Study Guide
Block-I

1st Year MBBS

Sharif Medical & Dental College, Lahore

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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.

LISTOFABBREVIATIONS

Abbreviations	Subjects
A	Anatomy
Ag	Aging
B	Biochemistry
BS	Behavioral sciences
C	Civics
CSIM	Clinical Skills in Medicine
CM	Community Medicine
P	Physiology
Ph	Pharmacology
Pa	Pathology
FM	Forensic Medicine
ENT	Ear Nose Throat
O	Ophthalmology
Psy	Psychiatry
M	Medicine
S	Surgery
Pe	Pediatrics
GO	Gynaecology and Obstetrics
QI	Quran and islamiyat
PERLs	Professionalism, Ethics, Research, Leadership

MODULAR COMMIITTEE

A. Foundation Module Committee

- Prof. Maimoona Hafeez, Prof & Head Dept of Gynae
- Prof. Uzma Ahsan, Prof & Head Dept of Dermatology
- Prof. Taj Jamshaid, Prof Dept of Medicine
- Prof. Maria Aslam, Prof & Head Dept of Pathology
- Prof. Sana Qanber, Prof Dept of Physiology
- Dr. Ammara Ghafoor, Associate Professor Dept of Anatomy
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- Dr. Faiza Parveen, Associate Professor Dept of Pharmacology
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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
Teachingandlearningthatoccurswithactualpatientasthefocus.Itoccursinwards, 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 environmentpriortotheirreal-lifeapplicationThisappliestobothbasicclinicalskills 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 sallow 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

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.

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. Classifyanddescribethecardiovascularsystemandcorrelateitfunctionally.
16. Amplify the anatomical basis for radiological, cross-sectional, and surface anatomy.
17. Correlate clinic pathologically the apoptosis in health & diseases.

Proposed Theme

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

CURRICULUM OF INDIVIDUALSUBJECTS

HUMAN ANATOMY

THEORY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 12		MIT (Mode of information transfer)
	GENERAL ANATOMY	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 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 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 use of bone tissue for bone marrow biopsy and bone grafting. • Describe the salient features of common types of fractures.	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 cartilage. • Describe the gross features of Elastic Cartilage. • Describe the gross features of Fibro cartilage. • Differentiate the three types of cartilages.	General Anatomy	Cartilage (Contrology)	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. • Describe the mechanism of movements	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 surface irregularities of the skin. • 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 and classify the burns and anatomical basis of manifestations of integumentary system.	General Anatomy	Integumentary System	LGIS (Large group interactive session)
FA-006	• Define Muscle • 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	Muscle Tissue (Myology)	LGIS (Large group interactive session)

	• Describe Type A, B and C of Skeletal Muscles. • Classify and describe the skeletal muscles based on architecture. • Classify skeletal muscle based on action. • Describe the parts of a skeletal muscle. • Describe the methods of studying skeletal muscle activity. • 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 Paralysis, Spasm, Atrophy, Hypertrophy, Hyperplasia and Regeneration in relation to muscle tissue. • Define Myasthenia Gravis and Polymyositis • Define Angina pectoris and fibrillation of Cardiac Muscle	Anatomy		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 anastomoses. • 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, • Lymphadenopathy and Lymphography	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. • Describe the gross and/or microscopic anatomy of the following structures: Nerve, Nerve fiber, Ganglion, Tract, Fasciculus, Funiculus and Lemniscus 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. • Define and explain Dermatome (s) • Define and 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 • Describe the basic concept behind taking a biopsy of a tissue.	Integrate with Radiology	Imaging in Anatomy	LGIS (Large group interactive session)
EMBRYOLOGY & POST-NATAL DEVELOPMENT		**TOTAL HOURS = 20**		
FA-010	• Describe the cell cycle. • Enlist different stages of Mitosis and Meiosis • Compare and contrast mitosis and Meiosis. • Enlist the numerical chromosomal	Embryology	Cell cycle and Gametogenesis	LGIS (Large group interactive session)

FA-010	anomalies • Describe the anatomical basis for numerical chromosomal abnormalities. • Describe the clinical presentation of numerical chromosomal abnormalities and justify them Embryologically. • Describe the clinical presentation of structural chromosomal abnormalities and justify them Embryologically. • List the structural chromosomal anomalies. • Describe the anatomical basis for structural chromosomal abnormalities. • Describe the anatomical basis for the structural and numerical chromosomal anomalies. • Describe the embryological basis for mosaicism. • Describe the embryological basis for teratoma. • Describe the clinical presentation of common numerical. chromosomal abnormalities.	Embryology	Cell cycle and Gametogenesis	LGIS (Large group interactive session)
FA-011	• Describe the process of spermatogenesis and spermiogenesis. • Describe the embryological basis for Abnormal gametes. • Discuss the embryological basis of male infertility.	Embryology	Spermatogenesis	LGIS (Large group interactive session)
FA-012	• Describe the Prenatal and postnatal maturation of oocyte.	Integrate with Gynaecology	Oogenesis	LGIS (Large group interactive session)
FA-013	• Describe the significance of arrested development of oocyte. • Describe the hormonal control of oocyte maturation. • Discuss the embryological basis of female infertility.	Embryology	Oogenesis	LGIS (Large group interactive session)
FA-014	• Compare and contrast oogenesis and spermatogenesis		Gametogenesis	LGIS (Large group interactive session)

FA-015	• Enlist and briefly describe the female reproductive organs. • Describe the hormonal control of female reproductive cycles. • Enumerate and describe the steps of the ovarian cycle. • Describe the process of ovulation		Female Reproductive organs	LGIS (Large group interactive session)

FA-016	• Describe the formation, function, and fate of corpus luteum. • Describe the anatomical and physiological basis of the following: Mittelschmerz, Anovulation, Menopause • Define menstrual cycle. • Describe the phases of menstrual cycle. • Describe the anatomical and physiological basis of an-ovulatory menstrual cycle	Integrate with Gynaecology	Female Reproductive Cycle	LGIS (Large group interactive session)
FA-017	• Describe the transportation of male and female gametes. • Describe viability of gametes • Explain the anatomical basis of diaspermy, triploid		Transportation of gametes	LGIS (Large group interactive session)
FA-018	• Define fertilization. • Describe the phases of fertilization. • Draw and label a diagram illustrating the phases of fertilization. • Enumerate and describe the results of fertilization. • Describe the anatomical and physiological basis of sex determination of the embryo	Embryology	Fertilization	LGIS (Large group interactive session)
FA-019	• Define contraception. • Explain the mechanisms of following contraceptive techniques: 1. Barrier methods 2. Hormonal methods 3. Intrauterine device (IUD) 4. Emergency contraceptive pills (ECPs) 5. Male and female sterilization	Integrate with physiology	Contraception	LGIS (Large group interactive session)

FA-020	• Describe the anatomical and physiological basis of male and female infertility. • Describe the role of clomiphene citrate in inducing ovulation. • Define assisted reproductive techniques. • Describe the mechanisms of following reproductive techniques: 1. In vitro fertilization (IVF) and embryo transfer 2. Cryopreservation of embryo 3. Intra-cytoplasmic sperm injection (ICSI) 4. Assisted in vivo fertilization. 5. Surrogacy	Integrate with Gynaecology	Infertility & assisted reproductive techniques	LGIS (Large group interactive session)

	• Explain the correlation of multiple births with assisted reproductive techniques			
FA-021	• Describe the process of cleavage of embryo and blastocyst formation. • Describe the differentiation of embryo blast into epiblast and hypoblast. • Describe the establishment of cranial-caudal embryonic axis. • Describe pre-implantation genetic diagnosis. • 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. • Describe the events and factors influencing the cleavage of zygote	Embryology	Cleavage , blastocyst formation	LGIS (Large group interactive session)
	• Describe the sequence of events pertaining to formation of blastocyst. • 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) • Describe the anatomical basis for the pre-implantation genetic diagnosis. • Describe the formation of amniotic cavity, embryonic disc, and umbilical vesicle. • Describe the formation of chorionic sac.	Embryology		LGIS (Large group interactive session)

FA-022	• Describe the Uterus at the time of implantation (decidua reaction) • Illustrate the concept of Implantation. • Describe the differentiation of inner and outer cell mass. • Describe the Abnormal implantation/ extra uterine implantations. • Enumerate the factors responsible for inhibition of implantation.	Embryology	Implantation	LGIS (Large group interactive session)
FA-023	• Describe the Molar pregnancy.		Molar pregnancy	LGIS (Large group interactive session)
FA-024	• Describe the establishment of utero-placental circulation.		Utero-placental circulation	LGIS (Large group interactive session)
FA-025	• Describe the embryological basis of abortions and its types.	Integrate with Gynaecology	Abortion	LGIS (Large group interactive session)

FA-026	• 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-027	• 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.	Embryology	Formation of notochord	LGIS (Large group interactive session)
FA-028	• 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	Embryology	Derivatives of ectoderm	LGIS (Large group interactive session)
FA-029	• Describe the Differentiation of mesoderm into its constituting components. • Describe the Somite formation and its fate. • Describe the Estimation of age by somites	Integrate with pediatrics	Mesodermal derivatives	LGIS (Large group interactive session)

	• Describe the formation of intra-embryonic coelom			
FA-030	• 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-031	• Enlist the derivatives of germ layers	Embryology	Germ layer derivatives	LGIS (Large group interactive session)
FA-032	• Describe the formation and functions of chorionic villi.		Chorionic Villi	LGIS (Large group interactive session)
FA-033	• Describe the Cephalo-caudal folding	Integrate with Gynaecology	Folding of embryo	LGIS (Large group interactive session)
	• Describe the Lateral folding	Embryology		LGIS (Large group interactive session)
FA-034	• Enlist and Describe the Derivatives of intermediate and lateral plate mesoderm. • Enlist & Describe the Derivatives of endoderm		Germ layer derivatives	LGIS (Large group interactive session)
	• Enlist & describe the derivatives of ectoderm	Integrate with Gynaecology/ pediatrics		
FA-035	• Describe the factors influencing the embryonic development.	Embryology	Control of the embryonic development	LGIS (Large group interactive session)
FA-036	• Enlist the characteristic features of the embryo during 4th – 8th weeks. • 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)
FA-037	• Explain the trimesters of Pregnancy. Explain the estimation of fetal age. • Explain the measurement and characteristics of fetus. • Describe the Overview of the monthly changes in external appearance of fetus (9th-38th weeks). • Describe Viability of fetuses and low birth weight babies • Explain the factors influencing fetal growth. • Describe clinical problems. encountered by babies born with IUGR and post maturity		Fetal period	LGIS (Large group interactive session)

	• Tabulate the criteria for estimating fertilization age during the fetal period. • Describe the post maturity syndrome. • Describe the procedures for assessing fetal status. • Describe the clinical picture of IUGR & factors resulting in IUGR.	Integrate with Gynaecology		LGIS (Large group interactive session)
	• Correlate the levels of alpha fetoprotein essay and fetal anomalies	Integrate with Gynaecology/ Radiology		LGIS (Large group interactive session)
FA-038	• 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 justify the hemolytic disease of the neonate. • Describe the functions of placenta. • Describe Placenta as an allograft & as an invasive tumor-like structure. • Describe the placental anomalies and their clinical picture (placenta previa, placenta ecreta, placenta percreta, battledore placenta, membranous placenta, pre-eclampsia) • Describe the role of placenta as an allograft. • Describe the stages of labor	Integrate with Gynaecology		LGIS (Large group interactive session)
	• Describe the Formation & fate Umbilical cord. • Describe the Cord abnormalities. • Justify embryologically the clinical features observed in absence of			

FA-039	umbilical artery • Describe the formation and circulation of Amniotic fluid. • Enlist the components 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 characteristic signs and symptoms of oligohydramnios and polyhydramnios and justify embryologically. • Explain the clinical picture of umbilical band syndrome and justify it embryologically. • Explain the formation and fate of umbilical vesicle (yolk sac) • Explain the formation and fate of Allantois. • Describe the clinical picture of allantois cyst & sinus and justify it Embryologically	Integrate with Gynaecology	Fetal membranes	LGIS (Large group interactive session)
FA-040	• Describe the development of Dizygotic twins. • Describe the development of Monozygotic twins. • Describe the fetal membranes in twin pregnancy. • Describe the twin transfusion syndrome. • 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-041	• Describe the Various methods of pre-natal diagnosis. • Describe the Fetal therapy		Prenatal diagnosis and fetal therapy	LGIS (Large group interactive session)
FA-042	• Describe Molecular regulation and cell signaling and common signaling pathways used during development. • Describes morphogens, protein. kinases, notch delta pathway, transcription factors, epigenetics.	Embryology	Molecular regulations and signaling pathways	LGIS (Large group interactive session)
	• Describe stem cells and pluripotency. • Describe the human disorders associated with genetic mutations			
	• Define teratology: classification and causes of birth defects			

FA-043	• Define genomic imprinting. • 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		Teratogenicity	LGIS (Large group interactive session)
Microscopic Anatomy (Histology and Pathology) Total Hours = 08				
FA-044	• Describe different types of microscopies. • Describe Staining methods and their significance. • Describe the basis of enzyme histochemistry	Basic techniques in histology	Introduction to microscopy & staining techniques	LGIS (Large group interactive session)
FA-045	• 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)
	• Explain different modes of transport across the cell membrane. • Describe the signal reception and transduction through different routes. • Tabulate the mechanisms of transport across the cell membrane. • Explain the following disorders related to cell membrane: • Pseudohypoparathyroidism and Dwarfism	Integrate with pathology		LGIS (Large group interactive session)
FA- 046c	• List the membranous and non-membranous cellular organelles. • Draw and label the light and electron. microscopic structure and functions of the cellular organelles	Basic Histology	Cell organelles	LGIS (Large group interactive session)
				Small group discussion

FA- 046c	• Describe the structure of the following cellular organelles and correlate with their function: o Ribosomes o Endoplasmic reticulum (rough & smooth) o Golgi apparatus o Lysosomes o Proteasomes o Mitochondria o Peroxisomes • Describe the clinical presentation of lysosomal storage diseases and correlate with their histological basis • Describe the structural components of cytoskeleton, and correlate them with their functions • Explain the histological basis of immotile cilia syndrome.	Basic Histology	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-047	• Describe the structure of chromatin. • Describe the structure of chromosomes. • Draw and label the structure of nucleolus. • 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 the clinical presentation of the following diseases and correlate with its histology. o Laminopathies o Malignancy	Integrate with pathology		LGIS (Large group interactive session)
	• Describe the correlation of cell cycle with the following diseases. o Retinoblastoma o Malignancy			LGIS (Large group interactive session)
	• Describe the histological structure and function of basement membrane (light and electron).			LGIS (Large group interactive session)

	• Describe the mechanism of ciliary movements			
FA-048	• 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	Small group Discussion Epithelium	LGIS (Large group interactive session)
	• Explain the correlation of intercellular junctions with the following diseases: o Gastric ulcer o Food poisoning o Pemphigus vulgaris			LGIS (Large group interactive session)
	• Describe the electron microscopic structure of the following apical cell surface specializations: o Microvilli o Stereocilia o Cilia	Integrate with biochemistry		LGIS (Large group interactive session)
	• Explain the correlation between the structure of microvilli and celiac disease. • 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: o Shape of secretory portions and ducts o Mode of secretion o Type of secretion	Histolog y		LGIS (Large group interactive session)
	• Explain the histological basis of acne vulgaris	Integrate with pathology		LGIS (Large group interactive session)

FA-049	• 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	Histology	Connective tissue	LGIS (Large group interactive session)

	connective tissue • Explain the role of GAGs in formation of barrier against bacteria and the role of hyaluronidase in the breakdown of this barrier			
	• 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			LGIS (Large group interactive session)
	• Describe the types of adipose tissue (white & brown), their histogenesis, locations and function	Histology		LGIS (Large group interactive session)
	• Explain the etiology of Marfan's syndrome.	Integrate with pathology		LGIS (Large group interactive session)
	• Describe lipid storage and mobilization in and from adipocytes and compare the brown and white adipose tissue			LGIS (Large group interactive session)
	• Explain the histological basis and clinical presentation of the following diseases in relation to adipocytes: o Lipoma o Obesity (with special emphasis of the role of leptin)			LGIS (Large group interactive session)

PRACTICAL

CODE	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT (Mode of information transfer)
	General Anatomy	**Total Hours = 05**		
FA-050	• 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	SGD(Small group discussion)

	Embryology	Total Hours = 05		
FA-051	• 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)

FA-051	fetal specimens, identify the: o 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 (sacrococcygeal teratoma, neural tube defects) o Placenta and its positional & implantational variations, umbilical cord and its contents. o Fetal features during fetal period. Determine age of fetus based on these features.	Anatomy	Embryology	SGD (Small group discussion)
FA-052	• Perform USG interpretation of: • fetal features, fetal age estimation, placental o Attachment with its variations and fetal membranes. o Multiple pregnancies	Integrated with Radiology		
FA-053	• On gross examination of human placenta and umbilical cord, identify: o normal complete placenta and cord o placental structural variations o umbilical cord and anomalies of its attachment to placenta o contents of umbilical cord (umbilical vessels anomalies)	Integrated with Gynaecology		SGD (Small group discussion)

FA-054	• Identify the features of hemolytic disease of newborn, dizygotic and monozygotic twins and correlate them embryologically	Integrated with Paediatrics		SGD(Small group discussion)
FA-055	• Identify the protocols and procedural steps for amniocentesis and chorionic villus sampling (CVS) and correlate their significance in developmental defects. • Correlate the role of alpha feto-protein assays in neural tube defects.	Integrated with Gynaecology		SGD(Small group discussion)
	Histology	**Total Hours = 22**		
FA-056	• Describe different types of staining techniques and their significance with special emphasis on H&E staining		Staining techniques	Laboratory Practical
FA-057	• Identify and draw different parts of light microscope		Microscope	Laboratory Practical
FA-058	• Identify and demonstrate different cell shapes under the microscope		Cell shape	Laboratory Practical
FA-059	• Identify and demonstrate under light microscope the following types of epithelia: o Simple squamous o Simple cuboidal o Simple columnar (ciliated & non- ciliated) o Pseudostratified columnar (ciliated & non-ciliated) o Stratified squamous (keratinized & non keratinized) o Stratified cuboidal. o Stratified columnar.	Microscopic Anatomy	Epithelium	Laboratory Practical
FA-060	• Identify and demonstrate serous & mucous secreting glands under light microscope		Epithelium	Laboratory Practical
FA-061	• Identify and demonstrate the various types of connective tissue		Connective tissue	Laboratory Practical

MEDICAL PHYSIOLOGY

THEORY

	PHY	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) • Define the Reticuloendothelial system. • Enlist the different components of Reticuloendothelial system	Medical Physiology	White Blood Cells	LGIS (Large group interactive session)

	• 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 = 40		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) / Presentations/ Tutorials / SGD (Small Group Discussion)
FB-005	• Describe the chemistry of purines and pyrimidines and their linkage in nucleic acid synthesis and their metabolism		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		DNA	LGIS (Large group interactive session) / Presentations / Tutorials / SGD (Small Group Discussion)
	• Discuss the structure of different types of RNAs with special reference to composition, linkage,			
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	• Illustrate de Novo and salvage pathways of purines and pyrimidines. • Describe the degradation of purine and pyrimidine nucleotides. • Interpret Lesch-Nyhan syndrome, gout, and adenosine deaminase deficiency on given data.		Nucleotide Metabolism	LGIS (Large group interactive session) / Presentations
FB-011	• Describe in detail all the steps in prokaryotic DNA replication with emphasis on: Different proteins required, Primers, DNA polymerase; their different components and functions, Initiation, elongation and termination of replication, Topoisomerases. • Describe in detail all the steps in Eukaryotic DNA • replication with emphasis on differences between Pro- and Eukaryotes		Replication	LGIS (Large group interactive session) / Presentations / Tutorials / SGD (Small Group Discussion)

FB-012	• Describe DNA repair especially Xeroderma pigmentosa		DNA repair	LGIS (Large group interactive session) / Presentations
FB-013	• Explain the transcription in prokaryotes focusing on the following key points, RNA polymerase, its components and functions, Initiation, elongation, and termination of transcription. • Illustrate the transcription in eukaryotes focusing on the differences between pro- and eukaryotic transcription and post-transcriptional modifications. • Wobble hypothesis		Transcription	LGIS (Large group interactive session) / Presentations / Tutorials / SGD (Small Group Discussion)
FB-014	• Interpret the translation focusing on the following key points: Initiation, elongation and termination and inhibition by drugs. • Describe Post-translational modification of • proteins		Translation	LGIS (Large group interactive session) / Presentations / Tutorials / SGD (Small Group Discussion)

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		Equipment	
FB-019	• Demonstrate the basic principles, uses and working of centrifuge, chromatography, electrophoresis & spectrophotometer		Demonstration of techniques	

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			
FPa-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)

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)
	BIOCHEMISTRY	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		Total hours = 06		MIT (Mode of Information Transfer)
	SPECIFIC LEARNING OUTCOMES	ATTRIBUTE	TOPIC	PORTFOLIO ENTRY	
PERL s-001	• Describe a Portfolio • Describe types of portfolios • Identify Portfolio entries. • Write reflection based on Gibbs reflective cycle	Introduction to PERLs	Portfolio Reflective Writing	Reflective writing on portfolio outline development	LGIS (Large group interactive session)
PERL s-002	• Demonstrate non-verbal and verbal communication skills • Describe principles of communication. • Discuss types of Communication at professional level • Identify different Communication Styles • Explain the importance of non- verbal communication • Demonstrate active Listening. • Describe assertive Communication techniques. • Describe barriers to Effective Communication	Communicator	Verbal and non- verbal Communication Skills	Communication encounter with a peer or teacher	LGIS (Large group interactive session)
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 • Explain the professional code of conduct	Responsible & Accountable	Responsibility towards self and the profession	Quiz on rules and regulations of the institution Attendance record	LGIS (Large group interactive session)
	• Work respectfully and				

PERL s-004	effectively with their peers • Describe characteristics of a team. • Describe types of teams • Discuss stages of team development. • Identify various team roles. • Discuss barriers to effective teamwork	Team Player	Teamwork	Self-evaluation through reflective writing	TBL (Team Based Learning)
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 1st VISIT	Demonstrate the procedure of taking the pulse	Radial Pulse	3	Skills Lab / Demonstration / Bedside Teaching
C-FRC-1-02 2nd VISIT	Record the Respiratory Rate of patient	Respiratory Rate measurement	3	Skills Lab / Demonstration / Bedside Teaching
C-FRC-1-03 3rd VISIT	Demonstrate the procedure of taking the Blood Pressure	Blood Pressure	3	Skills Lab / Demonstration / Bedside Teaching
C-FRC-1-04 4th VISIT	Demonstrate the process of wearing the gloves	Gloving	2	Skills Lab / Demonstration / Bedside Teaching
C-FRC-1-05 5th VISIT	Demonstrate steps of hand washing	Hand washing	2	Skills Lab / Demonstration / Bedside Teaching

HOLY QURAN AND ISLAMIYAT

CODE	The Holy Quran	Total Hours = 04		PORTFOLIO ENTRY	MIT (Mode of Information Transfer)
	SPECIFIC LEARNING OUTCOMES	DESCIPLINE	TOPIC		
QI-001	• Describe Unity of Allah in being. • Describe Unity of Allah in attributes. • Describe Concept of Shirk • Describe impact of Tawheed in human life	Faith	Oneness of Allah (SWT) (Tawheed)	One reflective writing One class quiz	LGIS (Large group interactive session)
QI-002	• Explain Significance of Risalat. • Identify Prophets as role models. • Recognize finality of Prophethood - Prophet Muhammad (PBUH) • Explain the divine decree in sending the Holy Books • Identify the Holy Quran as the only preserved & authenticated divine revelation to date. • Interpret Quran as Furqan		Prophethood (Risalat) & Divine Revelations (Holy Books)		LGIS (Large group interactive session)
QI-003	• Appraise continuity of life beyond material world • Concept of Dooms Day and its various stages. • Concept of Day of Judgment and accountability in the Hereafter • Concept of "Meezan" • Discuss belief in angels and its significance. • Describe the universal role of angels (their specific duties)		Angels & Belief In Hereafter (Aakhirat)		LGIS (Large group interactive session)
QI-004	• Identify Taqdeer as Knowledge of Allah Explain the concept of Faith in Good and Evil • Explain different types of Qadr		Qadr (Taqdeer)		LGIS (Large group interactive session)

PAKISTAN STUDIES

CODE	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC	PORTFOLIO ENTRY	MIT (Mode of Information Transfer)
P-001 P-002 P-003	• Describe brief the salient features of the Pakistan movement. • Explain the basis for the creation of Pakistan. • Give a brief account of the history of Pakistan	Pakistan Studies	History of Pakistan	One reflective writing One class quiz	LGIS (Large group interactive session)

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)

MARKS DISTRIBUTION

Subject	**Theory**		**Practical**		**Total**
Block 1 (Foundation+ Hematopoietic and Lymphatic Modules)	Part I MCQs Part II SEQS	85 Marks 35Marks	Oral and Practical/ Clinical Examination	120 Marks	**300**
	Internal Assessment	30 Marks	Internal Assessment	30 Marks	
		150		**150**	

FOUNDATION MODULE TEACHING HOURS

Anatomy=72	Community Medicine=10
Physiology=52	Behavioral Sciences= 8
Biochemistry=51	PERLs=5
SDL=21	Holy Quran=4
C-FRC= 13	Pharmacology=4
Pathology=12	Aging=1

H & L MODULE TEACHING HOURS

Anatomy=10	Community Medicine=3
Physiology=26	Medicine=5
Biochemistry=27	PERLs=5
SDL=6	Holy Quran=2
C-FRC= 7	Pharmacology=3
Pathology=5	Aging=2

RESOURC EBOOKS

Anatomy

- MooreK.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. Sunders & 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

lslamiyat/Pakistan studies Books

- Standard lslamiyat (Compulsory) for B.A, B.Sc., M.A, M.Sc., MBBS by Prof. M. Sharif lslahillm ilslamiyat (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