Steven Johnson/Toxic Epidermal Necrolysis.
3	Viral Infections of the skin • Chicken pox and Herpes Zoster • Warts (Human Papilloma Virus) • Molluscum Contagiosum • Cutaneous manifestation of AIDS	Explain the clinical manifestations, differential diagnosis and management of Chicken Pox and Herpes Zoster
		Classify Warts
		Explain the mode of transmission, differential diagnosis and management of warts
		Explain the mode of transmission, clinical presentation, differential diagnosis, and management of Molluscum Contagiosum in children and adults
4	Acute Bacterial infections of the skin • Impetigo • Folliculitis	Describe the etiology, clinical features, and management of acute bacterial skin lesions described

	• Furunculosis • Carbuncles	
5	Chronic bacterial infections of the skin • Cutaneous Tuberculosis • Leprosy • Syphilis	Discuss the etiology, clinical features, and management of chronic bacterial skin lesions described
6	Fungal infections • Pityriasis versicolor • Dermatophytosis • Candidiasis	Explain the etiology, clinical features, and management of fungal infections described
		Explain the different types of Acne
7	Sebaceous glands diseases Acne	Explain the pathogenetic mechanisms, clinical features, complications, differential diagnosis, and management of Acne
8	Autoimmune blistering disorders • Pemphigus Vulgaris • Bullous pemphigoid	Describe the etiology, clinical features, and management of diseases described
9	Eczemas	Classify Eczema
		Explain the clinical presentation, differential diagnosis and management of different types of Eczemas
10	Inflammatory dermatosis • Psoriasis • Lichen Planus • Sebbhoriac Dermatitis • Erythema Nodosum • Urticaria	Describe the etiology, clinical features, and management of diseases mentioned
11	Erythroderma	Discuss etiology, clinical presentation, differential diagnosis, and management of Erythroderma.
		Take history form a patient with generalized Rash.
		Counsel a patient suffering from Psoriasis.
Surgery/ Plastic Surgery		

1	Burns • Classification • Assessment • Management • Complications	Classify burns.
		Assess a patient of burns in terms of burn area calculation, fluid assessment, and referral to specialized burn units.
		Discuss the initial and long-term management of burns
		Explain the early and late complications of burns
		Calculated burn area.
		Counsel a patient and his/her family members with burns.

THEORY EXAMINATION SCHEME

Block-N (Foundation-3, Blood-3 and MSK-3)

Block	Module	Subject hours	Subject MCQs	Total MCQs	Paper MCQs
N	Foundation - 3	PRIME	5	25	120
		Medicine	3		
		Surgery	10		
		Psychiatry	3		
		Pediatrics	3		
		Radiology	1		
	Blood - 3	Pediatrics	17	35	
		Medicine	16		
		Gynecology	2		
	MSK - 3	Medicine	21	60	
		Orthopedics	12		
		Paediatrics	7		
		Dermatology	14		
		Surgery/plastic surgery	5		
		Psychiatry	1		

PRACTICAL EXAMINATION SCHEME

OSCE station distribution of different subjects

BLOCK-N (TOTAL STATIONS=20 AND 6 MARKS/STATION)					
Subjects	**OSCE stations**		**Viva stations**	**Logbook and history books (1-station)**	**Structured Long case =30 marks)**
	Static/ interactive	**Short cases**			
Medicine+ Rheumatology	2	2	1	General Surgery and allied	General Surgery
Surgery	2	0	1		
Paediatrics	2	2	1		
Orthopedics	1	1	1		
Dermatology	2	0	1		
Total	9	5	5	1	1

BLOCK-O

(Cardiorespiratory Module-3)

CARDIORESPIRATORY MODULE-3

Themes

S. No	Themes	Duration in Hours
1	Chest Pain and Palpitations	10 hours
2	Shortness of Breath	27 hours
3	Fever and Cough	19 hours
4.	Painful leg and Blood Pressure	5 hours
Total		61hours

General Learning Objectives

By the end of Cardiorespiratory Module, Final year MBBS students will be able to:

Knowledge:

1) Discuss the management of a patient with chest pain
2) Explain the management of patients with different types of ischemic heart diseases
3) Explain the management of patients with different types of arrhythmias
4) Discuss the management of traumatic chest injuries as a primary care physician
5) Explain the management of a patient with heart failure
6) Explain the management of patients with different types of Obstructive lung diseases
7) Discuss the management of pleural and pericardial diseases
8) Explain the diagnostic criteria and management of Bacterial endocarditis and Rheumatic fever and their complications
9) Explain the clinical features and management of cyanotic and acynotic congenital and Valvular heart diseases
10) Discuss the management of cardiomyopathies and myocarditis
11) Explain the diagnostic workup and management of patients with different types of Pneumonias
12) Explain the management approach of a patient with Hypertension
13) Discuss the diagnostic approach and management of DVT and its prevention.

Skills:

1) Discuss the management of a patient with chest pain
2) Explain the management of patients with different types of arrhythmias
3) Discuss the management of traumatic chest injuries as a primary care physician
4) Discuss the management of pleural and pericardial diseases
5) Explain the diagnostic workup and management of patients with different types of Pneumonias

6) Discuss the diagnostic approach and management of DVT and its prevention.

Attitude:

1) Explain the management approach of a patient with Hypertension
2) Discuss the diagnostic approach and management of DVT and its prevention.

Specific Learning Objectives

Theme 1: Chest Pain and Palpitations		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Approach to a patient with chest pain	Discuss the diagnostic workup and management approach for a patient with chest pain
		Take history and perform physical examination of patient with chest pain
2	Ischemic heart diseases	Classify IHD
		Explain the management approach to a patient with stable angina pectoris
		Explain the management approach to a patient with unstable angina pectoris
		Explain the management approach to a patient with acute MI.
		Discuss the risk stratification strategies in post-MI patients
3	Disorders of Rhythm	Classify arrhythmias and heart block and discuss their ECG abnormalities
		Explain the diagnostic and management approach to a patient with irregularly irregular pulse
		Discuss the management approach to a patient with SVT

		Discuss the management approach to a patient with Ventricular tachycardia
		Explain the management of a patient with different types of heart blocks
		Counsel a patient with recent onset acute MI
Cardiology		
1	Cardiac intervention techniques	Explain the different types, methods, and indications of cardiac interventions in cardiology practices
Pediatrics		
1	Supraventricular tachycardia	Discuss the clinical presentation and the diagnostic workup needed for Supraventricular tachycardia in Pediatric patients
		Counsel a parent of a neonate, infant and child with Supraventricular tachycardia
Surgery		
1	Chest trauma Hemothorax	Discuss the diagnostic workup for Chest trauma
		Discuss the management options for a patient with Chest trauma
		Perform ABC in a case presenting with chest trauma
		Observe chest intubation of a patient presenting with chest trauma

Theme 2: Shortness of breath		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine (CVS)		
1	Congestive cardiac failure	Explain the types, etiology, clinical features, investigations, prognosis, and management of a patient with CCF.
		classify cardiomyopathies
		Explain the etiology, clinical features, and management of a

		patient with myocarditis
	Pericarditis and pericardial effusion	Explain the etiology, clinical features, and management of a patient pericarditis and pericardial effusion
Medicine (Respiratory)		
1	Bronchial asthma (Wheezy chest)	Explain the diagnostic and management approach for a patient with chronic wheezy chest
		Differentiate between bronchial asthma and cardiac asthma
2	COPD	Explain the diagnostic and management approach for a patient with COPD
		Interpret Pulmonary Function test results
		Interpret a report of Arterial blood gases
3	Interstitial lung disease (ILD)	Discuss the types, etiology, clinical and radiological presentation, investigations, and management of a patient with ILD
4	Pleural effusion	Explain the diagnostic and management strategies in a patient with pleural effusion
		Assist in pleural fluid aspiration
5	Pneumothorax	Explain the diagnostic and management strategies in a patient with Pneumothorax
	Pulmonary embolism	Discuss the risk factors diagnostic criteria, complications, and treatment of a patient with suspected pulmonary embolism
Pulmonology		
1	Respiratory Failure	Explain the types, etiology, and pathogenesis of Respiratory Failure
		Discuss the diagnostic workup and management for Respiratory Failure
		Discuss the types, indications, and approaches to Oxygen therapy

Pediatrics		
1	Acyanotic heart disease	Discuss the clinical presentation and the diagnostic workup needed for Acyanotic heart disease in Pediatric patients
		Discuss the management of an infant and child with Acyanotic heart disease
2	Ventricular Septal Defect (VSD)	Discuss the diagnostic workup and management for Ventricular Septal Defect.
3	Atrial Septal Defect (ASD)	Discuss the diagnostic workup and management for Atrial Septal Defect
4	Aortic stenosis	Discuss the diagnostic and management workup for Aortic stenosis
5	Coarctation of aorta	Explain the etiology clinical presentation of Coarctation of aorta
		Discuss the diagnostic workup and management for Coarctation of aorta
6	Cyanotic heart disease	Discuss the clinical presentation and the diagnostic workup needed for Cyanotic heart disease in Pediatric patients
		Discuss the management of an infant and child with Cyanotic heart disease
		Perform physical examination of a neonate and infant with Cyanotic heart disease
		Counsel a parent of a neonate, infant and child with Cyanotic heart disease
7	Tetralogy of Fallot (TOF)	Explain the etiology and clinical presentation of Tetralogy of Fallot
		Discuss the diagnostic workup and management for Tetralogy of Fallot
8	Transposition of	Explain the etiology and clinical presentation of Transposition

	Great Arteries (TGA)	of Great Arteries
		Discuss the diagnostic workup and management for Transposition of Great Arteries
9	Ebstein anomaly	Explain the etiology and clinical presentation of Ebstein anomaly
		Discuss the diagnostic workup and management for Ebstein anomaly
10	Total Anomalous Pulmonary Venous Drainage or Connections (TAPVC)	Explain the etiology and clinical presentation of TAPVC
		Discuss the diagnostic workup and management for TAPVC
11	Truncus arteriosus	Explain the etiology and clinical presentation of Truncus arteriosus
		Discuss the diagnostic workup and management for Truncus arteriosus
12	Tricuspid atresia	Explain the etiology and clinical presentation of Tricuspid atresia
		Discuss the diagnostic workup and management for Tricuspid atresia
13	Congestive Cardiac Failure (CCF)	Discuss the clinical presentation and the diagnostic workup and management needed for Congestive Cardiac Failure in Pediatric patients
		Take history and perform physical examination of a neonate, infant and child with Congestive Cardiac Failure
		Counsel the parents of a neonate, infant and child with Congestive Cardiac Failure
14	Cardio-myopathy	Discuss the management algorithm of an infant and child with Cardiomyopathy
15	Cystic fibrosis	Explain the etiology and clinical presentation of Cystic

		fibrosis
		Discuss the diagnostic workup and management for Cystic fibrosis
Family Medicine		
1	IHD/CCF	Explain the management strategies of a patient with IHD and heart failure in general practice including the psychosocial impact of disease on patient and their families
		Describe the strategies for prevention of IHD and CCF
		Identify the red-flags in a patient with IHD/CCF and appropriately refer to speciality care when required
Surgery		
1	Thoracostomy and chest intubation	Explain the indications for Thoracostomy and chest intubation.
		Observe the procedure of Thoracostomy and chest intubation
		Counsel a patient for the procedure of Thoracostomy and chest intubation

Theme 3:		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Bacterial endocarditis	Explain the risk factors, etiology, clinical features, diagnostic criteria, management, and prevention of Bacterial endocarditis.
2	Pneumonias	Discuss the etiology and classification of pneumonias
		Explain the etiology, risk factors clinical features, diagnosis, and management of patients with different types of pneumonias.
		Examine a patient with features of pneumonia
3	Pulmonary	Explain the diagnostic workup, management, and complications

	Tuberculosis	of a suspected case of pulmonary TB
4	Bronchiectasis	Develop a management algorithm for a patient with bronchiectasis
5	Lung abscess	Explain the etiology, clinical and radiological features, complications, and management of a patient with lung abscess.
6	Lung tumors	Classify lung tumors
		Explain the diagnostic workup and management and complications of a patient with suspected Bronchogenic carcinoma
		Explain the diagnostic workup and management and complications of a patient with suspected pleural mesothelioma
7	Cardiovascular involvement in systemic diseases	Discuss the cardiovascular manifestations of systemic diseases, their clinical features, investigations, prognosis, and relevant management
8	Pulmonary involvement in systemic diseases	Discuss the pulmonary manifestations of systemic diseases, their clinical features, investigations, prognosis, and relevant management
Pediatrics		
1	Rheumatic fever	Discuss the clinical presentation and the diagnostic workup needed for Rheumatic fever in Pediatric patients
		Discuss the management of an infant and child with Rheumatic fever
		Perform physical examination of a neonate, infant with Rheumatic fever
		Counsel a parent of a neonate, infant and child with Rheumatic

		fever
2	Acute Respiratory Infections (ARI)	Explain the clinical presentation and diagnostic needed for Acute Respiratory Infections
		Discuss the management of an infant and child with Acute Respiratory Infections
		Perform physical examination of a neonate infant with Acute Respiratory Infections
		Counsel a parent of a neonate, infant and child with Acute Respiratory Infections
3	Croup	Explain the clinical presentation and diagnostic workup needed for Croup
		Discuss the management of an infant and child with Croup
4	Pneumonia	Explain the clinical presentation and diagnostic workup needed for Pneumonia
		Discuss the management of an infant and child with Pneumonia
Family Medicine		
1	Acute respiratory presentations- primary care management and Red flags	Explain the approach to a patient with cough or shortness of breath in a primary health care setting.
		Discuss the differential diagnosis of a patient with cough or shortness of breath
		Discuss the investigations for a patient with cough or shortness of breath in a primary health care setting
		Identify common red flags
		Identify patients that need urgent and proper referral for specialist care
Pediatrics		
1	Rheumatic fever	Discuss the clinical presentation and the diagnostic workup needed for Rheumatic fever in Pediatric patients.
		Discuss the management of an infant and child with Rheumatic

		fever.
		Perform physical examination of a neonate infant with Rheumatic fever.
		Counsel a parent of a neonate, infant and child with Rheumatic fever.
2	Infective endocarditis	Discuss the clinical presentation and the diagnostic workup needed for Infective endocarditis in Pediatric patients
		Discuss the management of an infant and child with Infective endocarditis.
		Perform physical examination of a neonate infant with Infective endocarditis.
		Counsel a parent of a neonate, infant and child with Infective endocarditis.
3	Myocarditis	Discuss the clinical presentation and the diagnostic workup needed for Myocarditis.
		Discuss the management of an infant and child with Myocarditis.
		Perform physical examination of a neonate, infant with Myocarditis.
		Counsel a parent of a neonate, infant and child with Myocarditis.

Theme-4: Painful leg and Blood pressure		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Deep vein thrombosis (DVT)	Discuss the diagnostic algorithm for an elderly patient with a sudden swollen and painful limb.
		Discuss the diagnosis and management strategies for a patient with DVT.
2	Coarctation of Aorta	Explain the types, clinical features, investigations, complications, and management of Coarctation of the Aorta.
3	Systemic Hypertension	Discuss the management approach to a patient who is newly diagnosed hypertensive.
		Take history from a hypertensive patient
		Perform a physical examination of a hypertensive patient
		Counsel a newly diagnosed hypertensive patient
Family medicine		
1	Hypertension in general practice	Explain the management strategies of a hypertensive patient in general practice including the psychosocial impact of disease on patients and their families.
		Describe the strategies for prevention of hypertension and its complications.
		Identify the red flags in a hypertensive patient and appropriately refer to speciality care when required

THEORY EXAMINATION SCHEME

Block-O (CVS-3 and Respiratory-3)

Block	Module	Subjects	Subject MCQs	Total MCQs	Paper MCQs
O	Cardiopulmonary - 3	**CVS-3**			120
		Medicine/cardiology	45	70	
		Pediatrics	25		
		Respiratory-3			
		Medicine/pulmonology	25	50	
		Pediatrics	20		
		Surgery	5		

PRACTICAL EXAMINATION SCHEME

OSCE station distribution of different subjects

BLOCK-O (TOTAL STATIONS=20 AND 6 MARKS/STATION)					
Subjects	OSCE stations		Viva stations	Logbook and history books (1-station)	Structured Long case =30 marks)
	Static/ interactive	Short cases			
Medicine	2	1	1	General Medicine and Allied	General Medicine
Cardiology	3	1	1		
Pediatrics	2	2	1		
Pulmonology	3	1	1		
Total	10	5	4	1	1

BLOCK-P

(Renal-3, Endocrine & Reproduction-3)

RENAL-III MODULE

Themes

S. No	Themes	Duration in Hours
1	Facial swelling	4
2	Scanty Urine	6
3	Loin pain and dysuria	5
4	Pain and swelling of external genitalia	5

General Learning Objectives

By the end of Renal Module, Final year MBBS students will be able to:

Knowledge:

1) Discuss the diagnostic approach and management of an adult and a child with suspected glomerular disease.
2) Discuss the diagnostic approach and management of an adult and a child with acute and chronic renal disease.
3) Discuss the management of a patient with nephrocalcinosis.
4) Discuss the etiology, clinical features, and management of common electrolyte abnormalities.
5) Explain the diagnosis and management of a patient with hematuria and UTIs.
6) Explain the common diseases of the urogenital system.

Skills:

1) Discuss the diagnostic approach and management of an adult and a child with suspected glomerular disease.
2) Discuss the diagnostic approach and management of an adult and a child with acute and chronic renal disease.
3) Discuss the management of a patient with nephrocalcinosis.
4) Discuss the etiology, clinical features, and management of common electrolyte abnormalities.
5) Explain the diagnosis and management of a patient with hematuria and UTIs.
6) Take history and perform a physical examination of urogenital system.
7) Counsel a patient with acute and chronic renal failure.

Attitude:

1) Counsel a patient with acute and chronic renal failure.

Specific Learning Objectives

Theme 1: Facial swelling		
S NO	**TOPIC**	**LEARNING OBJECTIVE**
Medicine/ Nephrology		
1	Investigations of renal diseases	Discuss the biochemical, radiological, hematological, and other specialized investigations and their interpretations in renal diseases.
2	Approach to a facial swelling	Discuss the diagnostic workup and management approach for a patient with facial swelling of renal origin
		Take history and perform physical examination of patient with facial swelling
3	Minimal change disease	Explain the diagnostic workup and management and complications of a patient with Minimal change disease.
4	Post streptococcal Glomerulonephritis	Explain the diagnostic workup and management and complications of a patient with Post-Streptococcal Glomerulonephritis.
5	IgA Nephropathy	Explain the diagnostic workup and management and complications of a patient with IgA Nephropathy.
6	Chronic glomerulonephritis	Explain the diagnostic workup and management and complications of a patient with Chronic glomerulonephritis
Pediatrics		
1	Nephrotic	Discuss the clinical presentation, the diagnostic workup and

	Syndrome	management for suspected GN and Nephrotic Syndrome in Pediatric patients.
		Take a history from a patient with Nephrotic Syndrome.
		Perform physical examination of a patient with suspected GN and Nephrotic Syndrome.
		Effectively counsel a child and his/her parents with nephrotic syndrome.

Theme-2: Scanty Urine		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine / Nephrology		
1	Electrolyte disorders	Explain the etiology, clinical features, diagnosis, and treatment of Hyper and Hyponatremia.
		Explain the etiology, clinical features, diagnosis, and treatment of hyper and hypokalemia.
		Explain the etiology, clinical features, diagnosis, and treatment of hyper and hypophosphatemia.
		Explain the etiology, clinical features, diagnosis, and treatment of hyper and hypomagnesemia.
2	Blood Ph abnormalities	Explain the etiology, clinical features, diagnosis and treatment of Metabolic acidosis and alkalosis and its associated compensations.
		Explain the etiology, clinical features, diagnosis and treatment of respiratory acidosis and alkalosis and its associated compensation.
3	Scanty Urine	Discuss the diagnostic workup and management approach for a patient with oliguria and anuria.
4	Uremia	Discuss the pathophysiological mechanisms, clinical manifestations, investigations, and management of a patient with Uremia.
5	Chronic Kidney Injury	Explain the diagnostic workup and management and complications of a patient with Chronic Kidney Injury
Pediatrics		
1	Acute Kidney	Discuss the clinical presentation, the diagnostic workup and

	Injury (AKI)	management for Acute Kidney Injury in Pediatric patients.
2	Chronic Renal Failure (CKD)	Discuss the clinical presentation, the diagnostic workup and management for Chronic Renal Failure in Pediatric patients.

Theme-3: Loin pain and dysuria		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine / Nephrology		
1	Approach to blood in urine (haematuria)	Take a history from a patient presenting with blood in the urine.
		Perform a physical examination of a patient with blood in the urine.
		Discuss the diagnostic workup and management approach for a patient blood in urine.
2	Loin pain and dysuria	Discuss the diagnostic workup and management approach for a patient with loin pain and dysuria.
3	Acute pyelonephritis	Discuss the diagnostic workup and management approach for a patient with acute pyelonephritis.
4	Acute and chronic prostatitis	Discuss the diagnostic workup and management approach for a patient with acute and chronic prostatitis
Surgery		
1	Nephrolithiasis	Explain the etiology, risk factors, types, approach, investigations, treatment, and prevention of Nephrolithiasis
		Take history from a patient presenting with acute Flank and loin pain.
		Perform a physical examination of a patient with acute Flank, and loin pain.
		Counsel a patient presenting with nephrolithiasis.
2	Dysuria	Discuss the diagnostic workup for Dysuria.
		Discuss the management options for a patient with Dysuria
3	Hematuria	Discuss the diagnostic workup for Hematuria.
		Discuss the management options for a patient with Hematuria.

Theme-4: Pain and swelling of external genitalia		
SUBJECT	**TOPIC**	**LEARNING OBJECTIVES**
Surgery		
1	Testicular torsion	Discuss the diagnostic workup for Testicular torsion
		Discuss the management options for a patient with Testicular torsion.
2	Hydrocele	Discuss the diagnostic workup for Hydrocele.
		Discuss the management options for a patient with Hydrocele.
3	Testicular tumors	Explain the diagnostic workup and management and complications of a patient with suspected Testicular tumors.
4	Epididymo-orchitis	Discuss the diagnostic workup for Epididymo-orchitis.
		Discuss the management options for a patient with Epididymo-orchitis.
Pediatric Surgery		
1	Hypospadias	Discuss the types, complications, and management of a child with Hypospadias.
Urology		
1	Male infertility	Discuss the diagnostic approach and management options for a male patient with infertility.
Medicine/ Nephrology		
1	Sexually transmitted infections	Classify STDs and enlist their treatment options.
		Discuss the management approach of a patient with a new onset lesion on the genitalia.

ENDOCRINE & REPRODUCTION- III

Themes

S. No	Themes	Duration in Hours
1	Tall/Short Stature	3
2	Neck Swelling and Muscle cramps	5
3	Excessive Thirst & Urination	8
4	Moon Face	4
5	Pregnancy and Breast Lump	20

General Learning Objectives

By the end of Endocrine and Reproduction-III Module, Final year MBBS students will be able to:

Knowledge:

1) Discuss the clinical conditions resulting in Tall/short stature and its management.
2) Discuss the clinical conditions causing Excessive thirst and Urination and its management.
3) Discuss the clinical conditions resulting in Infertility and its management.
4) Discuss pathophysiology of Pregnancy, its Management, and complications.
5) Discuss the development of fetus, its growth, and complications.
6) Discuss the pathophysiology of Obstetrics emergencies, its Management, and complications.

Skills:

1) Discuss the clinical conditions resulting in Tall/short stature and its management.
2) Discuss the clinical conditions causing Excessive thirst and Urination and its management.
3) Discuss the clinical conditions resulting in Infertility and its management.
4) Discuss the development of fetus, its growth, and complications.
5) Discuss the pathophysiology of Obstetrics emergencies, its Management, and complications.

Attitude:

6) Discuss the clinical conditions resulting in Infertility and its management.
7) Discuss the pathophysiology of Obstetrics emergencies, its Management, and complications.

Specific Learning Objectives

Theme-1: Tall / short stature		
S NO	**Topic**	**Learning Objectives**
Medicine		
1	Anterior pituitary gland	Discuss the diagnostic approach and management of a patient with tall stature.
2	Posterior pituitary gland	Discuss the approach consideration of a patient with polydipsia
		Explain the diagnostic approach and treatment of a patient with Diabetes insipidus.
Pediatrics		
1	Short stature	Discuss the diagnostic approach and management of a child with short stature.

Theme-2: Neck swelling and muscle cramps		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Thyroid gland disorders	Discuss the diagnostic approach, management, and complications of a patient with suspected hyperthyroidism.
		Discuss the diagnostic approach, management, and complications of a patient with suspected hyperthyroidism.
2	Parathyroid gland	Discuss the diagnostic approach, management, and complications of a patient with tetany.
		Take history and perform physical examination of a patient with goitre.
		Counsel a patient with goitre.
Surgery		
1	Thyroid nodule	Explain the diagnostic approach, management, and complications of multinodular goitre.
		Explain the diagnostic approach, and management of a patient with solitary thyroid nodule.
		Perform thyroid examination
Pediatrics		
1	Thyroid disorders	Explain the neonatal screening for hypothyroidism
		Explain the diagnostic approach and management of a child with suspected Cretinism
		Discuss the complications of Cretinism
		Psychomotor Take history and perform physical examination of a child with hypothyroidism/cretinism.

Theme-3: Excessive thirst and urination		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Diabetes Mellitus	Explain the diagnostic approach, screening and management of a patient with suspected Diabetes Mellitus.
		Elaborate the pharmacological and non-pharmacological management strategies in the management of type-1 and type- 2 DM.
		Elaborate on the acute and chronic complications of DM and their management
		Discuss the diagnostic approach, management, and complications of hyperglycemic syndromes in Diabetic patients.
		Explain the diagnosis, management and complications of a diabetic patient presenting with hypoglycemia's.
		Take history and perform physical examination of a patient with Type 2 DM.
		Counsel a newly diagnosed patient with DM.
Family Medicine		
1	Diabetes mellitus general practice management	Explain the management strategies of a diabetic patient in general practice including the psychosocial impact of disease on patients and their families.
		Describe the strategies for prevention of diabetes mellitus and its complications.
		Identify the red flags in a diabetic patient and appropriately refer to specialty care when required.
Surgery		

1	Diabetic foot ulcers	Discuss the classification, investigations, management, and complications of diabetic foot ulcers
		Examine and stage a diabetic foot ulcer
Nephrology		
1	Diabetic nephropathy	Explain the pathogenesis, clinical features, complications, short and long-term management of Diabetic Nephropathy
Pediatrics		
1	Type-1 DM	Explain the diagnostic approach, screening, and management of a Child with suspected Type-1 Diabetes Mellitus
		Take history and perform physical examination of a patient with Type 2 DM
		Counsel a newly diagnosed patient and parents with type 1 DM

Theme-4: Moon face and obesity		
S NO	**Topic**	**Learning Objectives**
Medicine		
1	Cushing`s syndrome	Discuss the diagnosis, management, and complications of a patient with suspected Cushing`s syndrome.
		Explain the Dexamethasone suppression test in terms of its indications and interpretation.
		Explain the protocol of steroids withdrawal in a patient with steroids abuse.
		Take history and perform physical examination of a patient with Cushing`s syndrome.
2	Addison`s disease	Discuss the diagnosis, management, and complications of a patient with suspected Addison`s disease (both primary and secondary).
		Explain the concept of steroids replacement in terms of its indications and precautions.

3	Obesity	Discuss the etiology, complications, medical and surgical approaches to the management of obesity.
		Take history and perform physical examination of a patient with morbid obesity.
		Counsel a morbidly obese patient regarding the complications and lifestyle management.

Theme-5: Pregnancy and breast feeding		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Gynecology and Obstetrics		
1	Obstetrics history and examination	Take an obstetric history and perform abdominal, pelvic, and obstetric examination of a pregnant lady.
		Measure and interpret blood pressure in a pregnant lady
		Examine the breast of a full-term pregnant female
		Perform urine examination via dipstick technique for pregnancy, glucose, urine, and bacteria
2	Antenatal care	Define and explain the aims of antenatal care
		Discuss the components of antenatal care
		Explain different types of screening tests during antenatal care
		Discuss the maternal and neonatal complications associated with increased BMI in pregnancy
		Identify high risk women of developing pre-eclampsia, preterm birth, fetal growth restriction, and vitamin D deficiency
		Perform and record proper antenatal check-ups
		Counsel a pregnant lady about the complications of pregnancy
3	Assessment of fetal wellbeing	Explain the methods of assessment of fetal wellbeing
		Explain the types and diagnosis of fetal abnormalities
4	Prenatal	Explain the reasons, classification, and methods of prenatal

	diagnosis	diagnosis
5	Antenatal maternal a nd obstetric complications	Discuss musculoskeletal, gastroenterological, and hematological problems associated with pregnancy.
		Discuss the risk factors and management of venous thromboembolism in pregnancy.
		Explain the causes, complications, and management of polyhydramnios and oligohydramnios.
		Discuss the etiology, complications and management of fetal malpresentations.
		Explain the approach and management of a pregnant lady with antepartum bleeding.
		Discuss the etiology, prevalence, management, and prevention of Rh isoimmunization.
6	Preterm labor PROM / PPROM	Discuss the etiology, complications, and management of preterm labor.
Family Medicine / Obstetrics		
1	Hypertensive disorders in pregnancy	Classify hypertension in pregnancy and disorders of hypertension in pregnancy.
		Discuss the diagnostic approach, management, complications and prevention of Pre-eclampsia and Eclampsia
2	Diabetes mellitus and pregnancy	Explain the management of a pregnant lady with gestational DM and overt DM
Obstetrics		
1	Perinatal infections	Classify prenatal infections.
		Explain the screening and preventive strategies of common perinatal infections.
2	Labour	Explain the management of normal labour at different stages
		Explain the management of abnormal labour at different stages
		Discuss the indications and complications of analgesia and

		anaesthesia in labour.
		Discuss the management of labour at special circumstances like uterine scar, fetal malposition's, and multiple pregnancies,
		Explain the types, indications, and complications of operative deliveries.
		Discuss the indications and complications of Caesarian section
3	Management of labor in special circumstances	Discuss the management of labor at special circumstances like
		Uterine scar, fetal malpositions, fetal death, multiple pregnancies, and post-date pregnancies
		Explain the types, indications, and complications of operative deliveries.
		Discuss the indications and complciations of Caesarian section.
		Observe normal labor and assisted deliveries.
4	Obstetric emergencies	Classify obstetric emergencies.
		Discuss the management of sepsis in pregnancy
		Explain the management and complications of placental diseases in a pregnant woman.
		Observe a normal delivery
5	Postpartum bleeding	Discuss the etiology, diagnostic and management approach to a patient with postpartum haemorrhage.
6	Puerperium	Classify puerperal disorders and their management
Psychiatry		
1	Psychiatric disorders in pregnancy and puerperium	Classify different psychiatric disorders in pregnancy and puerperium.
		Discuss the management of puerperal psychosis and depression
		Counsel a patient and her family with postpartum psychosis/depression.
Pediatrics		
1	The neonate	Discuss the types and management of common problems of

		preterm and term babies
		Discuss the principles of neonatal care
		Observe the care of a neonate in nursery
		Take history and perform physical examination of a neonate
Surgery		
1	Breast diseases	Discuss approach to a patient with breast lump emphasizing on diagnostic work-up of different breast pathologies (complexity of benign and malignant breast diseases) including imaging and procedures.
		Discuss the diagnostic approach and management of a patient with nipple discharge.
		Perform a Clinical breast examination by all techniques including “radial wagon wheel” and “spoke” method
		Counsel a patient with breast cancer about the diagnosis, management, and screening of her family members.

THEORY EXAMINATION SCHEME

Block-P (Renal-3 and Endocrine and Reproduction-3)

Block	Module	Subjects hours	Subject MCQs	Total MCQs	Paper MCQs
P	Renal-3	Medicine/Nephrology	22	40	120
		Surgery/Urology	10		
		Pediatrics	6		
		Pediatric surgery	2		
	Endocrine and Reprouction-3	Medicine/ Family medicine	12	80	
		Obstetrics	56		
		Surgery	8		
		Paediatrics	4		

PRACTICAL EXAMINATION SCHEME

OSCE station distribution of different subjects

BLOCK-P (TOTAL STATIONS=20 and 6 marks/station)					
Subjects	**OSCE stations**	**Viva stations**	**Short cases**	**Logbook and history books (1-station)**	**Structured Long case (30 marks)**
Gynecology	7	1	2	Gynecology And Obstetrics	Gynecology And Obstetrics
Medicine+ Endocrinology	2	1	1		
Pediatrics	1	1	0		
Surgery	1	1	1		
Total	11	4	4	1	1

BLOCK-Q

(Neurosciences-III, GIT-III, Multisystem-II)

NEUROSCIENCES-III

Themes

S. No	Themes	Duration in Hours
1	Disturbed mood & behavior	4
2	Right-sided weakness and inability to speak	2
3	Loss of consciousness and Fits	3
4	Tremors	3
5	Headache	9
6	Paraplegia	8

General Learning Objectives

By the end of Neurosciences-III Module, Final year MBBS students will be able to:

Knowledge:

1) Discuss the management approach to a patient with different types of Dementia
2) Discuss the management of common psychiatric disorders, autism, and substance abuse disorders
3) Explain the management of different types of strokes, and epilepsy
4) Discuss the management of different types of movement disorders
5) Explain the management of different intracranial infections
6) Discuss the management of intracranial space-occupying lesions and head injuries
7) Explain the management of common neuropathies and spinal cord diseases

Skills:

1) Explain the management of different types of strokes, and epilepsy
2) Discuss the management of intracranial space-occupying lesions and head injuries
3) Explain the management of common neuropathies and spinal cord diseases

Attitude:

1) Discuss the management of common psychiatric disorders, autism, and substance abuse disorders

Specific Learning Objectives

Theme-1: Disturbed mood and behavior		
S NO	**TOPIC**	**LEARNING OBJECTIVES**
Medicine		
1	Dementia	Discuss the etiology, clinical features, and management of different types of Dementias
		Classify the reversible and irreversible causes of Dementia
		Explain the pathophysiology and clinical features of a patient with Huntington's disease
		Discuss the diagnostic work up and management for patients suspected of dementia
		Perform mini-mental state examination
Psychiatry		
2	PTSD	Explain the etiology and management of a patient with PTSD
3	OCD	Explain the etiology and management of a patient with OCD
4	Somatic symptoms disorder	Explain the etiology and management of a patient with Somatic symptoms disorder and Chronic pain syndromes
5	Autism spectrum disorder	Explain the etiology and management of a child with autism spectrum disorder.
6	Substance abuse	Explain the risk factors, types of substance abuse, clinical features, withdrawal symptoms, complications and management of a patient with substance abuse
		Counsel and educate a family of a patient with Dementia
Family Medicine/ General Medicine		
7	Anxiety and	Explain the approach to a patient with anxiety and depression in

	depression	a primary health care setting.
		Explain the risk assessment for mental health
		Identify common red flags.
		Discuss the guidelines for management of a patient with Anxiety and depression in a primary health care setting.
		Perform Screening for Anxiety, Depression and Schizophrenia.
		Perform a consultation with a patient with anxiety or depression under supervision.
		Observe the consultation of a family physician with a patient with anxiety or depression

Theme 2: Right-sided Weakness and Inability to Speak				
Subject	**Topic**	**Hours**	**Domain of Learning**	**Learning objectives**
Medicine	Stroke syndromes	1	Cognitive	Discuss the diagnostic and management approach for a patient with Right-sided weakness and inability to speak due to an ischemic stroke.
		1	Cognitive	Discuss the diagnostic workup and management for a patient suspected of Haemorrhagic stroke
	Subarachnoid haemorrhage SAH)		Cognitive	Discuss the diagnostic workup and management for patients suspected of SAH
			Psychomotor Skills	Demonstrate the complete assessment of the patient on the NIH stroke scale under supervision
			Psychomotor Skills	Demonstrate the assessment of a comatose patient on the Glasgow coma scale under supervision
			Psychomotor Skills	Interpret the CT and MRI findings in stroke patients
			Affective domain	Counsel a stroke victim about future prevention and management of complications

Theme-3: Loss of consciousness and Fits				
Subject	**Topic**	**Hours**	**Domain of Learning**	**Learning objectives**
Medicine	Coma	1	Cognitive	Discuss the management algorithm of a patient with coma
	Epilepsy		Cognitive	Discuss the diagnostic work up and management for a patient with fits
		1	Cognitive	Discuss the diagnostic work up and management for a patient with Tonic Clonic epilepsy
			Cognitive	Discuss the diagnostic work up and management for a patient with Status Epilepticus

			Psychomotor Skills	Perform a consultation with a patient with epilepsy under supervision
			Psychomotor Skills	Write prescriptions for patients with Tonic-Clonic and Petit-mal epilepsy
			Affective	Counsel a patient with Epilepsy
Pediatrics	Epilepsy	1	Cognitive	Discuss the diagnostic work up and management for children with seizures and Epilepsy
			Psychomotor Skills	Perform a consultation with a child having epilepsy under supervision emphasizing history and examination.
			Psychomotor Skills	Write a prescription for a child with Tonic-Clonic and Petit-mal epilepsy
			Affective Domain	Counsel and educate the Parents/guardian of a child with epilepsy.
Theme-4: Tremors and movement disorders				
Subject	**Topic**	**Hours**	**Domain of Learning**	**Learning objectives**
Medicine	Movement Disorders	1	Cognitive	Classify movement disorders
			Cognitive	Discuss the diagnostic workup and management for patients suspected Cerebellar disorders
			Cognitive	Discuss the diagnostic and management approach to a patient with Ataxia
			Cognitive	Discuss the diagnostic and management approach to a patient with Chorea
	Parkinson`s disease	1	Cognitive	Discuss the diagnostic criteria, pharmacological, psycho-social, and rehabilitative approaches to the management of a patient with Parkinson's disease

			Psychomotor	Examine a patient with Parkinson`s disease by taking history and performing a physical examination.
Psychiatry	Dystonia	1	Cognitive	Discuss the diagnostic approach and management for patients suspected of Drug-Induced Dystonia
Theme 5: Headache				
Subject	**Topic**	**Hours**	**Domain of Learning**	**Learning objectives**
Medicine	Headache	1	Cognitive	Explain the diagnostic approach to patients with acute and chronic headaches
	Migraine		Cognitive	Explain the types, risk factors, diagnostic approach, management, and prevention of Migraine
			Psychomotor Skills	Demonstrate Complete history and examination of patient with migraine
			Affective domain	Discuss the lifestyle changes preventing migrainous headaches
	Meningitis	1	Cognitive	Classify meningitides
			Cognitive	Differentiate between the clinical features, investigations, CSF findings, radiological findings, and complications in patients with viral, bacterial, and tuberculous meningitis
			Cognitive	Discuss the pharmacological and surgical management approaches in patients with different types of meningitides
			Psychomotor Skill	Take history and perform relevant physical examination and elicit signs of meningitis in a suspected patient
			Psychomotor Skill	Interpret a CSF report in a patient with viral, acute pyogenic and

				tuberculous meningitis
			Psychomotor Skill	Observe the Lumbar puncture
			Affective domain	Counsel a patient and his/her family with Tuberculous meningitis regarding complications, treatments` side effects and follow ups
	Encephalitis	1	Cognitive	Discuss the etiology, pathogenesis, clinical
Family Medicine/ General Medicine	Headache	1	Cognitive	Explain the approach to a patient with Headache in a primary health care setting
			Cognitive	Identify common red flags in a patient with headache
			Cognitive	Discuss the investigations for a patient with Headache in a primary health care setting.
			Cognitive	Identify patients that need urgent and proper referral for specialist care.
Pediatrics		1	Cognitive	Discuss the diagnostic work up and management for children with Headache
	Meningitis	1	Cognitive	Discuss the diagnostic work up and managements for children suspected of Meningitis
			Cognitive	Explain the short term and long-term sequelae of meningitis
			Psychomotor Skills	Describe assessing the initial triad symptoms of meningitis in children
	Big head	1	Cognitive	Explain the diagnostic and therapeutic approach to a child with big head
Neurosurgery	Intracranial space	1	Cognitive	Classify intracranial space occupying lesions (benign, malignant and infections)

	occupying lesions		Cognitive	Discuss the clinical features, radiological findings and treatment of intracranial space occupying lesions
	Head Injury	1	Cognitive	Discuss the diagnostic workup and management for patients with Head Injury
			Affective domain	Counsel about the post-operative care of patients with head injuries and their families.

Theme-6: Lower limb weakness				
Subject	**Topic**	**Hours**	**Domain of Learning**	**Learning objectives**
Medicine	Multiple Sclerosis	1	Cognitive	Discuss the diagnostic approach and management of a patient with suspected Multiple Sclerosis
			Psychomotor	Examine the lower limbs of a patient with paraplegia
			Affective Domain	Discuss and counsel the pts regarding the changes in the lifestyle of patients with Multiple sclerosis
	Acquired Neuropathies	1	Cognitive	Classify acquired neuropathies and discuss their clinical features, investigations, and management
	Approach to lower limbs weakness	1	Cognitive	Discuss the diagnostic algorithm of a patient with lower limbs weakness
Pediatrics	Hereditary neuropathies	1	Cognitive	Classify hereditary neuropathies and discuss their clinical features, investigations, and management
Pediatric surgery	Congenital malformations - Spina Bifida/myelomeningocele	1	Cognitive	Explain the clinical features, investigations, and management of a pa child with Spina Bifida/Myelomeningocele
			Affective Domain	Discuss and counsel the pts regarding the changes in the lifestyle of patients with congenital malformations
Neurosurgery	Syringomyelia	**1**	Cognitive	Describe Syringomyelia and Explain the onset of Syringomyelia
			Cognitive	Discuss the diagnostic work up and management for pts suspected of Syringomyelia.
Orthopedics	Diseases of the vertebrae and intervertebral discs	**1**	Cognitive	Classify diseases of the vertebrae and intervertebral discs, their clinical features, investigations, complications, and management

	Kyphoscoliosis	1	Cognitive	Discuss the etiology, clinical features, management of Kyphoscoliosis.

GIT-III Module

THEMES

S. No	Themes	Duration in Hours
1	Difficulty in swallowing and Epigastric Pain	4
2	Yellow discoloration of the sclera	5
3	Diarrhea and Pain Abdomen	8
4	Constipation and bleeding per rectum	6

GENERAL LEARNING OBJECTIVES

By the end of GIT Module, Final year MBBS students will be able to:

Knowledge:

1) Discuss the approach to the management of a patient with dysphagia and upper GI bleed.
2) Explain the approach to the management of a patient with pain epigastrium.
3) Discuss the management of a patient with acute and chronic hepatitis, liver cirrhosis, and encephalopathy.
4) Explain the management of a patient with acute and chronic diarrheas.
5) Discuss the management of a patient with peritonitis and intestinal obstruction.
6) Explain the management of a patient with constipation and lower GI bleeding.

Skills:

1) Take history and perform a physical examination of a patient with GI diseases.
2) Counsel patients and their families with common GI diseases.

Attitude:

1) Counsel patients and their families with common GI diseases.

SPECIFIC LEARNING OBJECTIVES

Theme-1: Difficulty in swallowing and epigastric pain					
Subject	**Topic**	**Hours**	**S. No**	**Domain of learning**	**Learning objectives**
Surgery	Dysphagia	1	1	Cognitive	Explain the diagnostic workup and management of a patient with dysphagia.
Medicine	Upper GI bleeding	1	2	Cognitive	Explain the diagnostic workup and management and complications of a patient with Upper GI bleeding
			3	Psychomotor	Take history and perform a physical examination of a patient with an upper GI bleed.
			4	Psychomotor	Observe upper GI endoscopy.
			5	Psychomotor	Observe NG tube insertion.
Pediatrics	Vomiting	1	6	Cognitive	Explain the diagnostic and therapeutic approach to a neonate and infant with persistent vomiting.
Gynaecology	Hyperemesis gravidarum	1	7	Cognitive	Discuss the management of a patient with vomiting of pregnancy.
			8	Affective	Counsel a patient with hyperemesis gravidarum.

Theme-2: Yellow discoloration of the sclera					
Subject	**Topic**	**Hours**	**S. No**	**Domain of learning**	**Learning objectives**

Medicine	Investigations	1	9	Cognitive	Elaborate on the investigations used for the diagnosis of hepatobiliary disorders and their interpretations.
			10	Psychomotor	Take history and perform physical examination of a patient with liver cirrhosis.
			11	Psychomotor	Observe Ascitic fluid paracentesis.
			12	Psychomotor	Interpret Ascitic fluid report.
			13	Affective	Counsel a patient with Liver cirrhosis due to Hepatitis B/C.
	Acute fulminant hepatitis and acute liver failure	1	14	Cognitive	Discuss the diagnostic approach and management of a patient with suspected acute fulminant hepatitis/acute liver failure.
	Hepatic encephalopathy		15	Cognitive	Explain the grading system, etiology, diagnostic approach, management, and prevention of hepatic encephalopathy.
			16	Psychomotor	Elicit Asterixis/ hepatic flap.
Surgery	Obstructive jaundice	1	17	Cognitive	Discuss the diagnostic approach and management of a patient with suspected obstructive jaundice.
			18	Affective	counsel a standardized patient with newly diagnosed Carcinoma head of the Pancreas.
Pediatrics	Hyperbilirubinemias	1	19	Cognitive	Discuss the diagnostic approach and management of a neonate and infant with jaundice.
			20	Psychomotor	Take history and perform physical examination of a child with jaundice.
			21	Affective	Counsel a child and his parents with Gilbert syndrome.

Gynaecology	Obstetrics cholestasis liver	1		Cognitive	Discuss the management of cholestasis in pregnancy and fatty liver in pregnancy
Theme-3: Pain Abdomen and Diarrhea					
Subject	**Topic**	**Hours**	**S. No**	**Domain of learning**	**Learning objectives**
Surgery	Acute appendicitis	1	22	Cognitive	Discuss the diagnostic approach and management of a patient with pain in the right iliac fossa due to suspected appendicitis.
	Pain abdomen		23	Cognitive	Discuss the diagnostic approach and management of a patient with pain in the abdomen of acute onset and chronic onset.
			24	Psychomotor	Illicit signs of acute appendicitis in a child.
			25	Affective	Counsel the parents of a child with acute appendicitis
	Intestinal obstruction	1	26	Cognitive	Discuss the etiology, diagnostic approach, and management of a patient with suspected intestinal obstruction.
	Intestinal perforation	1	27	Cognitive	Discuss the etiology, diagnostic approach, and management of a patient with suspected intestinal perforation/peritonitis.
	Hernias	1	28	Cognitive	Discuss the etiology, anatomical concepts, management, and complications of a patient with inguinal hernias .
			29	Psychomotor	Perform transillumination test for inguinal hernias.
Pediatrics	Malabsorption	1	30	Cognitive	Explain the diagnostic workup and management of a patient with Malabsorption due to celiac disease.
			31	Affective	Counsel a child and his/her parents regarding dietary advice regarding celiac disease

	Acute diarrhea	1	32	Cognitive	Explain the diagnostic workup and management of a patient acute watery diarrhea
			33	Psychomotor	Assess the state of hydration in a child with acute diarrhea
	Chronic diarrhea	1	34	Cognitive	Explain the diagnostic workup and management of a patient with chronic diarrhea.
Family medicine / Medicine	Approach to a patient	1	35	Cognitive	Explain the approach, differential diagnosis, investigations, initial management, and indications for referral of a patient with Abdominal Pain in a primary health care setting.
Theme-4: Constipation and bleeding per rectum					
Subject	**Topic**	**Hours**	**S. No**	**Domain of learning**	**Learning objectives**
Medicine	Approach to a patient bleeding Per rectum	1	36	Cognitive	Discuss the diagnostic workup
Surgery	Constipation	1	37	Cognitive	Discuss the diagnostic workup approach for a patient with constipation
	Ulcerative colitis	1	38	Cognitive	Discuss the approach to the management of a patient with ulcerative colitis, its short and long-term complications, and the role of surveillance colonoscopies in the prevention of colorectal malignancies.
	Crohn's Disease	1	39	Cognitive	Discuss the approach to the management of a patient with complications, and extra intestinal manifestations.
	Colorectal cancer	1	40	Cognitive	Discuss the approach to the management of a patient with suspected colorectal cancer and its staging

Pediatrics surgery	Hirschsprung's disease	1	41	Cognitive	Explain the etiology, clinical features, investigations, treatment of a child with Hirschsprung's disease.

Multisystem-II

THEMES

S. No	Themes	Duration in Hours
1	Weight loss/gain	9
2	Poisoning	7
3	Cold & Heat	3
4	The Abnormal Baby	7
5	Rash & Joint Pains	13

GENERAL LEARNING OBJECTIVES

By the end of Multisystem-II Module, Final year MBBS students will be able to:

Knowledge:

1. Explain the etiology, risk factors, complications, and management of obesity
2. Explain the classification, etiology, risk factors, and management of PCM
3. Explain the risk factors, clinical features, investigations, and treatment of common water-soluble and fat- soluble vitamins
4. Explain the concepts of nutritional support both in the hospital and community settings
5. Explain the risk factors, clinical features, complications, and management of Anorexia nervosa and Bulimia nervosa
6. Discuss the management of common household poisoning including natural gas and snake bites
7. Explain the management of heat and cold-related disorders
8. Discuss the high-altitude sickness, decompression sickness, drowning, and electrocution.
9. Discuss chromosomal abnormalities, their clinical features, and the concepts of genetic counselling
10. Discuss the management of different autoimmune disorders and vasculitides in children and adults and their complications.

Skills:

1. Discuss the management of common household poisoning including natural gas and snake bites
2. Explain the management of heat and cold-related disorders
3. Discuss the high-altitude sickness, decompression sickness, drowning, and electrocution.

Attitude:

1. Explain the concepts of nutritional support both in the hospital and community settings
2. Explain the risk factors, clinical features, complications, and management of Anorexia nervosa and Bulimia nervosa
3. Discuss chromosomal abnormalities, their clinical features, and the concepts of genetic counselling

SPECIFIC LEARNING OBJECTIVES

Theme-1: Weight loss/gain					
Subject	**Topic**	**Hours**	**S. No**	**Domain of learning**	**Learning objectives**
Medicine	Obesity	2	1	Cognitive	Classify the types of obesity.
			2	Cognitive	Discuss the etiology of obesity.
			3	Cognitive	Explain the methods of measuring obesity.
			4	Cognitive	Discuss the musculoskeletal, endocrine, cardiovascular, and psychological complications of obesity.
			5	Cognitive	Classify the drugs used in the management of obesity and their complications and adverse effects.
Surgery	Bariatric surgery	1	6	Cognitive	Discuss the forms of surgical management of obesity
	Vitamins deficiencies • Thiamine deficiency • Pyridoxine deficiency • B12 deficiency and pernicious • anemia	1	7	Cognitive	Explain the etiology, clinical features, investigations, and treatment of Beri Beri.
			8	Cognitive	Explain the etiology, clinical features, investigations, and treatment of Pyridoxine deficiency.
			9	Cognitive	Explain the etiology, clinical features, investigations, and treatment of B12 deficiency / pernicious anemia.
	Vitamin A, D, E, K	1	10	Cognitive	Explain the etiology, clinical features, investigations,

	deficiency				treatment, and prevention of Vitamin A deficiency
			11	Cognitive	Explain the etiology, clinical features, investigations, and treatment of vitamin D deficiency
			12	Cognitive	Explain the etiology, clinical features, investigations, and treatment of vitamin E deficiency
			13	Cognitive	Explain the etiology, clinical features, and management of vitamin K deficiency
Surgery	Nutritional support/Enteral and parenteral nutrition	2	14	Cognitive	Define malnutrition and explain the methods of nutritional support.
			15	Cognitive	Explain the indications, contraindications, and complications of oral, enteral, and parenteral nutritional support
			16	Cognitive	Discuss the modes of clinical and laboratory monitoring of nutritional support
			17	Cognitive	Describe the routes of access of parenteral nutrition
			18	Psychomotor	Perform insertion of Nasogastric tube
			19	Psychomotor	Observe the insertion and care of PEG tube
			20	Psychomotor	Keep an intake and output record of an admitted patient on parenteral nutrition
			21	Affective	Counsel a patient before NG tube and PEG tube insertion
Pediatrics	Protein calorie malnutrition	1	22	Cognitive	Discuss the causes of malnutrition in developing countries - Describe the different forms of protein-energy malnutrition - Describe the symptoms of severe protein-energy malnutrition in children - Outline the treatment needed t - Define the criteria that classifies protein-energy

					malnutrition
					Discuss the causes of malnutrition in developing countries - Describe the different forms of protein-energy malnutrition - Describe the symptoms of severe protein-energy malnutrition in children - Outline the treatment needed t - Define the criteria that classifies protein-energy malnutrition Explain the different causes, forms, classification, clinical features, and management of PMC
Psychiatry	Anorexia nervosa and Bulimia nervosa	1	23	Cognitive	Discuss the etiology, precipitating factors, clinical features, and management of Anorexia nervosa
			24	Cognitive	Discuss the etiology, precipitating factors, clinical features, and management of Bulimia nervosa.
Theme-2: Poisoning					
Subject	**Topic**	**Hours**	**S. No**	**Domain of learning**	**Learning objectives**
Medicine	Approach to a patient with poisoning	1	25	Cognitive	Explain the management approach to a patient with poisoning in emergency setup

	Management of a comatose patient with poisoning	1	26	Cognitive		Discuss the management approach to a patient who presents in a comatose state in emergency
	Diagnosis of a patient with poisoning	1	27	Cognitive		Diagnose a patient with poisoning
	Common antidotes and general management of poisoning		28	Cognitive		Discuss the antidotes for common poisons and their management
	Selected poisoning • Acetaminophen • Amphetamines and cocaine • Benzodiazepine • Insecticides and anticholinergics • Carbon monoxide • Ethanol and Methanol • Snake bites	1	29	Cognitive		Discuss the management of a patient with paracetamol poisoning
		3	30	Cognitive		Discuss the management of a patient with Amphetamine, cocaine and Ice poisoning
			31	Cognitive		Discuss the management of a patient with benzodiazepine poisoning
			32	Cognitive		Discuss the management of a patient with insecticide and anticholinergic poisoning
			33	Cognitive		Discuss the management of a patient with ethanol and methanol poisoning
			34	Cognitive		Discuss the management of a patient with Carbon monoxide (Natural gas) poisoning
			35	Cognitive		Discuss the management of a patient with snake venom poisoning
			36	Psychomotor		Perform gastric lavage
			37	Affective		Counsel a patient/family with

					poisoning

Theme-3: Cold and heat					
Subject	**Topic**	**Hours**	**S. No**	**Domain of learning**	**Learning objectives**
Medicine	Heat-related disorders	1	38	Cognitive	Classify heat-related disorders
	Hyperthermia		39	Cognitive	Explain the etiology, pathogenesis, clinical features and management of Hyperthermia and heat stroke
			40	Cognitive	Differentiate between hyperthermia and hyperpyrexia
	Hypothermia	1	41	Cognitive	Explain the risk factors, complications, and management of hypothermia.
	Drowning		42	Cognitive	Explain the management of a patient with drowning
	Electrical injuries		43	Cognitive	Discuss the management of a patient with electrocution
	High altitude sickness	1	44	Cognitive	Discuss the clinical features, management, and prevention of high-altitude sickness.
	Decompression sickness		45	Cognitive	Discuss the management of a patient with decompression sickness.

Theme-4: The abnormal baby					
Subject	**Topic**	**Hours**	**S. No**	**Domain of learning**	**Learning objectives**
Pediatrics	Porphyria	1	46	Cognitive	Classify porphyria.
			47	Cognitive	Explain the etiology, pathogenesis, clinical features and treatment of different types of porphyria
	Down syndrome	1	48	Cognitive	Explain the risk factor, chromosomal aberrations, clinical features and complications of Down Syndrome
	Collagen disorders	1	49	Cognitive	Classify collagen disorders and their clinical features

	Glycogen storage diseases		50	Cognitive	Classify glycogen storage disease and their clinical features
	Mucopolysaccharidosis	1	51	Cognitive	Describe the clinical features and complications of mucopolysaccharidosis
	Galactosemia and Phenylketonuria		52	Cognitive	Describe the clinical features, investigations and complications of Galactosemia and Phenylketonuria
Medicine	Chromosomal disorders	1	53	Cognitive	Classify chromosomal disorders and give examples
	Single gene defects		54	Cognitive	Classify single gene disorders and give examples
	Sex linked disorders		55	Cognitive	Classify sex linked disorders and give examples
	Polygenic inheritance		56	Cognitive	Classify polygenic inheritance disorders and give examples
	Marfan syndrome	1	57	Cognitive	Explain the clinical features and complications of Marfan syndrome
Gynaecology	Genetic counselling and perinatal diagnosis	1	58	Cognitive	Explain the modes and indications of perinatal diagnosis
			59	Cognitive	Discuss the concept of genetic counseling
			60	Affective	Observe premarital counseling of a family for thalassemia.

Theme-5: Rash and joint pains

Subject	Topic	Hours	S. No	Domain of learning	Learning objectives
Medicine	Evaluation of an adult with suspected autoimmune disorder	1	61	Cognitive	Discuss the diagnostic approach to a patient who presents with suspected autoimmune disorder
			62	Cognitive	Explain the different serological and immunological investigations used in the diagnosis of autoimmune disorders

			63	Cognitive	Classify and explain the mechanism of action of different pharmacotherapies in the management of autoimmune disorders
	SLE	2	64	Cognitive	Explain the clinical features, investigations, management, prognosis and complications of SLE
			65	Cognitive	Discuss the diagnostic criteria for the diagnosis of SLE
			66	Cognitive	Explain the differences between SLE and drug induced lupus
	Antiphospholipid syndrome	1	67	Cognitive	Explain the clinical features, investigations, management, prognosis and complications of Antiphospholipid syndrome
	Scleroderma	1	68	Cognitive	Explain the clinical features, investigations, management, prognosis, and complications of Scleroderma/Systemic sclerosis
	Polymyositis and dermatomyositis	1	69	Cognitive	Explain the clinical features, investigations, management, prognosis and complications of polymyositis and dermatomyositis
	Sjogren Syndrome		70	Cognitive	Explain the clinical features, investigations, management, prognosis and complications of Sjogren Syndrome
	Giant cell arteritis and polymyalgia Rehumatica	1	71	Cognitive	Explain the clinical features, investigations, management, prognosis and complications of Giant cell arteritis and polymyalgia Rehumatica
	Polyarteritis nodosa	1	72	Cognitive	Explain the clinical features, investigations, management, prognosis and complications of Polyarteritis nodosa

	Wegener granulomatosis		73	Cognitive	Explain the clinical features, investigations, management, prognosis, and complications of Wegener granulomatosis
	Vascilitides	1	74	Cognitive	Classify vascilitides, their clinical features, diagnostic approach, and management
			75	Cognitive	Explain the clinical features, investigations, management, prognosis, and complications of Henoch-SchÕnlein purpura
			76	Cognitive	Explain the clinical features, investigations, management, prognosis, and complications of BehÇet syndrome
Pediatrics	Kawasaki disease	2	77	Cognitive	Explain the clinical features, investigations, management, prognosis and complications of Kawasaki syndrome
			78	Cognitive	Explain the clinical features, investigations, management, prognosis and complications of SLE in children
Nephrology	Renal involvement in different autoimmune disorders	2	79	Cognitive	Classify different pathological entities involving the kidneys in SLE, Rheumatoid arthritis and other autoimmune disorders
			80	Cognitive	Explain the renal complications and their management in SLE and Rheumatoid arthritis.

Theory Examination Scheme

Block-Q (Neurosciences-3, GIT-3 and Multisystem-3)

Block	Module	Subjects hours	Subject MCQs	Total MCQs	Paper MCQs
Q	NS-3	Medicine/ Family medicine	24	45	120
		Psychiatry	5		
		Pediatrics	8		
		Neurosurgery/surgery	4		
		Pediatrics surgery/Surgery	2		
		Orthopedics	2		
	GIT-3	Medicine	9	35	
		Surgery/ Pediatric surgery	17		
		Pediatrics	8		
		Gynaecology	1		
	Multisystem-2	Medicine/Nephrology	22	40	
		Paediatrics	11		
		Surgery	5		
		Psychiatry	1		
		Gynaecology	1		

Practical Examination Scheme

OSCE station distribution of different subjects

BLOCK-Q (TOTAL STATIONS=20 and 6 marks/station)					
Subjects	**OSCE stations**	**Viva stations**	**Short cases**	**Logbook and history books (1-station)**	**Structured Long case- 30 marks)**
Medicine/neurology/ Gastroenterology	4	1	2	Paediatrics	Paediatrics
Paediatrics	1	1	1		
Surgery/neurosurgery/ Paediatric surgery	5	1	1		
Psychiatry	1	1	0		
Total	11	4	4	1	1