

Study Guide Block-I

1st Year MBBS

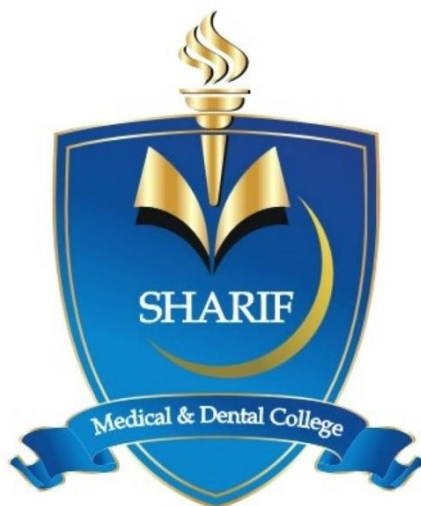


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VISION & MISSION

Vision & Mission of UHS

Vision statement

UHS is a leading university aiming to keep its graduates apt with the ever-emerging global health challenges evolving educational methodologies and emerging technological advancements to maintain its distinguishable positions as a Medical University.

Mission statement

UHS shall we continue to strive for producing a human resource par and excellence to cater for the health needs of the people of Punjab and Pakistan.

Vision & Mission of SMDC

Vision

To be recognized for the provision of a safe and functional environment conducive to collaborative teaching & learning, comfortable working atmosphere and conducting world class research through professionalism and excellence.

'Veritas et Devotio'

Mission

Sharif Medical & Dental College is dedicated to best serving the nation through preservation and dissemination of advanced knowledge and educating the students by latest trends in learning and research reaching levels pars excellence.

The Institution is committed to provide standardized quality medical education to its students by inculcating professional knowledge, skills, and responsibilities in them with the aim of:

- Preparing them as modern physicians having initiative to act as future leaders in their respective fields and becoming lifelong learners.
- Encouraging the spirit of critical thinking through research and publication.
- Building up an understanding of the ethical values compatible with our religion, culture, and social norms.
- Developing a sense of being responsible citizens of society possessing professional competence and instilling in them the values of hard work and dedication thus preparing them to be accountable to the stakeholders and the state.

The Institution is devoted to keep abreast its faculty with the latest trends in Medical Education encompassing teaching/learning methodologies, assessment tools, research opportunities and professionalism to facilitate their professional development, competencies, and commitment towards continues learning.

Our patient-centered mission is achieved by outstanding medical care & services in professional practice with due emphasis and focus on our local health needs.

Our mission further elaborates upon establishing academic and research facilities in areas of local demand under global gold standards and leading advancement in research, education & patient care.

List of Abbreviations

Abbreviations	Subjects
A	Anatomy
ABG	arterial blood gas
Ag	Aging
AKI	acute kidney injury
ALT	alanine transaminase
AMP	Adenosine monophosphate
ANS	Autonomic Nervous System
AST	aspartate aminotransferase
AV	Atrioventricular
B	Biochemistry
BhS	Behavioral Sciences
C	Civics
CBC	Complete Blood Count
C-FRC	Clinical-Foundation Rotation Clerkship
CK	Creatine kinase
CM	Community Medicine
CNS	Central Nervous System
CO	Carbon monoxide
CO ₂	Carbon dioxide
COPD	Chronic obstructive pulmonary disease
COX	cyclooxygenase
CPR	Cardio pulmonary Resuscitation
CT	Computed tomography
CV	Cardiovascular
CVA	cerebral vascular accident
DALY	Disability-Adjusted Life Year
DCMLS	Dorsal column medial lemniscus system
DLC	differential Leukocyte Count
DNA	Deoxy Ribonucleic Acid
ECF	Extra Cellular Fluid
ECG	Electrocardiography
ECP	Emergency contraceptive pills
EEG	Electroencephalogram
EnR	Endocrinology & Reproduction
ENT	Ear Nose Throat
ER	Emergency Room
F	Foundation
FEV ₁	Forced Expiratory Volume 1
FM	Forensic Medicine
FVC	Forced Vital Capacity
GFR	Glomerular Filtration Rate

GIT	Gastrointestinal tract
GMP	guanosine monophosphate
GO	Gynecology and Obstetrics
GTO	Golgi Tendon Organ
HCL	Hydrochloric acid
H & E	Hematoxylin and eosin
HL	Hematopoietic & Lymphatic
HMP	Hexose Monophosphate
HNSS	Head & Neck and Special Senses
ICF	Intra Cellular Fluid
IL	Interleukin
IN	Inflammation
INR	International Normalized Ratio
IUD	Intrauterine device
IUGR	Intra Uterine Growth Restriction
JVP	Jugular Venous Pulse
LDH	Lactate Dehydrogenase
M	Medicine
MALT	Mucosa Associated Lymphoid Tissue
MCH	Mean Corpuscular Volume
MCV	Mean Corpuscular Volume
MRI	Magnetic resonance imaging
MS	Musculoskeletal
MSD	Musculoskeletal disorders
NEAA	non-essential amino acids
NMJ	Neuro Muscular Junction
NS	Neurosciences
O	Ophthalmology
Or	Orientation
P	Physiology
Pa	Pathology
PAF	Platelet activating factor
PBL	Problem Based Learning
PCR	Polymerase Chain Reaction
PDGF	Platelet derived growth factor
Pe	Pediatrics

PEM	Protein Energy Malnutrition
PERLs	Professionalism, Ethics, Research, Leadership
Ph	Pharmacology
PNS	Peripheral Nervous System
Psy	Psychiatry
PVC	Premature Ventricular Contraction
QALY	Quality-Adjusted Life Year
QI	Quran and Islamiyat
R	Renal
Ra	Radiology
RBCs	Red Blood cells
RDA	Recommended Dietary Allowance
Re	Respiratory
RFLP	Restriction Fragment Length Polymorphism
RMP	Resting Membrane Potential
RNA	Ribonucleic Acid
S	Surgery
SA	Sinoatrial
TCA	Tricarboxylic acid cycle
TNF	Tumor Necrotic Factor
USG	Ultrasonography
UTI	Urinary Tract Infections
WBCs	White Blood Cells

Introduction to Study Guide

Welcome to your first year at medical school! Developing effective study habits and strategies is essential as you embark on the exciting and challenging journey to become a healthcare professional. These will serve as the pillars supporting your achievement in medical college.

This study guide is intended to help you get a deeper understanding of the subject matter and become ready for the rigors of clinical practice, all while giving you a road map for navigating the complexities of medical school education. You're transitioning from undergraduate studies and pursuing a lifelong dream of entering the medical field, this guide aims to support your academic growth and personal development.

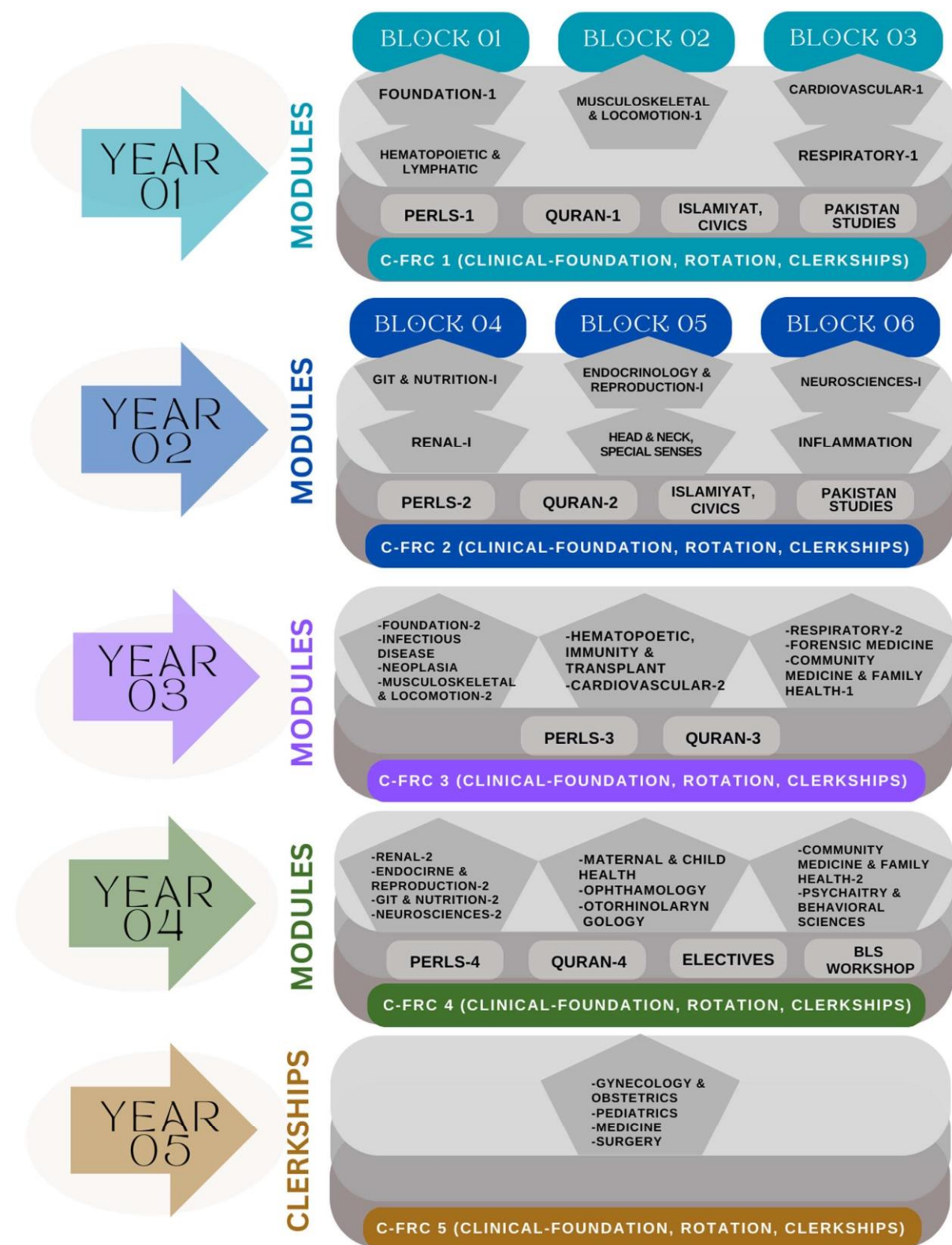
The purpose of this study guide is to help you to synthesize and summarize the information. You might think of your study guide as a mini outline. The primary advantage of a study guide is that it introduces the amount of information to be learned. Study guide provides a focus for different educational activities in which the students are engaged. It equips students with information on the topic of study and assists in management of student learning.

This study guide is organized according to modules, each focusing on a specific subject area or discipline within the modular curriculum. Within each module, you'll find a structured outline of topics, accompanied by key concepts, learning objectives, and suggested resources for further exploration.

As you progress through your first year of medical school, refer to this study guide as a valuable companion on your academic journey. Embrace the opportunity to immerse yourself in the study of medicine, cultivate a lifelong passion for learning, and embrace the responsibilities of professionalism and patient-centered care.

Curriculum 2K23 *version 2.0*

CURRICULUM FRAMEWORK



Modular Committee

Sr	Module Committee	Faculty Members
1.	Foundation Module Committee	• Prof. Uzma Ahsan, Prof & Head Dept of Dermatology • Prof. Maria Aslam, Prof & Head Dept of Pathology • Prof. Taj Jamshaid, Prof Dept of Medicine • Dr. Nishat Akhram, Associate Professor Dept of Gynae • Dr. Uzma Shahid, Head of Medical Education • Dr. Waqas Iqbal, Associate Professor Dept of Anatomy • Dr. Hassan Jamil, Associate Professor Dept of Biochemistry • Dr. Zarish Ghafoor, Assistant Professor Dept of Pharmacology • Dr. Amna Iqbal, Associate Professor Dept of Community Medicine • Dr. Nausheen Iftikhar, Associate Professor Dept of Pediatrics • Dr. Nazish Jamil, Assistant Professor Dept of Physiology • Miss. Kanwal Iqbal, Department of Psychiatry
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FOUNDATION MODULE

RATIONALE OF MODULE 1

Tomorrow's doctor is required to acquire competencies, which could align his knowledge base and skill set for his professional practices. The foundation of knowledge needs to commence from 'The Cell'. The cell is a structural and functional unit of life and has a role in normal homeostasis ensuring appropriate cellular functions. Hence, this module has been designed to introduce a blend of molecular, genetic, anatomical, physiological, and psychosocial information essential for developing a perspective on the function of the human body in health and disease. Besides, an initial orientation to pharmacology and pathology subject has been provided so that students are able to use this information in the coming modules.

MODULE OUTCOME

1. Describe the microscopic features of nerve cells, muscle cells, and general features of epithelia of the body.
2. Appraise the functional characteristics of various components of cell membrane and organelles of cell.
3. Differentiate between the dynamics of various transport mechanisms along the cell membrane.
4. Compare the functional differences between RBCs, WBCs and blood groups.
5. Explain the significance of homeostatic mechanisms in keeping body's internal environment nearly constant.
6. Appraise the formation and functions of autonomic nervous system.
7. Correlate the structural design of each organ to its function.
8. Acquire information about the different fascial planes in the different regions of the body & their surgical importance.
9. Use descriptive anatomical terms of position to describe the different body structures in relation to each other.
10. Describe the movements of body using proper anatomical terms of movement.
11. Describe and demonstrate the various bony landmarks.
12. Describe the types of joints and correlate them to the mechanisms of movement.
13. Classify the bone, joints and muscles based on the structure, function, phylogenetic origin.
14. Describe the structures associated with muscles and explain their functional correlations.
15. Classify and describe the cardiovascular system and correlate it functionally.
16. Amplify the anatomical basis for radiological, cross-sectional, and surface anatomy.
17. Correlate clinico-pathologically the apoptosis in health & diseases.

PROPOSED THEME

1. Cell structure
2. Cell transport and signaling
3. Cell chemistry
4. Homeostasis and blood
5. Autonomic nervous system
6. Body movement
7. Muscles
8. Growth and development

CURRICULUM OF INDIVIDUAL SUBJECTS

HUMAN ANATOMY

THEORY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS=15		MIT (Mode of information transfer)
		DISCIPLINE	TOPIC	
FA-001	- Briefly describe the applied branches of anatomy. - Describe the "Anatomical Position" - Describe the anatomical planes of the body. - Describe the terms of relationship, commonly used in Anatomy. - Describe the anatomical terms used specifically for Limbs. - Describe the terms related to movements.	General 6i Anatomy	Introduction to General Anatomy	LGIS (Large group interactive session)
FA-002	- Describe, identify, and exemplify the general morphological features of bones. - Describe the developmental classification of bones. - Describe the regional classification of bones. - Describe the structural classification of bones. - Describe the morphological classification of bones. - Describe and exemplify Sesamoid, Pneumatic, Wormian and Heterotopic bones. - Describe the general features of adult typical long bone. - Describe the types of epiphysis. - Discuss the general concept of ossification (primary & secondary centers & rule of ossification) - Describe the classification of bones based on osteogenesis. - Describe the relationship of growing end of bones with the direction of nutrient foramen. - Describe the blood supply, innervation, and lymphatic drainage of various types of bones. - Describe the salient features of common types of fractures and basic concept of healing of fracture.	General Anatomy	Bones (Osteology)	LGIS (Large group interactive session)

FA-003	- Describe the general features of cartilage and its importance in gross anatomy. - Describe the subtypes and gross features of hyaline, elastic and fibro cartilage. - Differentiate the three types of cartilages.	General Anatomy	Cartilage (Chondrology)	LGIS (Large group interactive session)
FA-004	- Describe and exemplify the structural classification of joints (synovial, cartilaginous & fibrous) along with their sub-classification. - Describe the components and characteristic features of a Synovial Joint - Describe the blood supply, innervation and lymphatic drainage of Synovial Joints, cartilaginous joints, and fibrous joints. - List the factors stabilizing a synovial joint. - Define common joint injuries and diseases	General Anatomy	Joints (Arthrology)	LGIS (Large group interactive session)
FA-005	- Describe the structure and function of Skin on the basis of its two layers, Epidermis and Dermis. - Describe the structure of Hair as an appendage of skin. - Describe the structure of Nail as an appendage of skin. - Describe the structure of Sweat and Sebaceous glands. - Describe the structure and function of Superficial fascia. - Describe the structure, function, and modifications of deep Fascia. - Describe important clinical correlates of skin (skin infections, sebaceous cyst, skin burns and skin grafting)	General Anatomy	Integumentary System	LGIS (Large group interactive session)
FA-006	- Classify and describe Muscle Tissue based on structure, function, and development. - Describe Somatic and Visceral Muscles. - Describe and differentiate the Red and White Variety of Skeletal Muscles.	General anatomy	Muscle Tissue (Myology)	LGIS (Large group interactive session)

	• Classify and describe the skeletal muscles based on architecture. • Classify skeletal muscle based on action. • Describe the parts of a skeletal muscle. • Describe and differentiate the basic organization of innervation to skeletal, smooth, and cardiac muscle. • Describe the structure of Tendons. • Describe the structure of Synovial Bursae • Describe the structure of Raphe. • Comprehend the meaning of Hypertrophy, Hemiplegia, Quadriplegia, Paraplegia and Hemiparesis.			LGIS (Large group interactive session)
FA-007	• Classify the types of blood circulation. • Classify and exemplify various types of blood vessels. • Describe and exemplify various types of anastomosis. • Explain the importance of End Arteries • Define the terms: Arteriosclerosis, Atherosclerosis and Varicose Veins • Describe the general organization of Lymphatic circulation. • Define the terms: Lymphoid Tissue, Tissue Fluid, Lymphatic Capillaries, Lymph and Lymphatic Vessels. • Define the terms; Lymphangitis, Lymphadenitis.	General Anatomy	Vascular System (Angiology)	LGIS (Large group interactive session)
FA-008	• Define neurons. • Describe the anatomical structure of a neuron. • Classify neurons based on morphology with examples. • Classify neurons based on function. • Describe the components of the central nervous system. • Describe the components of the peripheral nervous system.	General Anatomy	Nervous Tissue (Neurology)	LGIS (Large group interactive session)

	- Name the supporting cells (neuroglia) of the central nervous system. - Describe the structure and functions of the neuroglia of the central nervous system. - Enumerate the supporting cells (neuroglia) of the peripheral nervous system. - Describe the structure and functions of the neuroglia of the peripheral nervous system. - Enlist the cranial nerves I to XII. - Describe the types of nerve fibers carried by and distribution of the cranial nerves. - Describe the formation, types of modalities carried out by, and distribution of the spinal nerves. - Explain Dermatome (s) - Explain Myotome (s) - Describe the formation of Plexuses. Differentiate between Somatic and Visceral nervous system. - Define Receptors - Describe the functions of receptors. - Classify sensory receptors based on modality (with location) - Define Effectors - Describe the functions of effectors. - Describe ANS and differentiate between sympathetic and parasympathetic nervous system	General Anatomy	Nervous Tissue (Neurology)	
FA-009	- Identify displacement of fracture segments of the bone - Identify dislocation of joints	Integrate with Radiology	Imaging in Anatomy	LGIS (Large group interactive session)
EMBRYOLOGY & POST-NATAL DEVELOPMENT		TOTAL HOURS =25		
FA-010	- Define chromosome Theory of inheritance - Enlist different stages of Mitosis and Meiosis - Compare and contrast Mitosis and Meiosis. - Enlist the numerical chromosomal	Embryology	Cell division and chromosomal abnormalities	LGIS (Large group interactive session)

FA-016	Describe the transportation of male and female gametes.	Embryology	Transportation of gametes	LGIS (Large group interactive session)
FA-017	- Describe capacitation & Acrosomal reaction - Define fertilization. - Describe the phases of fertilization. - Draw and label a diagram illustrating the phases of fertilization. - Enumerate and describe the results of fertilization.		Fertilization	LGIS (Large group interactive session)
FA-018	- Define contraception. - Explain the mechanisms of following contraceptive techniques: - Barrier methods - Hormonal methods - Intrauterine device (IUD) - Emergency contraceptive pills (ECPs) - Male and female sterilization	Integrate with physiology	Contraception	LGIS (Large group interactive session)
FA-019	- Describe the anatomical and physiological basis of male and female infertility. - Define assisted reproductive techniques. - Describe the mechanisms of In vitro fertilization & embryo transfer - Explain the correlation of multiple births with assisted reproductive techniques	Integrate with Gynaecology	Infertility & assisted reproductive techniques	LGIS (Large group interactive session)

FA-020	- Describe the process of cleavage of embryo and blastocyst formation. - Describe the origin and uses of embryonic stem cells and the techniques of obtaining these cells from the embryo (reproductive cloning & therapeutic cloning) - Explain the embryological basis of spontaneous abortion.	Embryology	Cleavage , blastocyst formation	LGIS (Large group interactive session)
	Compare and contrast the villi.	Integrate with Gynaecology		LGIS (Large group interactive session)
	- Describe the process of Compaction. - Describe the Formation of morula (division into inner and outer cell mass)	Embryology		LGIS (Large group interactive session)
FA-021	- Describe the Uterus at the time of implantation (decidua reaction) - Illustrate the concept of Implantation. - Describe the Abnormal implantation/ extra uterine implantations. - Define the Molar pregnancy - Describe the formation of amniotic cavity, embryonic disc, and umbilical vesicle. Describe the formation of chorionic sac	Embryology	Implantation Week 2 of development	LGIS (Large group interactive session)
FA-022	Describe the establishment of utero-Placental circulation.		Utero-placental circulation	LGIS (Large group interactive session)

FA-023	- Describe the Formation & fate of primitive streak. - Draw a concept map highlighting the sequence of events responsible for transformation of bilaminar germ disc into trilaminar germ disc. - Describe the embryology behind sacrococcygeal teratoma and justify its clinical picture. - Describe the molecular factors responsible for gastrulation	Embryology Integrate with Gynaecology	Gastrulation	LGIS (Large group interactive session)
FA-024	- Describe the Invagination and movement of pre-notochordal cells. - Describe the Notochordal plate formation. - Describe the Neurogenetic canal formation. - Describe the fate of the notochord. - Describe the Establishment of body axis. - Draw and label the fate map establishment. - Describe the fate map establishment. - Describe the molecular basis for notochord formation. - Describe the role of notochord as an inducer. - Describe the embryological basis for Situs inversus, Sirenomelia, Holoprosencephaly - Describe the development of trophoblast and chorionic villi during 3rd week of development	Embryology	Formation of notochord	LGIS (Large group interactive session)
FA-025	- Describe the Formation of neural tube from neural plate. - Justify embryologically the clinical picture seen in various neural tube defects. - Describe the process of Migration of neural crest cells. - Enlist the Derivatives of neural tube and describe the fate of each. - Enlist the Derivatives of neural crest cells - Enlist the ectodermal derivatives. - Describe the molecular and genetic factors for the process of neurulation - Describe important neural tube defects	Embryology	Derivatives of ectoderm	LGIS (Large group interactive session)

FA-026	- Describe the Differentiation of mesoderm into its constituting components. - Describe the Somite formation and its fate. - Describe the Estimation of age by somites - Describe the formation of intra-embryonic coelom	Integrate with pediatrics	Mesodermal derivatives	LGIS (Large group interactive session)
FA-027	- Describe the processes of vasculogenesis & angiogenesis. - Explain the features of primordial cardiovascular system. - Describe the anatomical justification for Capillary hemangiomas.	Integrate with Cardiology	Early development of CVS	LGIS (Large group interactive session)
FA-028	- Describe the Cephalo-caudal folding - Describe the Lateral folding	Integrate with Gynaecology	Folding of embryo	LGIS (Large group interactive session)
FA-029	- Describe the derivatives of germ layers - Enlist and Describe the Derivatives of intermediate and lateral plate mesoderm. - Enlist & Describe the Derivatives of Endoderm	Embryology	Germ layer derivatives	LGIS (Large group interactive session)
	Enlist & describe the derivatives of ectoderm	Integrate with Gynaecology/ pediatrics		
FA-030	Describe the regulation of embryonic development by Homeobox genes.		Control of the embryonic development	LGIS (Large group interactive session)
FA-031	- Enlist the characteristic features of the embryo during 2nd month. - Describe the criteria for estimating the developmental staging in human embryos. - Explain the estimation of gestational & embryonic age		Folding of Embryo Embryonic period	LGIS (Large group interactive session) ³

FA-032	• Explain the measurement and characteristics of fetus/key events during Embryonic period. • Describe the Overview of external appearance of fetus during fetal period. Enlist developmental horizons during fetal life event. • Describe Viability of fetuses and low birth weight babies • Explain the factors influencing fetal growth. • Describe the clinical problems encountered by babies born with IUGR (Intra uterine growth restriction)	Embryology	Fetal period	LGIS (Large group interactive session)
FA-033	• Tabulate the criteria for estimating fertilization age during the fetal period. • Describe the procedures for assessing fetal status. • Describe the clinical picture of IUGR & Factors resulting in IUGR (Intra uterine growth restriction). Define Pre-eclampsia	Integrate with Gynaecology	Fetal Status	LGIS (Large group interactive session)
FA-034	• List the fetal membranes. • Describe the macroscopic & microscopic features of decidua. • Enlist the various parts of decidua. • Functionally correlate the parts of the decidua with its structure • Describe the Changes in the trophoblast leading to the development of placenta. • Describe the Structure (macroscopic & microscopic) of placenta. • Enlist & correlate the functions of placenta with its structure. • Describe the Microscopic anatomy of Placental membrane. • Describe the Placental circulation (fetal & maternal)	Integrate with Gynaecology	Placenta	LGIS (Large group interactive session)

	- Embryologically justifies the hemolytic disease of the neonate (Erythroblastosis fetalis). - Describe the placental anomalies and their clinical picture (placenta previa, placenta accreta, placenta percreta, battledore placenta, membranous placenta, pre-eclampsia)	Integrate with Gynaecology		LGIS (Large group interactive session)
FA-035	- Describe the Formation & fate Umbilical cord. - Describe the Cord abnormalities. Justify embryologically the clinical features observed in absence of umbilical artery - Describe the formation and circulation of Amniotic fluid. - Describe the Procedure of diagnostic amniocentesis. - Explain the significance of amniotic fluid. - Describe the factors responsible for Polyhydramnios and oligohydramnios. - Describe the consequences of oligohydramnios and polyhydramnios. Define amniotic bands. - Explain the formation and fate of umbilical vesicle (yolk sac). Define physiological umbilical hernia.	Integrate with Gynaecology	Fetal membranes	LGIS (Large group interactive session)
FA-036	- Describe the development of Dizygotic twins. - Describe the development of Monozygotic twins. - Describe the fetal membranes in twin pregnancy. - Describe Fetus Papyraceous - Explain the zygosity of the twins. - Describe the characteristics of various types of conjoined monozygotic twins	Embryology	Multiple pregnancies	LGIS (Large group interactive session)
FA-037	- Define preterm birth. - Describe parturition & three stages of labor. - Describe the Various methods of pre-natal diagnosis. - Describe the Fetal therapy		Prenatal diagnosis and Fetal therapy	LGIS (Large group interactive session)

	- Describe maternal serum screening - Correlate levels of Alpha fetoprotein levels and fetal anomalies - Describe stem cell transplantation and gene therapy	Embryology		
FA-038	Define morphogens, protein kinases, notch delta pathway, transcription factors, epigenetics.		Molecular regulations and signaling pathways	LGIS (Large group interactive session)
FA-039	- Define teratology and causes of birth defects - Define genomic imprinting. - Define human disorders associated with genetic mutations. - Describe birth defects caused by genetic factors: numerical and structural anomalies. - Define and enlist the teratogens. - Describe the role of following in causing teratogenicity in humans: - Drugs - Environmental agents - Chemicals & heavy metals - Infectious agents - Radiation - Hormones - Maternal diseases - Describe the basis for male-mediated teratogens - Describe the prevention of birth defects		Teratogenicity	LGIS (Large group interactive session)
Microscopic Anatomy (Histology and Pathology) Total Hours= 08				
FA-040	- Describe different types of microscopes. - Describe staining methods and their significance.	Basic techniques in histology	Introduction to microscopy & staining techniques	LGIS (Large group interactive session)

FA-041	- Describe the electron microscopic structure and fluid mosaic model of plasma membrane. - Draw the fluid mosaic model of plasma membrane. - Draw and label the structure and function of glycocalyx coat and lipid raft. - Describe the structure of glycocalyx coat and lipid raft and correlate it with function. - Describe different types of membrane proteins and their functions.	Basic Histology	Cell membrane	LGIS (Large group interactive session)
	- Describe the electron microscopic structure and fluid mosaic model of plasma membrane. - Draw the fluid mosaic model of plasma membrane - Describe the structure of glycocalyx coat and lipid raft and correlate it with function. - Describe different types of membrane proteins and their functions.	Basic Histology		LGIS (Large group interactive session)
	Explain different modes of transport across the cell membrane.	Integrate with Pathology		
FA- 042	- List the membranous and non-membranous cellular organelles. - Describe the structure of the following cellular organelles and correlate with their function: - Ribosomes - Endoplasmic reticulum (rough & smooth) - Golgi apparatus - Lysosomes - Proteasomes - Mitochondria - Peroxisomes	Integrate with Pathology	Cell organelles	LGIS (Large group interactive session)
				Small group discussion

	- Describe the structural components of cytoskeleton, and correlate them with their functions - Explain the histological basis of immotile cilia syndrome.	Integrate with pathology	Cell organelles	LGIS (Large group interactive session)
	Describe the histological features of Cytoplasmic inclusions	Integrate with pathology		
	Describe the structure of nuclear envelope and nuclear pores	Integrate with Physiology	Cell nucleus	LGIS (Large group interactive session)
FA-043	- Describe the structure of chromatin. - Describe the structure of chromosomes. - Describe the structure of nucleolus. - Describe the structure and types of DNA and RNA. - Describe the histological basis for Apoptosis and necrosis	Histology		LGIS (Large group interactive session)
	Describe structure of different types of cell junctions	Integrate with pathology		LGIS (Large group interactive session)
	- Describe the cell cycles & cell division - Define important clinicopathological terms: Atresia, Hypertrophy, Atrophy, Hyperplasia, Metaplasia, Anaplasia, Neoplasia, Inflammation, Metastasis			LGIS (Large group interactive session)

FA-044	- Describe the histological structure and function of basement membrane (light and electron). - Draw and label a diagram illustrating the electron microscopic structure of basement membrane. - Describe the basal surface modifications of epithelia. - Describe the electron microscopic structure and functions of intercellular junctions (lateral surface modifications) and give their locations. - Describe the Biochemical composition of the basolateral modifications.	Histology	Epithelium	LGIS (Large group interactive session)
	Describe the electron microscopic structure of the following apical cell surface specializations: 1. Microvilli 2. Stereocilia 3. Cilia	Integrate with biochemistry		LGIS (Large group interactive session)
	Classify and exemplify the epithelia with their histological structure, locations and functions.	Integrate with pathology		LGIS (Large group interactive session)
	- Describe the structure of exocrine glands. - Explain the mechanism of transport across the epithelia. - Describe the classification of exocrine glands based on: 1. Shape of secretory portions and ducts 2. Mode of secretion 3. Type of secretion	Histology		LGIS (Large group interactive session)
FA-045	- Describe the composition and list the constituents of connective tissue. - Classify the connective tissue with examples. - Describe the composition of ground substance of connective tissue. - Describe the composition, distribution, and function of glycosaminoglycans in connective tissue - Describe connective tissue fibers, cells. Define fibrosis	Histology	Connective tissue	LGIS (Large group interactive session)
	Describe the structure, distribution, and functions of the cells of macrophage-Mononuclear phagocytic system	Integrate with Biochemistry/ physiology		LGIS (Large group interactive session)
	- Describe the role of macrophages in innate immunity & formation of foreign body gaint cell - Describe the structure & functions of Mast cells. Role of Mast cells in			LGIS (Large group interactive session)

	immediate hypersensitivity reactions. Describe structure of Plasma Cells and their role in antibody formation.			
	Describe the types of adipose tissue (white & brown), their histogenesis, Locations and function	Integrate with pathology		LGIS (Large group interactive session)
	Describe lipid storage and mobilization in and from adipocytes and compare the Brown and white adiposetissue			LGIS (Large group interactive session)

PRACTICAL

CODE	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT (Mode of information transfer)
	General Anatomy	Total Hours=03		SGD(Small group discussion)
FA-046	• Demonstrate the anatomical terms of position and movement, on limbs. • Demonstrate various anatomical movements of body. • Identify various elevations and anatomical landmarks on bones. • Identify and interpret normal radiographs of various body regions. • Identify and interpret joint dislocations and displaced fracture bone segments radiographically.	Anatomy	Osteology Imaging and cross-sectional anatomy Arthrology	
	Embryology	Total Hours=05		
FA-047	• Calculate fertilization age, gestational age, embryonic/fetal age and expected date of delivery. • On models, charts, aborted embryos and	Anatomy	Embryology	
				SGD(Small group discussion)

	fetal specimens, identify the: - Events of embryonic period, i.e., cleavage, morula and blastula formation, yolk sac, amniotic cavity, connecting stalk, gastrulation (notochord & primitive streak, three germ layers and their parts/derivatives), angiogenesis, neurulation, somites, and embryonic age determination based on it, chorionic villi (primary, secondary & tertiary), developmental defects (sacroccygeal teratoma, neural tube defects) - Placenta and its positional & implantational variations, umbilical cord and its contents. - Fetal features during fetal period. Determine age of fetus based on these features.	Anatomy	Embryology	SGD(Small group discussion)
	Describe the USG (Ultrasonograohy) report for the: fetal features, fetal age estimation, placental attachment with variations, fetal membranes and multiple pregnancies	Anatomy		
	Histology	Total Hours=14		
FA-048	Describe different types of staining techniques and their significance with Special emphasis on H&E (Hematoxylin and Eosin) staining		Staining techniques	Laboratory Practical
FA-049	Enlist important features of different parts of light microscope		Microscope	Laboratory Practical
FA-050	Identify and draw & label different cell shapes under the microscope		Cell shape	
FA-051	- Identify under light microscope and draw and label the following types of epithelia: - Simple squamous - Simple cuboidal - Simple columnar (ciliated & non- ciliated) - Pseudostratified columnar (ciliated & non-ciliated) - Stratified squamous (keratinized & non keratinized) - Stratified cuboidal - Stratified columnar	Microscopic Anatomy	Epithelium	Laboratory Practical
FA-052	Identify under light microscope and draw and label serous & mucous secreting glands under light		Epithelium	Laboratory Practical

	microscope			
FA-053	Identify under light microscope and draw and label the various types of connective tissue		Connective tissue	Laboratory Practical

MEDICAL PHYSIOLOGY

THEORY

PHYSIOLOGY		Total Hours = 40		MIT (Mode of information T)
CODE	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	
P-001	- Define Homeostasis - Explain control system of body by giving examples. - Differentiate between Extracellular and Intracellular fluids. - Explain the positive and negative feedback mechanisms with examples. - Explain the significance of feed forward/ adaptive control/delayed negative feedback mechanisms. - Explain the structure of cell membrane. - Enlist the types of cell membrane proteins. - Enumerate the functions of membrane proteins. - Define and enumerate the functions of cell Glycocalyx. - Enlist membranous and non-membranous organelles. - Enlist the self-replicative organelles. - Differentiate between the functions of smooth and rough endoplasmic reticulum. - Explain the functions of Golgi apparatus. - Enlist the enzymes of lysosomes Explain the functions of lysosomes. - Enlist the enzymes of peroxisomes. - Explain the functions of peroxisomes. - Enumerate the components and functions of cytoskeleton. - Define and enlist types of endocytosis. - Explain the mechanism of pinocytosis. - Classify different transport mechanisms. - Compare the composition of Na, K and Cl in extracellular and intracellular fluid. - Define and enlist different types of diffusion. - Explain the process of facilitated diffusion with the aid of diagram. - Define and classify different types of active transport. - Describe primary and secondary Active	Medical Physiology	Cell Biology	LGIS (Large group interactive session)

	transport with examples - Explain voltage and ligand gated channels with examples. - Name Na, K channel Blockers. - Discuss functions and significance of Na/K ATPase pump.			LGIS (Large group interactive session)
FP- 002	- Enumerate the functions of blood. - Explain the composition of blood. - Enumerate the plasma proteins. - Discuss functions of plasma proteins & describe the pathophysiology of edema.	Medical Physiology	Blood	LGIS (Large group interactive session) / SGD (Small group discussion)
FP- 003	- Discuss the characteristics of red blood cells. - Explain different types of Bone marrows. - Enumerate the different sites of erythropoiesis at different ages. - Explain the stages of erythropoiesis. - Enumerate factors that regulate erythropoiesis. - Discuss the site and role of erythropoietin in red blood cell production. - Explain the significance of vitamin B12 and folic acid in maturation of red blood cell	Medical Physiology	Red Blood Cells	LGIS (Large group interactive session)
FP- 004	- Enumerate the types of normal hemoglobin in different ages of life. - Explain the role of Iron in Hemoglobin formation. - Define blood indices, give their normal values & enumerate the conditions in which these values are disturbed. - Enlist the abnormal types of hemoglobin	Medical Physiology	Haemoglobin	LGIS (Large group interactive session) / SGD (Small group discussion)
FP- 005	- Enumerate the types of white blood cells. - Describe the characteristics and functions of Neutrophils. - Explain the process of defense against invading agent by neutrophils. - Define leukocytosis and leukemia. - Explain the effects of leukemia on the body. - Define leukopenia. - Explain the process of defense against invading agent by macrophages. - Discuss different lines of defense during inflammation. - Explain the functions of neutrophils and macrophages in spread of inflammation (walling off effect)	Medical Physiology	White Blood Cells	LGIS (Large group interactive session)

	- Define the Reticuloendothelial system. - Enlist the different components of Reticuloendothelial system			
	- Explain the characteristics and functions of basophils. - Explain the characteristics and functions of eosinophils and enlist conditions in which these cells are raised.			
FP-006	- Enumerate different blood group types. - Explain the basis of ABO and Rh blood system. - Explain the Landsteiner law	Medical Physiology	Blood Types	LGIS (Large group interactive session) / Laboratory Practical
FP-007	- Discuss Components of Autonomic nervous system. - Explain the physiological anatomy of sympathetic and parasympathetic nervous system	Medical Physiology	Autonomic nervous system	LGIS (Large group interactive session)
	- Describe the types of adrenergic and cholinergic receptors and their functions. - Explain the effects of sympathetic and parasympathetic on various organs/ system of body			LGIS (Large group interactive session)

PRACTICAL

CODE	PHYSIOLOGY PRACTICAL	Total Hours = 10		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
FP-008	- Explain laboratory/clinical procedure to the subject. - Obtain verbal consent from subject before starting a procedure. Reassure the subject after the procedure.	Medical Physiology	Consent	Laboratory Practical
FP-009	Determine Erythrocyte Sedimentation Rate and packed cell volume		RBCs	
FP-010	Determination of blood group		Blood Group	
FP-011	Interpret Total Leucocyte Count, Differential Leucocyte Count (normal & abnormal) in a CBC report generated by Automated Cell Counter		WBCs	

MEDICAL BIOCHEMISTRY

THEORY

BIOCHEMISTRY THEORY		Total Hours = 36		MIT (Mode of Information Transfer)
CODE	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	
FB-001	- Differentiate between different types of cells. - Explain the concept of organization of cells to tissue, tissues to organ, organs to system. - Differentiate between the eukaryotic and prokaryotic cells.	Cell Biology	Structure of cell	LGIS (Large group interactive session) / Tutorials / SGD (Small Group Discussion)
FB-002	- Describe the composition and structure of cell on biochemical basis and justify it as fluid mosaic model. - Describe the structure and function of cell membrane with reference to the role of (i) Lipids (ii) Carbohydrates (iii) Proteins - Explain why the cell membrane is called fluid mosaic model		Cell Membrane	LGIS (Large group interactive session) / Tutorials / SGD (Small Group Discussion)
FB-003	- Discuss the various ways of cell-to-cell communication and to the environment. - Describe cell to cell communications. Cell signaling pathways (only G protein signaling) - Describe cell to cell adhesion.		Signal transduction	LGIS (Large group interactive session) / Presentations / Tutorials / SGD (Small Group Discussion)
FB-004	- Explain the biochemical markers and importance of subcellular organelles and their inherited disorders especially: a. I- cell disease b. Refsum disease c. Parkinsonism d. Progeria		Subcellular organelles	LGIS (Large group interactive session) / Presentation s/ Tutorials / SGD (Small Group Discussion)
FB-005	Describe the chemistry of purine sand Pyrimidines and their linkage in nucleic acid synthesis.		Chemistry of purine and pyrimidines	LGIS (Large group interactive session) / Presentations / Tutorials / SGD (Small Group Discussion)

FB-006	- Discuss the organization of DNA with special reference to Watson and crick model, composition, structure, role of - proteins, Chargaff's rule of base pairing and genetic coding. - Describe the structural forms of DNA - Discuss the structure of different types of RNAs with special reference to composition, linkage,		DNA	LGIS (Large group interactive session) / Presentations / Tutorials / SGD (Small Group Discussion)
FB-007	functions in RNA, micro-RNA - Illustrate the structure and functions of various types of RNAs. - Describe the functions of various small RNAs. - present in cell		RNA	LGIS (Large group interactive session) / Tutorials / SGD (Small Group Discussion)
FB-008	- Explain the structure and nomenclature of nucleotides, biomedical importance of natural and synthetic analogues. - Interpret the role of synthetic analogues of nucleotides in medicine based on sign/symptoms and data e.g., Methotrexate, 5 Fluorouracil and Allopurinol.		Nucleotides	LGIS (Large group interactive session) / Presentations / Tutorials / SGD (Small Group Discussion)
FB-009	- Explain the higher organization of DNA. Difference between DNA, chromatid and - chromosome		Chromosome	LGIS (Large group interactive session) / Tutorials / SGD (Small Group Discussion)
FB-010	- Describe enzymes with reference to: - Active sites - Specificity - Catalytic efficiency - Cofactor - Coenzyme - Holoenzyme - Apoenzyme - Prosthetic group - Zymogens 10. Location Classify enzymes according to the reaction they catalyze and their nomenclature. Explain the mechanism of enzyme action from reactants to products (catalysis). Discuss the effect of various factors on enzymatic activity: - Substrate concentration - Temperature		Enzymes	LGIS (Large group interactive session) / Presentations

	3. PH 4. Enzyme concentration Explain the regulation of enzymatic activity (Michaelis Menten and Line weaver Burk's equation). Discuss inhibitors of enzymatic activity (with special reference to K_m/V_{max}) 1. Competitive 2. Non competitive 3. uncompetitive Explain the application of enzyme in clinical diagnosis • and therapeutic use			
FB-011	Classify amino acids based on polarity, nutritional importance and glucogenic/Ketogenic properties • Explain the structure, physical, chemical properties of amino acids and their biomedical importance		Amino acids	LGIS (Large group interactive session) / Presentations / Tutorials / SGD (Small Group Discussion)
FB-012	Classify proteins on the basis of functions, solubility and physicochemical properties 1. Explain its biomedical importance 2. Distinguish between class A and B proteins Protein Explain the structural levels of proteins 1. Differentiate between alpha helix and beta pleated protein structures 2. Identify bonding at different levels of proteins Describe the role of chaperons in protein folding 1. Interpret disorders related to protein misfolding on basis of given data 2. Describe the biochemical basis of Alzheimer's • disease/ prion disease		Protein	LGIS (Large group interactive session) / Presentations
FB-013	Classify and explain the bio-chemical role of each • class of plasma proteins		Plasma proteins	LGIS (Large group interactive session) / Presentations / Tutorials / SGD (Small Group Discussion)
FB-014	Explain the structure and biochemical role of Immunoglobulins 1. Describe the production, structure and functions of B cells, plasma cells, and antibodies (IgA, IgD, IgE, IgG, and IgM). 2. Discuss the functions of the cytokines		Immunoglobulins	LGIS (Large group interactive session) / Presentations / Tutorials /

	(Interleukins (ILs), Tumor Necrosis Factor (TNFs), IFs, Platelet derived growth factor (PDGF), and Platelet activating factor (PAF)). 3. Interpret multiple myeloma on basis of given • data			SGD (Small Group Discussion)
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PRACTICAL				
CODE	BIOCHEMISTRY PRACTICAL	Total Hours = 10		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT (Mode of Information Transfer)
FB-015	• Demonstrate the step taken to prevent or rectify the Laboratory Hazards	Biochemistry	Lab hazards	Demonstrations Performances
FB-016	• Identify the structure of cells under microscope		cell	
FB-017	• Identify the methods of isolation of cell organelles'		Cell organelles	
FB-018	• Identify the different parts of equipment i.e., centrifuge, Microlab, Electrophoresis, Hot Oven, water bath		Equipment	
FB-019	Detection of amino acids by paper chromatography Prepare different types of solution Molar, Molal, Normal and %		Chromatography Solutions	

MEDICAL PATHOLOGY

THEORY

CODE	Pathology theory	Total Hours = 12		MIT (Mode of Information Transfer)
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	
FPa-001	• Discuss the significance of pathology. • Discuss the causes of cell injury. • Identify the types of cell injury. • Describe the mechanism of cell injury. • Identify the types of cell death. • Define necrosis and apoptosis. • Describe different types of necrosis. • Compare apoptosis with necrosis. • Identify different types and mechanisms of cellular adaptations to stress. • Discuss the mechanism and types of intracellular accumulations and pathological calcifications	General Pathology	Cell Injury	LGIS (Large group interactive session)

FPa-002	- Enumerate the microbes causing infectious diseases. - Describe the structure of bacterial cells. - Differentiate cell walls of gram positive and gram-negative bacteria. - Compare the structure of bacterial cells and viruses. - Discuss the growth curve of bacteria. - Enlist steps of viral replication. - Identify types of bacterial infections	General Microbiology	Introduction to Microorganisms	LGIS (Large group interactive session)
	- Enlist stages of bacterial pathogenesis - Discuss the determinants of bacterial pathogenesis			
FPh-003	- Define sterilization and disinfection. - Describe the principles of sterilization & disinfection. - Describe clinical uses of common disinfectants and their mode of sterilization. - Discuss physical and chemical agents of sterilization		Sterilization & Disinfection	LGIS (Large group interactive session)

PHARMACOLOGY AND THERAPEUTICS

THEORY

CODE	Pharmacology theory	Total Hours = 04		MIT (Mode of Information Transfer)
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	
FPh-001	- Definitions of Pharmacology, drug, pro-drug, placebo, active principles, sources of drugs. - Brief outline of Absorption, Distribution, Metabolism and Excretion	General Pharmacology	Absorption, Distribution, Metabolism and Excretion of drugs	LGIS (Large group interactive session)
FPh-002	- Definitions of receptor, agonist, partial agonist, inverse agonist, antagonist, and types of receptors and second messengers. - Diagrammatic concept of signaling mechanisms		Basic terminologies of Pharmacology	LGIS (Large group interactive session)
FPh-003	Pharmacological aspects of Autonomic Receptors (types of autonomic receptors, important sites and actions)		Autonomic System	LGIS (Large group interactive session)

COMMUNITY MEDICINE AND PUBLIC HEALTH

THEORY

CODE	Community Medicine theory	Total Hours = 08		MIT (Mode of Information Transfer)
	SPECIFIC LEARNING OBJECTIVES	DICIPLINE	TOPIC	
FCM-001	- Describe the changing concepts and new philosophy of health. - Explain responsibility for health	Health	Concept of health	LGIS (Large group interactive session)
FCM-002	- Explain dimensions and determinants of health and their role in achieving positive health. - Discuss concept of health and wellbeing - Describe the Physical quality of Life Index & Human Development Index		Positive health Dimensions, health Determinants	LGIS (Large group interactive session)
FCM-003	- Describe explain importance of health indicators. - Classify health indicators. - Calculate Morbidity and Mortality - Describe Disability indicators. - Compare indicators among countries		Health indicators	LGIS (Large group interactive session)
FCM-004	- Conceptualize disease causation and natural history of disease. - Explain Germ theory & multifactorial causation. - Describe Epidemiological Triad - Discuss Web of disease causation - Describe Gradient of infection	Disease	Disease causation	LGIS (Large group interactive session)
FCM-005	- Describe principles of prevention and control on prevalent diseases - Explain difference between elimination and eradication. - Describe disease surveillance, types and cycle. - Explain Primary, secondary, & tertiary prevention. - Describe five levels of interventions		Disease Prevention	LGIS (Large group interactive session)

AGING

THEORY

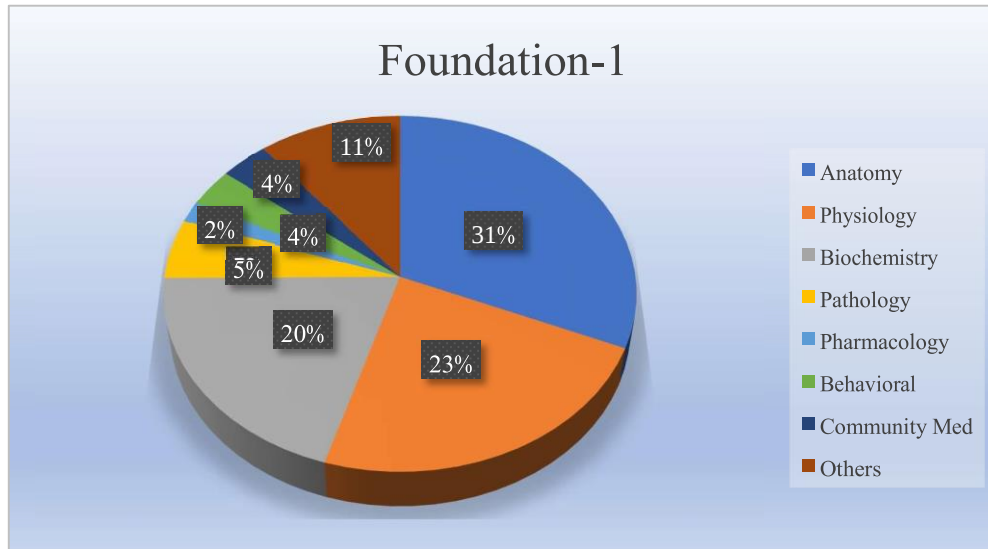
CODE	Aging theory	Total Hours = 01		MIT (Mode of Information Transfer)
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	
FAG-001	Discuss telomeres and telomerase and their clinical significance in aging.	Geriatrics Integrate with Biochemistry	Process of Aging	LGIS (Large group interactive session)

IMPACT (EPIDEMIOLOGY, SOCIOLOGY/SOCIETY, PUBLIC HEALTH)

THEORY

CODE	Theory	Total Hours = 08		MIT (Mode of Information Transfer)
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	
FBS-001	- Identify the Biological Basis of human behavior and discuss social behavior. - Describe processes such as neurobiology of memory, emotions, sleep, learning, motivation, sex, arousal, reward, and punishment	Behavioral Sciences integrated with healthcare	Biological Basis of behavior	LGIS (Large group interactive session)
FBS-002	- Identify the burden of mental illness on the person, family, and society. - Describe Intellectual disability, Mental Disorders and Personality Disorders		Psychological Disorders	LGIS (Large group interactive session)
FBS-003	- Identify the role of psychosocial factors in various illnesses. - Describe psychosocial aspects of various system diseases such as CVS, CNS, GIT, Respiration, renal, endocrine and Cancer		Psychology and Disease	LGIS (Large group interactive session)
FBS-004	- Identify the behavioral factors associated with pharmacological treatment of diseases. - Discuss Health belief model, treatment compliance and its psychosocial factors, social factors in drugs prescription and drug resistance		Behavioral factors and pharmacological treatment	LGIS (Large group interactive session)
FBS-005	- Identify the rehabilitation work for patients on dialysis and any kind of physical disability. - Discuss the care requirements in chronic debilitating conditions like Diabetes, Multi-infarcts Dementia, chronic renal disease, limb amputation		Palliative care	LGIS (Large group interactive session)
FBS-006	- Identify the various physiological effects of stress. - Explain ANS response to stress. - Describe behavioural manifestations of stress. - Stress related multiple sclerosis and autoimmune diseases		Stress	LGIS (Large group interactive session)

**DISTRIBUTION AND DURATION OF TEACHING
ACTIVITIES
AMONGST DISCIPLINES**



Module Weeks	Recommended Minimum Hours
08	223

HEMATOPOIETIC & LYMPHATICMODULE

RATIONALE OF MODULE 2

Blood is Life". Unlike any other organ, components of blood and immunity reflect/reveal disease processes in other organs as well. Therefore, studying blood is like opening a book to all aspects of medicine, Hence, this module has been designed to enable students to have a basic understanding about the normal structure, function and biochemistry of blood, immune and Lymphatic systems. Not only that, but students would also learn, when normal physiology and composition blood and immune system is disturbed, what disorders result in our community. Emphasis has been given to incorporate deranged laboratory findings into the clinical problem solving.

MODULE OUTCOMES

1. Explain the function of all the organs / structures involved in this system and the mechanisms controlling them. (Spleen, lymph nodes, thymus, bone marrow, RBC's, WBCs, and platelets 2. Explain the etiology and pathogenesis of common blood & lymphatic diseases, particularly those of importance in Pakistan. 3. Explain the rationale for the use of common therapeutic agents for the diseases related to Blood and immunity. 4. Describe the role of immunity in the body. 5. Discuss the working & uses of laboratory instruments in diagnostic lab visits. 6. Relate red cell indices with health and disease. 7. Recognize ABO/RH blood grouping system. 8. Describe the role of Reticuloendothelial system in the body. 9. Describe the events of hemostasis. 10. Extrapolate the biochemical aspects of plasma proteins. 11. Discuss the pharmacological treatment of iron deficiency anemia. 12. Discuss Blood composition and function. 13. Discuss the role of liver in hemolytic anemia. 14. Practice history taking of a patient presented with blood disorders
Themes
1. Red blood cell 2. Platelets 3. White blood cell
Clinical Relevance
1. Aplastic anemia 2. Hemolytic anemia 3. Blood loss anemia 4. Nutritional anemia 5. Polycythemia 6. Hemoglobinopathies 7. Jaundice 8. Acute and chronic lymphocytic and myelogenous Leukemia 9. Allergy (Type I, Type II & Type III)

CURRICULUM OF INDIVIDUAL SUBJECTS

HUMAN ANATOMY

THEORY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 2		MIT (Mode of information transfer)
	GROSS ANATOMY	DISCIPLINE	TOPIC	
HL-A-001	- Identify and describe the components of the - Hematopoietic & Lymphoid Tissue and their function - Location, coverings, relations of Spleen - Origin, course branches and distribution of - Splenic artery - Venous drainage of Spleen, Portal vein - formation, tributaries, and area of drainage. - Location and relations of Thymus. - Age related changes in Thymus	Human Anatomy	Hematopoietic & Lymphoid Tissue	LGIS (Large group interactive session) SGD (Small group discussion)
	EMBRYOLOGY & POST-NATAL DEVELOPMENT	TOTAL HOURS = 1		
HL-A- 002	Intrauterine Development of spleen	Embryology	Developmental Anatomy of Spleen	LGIS (Large group interactive session)

PRACTICAL

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 2		MIT (Mode of information transfer)
	HISTOLOGY	DISCIPLINE	TOPIC	
HL-A- 003	Light microscopic structure of Spleen, Thymus, Lymph nodes, tonsils and MALT including Appendix.	Histology	Histological features of lymph node, spleen & thymus	Laboratory Practical

MEDICAL PHYSIOLOGY

THEORY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 20		MIT (Mode of information transfer)
	NORMAL FUNCTIONS	DISCIPLINE	TOPIC	
HL-P- 001	- Define anemia. - Classify anemia based on morphology and cause. - Discuss the effects of anemia on the body	Medical Physiology	Anemia	LGIS (Large group interactive session)
HL-P- 002	- Define polycythemia. - Explain types of polycythemias - Discuss the effects of polycythemia on the body		Polycythemia	LGIS (Large group interactive session)
HL-P- 003	- Define hemostasis. - Describe the mechanisms by which hemostasis is secured		Hemostasis	LGIS (Large group interactive session)
HL-P- 004	- Discuss the characteristics and functions of platelets. - Explain the mechanism of formation of platelet plug		Platelets	LGIS (Large group interactive session)
HL-P- 005	- Enlist the clotting factors in blood. - Explain the conversion of Prothrombin to Thrombin & formation of Fibrin Fibers - Explain the Intrinsic & extrinsic clotting pathway. - Name & explain the mechanism of anticoagulants used in the laboratory. - Explain the factors that prevent intravascular coagulation. - Explain the role of Calcium ions in Intrinsic and Extrinsic pathways. - Enlist the vitamin K dependent clotting factors. - Explain the prothrombin time, INR, and its clinical significance.		Coagulation factors	LGIS (Large group interactive session)
HL-P- 006	- Enlist and explain the conditions that cause excessive bleeding. - Define thrombocytopenia. - Enlist the causes and consequences of Thrombocytopenia	Medical Physiology integrated with medicine	Coagulation disorders	LGIS (Large group interactive session)

HL-P- 007	- Define immunity. - Classify immunity. - Explain humoral immunity. - Explain Innate immunity. - Elaborate cell mediated immunity. - Describe the structure of antigen and immunoglobulin - Describe the role of Helper T-cells in cell mediated immunity. - Enlist the types of Immunoglobulins along with their functions. - Explain the role of memory cells in enhancing antibody response (secondary response) - Describe the mechanism of action of antibodies. - Elaborate the complement system.	Medical Physiology	Immunity	LGIS (Large group interactive session)
HL-P- 008	- Elaborate Immune tolerance. - Explain the process of clone selection during T cell processing. - Discuss the failure of tolerance mechanism	Medical Physiology	Tolerance	LGIS (Large group interactive session)
HL-P- 009	- Discuss immunization. - Define passive Immunity. - Explain features and physiological basis of delayed reaction allergy. - Explain features and physiological basis of Atopic Allergy - Explain features and physiological basis of Anaphylaxis, urticaria and Hay fever.	Medical Physiology Integrate with Pediatrics	Immunization	LGIS (Large group interactive session)
HL-P-010	Discuss the pathophysiology, features and treatment of ABO and RH incompatibility	Medical Physiology Integrate with Pathology	Blood group In-Compatibility	LGIS (Large group interactive session)
HL-P- 011	- Discuss the features and complications of mismatched blood transfusion reaction - Elaborate the Transplantation of Tissues and Organs		Blood mismatch Transfusion reactions	LGIS (Large group interactive session)
HL-P- 012	- Explain the process of tissue typing. - Explain prevention of Graft Rejection by suppressing immune system	Medical Physiology Integrate with Nephrology	Transplantation of tissues	LGIS (Large group interactive session)

PRACTICAL

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 6		MIT (Mode of information transfer)
	PHYSIOLOGY PRACTICALS	DISCIPLINE	TOPIC	
HL-P- 013	- Interpret the Red Blood Cell Count, Hemoglobin concentration, Hematocrit and RBC Indices by Automated Cell Counter - Interpret the Total Leucocyte Count, Differential Leucocyte Count Platelet Count by Automated Cell Counter.	Medical Physiology	Blood Cells	Laboratory Practical
HL-P- 014	- Determine Bleeding Time. - Determine Clotting Time		Bleeding/ Clotting time	

MEDICAL BIOCHEMISTRY

THEORY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 21		MIT (Mode of information transfer)
		DISCIPLINE	TOPIC	
HL-B- 001	- Discuss the biochemical role and types of hemoglobin. a) Differentiate Hemoglobin and myoglobin. b) Explain oxygen dissociation curve of hemoglobin and myoglobin and factors regulating them. c) Interpret CO toxicity on the basis of sign and symptoms. d) Explain the role of 2,3 BPG in fetal circulation	Medical Biochemistry	Hemoglobin and its types/ RBCs	LGIS (Large group interactive session) / Tutorials / SGD (Small Group Discussion)
HL-B- 002	- Discuss haemoglobinopathies and their biochemical and genetic basis with special emphasis on sickle cell anemia, Thalassemia and methemoglobinemia. a) Discuss the following types of anemia based on signs and symptoms and laboratory data: b) Hypochromic microcytic c) Normochromic microcytic d) Normochromic normocytic e) Macrocytic (megaloblastic)	Medical Biochemistry integrate with Pathology	Hemoglobinopathies/ RBCs/ Homeostasis	LGIS (Large group interactive session) / Tutorials / SGD (Small Group Discussion)
HL-B- 003	- Explain the iron metabolism with mechanism of absorption and factors affecting it. a) Interpret Iron deficiency anemia on the basis of given data and microscopic findings. b) Interpret folic acid and cobalamin in relation to anemias on given data and microscopic findings. c) Discuss biochemical role of pyridoxine and vitamin C in microcytic anemia	Medical Biochemistry Integrated with Medicine	Iron Metabolism/ RBCs	LGIS (Large group interactive session) / PBL (Problem Based Learning)
HL-B- 004	- Discuss the degradation of heme in macrophages of reticuloendothelial system. a) Describe the formation of bile pigments, their types and transport. b) Discuss the fate of bilirubin	Medical Biochemistry	Heme Degradation/ RBCs	LGIS (Large group interactive session) / Presentation/Tutorials / SGD (Small Group Discussion)
HL-B- 005	- Discuss hyperbilirubinemias and their biochemical basis. a) Differentiate types of jaundice on basis of sign/symptoms and data b) Evaluate the genetic basis of jaundice on the basis of lab investigations		Hyperbilirubinemias / RBCs/ Blood Groups	LGIS (Large group interactive session) / Presentations/Tutorials / SGD (Small Group Discussion)

HL-B- 006	Classify and Explain the biomedical importance of each class of plasma proteins		Plasma Proteins/ Homeostasis	LGIS (Large group interactive session) / Presentation/Tutorials / SGD (Small Group Discussion)
HL-B- 007	- Explain the structure and biochemical role of immunoglobulins. a) Describe the production, structure and functions of B cells, plasma cells, and antibodies (IgA, IgD, IgE, IgG, and IgM). b) Discuss the functions of the cytokines (ILs, TNFs, IFs, PDGF, and PAF). c) Interpret multiple myeloma on basis of given data		Immunoglobulins/ WBCs/ Immunity	LGIS (Large group interactive session) / Presentation/Tutorials / SGD (Small Group Discussion)
HL-B- 008	Explain and interpret pedigree of single gene defect i.e. sickle cell anemia (Autosomal recessive) and Beta Thalassemia (x linked recessive)		Genetics	LGIS (Large group interactive session)

PRACTICAL				
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 6		MIT (Mode of information transfer)
	BIOCHEMISTRY PRACTICALS	DISCIPLINE	TOPIC	
HL-B-009	- Interpret jaundice based on estimation of bilirubin - Perform estimation of ALT and interpret the findings. - Perform estimation of AST and interpret the findings. - Perform estimation of ALP and interpret the findings. - Interpret graph based on oxy HB curve and 23 BPG Interpret different types of anemias & porphyrias on basis of s/s and data	Medical Biochemistry	Jaundice & Anemias/ RBCs/ Homeostasis	Practical

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS

THEORY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 2+5= 7		MIT (Mode of information transfer)
		DISCIPLINE	TOPIC	
HL-Ph-001	- Describe the oral and parenteral iron preparations including their pharmacokinetics, uses, adverse effects. - Vitamin B12 preparations, Iron Antidotes - Should know the terms: Hematopoietic growth factors, their name, mechanism of actions, uses and adverse effects.	Pharmacology & Therapeutics	Anemia	LGIS (Large group interactive session)
HL-Pa- 001	- Define and classify anemias according to underlying mechanism and MCV/MCH - Discuss the causes and investigations of iron deficiency anemia and megaloblastic anemia. - Classify the benign and malignant disorders of - WBCs - Discuss the causes leading to reactive leukocytosis. - Interpretation of anemias based on peripheral blood smear and bone marrow findings. - Classify bleeding disorders. - Discuss first line laboratory investigations for bleeding disorders. - Describe the basic concept of blood grouping and acute hemolytic transfusion reaction	Pathology	Blood Cells, Platelets and Blood Group	LGIS (Large group interactive session)

DISEASE PREVENTION AND IMPACT

THEORY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 5		MIT (Mode of information transfer)
		DISCIPLINE	TOPIC	
HL-CM- 001	Describe the nutritional aspects of iron deficiency anemia and psychological aspects of diseases	Community Medicine and Public Health	Anemia	LGIS (Large group interactive session)
HL-CM- 002	- Enlist most common blood borne diseases in Pakistan. - Describe the routes of spread of blood borne diseases		Blood Cells, Platelets and Blood Group	LGIS (Large group interactive session)
HL-CM-003	Genetic counseling of parents		Genetic diseases	LGIS (Large group interactive session)
HL-BhS- 001	Psychological Counselling of patients and their families	Behavioral Sciences	Counselling, informational care	LGIS (Large group interactive session)
HL-BhS- 002	Identify and deal with the various psychosocial aspects of Hematopoietic System disorders (such as Sickle Cell Disease, Hemophilia, and Conditions of the Blood) on Individual, Family and Society.		Personal, Psychosocial, and vocational issues	LGIS (Large group interactive session)

AGING

THEORY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 5		MIT (Mode of information transfer)
		DISCIPLINE	TOPIC	
HL-Ag- 001	Discuss the role of platelets in PRP treatment in old age (for skin, hairs and joints)	Biochemistry /Dermatology	Platelet Rich Plasma Therapy	LGIS (Large group interactive session)
HL-Ag- 002	Explain the role of glutathione in skin whitening		Glutathione	LGIS (Large group interactive session)

PERLs (PROFESSIONALISM, ETHICS, RESEARCH, LEADERSHIP)

CODE	PERLs	ATTRIBU TE	Total hours = 06		MIT (Mode of Informatio n Transfer)
	SPECIFIC LEARNING OUTCOMES		TOPIC	PORTFOL IO ENTRY	
PERL s-001	- Describe a Portfolio - Describe types of portfolios - Identify Portfolio entries. - Write reflection based on Gibbs reflective cycle	Introductio n to PERLs	Portfo lio Reflec tive Writin g	Reflectiv e writing on portfolio outline develop ment	LGIS (Large group interact ive session)
	Demonstrate non-verbal and verbal communication skills				LGIS (Large group interact ive session)
	Describe principles of communication.				
PERL s-002	- Discuss types of Communication at professional level - Identify different Communication Styles - Explain the importance of non- verbal communication	Communica tor	Verbal and non- verbal Communicatio n Skills	Communi cation encounter with a peer or teacher	
	- Demonstrate active Listening. - Describe assertive Communication techniques. - Describe barriers to Effective Communication				
PERL s-003	- Follow the dress code and rules and regulations of the institution. - Demonstrate punctuality Describe responsibility to oneself. - Discuss responsibilities of being a learner	Responsi ble & Accounta ble	Responsibili ty towards self and the profession	Quiz on rules and regulatio ns of the institutio n Attendan ce	LGIS (Large group interacti ve session)
	Explain the professional code of conduct			record	
PERL s-004	- Work respectfully and effectively with their peers - Describe characteristics of a	Team Player	Teamwork	Self- evaluatio n through	TBL (Team Based Learnin

	team. - Describe types of teams - Discuss stages of team development.			reflective writing	g)
	- Identify various team roles. - Discuss barriers to effective teamwork				
PERs-005	- Maintain personal privacy while sharing information. - Identify cyber bullying, harassing, and sexting. - Describe cyber security laws. - Discuss digital rights and responsibilities.	Digital Citizen	Digital Identity& footprint	Make a digital profile case discussion of cyber bullying	LGIS (Large group interactive session)
PERL s-006	Discuss Science and scientific evidence	Evidence based practitioner	Difference between science, philosophy, art and Scientific method	Assignment on application of scientific method to a problem	LGIS (Large group interactive session)
PERL s-007	Identify gaps in learning through reflection	Self-directed Learner	Strategic planning Personal development plans Goal Setting	Written gaps in being a learner with goals	LGIS (Large group interactive session)

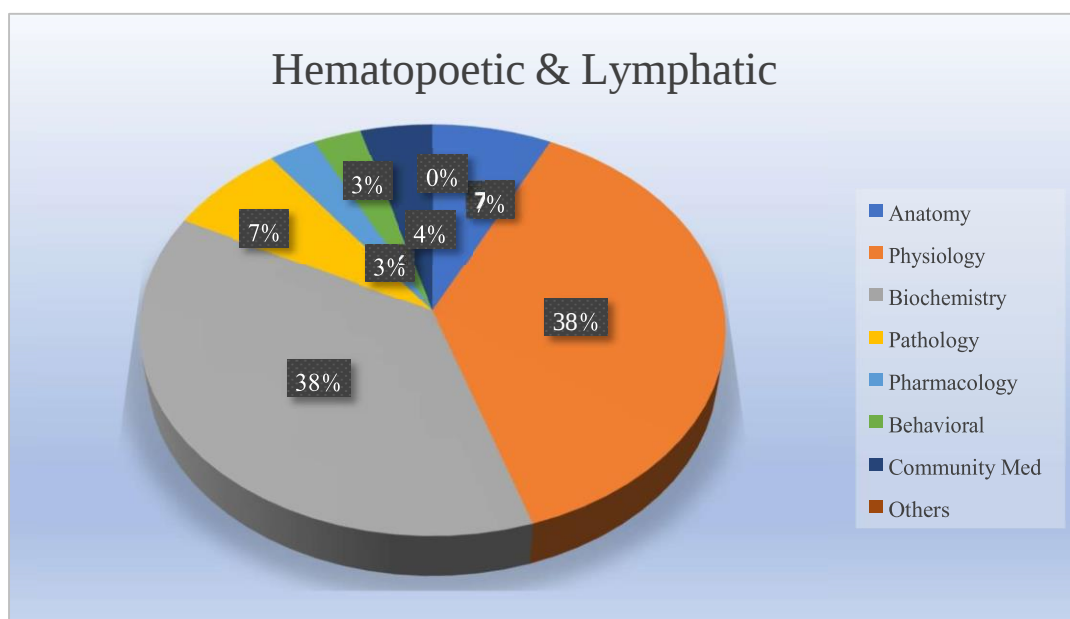
CLINICAL SKILLS FOUNDATION (C-FRC)

CODE	Early Clinical Exposure	Total Hours = 15		MIT (Mode of Information Transfer)
	SPECIFIC LEARNING OBJECTIVES	TOPIC	LOGBOOK ENTRIES	
C-FRC-1-01 1 st VISIT	Demonstrate the procedure of taking the pulse	Radial Pulse	3	Skills Lab / Demonstration / Bedside Teaching
C-FRC-1-02 2 nd VISIT	Record the Respiratory Rate of patient	Respiratory Rate measurement	3	Skills Lab / Demonstration / Bedside Teaching
C-FRC-1-03 3 rd VISIT	Demonstrate the procedure of taking the Blood Pressure	Blood Pressure	3	Skills Lab / Demonstration / Bedside Teaching
C-FRC-1-04 4 th VISIT	Demonstrate the process of wearing the gloves	Gloving	2	Skills Lab / Demonstration / Bedside Teaching
C-FRC-1-05 5 th VISIT	Demonstrate steps of hand washing	Hand washing	2	Skills Lab / Demonstration / Bedside Teaching

DISTRIBUTION AND DURATION OF TEACHING

ACTIVITIES

AMONGST DISCIPLINES



Module Weeks	Recommended Minimum Hours
03	69

MODES OF INFORMATION TRANSFER

Problem Based Learning (PBL) It is an instructional student-centered approach in which students work in small groups on a health problem, identifying their own educational needs and being responsible for the acquisition of the knowledge required to understand the scenario. Significance of its usage • Teamwork • Critical evaluation of literature • Self-directed learning and use of resources • Presentation skills • Leadership • Respect for colleagues views
Case Based Learning (CBL) It is an inquiry structured learning experience utilizing live or simulated patient cases to solve, or examine a clinical problem, with the guidance of a teacher and stated learning objectives. Significance of its usage • Induce a deeper level of learning by inculcating critical thinking skills. Flexibility on use of case • Helps students acquire insight full information. • Stay a breast with novel advancements in health care
Small Group Discussion (SGD) SGD is a class or short series of classes, in which one or more instructors provides intensive instruction on some subject to a small group. Its purpose is to explore view for discussion. Students point of allowing time and including self-directed, reflective learning skills Significance of its usage Develop and assess the extent of back ground knowledge of students, which enables them to properly understand concepts which may not have been understood in lectures. Develop problem-solving skills. Develop practice of self-learning. Reduced time to understand the topic.
Reflective Writing It is a meta-cognitive process that occurs before, during and after the situation with the purpose of developing greater understanding of both the self and situation so that future encounters with the situation are informed from previous encounters. Significance of its usage • Questioning attitude and new perspectives. • Areas for change and improvement. • Respond effectively to new challenges. • Critical thinking and coping skills

Bedside Teaching
Teaching and learning that occurs with actual patient as the focus. It occurs in wards, emergency departments, operating rooms, and high dependency units. Significance of its usage • Stimulus of clinical contact • Psychomotor skills • Communication skills • Language Skills • Interpersonal skills • Professional attitudes and empathy • Role modeling
Skills Laboratories
It refers to specifically equipped practice rooms functioning as training facilities offering hands on training for the practice of clinical skills within non-threatening environment prior to their real-life application. This applies to both basic clinical skills as well as complex surgical skills. Significance of its usage • Controlled, anxiety-free, and risk-free learning environment to students. • A platform for repeated practice for mastery in relevant clinical skills. Increase the preparedness of student learners before transitioning to the real hospital setting. • Build strong communication skills. • Enable learner stomach critical decisions.
Laboratory Practical
Lab practical involves things like identifying a structure, a type of stain through a microscope, a problem with preparation, reading biochemical test results and answering safety questions. These simulation allow students to attempt the experiments in the laboratory in a risk-free way that provides the opportunity to make mistakes and learn how to correct them using the immediate feedback generated. Significance of its usage • Enhance mastery of subject matter. \ • Develop scientific reasoning. • Develop practical skills. • Develop team workabilities.
Demonstration
The demonstration method in teaching can be defined as giving a demo or performing a specific activity or concept. It is a teaching-learning process carried out in a very systematic manner. Significance of its usage • Promotes learning and correlates theory with practice. • Sharpens observation skills. • Sustain interests in learning environment. • Helps teacher to evaluate students response

Case Presentation

It is a teaching method which provides descriptive information about a clinical patient scenario and to share this educational experience with the general medical and scientific community. It prepares students for clinical practice, using authentic clinical cases by linking theory to practice with the help of inquiry-based learning methods.

Significance of its usage

- Cultivate the capacity for critical analysis.
- Judgment and Decision making
- Facilitate creative problem solving.
- Allow students to develop realistic solutions to complex problems

ASSESSMENT STRATEGIES

Assessment tools for Theory

- Multiple Choice Questions (MCQ)
- Structured Essay Questions (SEQ)
- Reflective paper
- Assignment
- Presentation

Assessment tools for Practical, Clinical and Human (soft) skills

- Objective Structured Practical Examination
- Objective Structured Clinical Examination
- Structured Viva
- Short Case
- Long Case
- Logbook
- Portfolio
- Feedback (simple and/or 360 degree)

RESOURCE BOOKS

Anatomy

- Moore K.L. Clinically Oriented Anatomy. Baltimore, U.S.A. Williams, and Wilkins:
- The Developing Human by K.L. Moore.
- Snell's Clinical Neuroanatomy.
- Laiq H.S. Medical Histology. Paramount Books.

Physiology

- Guyton AC and Hall JE. Textbook of Medical Physiology. W. B. Saunders & Co., Philadelphia.

Biochemistry

- Champe, P.C. & Harvey, E.A. Biochemistry (Lippincott's Illustrated
- Robert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwell. Harper's Biochemistry. McGraw-Hill.
- ABC of Clinical genetics by H.M. Kingston.

Pathology

- Vinary Kumar, Abul K. Abbas and Nelson Fausto Robbins and Cotran, Pathologic basis of disease. WB Saunders.
- Richard Mitchall, Vinary Kumar, Abul K. Abbas and Nelson Fausto Robbins and Cotran, Pocket Companion to Pathologic basis of diseases. Saunder Harcourt.
- Walter and Israel. General Pathology. Churchill Livingstone.

Pharmacology

- Basic and Clinical Pharmacology by Katzung, Mc Graw-Hill.
- Pharmacology by Champe and Harvey, Lippincott Williams & Wilkins

Behavioral Sciences

- Hand book of Behavioral Sciences by Prof. Mowadat H.Rana, 3rd Edition
- Integrating Behavioral Sciences in Healthcare by Asma Humayun & Michael Herbert.

Community medicine

- Parks Textbook of Preventive and Social Medicine. K.Park (Editor)
- Public Health and Community Medicine Ilyas, Ansari (Editors)

Islamiyat/Pakistan studies Books

- Standard Islamiyat (Compulsory) for B.A, B.Sc., M.A, M.Sc., MBBS by Prof. M. Sharif Islahillm
islamiyat (Compulsory) for B.A. B.Sc., & equivalent.
- Pakistan studies (Compulsory) for B.A. B.Sc., B.Com., Medical/Engineering by Prof. Shah Jahan Kahlun
- Pakistanstudies (Compulsory) for B.A, B.Sc., B.Com.,B.Ed., Medical/Engineering
by Prof. Shah Jahan Kahlun