Foundation Module I

First Professional Year MBBS

6 Weeks

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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.

THEMES FOR 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

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 PowerPoint skills Excel sheet	Prepare the assignment on MS word 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	RNA & DNA	Define and explain nucleotides and nucleosides. 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	Disease causation	Describe Spectrum of Disease 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.