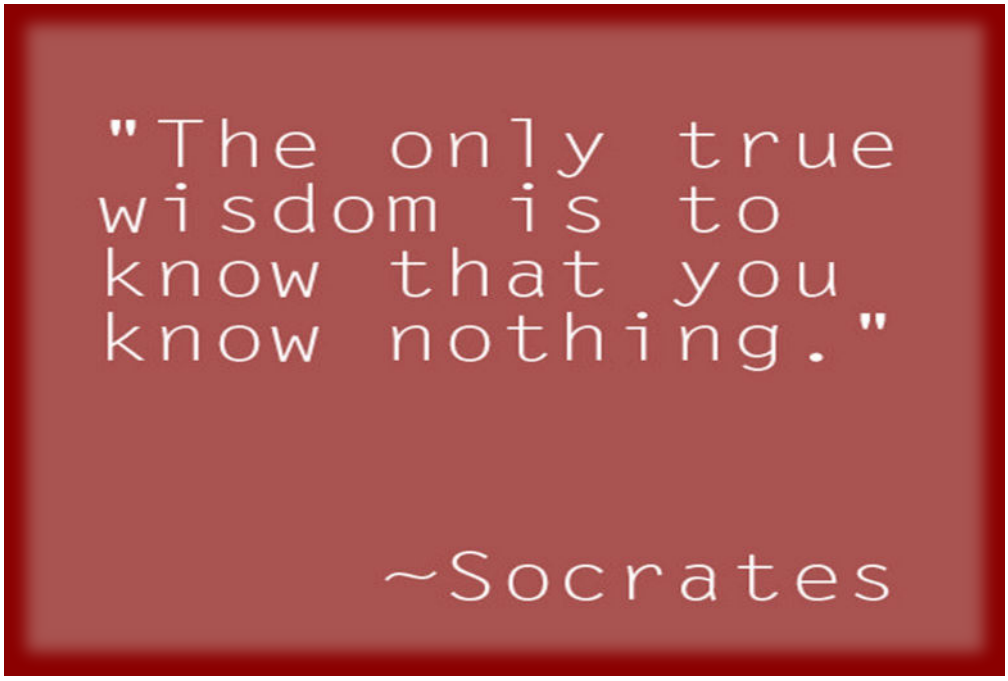
Jinnah Medical & Dental College

Foundation Module 1 & 2

Study Guide

2024-25


"The only true wisdom is to know that you know nothing."
~Socrates

Team Members of Foundation Module
2024-25

Name	Committee	Department
Professor Dr. Muhammad Baqir Soomro	Member	Anatomy
Professor Dr. Shahid Ahsen	Member	Biochemistry
Professor Dr. Sadaf Fatima	Member	Physiology
Professor Dr. Sanowar Ali	Member	Community Medicine
Professor Dr. Shoaib Raza	Member	Pathology & Microbiology
Dr. Imran Afzal	Member	Forensic Medicine
Professor Dr. Samia Perwaiz Khan	Member	Pharmacology
Dr. Zeelaf Shahid Director	Member	Medical Education

Introduction

Assalam – o – alaikum and a very warm welcome to medical students in the Foundation Module-1 & 2**.** This module has been developed to impart integrated teaching as a part of modular curriculum in Jinnah Medical and Dental College, Karachi. It will be covered in 8 weeks. The Foundation Module has been planned to study the normal structure and functions of cell in context of clinical problems. This will benefit the students to understand the basic biomedical information in relation to clinical sciences.

This module has been designed to introduce new entrants to the MBBS program basic concepts essential for understanding a number of topics in medical sciences. It aims to provide 'foundation' knowledge to the students so that they are able to apply it when they come across more advanced topics. This module hence provides a framework within which learners are expected to build future competencies.

This module will comprehensively cover the general anatomy, gross anatomy of skeleton, and muscle architecture. It will also explain histology of cell along with the early embryogenic and anomalies during development. The physiology of cell will describe the genetic control, function and transport across cell membrane. The study of biochemistry will help you to learn about the biochemical processes, signal transduction and genetic information in the cell.

This knowledge of basic sciences amicably integrated longitudinally with Ethics and Professionalism, Communication skills, Behavioral Sciences with standalone course of study skills will help students to learn every aspect of cell in a comprehensive manner.

Rationale

Before moving on to complex clinical issues, it becomes imperative for the students to achieve clear concepts of the basic organization of human body and organ systems. This module is designed to cover the general structure, function and biochemical reactions of the human body. Concepts acquired during this module will be revisited in all other subsequent modules of the undergraduate course.

General Learning Objectives

By the end of the foundation module, students will be able to:

1. Describe normal cell structure and biochemical functions.
2. Explain basic physiochemical principles and their biomedical importance.
3. Describe the structure and functions of nucleotides, nucleoside and nucleic acids.
4. Explain homeostatic mechanisms.
5. Explain the physiological basis of genetics.
6. Describe the general organization of human body
7. Discuss the basic tissues of body
8. Describe different organ systems.
9. Describe the early developmental stages of human.

JMDC CURRICULUM SEQUENCE: MBBS 1-5 YEARS

Year 1	Module 1	EOM	Module 2	EOM	Module 3	EOM	Module 4	EOM	Module 5	EOM* Exam of Module
	Foundation-1 8 weeks		Blood-1 4 weeks		Locomotor-1 8 weeks		Respiratory-1 4 weeks		CVS-1 4 weeks	
	PAKISTAN STUDIES & ISLAMIAT									

2	Module 6	EOM	Module 7	EOM	Module 8	EOM	Module 9	EOM	Module 10	EOM	Module 11	EOM	Module 12	EOM
	GIT-1 4 weeks		Head & Neck-1 5 weeks		Neurosciences-1 7 weeks		Special Senses 3 weeks		Endocrine-1 5 weeks		Reproductive-1 4weeks		Urinary-1 5weeks	
	Communication Skills				Patient Safety & Infection Control						Professionalism & Ethics			

3	Module 13	EOM	Module14	EOM	Module15	EOM	Module16	EOM	Module17	EOM	Module 18	EOM
	Foundation 2 10 weeks		Blood-2 5weeks		Locomotor-2 4 weeks		Respiratory-2 4 weeks		CVS-2 5 weeks		GIT-2 7weeks	

Clinical Rotations (Each Batch) WT* = Ward test

Communication Skills — Patient Safety & Infection Control — Professionalism & Ethics

R1	Medicine 2 weeks	WT	Psychiatry 2weeks	WT	Surgery 2 weeks	WT	Orthopedics 2 weeks	WT	OBS/ GYN 2 weeks	WT	Pediatrics 2 weeks	WT	Eye 2 weeks	WT	Ent 3 weeks	WT
R2	Medicine 2 weeks		Psychiatry 2weks		Surgery 2 weeks		Orthopedics 2weeks		OBS/ GYN 2 weeks		Pediatrics 2 weeks		Eye 2 weeks		Ent 3 weeks	

4	Module 19	EOM	Module 20	EOM	Module 21	EOM	Module 22	EOM	Module 23	EOM	Module 24	EOM	Module 25	EOM	Module 26	EOM	Module 27	EOM
	Nervous Sys & Psychiatry 2 8 weeks		H & N & SP Senses 2 (Eye) 4 weeks		H & N & SP Senses 3 (ENT) 4 weeks		Endocrinology 2 4 weeks		Repro 2 6 weeks		Urinary 2 4 weeks		Derma 2 weeks		Orthopedics 2 weeks		Rehab 2 weeks	

Lectures Eye/ENT

Clinical Rotations (Each Batch)

Communication Skills — Patient Safety & Infection Control — Professionalism & Ethics

R1	Medicine 3 weeks	WT	Psychiatry 3 weeks	WT	Surgery 3 weeks	WT	Orthopedics 3 weeks	WT	OBS/ GYN 3 weeks	WT	Pediatrics 3 weeks	WT	Eye 3 weeks	WT	Ent 3 weeks	WT
R2	Medicine 3weeks	WT	Surgery 3weeks	WT	Eye 3weeks	WT	Ent 3weeks	WT								

LECTURES R***= Rotation

5	Medicine	Surgery	OBS/Gynae	Pediatrics
	Clinical Rotations			
	Communication Skills		Patient Safety & Infection Control	
R1	Medicine 4 weeks	Surgery 4 weeks	OBS/ GYN 4 weeks	Pediatrics 4 weeks
R2	Medicine 5 weeks	Surgery 5 weeks	OBS/ GYN 5 weeks	Pediatrics 5 weeks

Final Exam

MAIN CONTENT AREAS

ANATOMY

General Anatomy

1. Introduction to organization levels of Anatomy
2. Anatomical Terminologies of planes & movements
3. Bone
4. Joints
5. Muscles
6. Nervous system
7. Cardiovascular system
8. Lymphatic system
9. Integumentary system, skin appendages & Fascia
10. Applied anatomy

General Histology

1. Tissue preparation
2. Cell cycle & Mitosis
3. Cell, Cell membrane & Cell organelles + Nucleus
4. Cytoskeleton & inclusions
5. Microscopy
6. Epithelium
7. Cell surface modifications
8. Cell Junctions
9. Glandular Epithelium
10. Connective Tissue Components & classification
11. Skin

General Embryology

1. Meiosis & Embryonic terms
2. Male & Female reproductive organs &
3. Spermatogenesis & Oogenesis
4. Reproductive cycles
5. Fertilization
6. 1^{st}, 2^{nd} & 3^{rd} Weeks of Development
7. Gastrulation & Neurulation
8. Ectodermal, Endoderm & Intraembryonic Mesoderm with derivatives
9. Embryonic & Fetal Periods
10. Fetal membranes (Amnion, Chorion, Umbilical Cord)

11. Placenta
12. Multiple pregnancies
13. Teratogenesis
14. Prenatal diagnosis & congenital malformations

BIOCHEMISTRY

1. Biochemistry Lab protocol
2. Solutions
3. Carbohydrates and Polysaccharides
4. Mono & Disaccharides
5. Proteins
6. Individual amino acids
7. Individual Proteins
8. Lipids
9.. Factors affecting Enzyme activity

PHYSIOLOGY

1. Introduction to Autonomic Nervous System
2. Function of divisions of ANS and the neurotransmitters involved
3. Extracellular fluid & internal environment
4. Homeostasis and control system of body.
5. Functional importance of Cell membrane
6. Various cell organelles.
7. Transport across cell membrane (Passive)
8. Transport across cell membrane (Active)
9. Cell signaling mechanism
10. Locomotion and Apoptosis:

Competencies assessed in this module

K=Knowledge

S=Skill

A=Attitude

Teaching / Learning Methods

The teaching learning sessions of this module will be of diverse types:

a. Large group interactive sessions (LGIS)
b. Small group teaching will include tutorials and, case – based learning session.
c. Problem – based learning sessions.
d. Practical session will comprise sessions on early exposure to clinical methods and practical laboratory demonstrations.
e. Seminars: on different topics, in which students will make oral presentations on different aspects of the allocated topic.
f. Self-directed learning sessions: This is the time during which students are expected to revise what they have learnt in the class, clear their concepts by consulting different textbooks, reference material and prepare their assignments and projects.

Students Assessment

There will be an end of Module-I examination after completion of module 1 & Module-II examination after completion of module 2 which will comprise the following components: -

i. Written Assessment

The theory paper will have components of one – best type multiple – choice questions (MCQs).

ii. Practical / lab examination:

This will comprise Objective Structured Practical Examination (OSPE) The OSPE will have both observed and non-observed stations. The end of Module - I written exam will be of 2 hours duration. This will comprise the following components:

The OSPE will be conducted in batches. The students will be having different patterns of OSPE in the subjects of Anatomy, Physiology and Biochemistry

Summary of marks of each module exam

Theory (BCQs) = 100 marks

OSPE (10 stations) = 100 marks

Total = 200 marks

Internal Assessment:

• Continuous monitoring of attendance and practical assessment in short groups.

• It may be in the form of MCQs, viva, SAQs , projects and OSPE.

• Internal assessment carries 20% weightage

Course Evaluation:

Course evaluation will be obtained through a feedback form which will be posted on the JMC website

Mandatory Policy:

Eligibility for sitting in Professional Examinations is as follows:

- 75% overall Class Attendance
- 75% Attendance all Clinical Wards with passing marks in all Clinical Ward Tests.
- Minimum 40% aggregate marks on all Internal Examinations (Module Tests, Midterm, Pre-Professional Examinations)
- MBBS 1st Year: Complete all Professional Communication assignments with passing marks
- MBBS 1st & 2nd Year: Obtain passing marks in Behavioral Sciences & Research Module assessments
- MBBS 2nd Year: Presentation in Journal club at least twice in a year
- MBBS 4th & Final Year: CPC Presentation at least once in a year
- Skills Labs: Must be completed with passing marks
- Research Paper must be completed before MBBS 4 Professional Examination

Failure to Meet the Eligibility Requirements:

- A Student failing to meet the above listed eligibility for sitting in the professional examination will NOT be allowed to sit in 1st attempt of the Professional Examination.
  The college has the right to withhold all students who however, not met the eligibility requirements from sitting in the 1st attempt.
- Such students who have been withheld from sitting in the 1st attempt of the Professional exam because of failure to meet the eligibility requirements will be allowed only to sit in the retake of that examination.
  It is expected that deficiency in requirements of Professional communication assignments, Behavioral Sciences & Research Module assessments, journal Club presentations, CPC, Skills Labs must be made up and fulfilled before a student will allowed to sit in the retake exam.

Details of ATTENDANCE POLICY

The CR is responsible to bring attendance sheets from Student Affairs Office to each class. At the end of class, the attendance sheet must be signed and returned by the faculty member to the Student Affairs Office. No attendance sheets from students will be accepted.

These attendances will be compiled together as follows:

LECTURE ATTENDANCE = # Lectures Attended / Total # of Lectures
PRACTICAL ATTENDANCE = # Practicals Attended / Total # of Practicals
TUTORIAL ATTENDANCE = # Tutorials Attended / Total # of Tutorials

NOTE: All tutorials will be conducted by a Senior Faculty Member (AP or above), assisted by a Junior Faculty Member (Lecturer)

FINAL CLASS ATTENDANCE =

$$\frac{\%\text{Lecture Attendance} + \%\text{Tutorial Attendance} + \%\text{Practical Attendance}}{3}$$

Recommended Reading Material

Anatomy

A. GROSS ANATOMY
1.Richard L Drake, A Wayne Vogl; Grey's Anatomy for students
2. K.L. Moore, Clinically Oriented Anatomy

B. HISTOLOGY
1. B. Young J. W. Health Wheather's Functional Histology

C. EMBRYOLOGY
1. Keith L. Moore. The Developingm Human
2. Langman's Medical Embryology

Biochemistry

TEXT BOOKS
1. Harper's Illustrated Biochemistry
2. Lippincott's Illustrated reviews of Biochemistry
3. Lehninger's Principles of Biochemistry
4. Biochemistry by Devlin
5. Biochemistry by Hashimi
6. Medical Biochemistry by MN Chatterjea
7.Biochemistry by DM Vasudevan

Physiology

A. TEXTBOOKS 1. Textbook Of Medical Physiology by Guyton And Hall
2. Human Physiology by Lauralee Sherwood
3. Berne & Levy Physiology
4. Best &Taylor Physiological Basis of Medical Practice

B. REFERENCEBOOKS 1. Ganong's Review of Medical Physiology

Community Medicine

- Public Health and Community Medicine by Shah Ilyas Ansari, 8th Edition

- Park's Textbook of Preventive and Social Medicine by K Park 24th Edition Epidemiology and Biostatistics:
- Epidemiology by Leon Gordis, Fifth Edition
- Basic Statistics for the Health Sciences by Jan W. Kuzma, Fifth Edition.

Forensic Medicine

- Gautam Biswas Book of Forensic Medicine
- Parikh's Book of Forensic Medicine

Pathology

- Basis of Pathology by Robbins & Cotran
- Review of Microbiology by Livingston

Pharmacology

- Katzung. Basic & Clinical Pharmacology. 14th Edition.
- Katzung & Trevor's. Pharmacology. 12th Edition.
- Rang & Dales. Pharmacology.

Foundation-1 Module

Organization

Time requirements: Basic Medical Sciences

- Anatomy 91 Hours
- Physiology 28 Hours
- Biochemistry 103 Hours

222 Hours

Longitudinal integration

Behavioral Sciences 6 Hours
Professional Communication 12 Hours
Islamiat / ethics 8
Total = 26 hours

Foundation-2 Module

Organization

Time requirements:

- Community Medicine 17 Hours
- Forensic Medicine 31 Hours
- Pathology & Microbiology 118 Hours
- Pharmacology 22 Hours

188 Hours

Total = 188 Hours

Anatomy

GENERAL ANATOMY Lectures

S No	Learning Objectives By the end of the session, students will be able to:	Content Areas	Learning Activity (Duration)	Assessment
1.	Levels of organization of Human Body •Describe the organization of the body from cellular to system level (K)	• Organization of Human Body • Organization of the body from cellular to system level	LGIS 50 mins	–
2.	Anatomical terminologies: positions and planes • Differentiate among the various positions and planes in the body (K) Terms of movement • Define the movements occurring at various joints of body (flexion, extension, abduction, adduction, rotation) •Identify movements occurring at specific joints (pronation, supination, inversion, eversion) • Identify the planes at which the movements occur. (K)	• Various positions and planes in the body • Movements occurring at various joints of body (flexion, extension, abduction, adduction, rotation) •Movements occurring at specific joints (pronation, supination, inversion, eversion) • Identify the planes at which the movements occur	DEMO 120 mins	OSPE MCQs
3.	Bones-1: Classification • Classify bone on the basis of shapes and region. • Describe the gross structure of young and adult bone.	• Classification bone on the basis of shapes and region. • Gross structure of young and adult bone	DEMO 120 mins	OSPE MCQs
4.	Bones-2: Ossification, Blood supply of long bones, Cartilage, Bone Markings • Explain the ossification of bone • Identify the centers of ossification and their significance	• Ossification of bone • The centers of ossification and their significance •Intramembranous and endochondral ossification • Identification bone markings	DEMO 120 mins	OSPE MCQs

	• Distinguish between intramembranous and endochondral ossification • Identify bone markings • List types of cartilage • Describe the general anatomical features of each type of cartilage with example (**K)**	• Types of cartilage •The general anatomical features of each type of cartilage with example		
5.	General Concept of Muscles I • List the components of muscular system. • Classify the muscles according to their shape(architecture) with example (**K)**	• Components of muscular system. • Classification muscles according to their shape(architecture) with example	DEMO 120 mins	OSPE MCQs
6.	General Concept of Muscles II • Classify the muscles according to direction of fibers and their actions with examples • Explain the principles of innervation and blood supply of muscles. **(K)**	• Classification of muscles according to direction of fibers and their actions with example • Principles of innervation and blood supply of muscles.	DEMO 120 mins	OSPE MCQs
7.	General concept of joints • Define the joints • Classify the joints on the basis of uniting material with example • Define a synovial joint • List the features of synovial joint • Classify Synovial joints on the basis of: • Shape of articulating surfaces • Degree of mobility • Express the principles of innervation and blood supply of synovial joints **(K)**	• Definition of joints • Classification on joints on the basis of uniting material with example • Synovial joint • Features of synovial joint •Synovial joints on the basis of: • Shape of articulating surfaces • Degree of mobility • Principles of innervation and blood supply of synovial joints	DEMO 120 mins	OSPE MCQs
8.	Nervous system- I: Somatic nerves and typical spinal nerve • List the basic divisions of Nervous system • Define the various components of CNS and PNS • Describe the structure of Neuron • Classify neurons on the basis of number of processes and length of fibers • Define a nerve and its coverings • Differentiate between myelinated and unmyelinated fibers • List various types of Neuroglia and state their functions • Define a spinal nerve. • Enumerate the spinal nerves in different regions. • Identify their location and site of emergence. • Identify various components of a typical spinal nerve. • Describe the fate of rami. • Describe the distribution of gray rami**. (K**)	• Basic divisions of Nervous system • Various components of CNS and PNS • Structure of Neuron • Neurons on the basis of number of processes and length of fibers • Nerve and its coverings • Myelinated and unmyelinated Fibers • Various types of Neuroglia and state their functions • Spinal nerve. • Spinal nerves in different regions. • Location and site of emergence. • Various components of a typical spinal nerve. • Fate of rami. • Distribution of gray rami.	DEMO 120 mins + DEMO 120 min	OSPE MCQs

9.	Nervous system: -II: Autonomic Nervous System (ANS) • Describe the anatomical components of ANS • Differentiate between sympathetic and parasympathetic systems based on gross structure and distribution **(K)**	Nervous system: -II: Autonomic Nervous System (ANS) •Anatomical components of ANS • Sympathetic and parasympathetic systems based on gross structure and distribution	DEMO 120 mins + 120 mins	OSPE MCQs
10	Cardiovascular system Describe General organization of CVS List the components of CVS Name the layers of blood vessels Describe the types of blood vessels Explain the pulmonary and systemic circulations **(K)**	Cardiovascular system organization and components	LGIS 50 min + LGIS 50 mins	MCQs
11.	Introduction to lymphatic system • Define lymphatic system, lymphatics and lymph nodes • Describe the structure of lymph nodes • List various lymphoid tissues and organs • Identify large lymphatic channels • Identify the role of lymphatics in the spread of cancer**(K)**	• Lymphatic system, lymphatics and lymph nodes • Structure of lymph nodes • Various lymphoid tissues and organs • Large lymphatic channels • Role of lymphatics in the spread of cancer	DEMO 120 mins	OSPE MCQs
12.	Integumentary system and its parts, function, appendages and fascia-I • Define the term integumentary system • Discuss the function of the skin • Differentiate between epidermis & dermis • Discuss the significance of tension lines.(**K)**	• Integumentary system • Function of the skin • Epidermis & dermis • Significance of tension lines.	LGIS 50 mins	MCQs
13.	Integumentary system and its parts, function, appendages and fascia-II • Discuss the main determinant of skin color. • Identify the appendages of the skin. Differentiate between superficial & deep fascia.(**K)**	• Main determinant of skin color. • Appendages of the skin. Differentiate between superficial & deep fascia.	DEMO 120 mins	OSPE MCQs

GENERAL EMBRYOLOGY Lectures

S No	Learning Objectives By the end of the session, students will be able to:	Content Areas	Learning Activity (Duration)	Assessment
1.	Terms of Embryo. Meiosis and comparison with mitosis • Explain related terms of embryology. • Identify steps of cell division: Mitosis • Explain the significance of mitosis. • Define Meiosis. • List the steps of meiosis • Differentiate first and second meiotic divisions. • State the phases of meiotic divisions. • Justify the importance and result of meiosis in both sexes. • Differentiate between mitosis and meiosis **(K)**	• Terms of embryology. • Steps of cell division: Mitosis • Significance of mitosis. • Define Meiosis. • Steps of meiosis • Differentiate first and second meiotic divisions. • Phases of meiotic divisions. • Importance and result of meiosis in both sexes. • Mitosis and meiosis	LGIS 50 mins	MCQs
2.	Introduction to Reproductive Organs • Identify the male & female reproductive organs • Describe Ovarian cycle • Relate ovarian cycle with uterine cycle • Describe the cyclical changes occurring in uterus, preparation of uterus for implantation with their endocrine control **(K)**	• Male & female reproductive organs • Ovarian cycle • Relation ovarian cycle with uterine cycle • Cyclical changes occurring in uterus, preparation of uterus for implantation with their endocrine control	LGIS 50 mins + LGIS mins	OSPE MCQs
3.	Oogenesis &Spermiogenesis • Define oogenesis. • Describe the process of oogenesis. • Differentiate between primary and secondary oocytes. • Compare the male and female gametes • Define gametogenesis. • Describe the sequence events of spermatogenesis in the male. • Discuss the importance of mitosis & meiosis in spermatogenesis. • List the steps in spermiogenesis. • Differentiate between spermatogenesis &spermiogenesis. **(K**)	• Oogenesis. • Process of oogenesis. • Primary and secondary oocytes. • Male and female gametes •Gametogenesis. • Sequence events of spermatogenesis in the male. • Importance of mitosis & meiosis in spermatogenesis. • Steps in spermiogenesis. • Spermatogenesis & spermiogenesis.	LGIS 50 mins	OSPE MCQs

4.	Transportation of Ovum and fertilization • Explain transportation of sperm and ovum, fertilization and abnormal implantation and initial stages of development. • Discuss the anomalies of fertilization **(K)**	Transportation of Ovum and fertilization • Explain transportation of sperm and ovum, fertilization and abnormal implantation and initial stages of development. • Discuss the anomalies of fertilization	LGIS 50 mins	OSPE MCQs
5.	1st week of development after fertilization • Discuss the formation of zygote • Correlate the transport of zygote from ampulla of fallopian tube with the uterine cavity and cleavage. • Explain the formation of blastocyst (**K)**	• Formation of zygote • Transport of zygote from ampulla of fallopian tube with the uterine cavity and cleavage. • Formation of blastocyst	LGIS 50 mins	OSPE MCQs
6.	2nd Week of Development • Define implantation • State its normal site • Explain the formation of outer and inner cell masses • Discuss the further development of outer cell mass(trophoblast), • Differentiate syncytiotrophoblast and cytotrophoblast with its microscopic appearance • Describe the process of implantation (day wise change) **(K)** • Statethedifferentiationofembryonicpoleanddevelopmentofbilaminargermdiscwith formation Epiblast and hypoblast, their cavities (amniotic cavity and primary yolk sac) • Discuss the development of the chorionic sac and formation Primary chorionic villi • Enumerate the abnormal sites for implantation (ectopic pregnancy) and the different diagnostic tools **(K)**	• Implantation • Normal site • Formation of outer and inner cell masses • Development of outer cell mass(trophoblast), • Syncytiotrophoblast and cytotrophoblast with its microscopic appearance • Process of implantation (day wise change) • Embryonic pole and development of bilaminar germ disc with formation Epiblast and hypoblast, their cavities (amniotic cavity and primary yolk sac) • Chorionic sac and formation Primary chorionic villi • Abnormal sites for implantation (ectopic pregnancy) and the different diagnostic tools	LGIS 50 mins	OSPE MCQs
7.	3rd week of Development Gastrulation, primitive streak and notochord • Define the gastrulation (formation of three germ layers). • Discuss the development of primitive streak and related congenital anomalies. (Sacrococcygeal Teratoma) • Describe the development of notochordal process, notochord canal, prechordal plate and cloacal membrane. • Describe the location of allantois and its importance • Discuss the formation of secondary and tertiary chorionic villi • Describe the development of intra-embryonic coelom **(K)**	• Gastrulation (formation of three germ layers). •Primitive streak and related congenital anomalies. (Sacrococcygeal Teratoma) • Development of notochordal process, notochord canal, prechordal plate and cloacal membrane. • Location of allantois and its importance • Formation of secondary and tertiary chorionic villi • Development of intra-embryonic coelom	LGIS 50 mins	OSPE MCQs

8.	3rd week of Development: Neurulation and somite formation • Define neurulation. • Describe briefly the events occurring in neurulation. • Describe briefly the formation of somite. **(K)**	• Neurulation. • Events occurring in neurulation. • Formation of somite.	LGIS 50 mins	MCQs
9.	Endoderm & folding of embryo .describe the process of folding of embryo . List the endodermal derivatives Describe folding of embryo in median and horizontal planes • List the derivatives of germ layers • List events with the corresponding weeks, occurring during the period. Intraembryonic mesoderm and derivatives . describe the formation of mesoderm and its different parts . list the mesodermal derivatives **(K)**	Endoderm & folding of embryo Intraembryonic mesoderm and derivatives	LGIS 50 mins + LGIS 50 mins	MCQs
10.	Embryonic Period • Define embryonic period. • Describe folding of embryo in median and horizontal planes • List the derivatives of germ layers • List events with the corresponding weeks, occurring during the period. **(K)**	• Embryonic period. • Folding of embryo in median and horizontal planes • Derivatives of germ layers • List events with the corresponding weeks, occurring during the period.	LGIS 50 mins	MCQs
11.	Amnion, Chorion, umbilical cord & Yolk-Sac, Disorders of amniotic fluid • Specify the development and functions of fetal membranes, chorion, amnion • Describe amnion &chorion. • Describe the formation and function of amniotic fluid and its disorders • Discuss the development of chorion and its complications. • Discuss the disorder of related to amniotic fluid volume**(K)**	•Development and functions of fetal membranes, chorion amnion • Amnion &chorion. • The formation and function of amniotic fluid and its disorders • The development of chorion and its complications. •The disorder of related to amniotic fluid volume.	LGIS 50 mins	MCQs
12.	Placenta • Describe the changes that occur in the endometrium of mother with formation of decidua and decidual reaction. • Describe the different types of chorionic villi. • Explain the development of placenta, both the fetal and maternal part. • Describe the functions of placenta. • Describe the placental circulation.**(K)**	• Changes that occur in the endometrium of mother with formation of decidua and decidual reaction. • Different types of chorionic villi. • Development of placenta, both the fetal and maternal part. • Junctions of placenta. • The placental circulation.	LGIS 50 mins	OSPE MCQs

13.	Teratogenesis • Define the term • Describe the teratogenic factors and their effects on the developing tissue **(K)**	Teratogenesis • Definitions of the term • The teratogenic factors and their effects on the developing tissue	LGIS 50 mins + LGIS 50 mins	MCQs
14.	Prenatal diagnosis • Discuss prenatal diagnosis • Identify the types of prenatal diagnosis. • Differentiate between amniocentesis, chorion villus sampling, cordocentesis, ultrasonography, maternal AFP levels. • Describe the indications and goal of prenatal diagnosis **(K)**	• Prenatal diagnosis • Types of prenatal diagnosis. • Differentiation between amniocentesis, chorion villus sampling, cordocentesis, ultrasonography, maternal AFP levels. • The indications and goal of prenatal diagnosis	LGIS 50 mins	MCQs
15.	Congenital Malformations • Identify the congenital anomalies and know **(K)**	• Congenital anomalies and know	LGIS 50 mins	MCQs

GENERAL HISTOLOGY Lectures

S No	Learning Objectives By the end of the session, students will be able to:	Content Areas	Learning Activity (Duration)	Assessment
1.	Tissue Preparation and different types of Staining • Describe different stages of tissue preparation • List various types of stains • Describe H&E staining **(K)**	• Different stages of tissue preparation • Various types of stains • H&E staining	LGIS 50 mins	MCQs
2.	Cell Membrane Structure • Identify the structures of cell membrane • Describe the phospholipid bilayer and its composition • Explain the Fluid Mosaic Model of cell membrane **(K)**	• Structures of cell membrane • The phospholipid bilayer and its composition • Fluid Mosaic Model of cell membrane	LGIS 50 mins	MCQs
3.	Cytoplasm • Define cytoplasm • Discuss functions and components of cytoplasm **(K)**	• Cytoplasm • Functions and components of cytoplasm	LGIS 50 mins	MCQs
4.	Nucleus • Describe the structure of nuclear membrane • Explain the component of nucleus and different types of chromatin material **(K)**	• The structure of nuclear membrane • Component of nucleus and different types of chromatin material	LGIS 50 mins	MCQs
5.	Cell organelles • Describe various cell organelles **(K)**	•Various cell organelles	LGIS 50 mins	MCQs

6.	Cytoskeleton (microtubule Microfilaments) • Define Cytoskeleton. • Describe the composition and functions of cytoskeleton. • Enumerate the type, distribution and functions of cytoskeleton. • Describe the details of cytoplasmic filaments and microtubules. **(K)**	• Cytoskeleton. • Composition and functions of cytoskeleton. • Type, distribution and functions of cytoskeleton. • Details of cytoplasmic filaments and microtubules.	LGIS 50 mins	MCQs
7.	Cell Cycle • Define cell cycle. • Explain various stages of cell cycle. • Explain the events of somatic cell division(mitosis). • Discuss the significance of S phase of cell cycle. • Relate phases of cell cycle with the basis of development of cancer.**(K)**	• Cell cycle. • Various stages of cell cycle. • Events of somatic cell division(mitosis). • Significance of S phase of cell cycle. • Relate phases of cell cycle with the basis of development of cancer.	LGIS 50 mins	MCQs
8.	Epithelium • Describe the types, locations and functions of Epithelium • Describe the structural details of organization of cells in epithelium and other basic tissues of body • Explain their origin of germinal layer and their derivatives. **(K)**	• Types, locations and functions of epithelium • Describe the structural details of organization of cells in epithelium and other basic tissues of body • Explain their origin of germinal layer and their derivatives.	LGIS 50 mins	MCQs
9.	Cell Junctions • Define cell junction • Name the junctions along the lateral and basal surfaces of cells • Discuss the structure and functions of the five main types of cell junction • List various sites of their distribution & components of junctional complex **(K)**	• Cell junction • Junctions along the lateral and basal surfaces of cells • The structure and functions of the five main types of cell junction • Various sites of their distribution & components of junctional complex	LGIS 50 mins	MCQs
10.	Glands • Define glands • Discuss the general feature and structure of exocrine glands • Classify exocrine glands on the basis of number of cells, their structure & types	• Definition of glands • General feature and structure of exocrine glands • Classification exocrine glands on the basis of number of cells, their structure & types of secretions	LGIS 50 mins	MCQs
11.	Connective Tissues Components • Define connective tissue. • Differentiate connectives from epithelial tissue. • Describe the components of the connective tissues. **(K)**	• Connective tissue. • Connectives from epithelial tissue. • Components of the connective tissue.	LGIS 50 mins	MCQs

12.	Connective Tissues Classification • Classify different types of connective tissue • Identify different types of connective tissue under the microscope • State the distribution of each type **(K)**	• Different types of connective tissue • Different types of connective tissue under the microscope • Distribution of each type	LGIS 50 mins	MCQs
13.	Histology of muscles • Describe the histological features of different types of muscular tissue and location **(K)**	• Histological features of different types of muscular tissue and location	LGIS 50 mins	MCQs

HISTOLOGY Practical

S NO	**Learning Objectives** By the end of this session, students will be able to:	**Content Areas**	**Teaching activity (Duration)**	**Assessment**
1.	Introduction to microscope: • Identify different parts of microscope **(S)**	Introduction to microscope: • Identification of parts of microscope	Practical 120 mins	OSPE
2.	**Cell** • **Identify various types of cell (S)**	• Various types of cell	Practical 120 mins	OSPE
3.	Epithelium • Identify various types of epithelium under microscope **(S)**	• Various types of epithelium under microscope	Practical 120 mins	OSPE
4.	Glands • Identify glands **(S)**	• Identification of glands	Practical 120 mins	OSPE
5.	Connective tissue • Identify connective tissue cell, fibers under microscope **(S)**	• Connective tissue cell, fibers under microscope	Practical 120 mins	OSPE
6.	Muscles • Identify the various types of muscular tissues **(S)**	• Identify the various types of muscular tissues	Practical 120 mins	OSPE
7.	Skin • Identify different layers of skin under the microscope **(S)**	• Identify different layers of skin under the microscope	Practical 120 mins	OSPE

BIOCHEMISTRY

BIOCHEMISTRY Lectures

S No	Learning Objectives By the end of the session, students will be able to:	Content Areas	Learning Activity (Duration)	Assessment
1.	TOPIC-1 WATER (3 Lectures) Lecture - 1: Chemical nature of water • Describe the structure and properties of water. • Discuss the physicochemical properties of water (e.g. surface tension, viscosity, • adsorption) • Explain the role of water as a Solvent • Describe the role of water in forming molecular bonds. • Lecture – 2: Distribution of water: • Discuss the Water distribution and Homeostasis • Explain the clinical aspects of water disturbances Lecture – 3: pH and Buffers • Describe the mechanism of dissociation of water and maintenance of normal pH. • Discuss the change in pH that accompanies the addition of a given quantity of acid or base. • Describe the role of buffers in maintaining pH. • Explain the Henderson–Hasselbalch equation **(K)**	• Structure and properties of water. • Physicochemical properties of water (e.g. surface tension, viscosity, • adsorption) • The role of water as a Solvent • The role of water in forming molecular bonds. • Water distribution and Homeostasis • Clinical aspects of water disturbances • Mechanism of dissociation of water and maintenance of normal pH. • Change in pH that accompanies the addition of a given quantity of acid or base. • Role of buffers in maintaining pH. • Henderson–Hasselbalch equation	LGIS 50 mins	MCQs
2.	TOPIC-2 CELL (2 Lectures) Lecture – 1: Cell membrane • Describe the biochemical composition • Describe the functions of the cell membrane Lecture – 2: Cell organelles • Discuss the biochemical structure and function of each organelle **(K)**	• Biochemical composition • The functions of the cell membrane • The biochemical structure and function of each organelle	LGIS 50 mins	MCQs
3.	TOPIC-3 CARBOHYDRATE CHEMISTRY (4 Lectures) Lecture – 1; Carbohydrate Classification • Define carbohydrates with examples • Classify carbohydrates with examples • Describe the biochemical role of carbohydrates Lecture – 2; Monosaccharides • Classify Monosaccharides with examples • Explain chiral carbon and isomerism with examples	• Carbohydrates with examples • Classification of carbohydrates with examples • Biochemical role of carbohydrates • Classification of Monosaccharides with examples •Chiral carbon and isomerism with examples • Properties and functions of Monosaccharides • Classification of Disaccharides with examples • Properties and functions of Disaccharides	LGIS 50 mins	MCQs

	• Explain the properties and functions of Monosaccharides Lecture – 3; Disaccharides and Oligosaccharides • Classify Disaccharides with examples • Explain the properties and functions of Disaccharides • Classify Oligosaccharides with examples • Explain the properties and functions of Oligosaccharides Lecture – 4; Polysaccharides • Classify Polysaccharides with examples • Explain the properties and functions of Polysaccharides • Describe the clinical importance of Polysaccharides **(K)**	• Classification of Oligosaccharides with examples • Properties and functions of Oligosaccharides • Classification Polysaccharides with examples • Properties and functions of Polysaccharides • Clinical importance of Polysaccharides		
4.	TOPIC-4 LIPID CHEMISTRY (5 lectures) Lecture -1: Lipid Classification • Define Lipids with examples • Classify Lipids with examples • Describe the biochemical functions of lipids Lecture -2: Fatty acids • Explain the chemical structure of fatty acids. • Classify fatty acids with examples • Describe the properties and functions of fatty acids Lecture - 3: Simple & Compound Lipids • Sub-classify simple and compound lipids with examples. • Explain the chemical structure of simple and compound lipids • Describe the properties and biological functions of simple and compound lipids • Discuss the clinical importance of Lipid storage diseases • Discuss the clinical significance of plasma lipoproteins Lecture-4: Steroids & Sterols **(K)** • Explain the structure and biochemical importance of steroids and sterols. • List the sources and functions of Cholesterol • Discuss the clinical importance of Cholesterol Lecture- 5: Eicosanoids: • Define Eicosanoids with examples • Classify Eicosanoids with examples • Explain the functions of Eicosanoids • Explain the synthesis of Eicosanoids. • Discuss the clinical significance of Eicosanoids **(K)**	• Definition of Lipids with examples • Classification of Lipids with examples • The biochemical functions of lipids • The chemical structure of fatty acids. • Classification of fatty acids with examples • Properties and functions of fatty acids • Sub-classification simple and compound lipids with examples. • Chemical structure of simple and compound lipids •Properties and biological functions of simple and compound lipids • Clinical importance of Lipid storage diseases • Clinical significance of plasma lipoproteins • Structure and biochemical importance of steroids and sterols. • Sources and functions of Cholesterol • Clinical importance of Cholesterol • Eicosanoids with examples • Classification of Eicosanoids with examples • Functions of Eicosanoids • Synthesis of Eicosanoids. • Clinical significance of Eicosanoids	LGIS 50 mins	MCQs

5.	TOPIC-5 PROTEIN CHEMISTRY (4 Lectures) Lecture-1: Amino acids • Describe the structure and classification of amino acids with example • Describe the properties of amino acids • Describe the functions of amino acids Lecture -2: Peptides and Polypeptides • Describe the structure and classification of Peptides and Polypeptides with examples • Describe the characteristics of the Peptide bond • Describe the functions and biomedical importance of Peptides and Polypeptides Lecture-3: Chemistry of Proteins • Define proteins with examples • Classify proteins with examples • List the sources and properties of proteins • Describe the functions and biomedical importance of individual proteins Lecture-4: Protein Structure • Explain the structure of proteins **(K)**	• Structure and classification of amino acids with example •Properties of amino acids • Functions of amino acids • Structure and classification of Peptides and Polypeptides with examples •Characteristics of the Peptide bond • Functions and biomedical importance of Peptides and Polypeptides • Proteins with examples • Classification of proteins with examples • Sources and properties of proteins • Functions and biomedical importance of individual proteins • Structure of proteins	LGIS 50 mins	MCQs
6.	TOPIC-6 NUCLEIC ACID CHEMISTRY (2 Lectures) Lecture 1: Nucleotides • Describe the structure and classification of nitrogenous bases with examples • Compare the structures of nucleotides and nucleosides • Discuss the biomedical functions of nucleotides • Explain the biomedical significance of nucleotide derivatives and synthetic analogues. Lecture 2: Chemistry of Nucleic acids **(K)** • Classify DNA and RNA with examples • Explain the properties of nucleic acids • Describe the structure and functions of DNA and RNA **(K)**	• Structure and classification of nitrogenous bases with examples • Comparison the structures of nucleotides and nucleosides • Biomedical functions of nucleotides • Biomedical significance of nucleotide derivatives and synthetic analogues. • Classification of DNA and RNA with examples • Properties of nucleic acids • Structure and functions of DNA and RNA	LGIS 50 mins	MCQs
7.	TOPIC-7 ENZYME CHEMISTRY (4 Lectures) Lecture -1: Classification of Enzymes • Define enzymes with examples • Classify enzymes with examples • Describe the structure and properties of Enzymes • Explain Co-enzymes, Co factors, zymogens, prosthetic group and Isoenzymes Lecture -2: Enzyme Kinetics • Explain the energy of activation • Explain the two hypothesis enzyme substrate binding. • Explain mechanism of action of enzymes	• Enzymes with examples • Classification of enzymes with examples • Structure and properties of Enzymes • Explanation of Co-enzymes, Co factors, zymogens, prosthetic group and Isoenzymes • Energy of activation • Two hypothesis enzyme substrate binding. • Mechanism of action of enzymes • Michaelis Menten Model of enzyme kinetics • Factors inhibiting and promoting enzyme activity • Enzyme inhibitors with examples • Enzyme inhibitors with examples	LGIS 50 mins	MCQs

	• Explain the Michaelis Menten Model of enzyme kinetics Lecture-3: Factors affecting enzyme activity • Discuss factors inhibiting and promoting enzyme activity • Define enzyme inhibitors with examples • Classify enzyme inhibitors with examples • Describe the regulation of enzyme activity Lecture-4: Clinical Enzymology • Explain the diagnostic importance of enzymes and isoenzymes • Outline different ways of measuring plasma enzymes • List enzymes and isoenzymes commonly assayed for diagnostic purposes • Discuss the clinical importance of isoenzymes of LDH, CPK, Troponin, Alkaline phosphatase • and Aldolase **(K)**	• Regulation of enzyme activity • Diagnostic importance of enzymes and isoenzymes • Different ways of measuring plasma enzymes • Enzymes and isoenzymes commonly assayed for diagnostic purposes • Clinical importance of isoenzymes of LDH, CPK, Troponin, Alkaline phosphatase • and Aldolase	LGIS 50mins	MCQs
8.	TOPIC-8 VITAMINS (2 Lecture) Lecture 1: Vitamins: • Define vitamins with examples • Classify vitamins with examples • Discuss the overall role of vitamins and their importance in normal body functions • Describe the chemical structure and functions of individual vitamins • List the sources, daily requirement, digestion & absorption of individual vitamins • Describe the clinical significance of deficiency and toxicity of vitamins **(K)**	• Definition of vitamins with examples • Classification of vitamins with examples • Overall role of vitamins and their importance in normal body functions • Chemical structure and functions of individual vitamins • Sources, daily requirement, digestion & absorption of individual vitamins • Clinical significance of deficiency and toxicity of vitamins	LGIS 50 mins	MCQs

Biochemistry Practical's

S NO	Learning Objectives By the end of this session, students will be able to:	Content Areas	Teaching activity (Duration)	Assessment
1.	TOPIC-1 Introduction to Biochemistry Lab (1 Practical) Practical 1: Biochemistry Lab protocol & Solutions • Explain the Biochemistry Laboratory protocols & Lab hazards • Identify the signs and symbols related to Laboratory hazards • Outline the method for preparation of different types of solutions • Prepare different types of Solutions (Normal, Molar, Molal, Percent) • Identify the clinical uses and hazards of different types of solutions • Interpret clinical conditions correlated with their laboratory investigations **(S,A)**	• Biochemistry Laboratory protocols & Lab hazards • Signs and symbols related to Laboratory hazards • Method for preparation of different types of solutions (Normal, Molar, Molal, Percent) • Clinical uses and hazards of different types of solutions • Clinical conditions correlated with their laboratory investigations	Demonstration 90 mins	OSPE
2.	TOPIC-2 Carbohydrates (2 Practical's) Practical 1: Detection of Carbohydrates and Polysaccharides • Outline the Scheme for detection of carbohydrates in a sample • Identify the chemical tests and bio-techniques to detect proteins • Detect Carbohydrates in the given sample with examples • Detect Polysaccharides in the given sample with examples • Interpret clinical conditions correlated with their laboratory investigations Practical 2: Detection of Mono & Disaccharides • Identify the chemical tests and bio-techniques to detect proteins • Detect Monosaccharides in the given sample with examples • Detect Disaccharides in the given sample with examples • Interpret clinical conditions correlated with their laboratory investigations **(S)**	• Scheme for detection of carbohydrates in a sample • Chemical tests and bio-techniques to detect proteins • Carbohydrates in the given sample with examples • Polysaccharides in the given sample with examples • Clinical conditions correlated with their laboratory investigations • Chemical tests and bio-techniques to detect proteins • Monosaccharides in the given sample with examples • Disaccharides in the given sample with examples • Clinical conditions correlated with their laboratory investigations	Demonstration 90 mins	OSPE
3.	TOPIC-3 Proteins (3 Practicals) Practical 1: Detection of Proteins • Outline the Scheme for detection of Proteins in a sample • Identify the chemical tests and bio-techniques to detect proteins • Detect Proteins in the given sample with examples (General tests)	• Scheme for detection of Proteins in a sample • Chemical tests and bio-techniques to detect proteins • Detection Proteins in the given sample with examples (General tests) • Clinical conditions correlation with their laboratory investigations	Demonstration 90 mins	OSPE

	• Interpret clinical conditions correlated with their laboratory investigations Practical 2: Detection of Individual amino acids • Identify the chemical tests and bio-techniques to detect the different amino acids • Detect Individual amino acids in the given sample • Interpret clinical conditions correlated with their laboratory investigations Practical 3: Detection of Individual Proteins • Identify the chemical tests and bio-techniques to detect the different amino acids • Detect individual Proteins in the given sample • Interpret clinical conditions correlated with their laboratory investigations **(S)**	• Chemical tests and bio-techniques to detect the different amino acids • Individual amino acids in the given sample • Clinical conditions in correlation with their laboratory investigations • Identification of chemical tests and bio-techniques to detect the different amino acids • Individual Proteins in the given sample • Clinical conditions in correlation with their laboratory investigations		
4.	TOPIC-4 Lipids (1 Practical) Practical 1: Detection of Lipids • Outline the method for detection of Lipids in a sample • Identify the chemical tests and bio-techniques to detect Lipids • Detect Lipids in the given sample with examples • Interpret clinical conditions correlated with their laboratory investigations. **(S)**	• Method for detection of Lipids in a sample • Chemical tests and bio-techniques to detect Lipids • Detection of Lipids in the given sample with examples • Clinical conditions in correlation with their laboratory investigations.	Demonstration 90 mins	OSPE
5.	TOPIC-5 Enzymes (1 Practical) Practical 1: Detection of Factors affecting Enzyme activity • Outline the Scheme for detection of factors affecting enzyme activity • Identify the chemical tests and bio-techniques to detect the factors affecting enzyme activity • Detect the effect of factors affecting the activity of salivary amylase • Interpret clinical conditions correlated with their laboratory investigations **(S)**	•Scheme for detection of factors affecting enzyme activity • Chemical tests and bio-techniques to detect the factors affecting enzyme activity • Effect of factors affecting the activity of salivary amylase • Clinical conditions in correlation with their laboratory investigations	Demonstration 90 mins	OSPE

BIOCHEMISTRY Tutorials

S No	Learning Objectives By the end of the session, students will be able to:	Content Areas	Learning Activity (Duration)	Assessment
1.	TOPIC – 1: Water & pH Tutorial – 1: Water & pH disturbances • Discuss the clinical importance of water & pH disturbances • Interpret clinical conditions correlated with their laboratory investigations. **(K)**	• Clinical importance of water & pH disturbances • Clinical conditions correlated with their laboratory investigations.	90 MINS	
2.	TOPIC –2: Carbohydrates • Tutorial – 1: Carbohydrates • Discuss the clinical importance of carbohydrates • Interpret clinical conditions correlated with their laboratory investigations. **(K)**	• Clinical importance of carbohydrates • Clinical conditions correlated with their laboratory investigations.	90 MINS	
3.	TOPIC –3: Lipid Tutorial – 1: Lipids • Discuss the clinical importance of Lipids • Interpret clinical conditions correlated with their laboratory investigations. **(K)**	• Clinical importance of Lipids • Clinical conditions correlation with their laboratory investigations.	90 MINS	
4.	TOPIC –4: Proteins Tutorial – 1: Proteins • Discuss the clinical importance of proteins • Interpret clinical conditions correlated with their laboratory investigations. **(K)**	• Clinical importance of proteins • Clinical conditions correlated with their laboratory investigations.	90 MINS	
5.	TOPIC –5: Nucleic Acids Tutorial – 1: Nucleic Acids • Discuss the clinical importance of nucleic acids • Interpret clinical conditions correlated with their laboratory investigations**(K)**	• Clinical importance of nucleic acids • Clinical conditions correlated with their laboratory investigations	90 MINS	

6.	TOPIC –6: Enzymes Tutorial – 1: Enzymes • Discuss the clinical importance of enzymes • Interpret clinical conditions correlated with their laboratory investigations. **(K)**	• Clinical importance of enzymes • Clinical conditions correlated with their laboratory investigations.	90 MINS	
7.	TOPIC –7: Vitamins Tutorial – 1: Vitamins • Discuss the clinical importance of vitamins • Interpret clinical conditions correlated with their laboratory investigations. **(K)**	• Clinical importance of vitamins • Clinical conditions correlated with their laboratory investigations.	90 MINS	

PHYSIOLOGY

PHYSIOLOGY Lectures

S. NO	Learning Objectives (Domain) By the end of this session students will be able to:	Content Areas	Teaching Activity (Duration)	Assessment
1.	Extracellular fluid & internal environment • Describe functional organization of human body and fluid compartments **(K)**	•Functional organization of human body and fluid compartments	LGIS 50 mins	MCQ
2.	Homeostasis and control system of body • Recognize the role of physiochemical aspects for the maintenance of homeostasis **(K)**	• Role of physiochemical aspects for the maintenance of homeostasis	LGIS 50 mins	MCQs
3.	Functional importance of Cell membrane • Explain composition and basic structure of cell membrane its functional importance and adaptation **(K)**	•Composition and basic structure of cell membrane its functional importance and adaptation	LGIS 50mins	MCQs
4.	Cell organelles1 & 2 • Describe the structure and functions of various cell organelles. **(K)**	• Structure and functions of various cell organelles.	LGIS 50 mins + LGIS 50 mins	MCQs
5.	Transport across cell membrane (Passive) • Describe types and process of passive transport across the membrane and their effects • Describe diffusion and its physical basis • Explain the process of endocytosis, exocytosis and transcytosis **(K)**	• Types and process of passive transport across the membrane and their effects • Diffusion and its physical basis • Process of endocytosis, exocytosis and transcytosis	LGIS 50 mins + 50 LGS	MCQs
6.	Transport across cell membrane (Active) • Describe membrane transport mechanism types and effects **(K)**	• Membrane transport mechanism types and effects	LGIS 50 mins	MCQs

7.	Cell signaling mechanism • Discuss the chemistry of signals, receptors and importance of lipid and proteins in membranes. **(K)**	• Chemistry of signals, receptors and importance of lipid and proteins in membranes.	LGIS 50 mins + LGIS 50 mins	MCQs
8.	Locomotion and Apoptosis: • Define Apoptosis • Describe the process of apoptosis and cell locomotion **(K)**	• Apoptosis • Process of apoptosis and cell Locomotion	LGIS 50 mins	MCQs
9.	Introduction to Autonomic Nervous System • Define Autonomic Nervous System • Describe the function of divisions of ANS and the neurotransmitters involved **(K)**	• Autonomic Nervous System • Function of divisions of ANS and the neurotransmitters involved	LGIS 50 mins	MCQs

Physiology Practical

S. NO	Learning Objectives (Domain) By the end of the practical session students will be able to:	Content Areas	Teaching Activity (Duration)	Assessment
1.	Show the effects of osmotic variations in ECF on cell. **(S)**	Effects of osmotic variations in ECF on cell.	Demonstration 90 mins	OSPE

Problem Based Learning (PBL)

- ___ PBLs will be conducted in this module
- Each will be introduced in one week and will be discussed the next week

Learning Tool	Theme	PBL Trigger	Subjects integrated in PBL
PBL 1			Learning objectives will be from Anatomy, Biochemistry and Physiology
PBL 2			Learning objectives will be from Anatomy, Biochemistry and Physiology

Learning Resources:

The students will be guided to look for the relevant study material from the books, internet guided by each discipline in the study guide in their relevant section in addition to other reference books from the college library

Medical Education Lectures / Workshop

S.NO	Learning Objectives (domain) At the end of session, student will be able to:	Content Areas	Teaching Activity (Duration)	Assessment
1.	**Introduction to Medical Education** • Appreciate the journey of medical education from learning biomedical to clinical science. **(K)** • Introduction to Study Guide	• Plan of medical education in college (From school into college) • Organization of undergraduate medical curriculum • Integrated Curriculum • Study Guide Session	LGIS 50 mins	–
2.	**Assessment Tools and Evaluation** • Describe assessment • Describe evaluation **(K)**	• Describe assessment • Describe evaluation	LGIS 50 mins	–
3.	**Problem – based Learning** • Describe the basis of problem – based learning. **(K)** • Follow the process / steps of problem – based learning session. **(S)**	• Basics of problem-based learning • Process / steps of problem – based learning • Practical demonstration of PBL session	Workshop (1 hours)	–

Learning resource: How to succeed at medical school, Dason Evans & Jo Brown, 2009

LONGITUDINAL INTEGRATION

Behavioral Science **Lectures**

S. NO	Learning Objectives (Domain) By the end of this session students will be able to:	Content Areas	Teaching Activity (Duration)	Assessment
1.	Introduction **(K)** • Why study BS in medical school • Describe Model of determinants of behavior & health • Explain the causes of declining disease prevalence (McKeown) • Describe history of Psychology as a science • What different branches of Psychology/Behavioral Sciences? • Explain Goals of learning BS in medical school	• Studying BS in medical school • Model of determinants of behavior & health • Causes of declining disease prevalence (McKeown) • History of Psychology as a science • Different branches of Psychology/Behavioral Sciences • Goals of learning BS in medical school	LGIS 50 mins	MCQ
2.	Learning: Classical Conditioning **(K)** • Define learning • Explain Classical Learning and Principles of Pavlovian Learning • Describe Increasing learning strength • Discuss Generalization / Discrimination Extinction / Inhibition / Systemic Desensitization • Explain Medical & Public Health • Discuss Applications of Classical Aversion Therapy • Explain Stimulus Control – Diet Therapy, etc. Insomnia / Bed wetting	• Definition learning • Classical Learning • Principles of Pavlovian Learning • Increasing learning strength • Generalization / Discrimination • Extinction / Inhibition / Systemic Desensitization • Medical & Public Health Applications of Classical • Aversion Therapy • Stimulus Control – Diet Therapy, etc. • Insomnia / Bed wetting	LGIS 50 mins	MCQs
3.	Learning: Operant Conditioning Learning Phobias **(K)** • Explain Operant Learning • Define Reward / Punishment / Re in forcers? • Explain the differences / Similarities to Classical Conditioning • Describe Schedules of Reinforcement: Continuous, Ratio, Interval Shaping • Explain Learned Helplessness • Explain Generalization / Discrimination / Extinction • Describe Superstitious Behavior and • Hierarchy of Reinforcers • Explain Effectiveness of Punishment versus Reinforcement • Describe Medical & Public Health Applications	• Operant Learning • Definition of Reward / Punishment / Reinforcers • Differences / Similarities to Classical Conditioning • Schedules of Reinforcement: Continuous, Ratio, Interval • Shaping • Learned Helplessness • Generalization / Discrimination / Extinction • Superstitious Behavior and • Hierarchy of Reinforcers	LGIS 50 mins	MCQs

	• What is Behavior Modification • Explain Programmed Self Instruction / Study Skills • Describe Public Health Campaigns using Reward System	• Effectiveness of Punishment versus Reinforcement • Medical & Public Health Applications • Behavior Modification • Programmed Self Instruction / Study Skills • Public Health Campaigns using Reward System		
4.	Learning: Social Learning Theory **(K)** • Describe Social Learning Theory • Explain the Components of Modeling Process • Discuss Medical and Public Health Applications • Explain Violence & Aggression • Describe Illness – Symptom Expression & Health Seeking Behavior • Discuss Media Effects on Lifestyle / Values / Stereotypes • Enlist Examples of Public Health Programs (Stanford, North Karelia)	• Social Learning Theory • Components of Modeling Process • Medical and Public Health Applications • Violence & Aggression • Illness – Symptom Expression & Health Seeking Behavior • Media Effects on Lifestyle / Values / Stereotypes • Examples of Public Health Programs (Stanford, North Karelia)	LGIS 50 mins	MCQs
5.	Memory I **(K)** • Explain the Stages of Memory Perception / Encoding / Storage / Retrieval • Discuss the Sensory Memory Recognition of Stimuli And Attention & Selective Focusing • Describe Short Term Memory Capacity and • Improving Retention (Rehearsal, Chunking)	• Memory I (K) • Stages of Memory • Perception / Encoding / Storage / Retrieval • Sensory Memory • Recognition of Stimuli • Attention & Selective Focusing • Short Term Memory • Capacity • Improving Retention (Rehearsal, Chunking)	LGIS 50 mins	MCQs
6.	Memory II **(K)** • Describe Long Term Memory • Explain Level of Processing • Describe Serial Position Effects • Discuss Mnemonics – Retrieval Clues • Describe Recognition vs Recall	• Long Term Memory • Level of Processing • Serial Position Effects • Mnemonics – Retrieval Clues • Recognition vs Recall	LGIS 50 mins	MCQs
7.	Memory III **(K)** • Describe Forgetting • Explain Interference • Discuss Repression • Explain Disuse and Distortion (Eyewitness Accuracy??) • Explain Retrieval Failure (Influence of organization & emotion) • Explain Aphasias • Describe Applications • Explain Improving Study Skills • Discuss Patient Instructions and Memory	• Forgetting • Interference • Repression • Distortion (Eyewitness Accuracy??) • Retrieval Failure (Influence of organization & emotion) • Aphasias • Disuse • Applications • Improving Study Skills • Patient Instructions and	LGIS 50 mins	MCQs

Professional Communication Lectures

S. NO	Learning Objectives (Domain) By the end of this session students will be able to:	Content Areas	Teaching Activity (Duration)	Assessment
1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17.	Professional Communication **(K)** • How to write an essay • Differentiate between colloquialism and • Slang • Explain non- verbal communication • Write cover letter for job application • How to Present a Topic • How to do self-Presentation • How to write a speech • Write your CV • How to prepare for an interview • How to create first impressions • What are communication barriers • Do a reading comprehension • Write a research paper on 'job satisfaction' • Write a research paper on 'Dealing with angry patients' • Write a movie review	• Introductory class • Writing Essay • Difference between colloquialism and slang • Non – verbal communication • Covering letter • Presentation • Self-presentation • Speech writing • CV and Resume • Preparation of an interview • Creating first impressions • Communication barriers • Reading comprehension • Job satisfaction • Dealing with angry patients • Movie review	LGIS 90 mins Essay writing 90 mins Verbal Discussions 90 mins Assignments; Worksheets 90mins Presentations 90mins	MCQs Fill in the blanks Quiz Presentation Verbal questioning Quizzing Role playing

Skills Lab

S. NO	Learning Objectives (Domain) By the end of this session students will be able to:	Content Areas	Teaching Activity (Duration)	Assessment
1.	Personal Safety-Hand Washing 1. List the times when hand ashing should take place. 2. Explain why they need to wash eir hands. 3. Explain how to wash their hands d for how long. 4. Demonstrate the right way to ver a cough or sneeze. 5. Understand that hand washing n help prevent getting sick. **(S)**	Personal Safety-Hand Washing	Demonstration 90 mins	Practical

TIMETABLE

Jinnah Medical & Dental College
MBBS I - Batch 24
Foundation Module 2021 – WEEK 1

Lecture Venue: LH10
(Mon, Wed, Fri-Groups ABC on campus; DEF lectures via ZOOM; Tues, Thurs-Groups DEF on campus; ABC via ZOOM)

MON March 1	**8:30-9:20 MEDICAL EDUCATION** Study Guide Session Dr. Fatima	**9:25-10:15 PHYSIOLOGY** Introduction to Physiology & Functional Organization of Human Body	**10:45-11:35 ANATOMY** Introduction to Anatomy & Level of Organization in Human Body	**11:40-12:30 BIOCHEMISTRY** Introduction to Biochemistry		**1:00-2:15 ANATOMY DEMONSTRATION** Terminology, Nomenclature & Planes
TUES March 2 DEF	**8:30-10:00 DEF – Professional Communication No Zoom for ABC**		**10:45-11:35 BEHAVIORAL SCIENCES** Introduction	**11:40-12:30 MEDICAL EDUCATION** Assessment Tools & Evaluation Dr. Junaid		**1:00-2:15 ANATOMY DEMONSTRATION** Bone & Cartilage Classification
WED March 3	**8:30-10:00 ABC – Professional Communication No Zoom for DEF**		**10:45-11:35 BEHAVIORAL SCIENCES** Learning: Classical Conditioning	**11:40-12:30 ANATOMY** Tissue Preparation		**1:00-2:15 ANATOMY DEMONSTRATION** Young Bone, Epiphysis & Blood Supply
THUR March 4	**8:30-9:20 PHYSIOLOGY** Homeostasis	**9:25-10:15 ANATOMY** Cell Cycle & Mitosis	**10:45-11:35 PHYSIOLOGY** Extracellular fluid & Internal Environment	**11:40-12:30 ANATOMY** Meiosis & Embryology Terms		**1:00-2:15 ANATOMY DEMONSTRATION** Joints: Classifications & Features
FRI March 5	**8:30-9:20 ANATOMY** Cell & Cell Membrane	**9:25-10:15 BIOCHEMISTRY** Cell Membrane Structure	**10:45-11:35 PHYSIOLOGY** Cell Membrane Function	**11:40-12:30 ANATOMY** Synovial Joints General Features		

WEEK 8

END OF MODULE

FONDATION MODULE TEST THEORY

FONDATION MODULE TEST OSPE