LAHORE
MEDICAL & DENTAL
COLLEGE

CURRICULUM DOCUMENT

(First Year MBBS)

STANDARD OPERATING PROCEDURES

LAHORE MEDICAL AND DENTAL COLLEGE

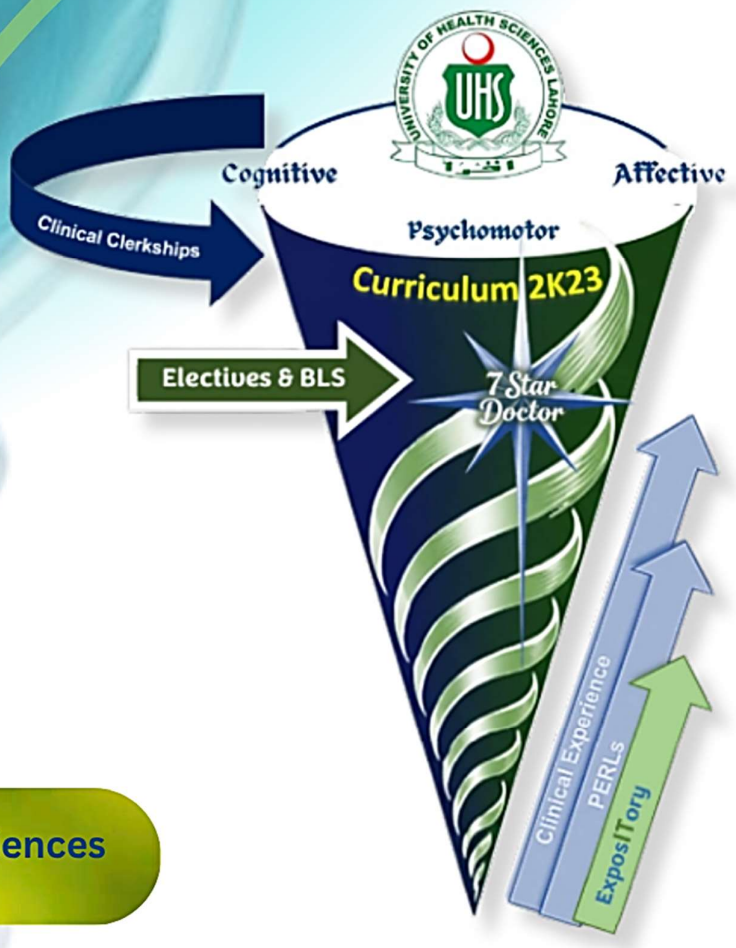
DEPARTMENT OF MEDICAL EDUCATION

MBBS YEAR 01

Volume-01

Modular Integrated Curriculum 2K23

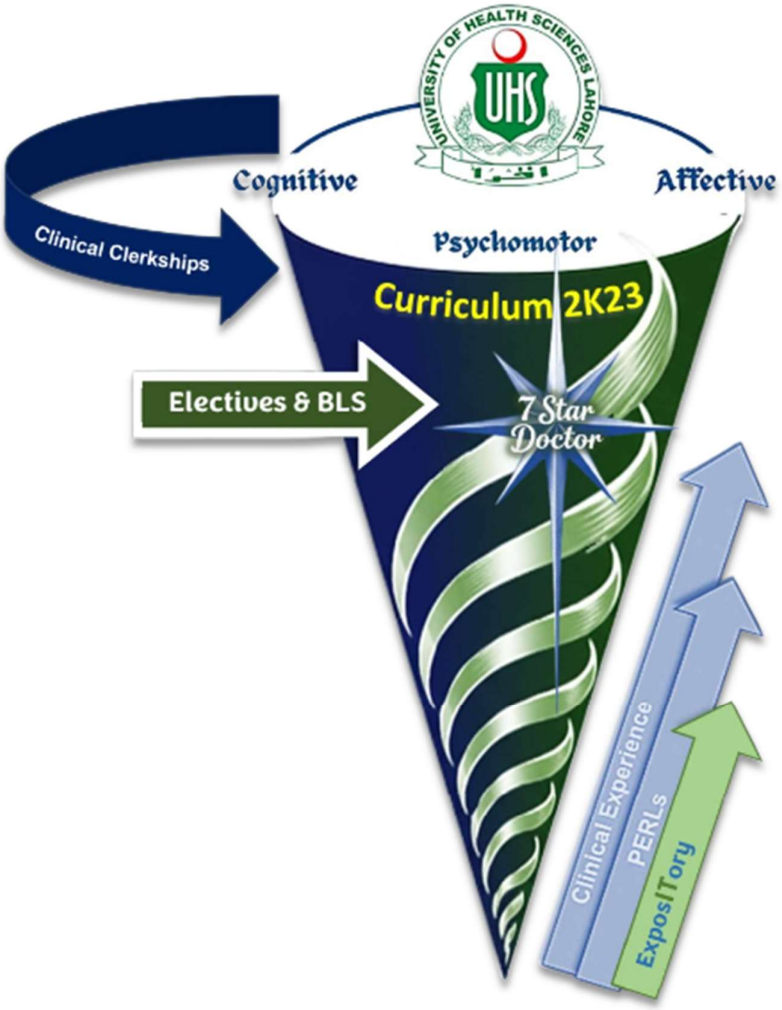
Final Version

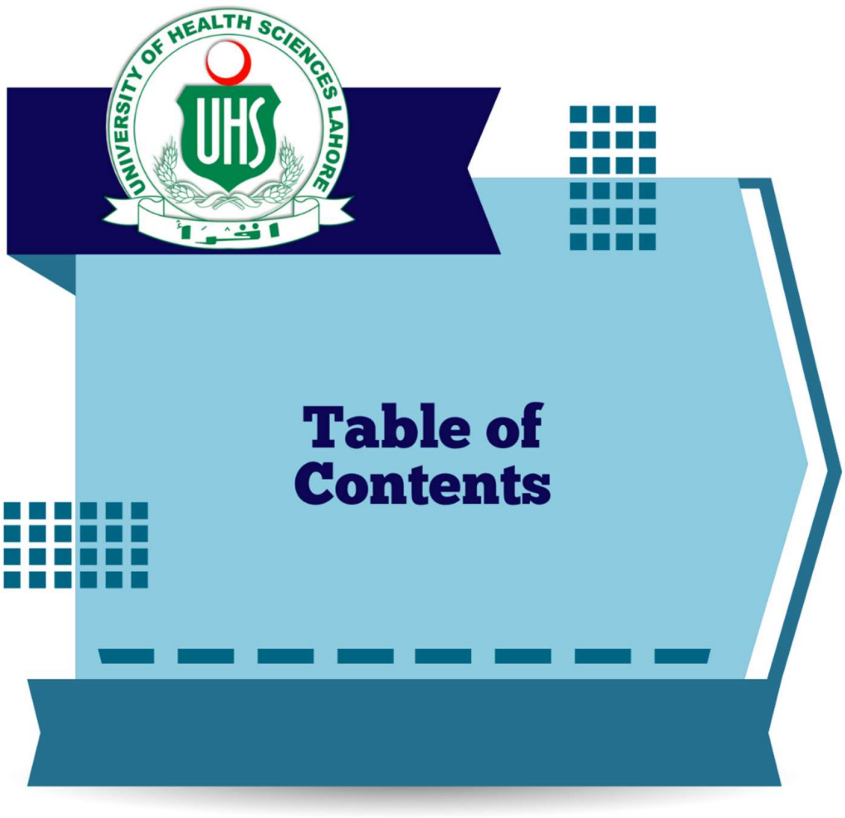


University of Health Sciences Lahore

Modular Integrated Curriculum 2K23

Volume-01 / Year-01





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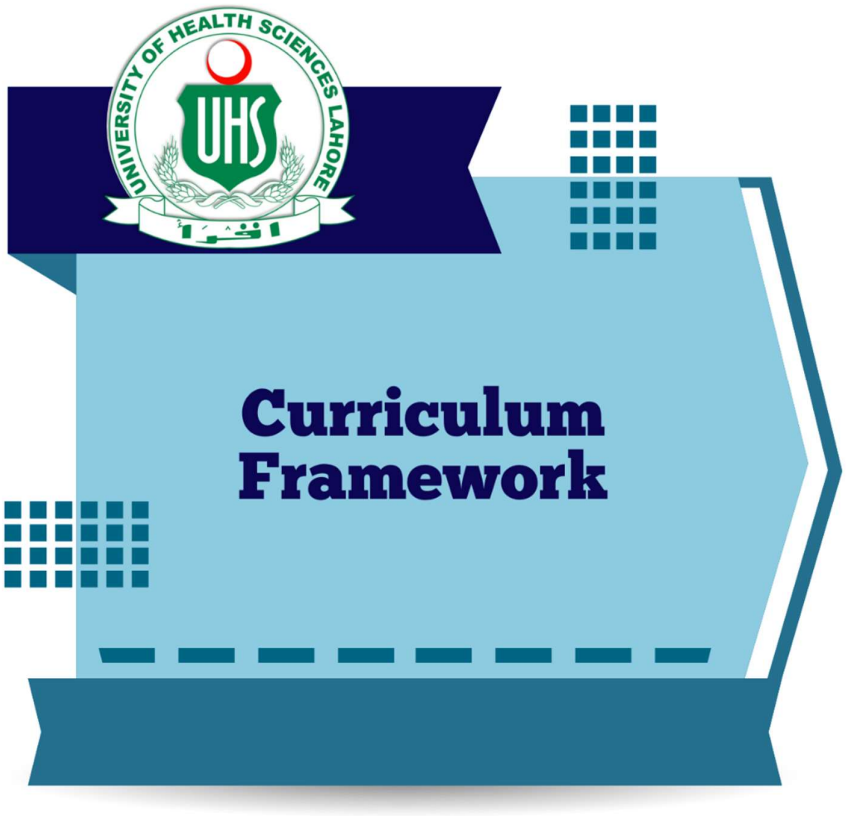
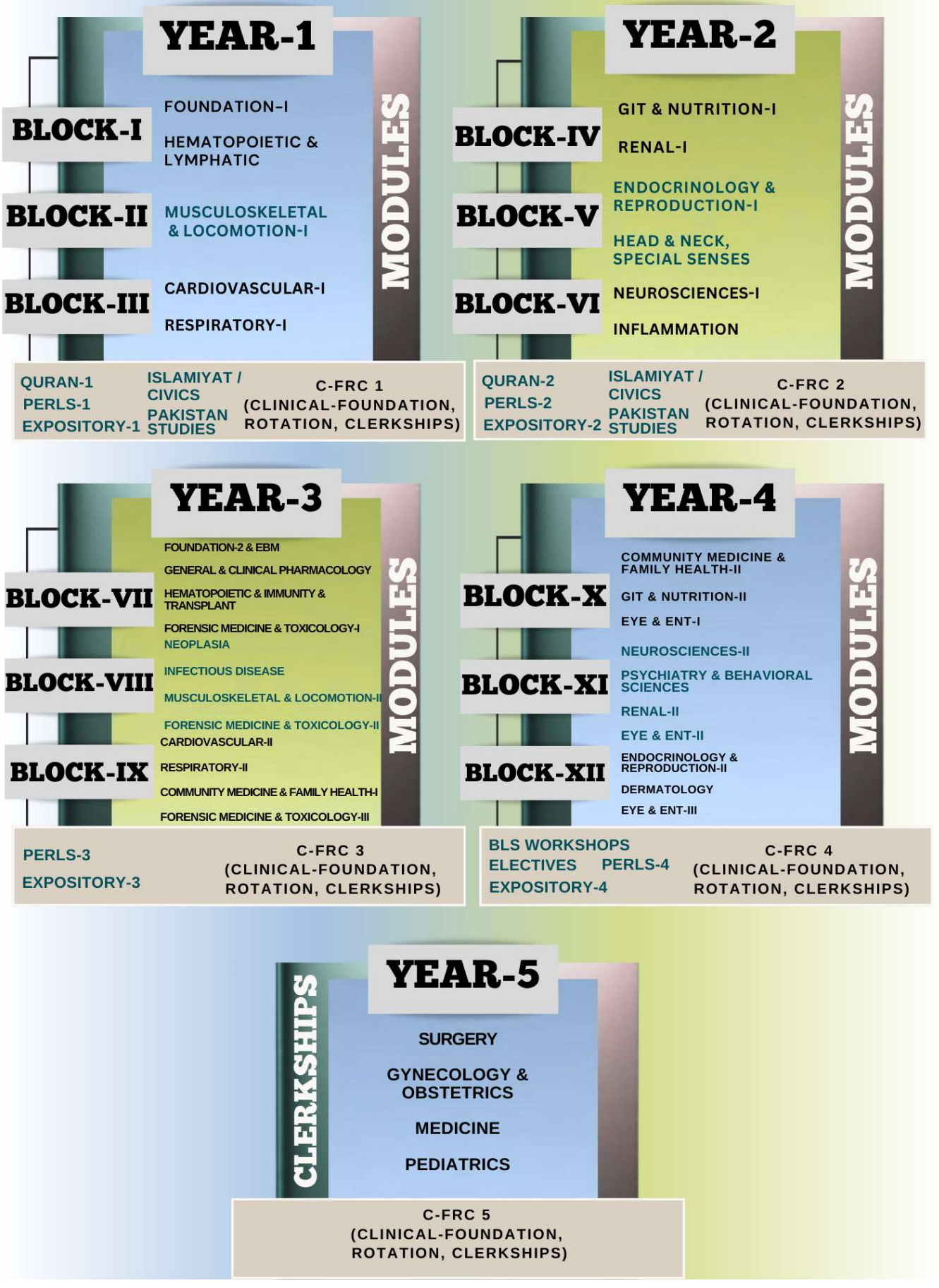

UNIVERSITY OF HEALTH SCIENCES LAHORE
UHS
Curriculum
Framework

Modular Integrated Curriculum 2K23 Framework

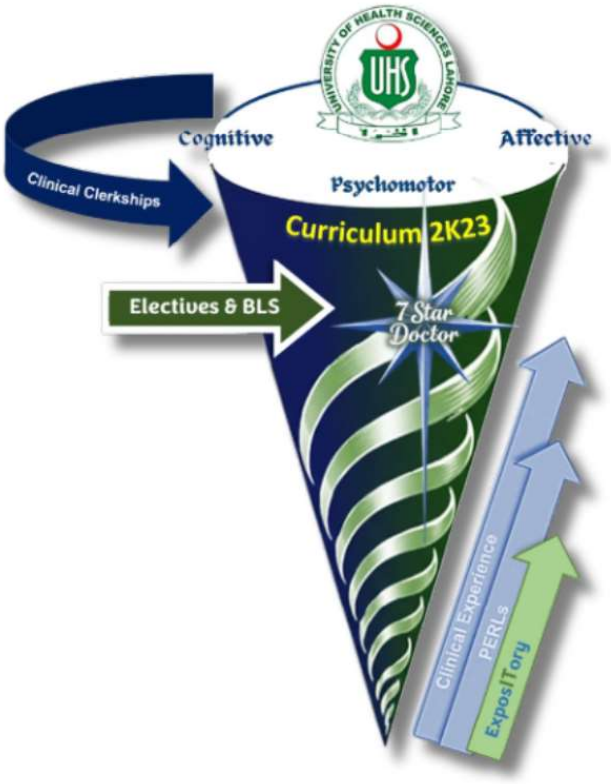



02
Section

Modular Integrated Curriculum 2K23

MBBS Year-01

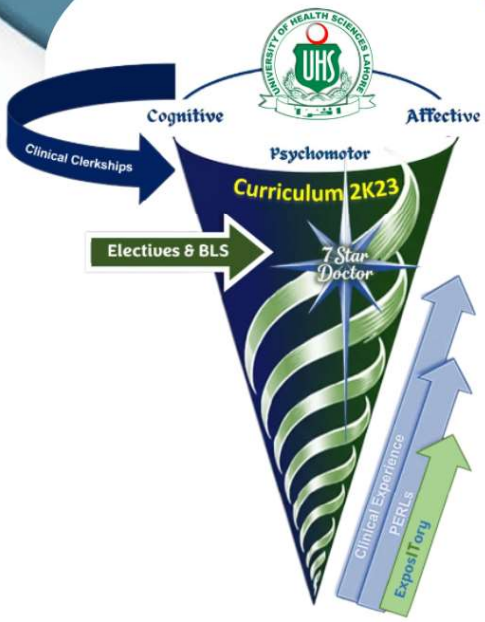
YEAR-1

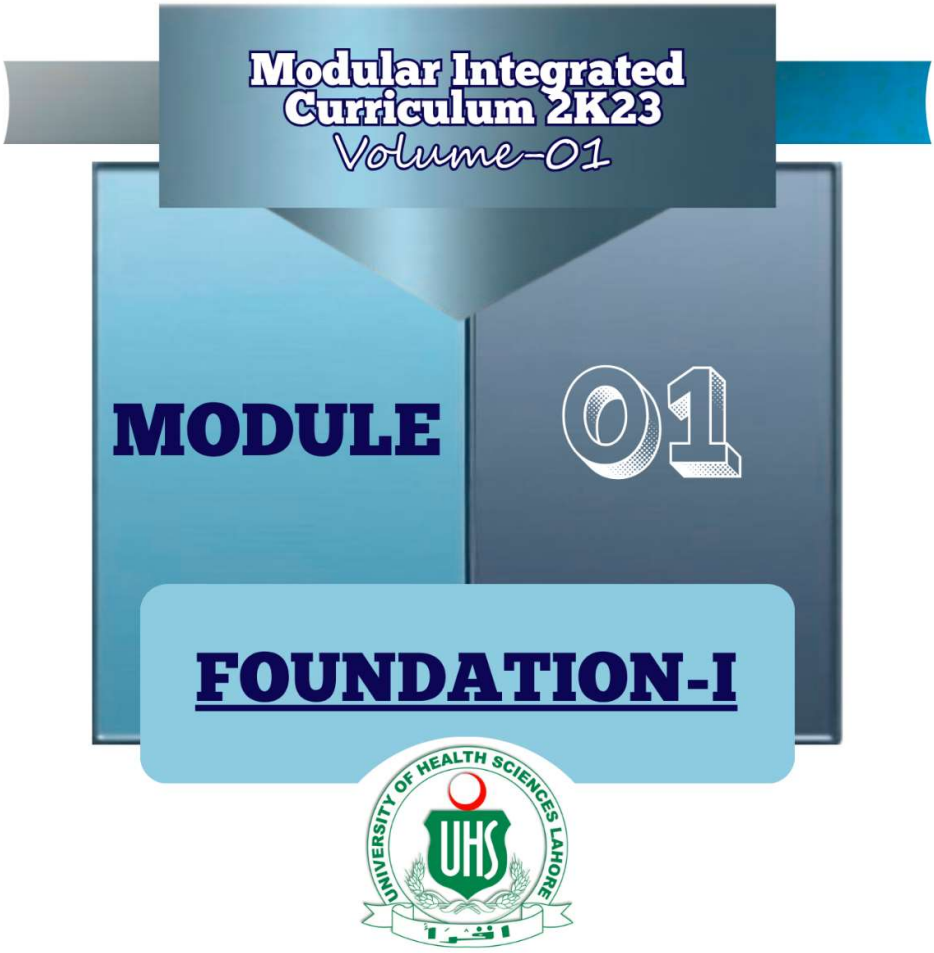


Modular Integrated Curriculum 2K23

MBBS Year-01

BLOCK-1




Modular Integrated Curriculum 2K23
Volume-01
MODULE
01
FOUNDATION-I
UNIVERSITY OF HEALTH SCIENCES LAHORE
UHS

MODULE RATIONALE

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.

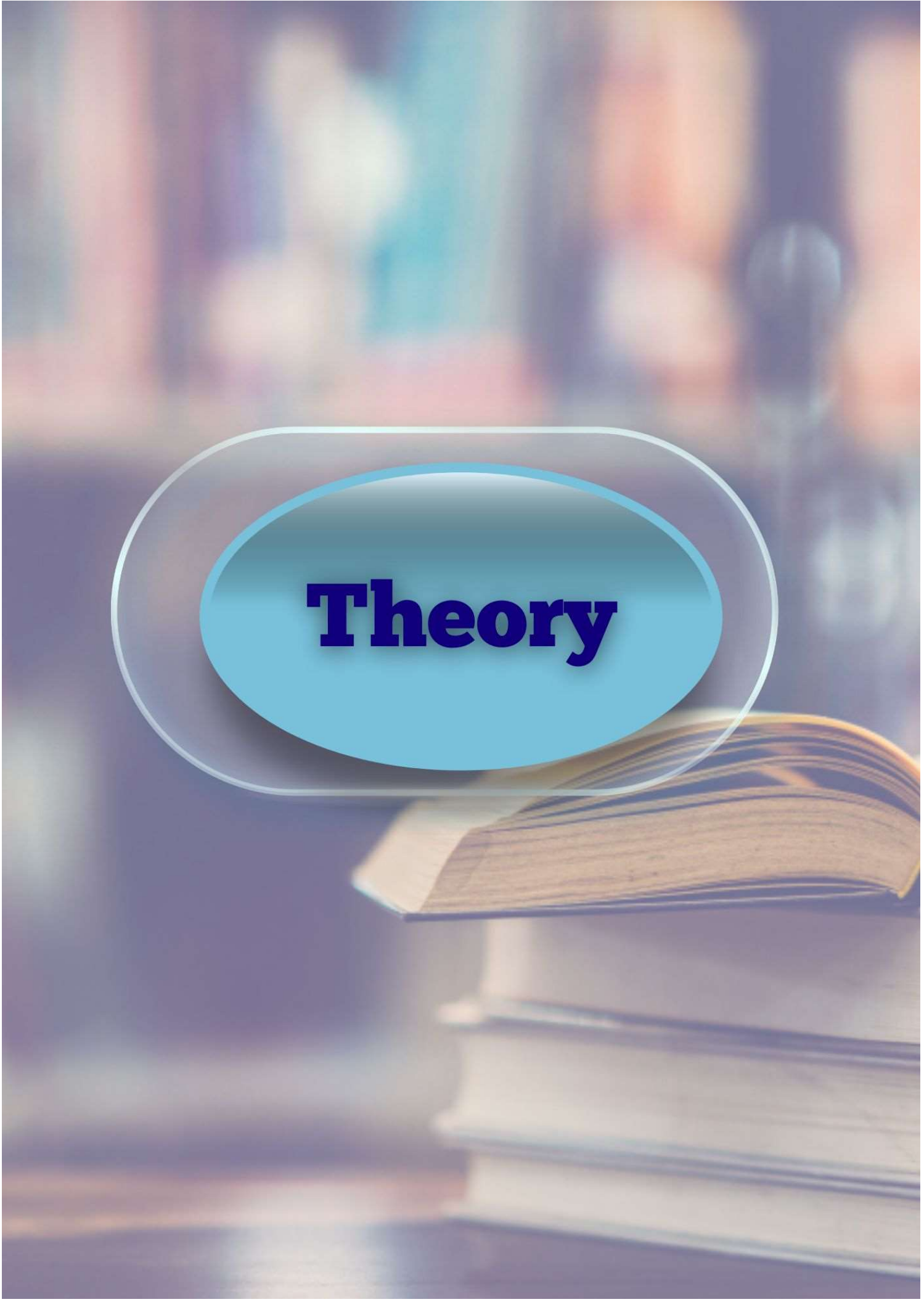
MODULE OUTCOMES

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

THEMES
• Cell structure • Cell transport and signaling • Cell chemistry • Homeostasis and blood • Autonomic nervous system • Body movement • Muscles • Growth and development

IMPLEMENTATION TORs
• The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1200. • The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. • However, the level of cognition can be kept at a higher level by the institution. • The Table of Specifications provided will be used for the three papers of the first professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.


Syllabus


Theory

FOUNDATION ORIENTATION

THEORY			
DAY-01			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 01+02+04	
		DISCIPLINE	TOPIC
F-Or-001	Analyze the societal expectations, impact and role of physicians. Meet with doctors in various leadership roles to gain insights into the multifaceted responsibilities in the medical field. Define and explain the concept of a "Seven-Star Doctor."	Foundation orientation	Understanding the Medical Profession and the Physician's Role
F-Or-002	Comprehend the values and mission of the institution. Familiarize themselves with the college campus, its facilities (educational psychologist, career counseling, and research department etc.), faculty, and administrative framework. Comprehend the medical facilities available to the student.	Foundation orientation	Exploring the Academic Environment

F-Or-003	Examine and differentiate various teaching methodologies, assessing their applicability and effectiveness. Develop and maintain professional portfolios and logbooks to reflect on their educational progression. Understand the assessment strategies of the program, considering their types and influence on learning. Practice the PBL (Problem Based Learning) mock to understand its process, including problem identification, teamwork, research, and presentation skills.	Foundation orientation	Acquainting with the MBBS Program

DAY-02			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 02+05**	
		DISCIPLINE	**TOPIC**
F-Or-004	Describe and understand the structure of Pakistan's Healthcare System (primary, secondary, and tertiary), recognizing the roles of different sectors and key health policies. Identify and comprehend cultural and ethical aspects unique to the Pakistani Healthcare context. Describe the principles of family practice within the Healthcare System.	Foundation orientation	Delving into the Healthcare System and Delivery

F-Or-005	Use the IT and library facilities such as eBooks', Year planners, access to scientific journals etc. Effectively use the university's learning management system and other online educational tools. Demonstrate proficiency in essential academic software tools such as Microsoft office such as (word, spreadsheets, and presentation software. Recognize and adhere to ethical practices in the use of digital resources, focusing on digital literacy and academic integrity.	Foundation orientation	Integrating Information Technology in Learning
DAY-03			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 05+04**	
		DISCIPLINE	**TOPIC**
F-Or-006	Articulate the structure and requirements of their MBBS program, including core and elective subjects. Understand the significance of interdisciplinary studies and the interconnection of various courses. Identify opportunities for experiential learning, research, and career advancement within the curriculum.	Foundation orientation	Understanding the Curriculum Structure
F-Or-007	Apply various metacognition strategies for learning. Apply digital tools effectively to organize and synthesize information for their academic projects. Create a personal action plan integrating stress management techniques and personal development strategies to enhance their academic and personal life.	Foundation orientation	Self-Directed Learning

NORMAL STRUCTURE			
GROSS ANATOMY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 15**	
		DISCIPLINE	**TOPIC**
F-A-001	Briefly describe the applied branches of anatomy Describe the "Anatomical Position" Describe the anatomical planes of 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
F-A-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 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 epiphyses Discuss the general concept of ossification (primary and secondary centers and rule of ossification) Describe the relationship of growing end of bones with the direction of nutrient foramen Describe the blood supply 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)
F-A-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)

F-A-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 Joints. Describe the blood supply, innervation 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)
F-A-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
F-A-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)
	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 Synovial Bursae Comprehend the meaning of Hypertrophy, Hemiplegia, quadriplegia, paraplegia, hemiparesis	General Anatomy	

F-A-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 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)
F-A-008	Define neuron. Describe the anatomical structure of a neuron. Classify neurons based on morphology with examples.	General Anatomy	Nervous Tissue (Neurology)
	Classify neurons based on function. Describe the components of the central nervous system. Describe the components of the peripheral nervous system. 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 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.	General Anatomy	

	Classify sensory receptors based on modality (with location) Define Effectors Describe the functions of effectors. Describe ANS (Autonomic Nervous System) and differentiate between sympathetic and parasympathetic nervous system		
F-A-009	Identify displacement of fracture segments of the bone Identify dislocation of joints	Integrate with Radiology	Imaging in Anatomy
CODE	**EMBRYOLOGY & POST-NATAL DEVELOPMENT**	**TOTAL HOURS = 25**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
F-A-010	Define Chromosome Theory of inheritance Enlist different stages of Mitosis and Meiosis Compare and contrast Mitosis and Meiosis Enlist the numerical chromosomal anomalies Describe the anatomical basis for numerical chromosomal abnormalities. Describe the clinical presentation of numerical chromosomal abnormalities & justify them embryologically Describe the clinical presentation of structural chromosomal abnormalities and justify them embryologically. Describe the embryological basis for mosaicism Describe the embryological basis for teratoma Describe Concept of Gene Mutation. Enlist common diagnostic techniques for identifying genetic abnormalities.	Embryology	Cell division and Chromosomal abnormalities
F-A-011	Describe the Process of spermatogenesis and spermiogenesis Describe the embryological basis for Abnormal gametes	Embryology	Gametogenesis Spermatogenesis
F-A-012	Describe the Prenatal and postnatal maturation of oocyte	Integrate with Gynecology	Gametogenesis Oogenesis

F-A-013	Describe the significance of arrested development of oocyte	Embryology	Gametogenesis Oogenesis
F-A-014	Compare and contrast oogenesis and spermatogenesis		Gametogenesis
F-A-015	Describe the hormonal control of female reproductive cycles Enumerate and describe the steps of the ovarian cycle Describe the process of ovulation Describe the formation, function and fate of corpus luteum Define Mittelschmerz pain Define menstrual cycle Describe the phases of menstrual cycle	Integrate with Gynecology	Female Reproductive Cycle
F-A-016	Describe the transportation of Oocyte	Embryology	Transportation of gametes
F-A-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
F-A-018	Define contraception Explain the mechanisms of following contraceptive techniques: 1. Barrier methods 2. Hormonal methods 3. Intrauterine device (IUD) 4. Emergency contraceptive pills (ECPs) 1. Male and female sterilization	Integrate with physiology	Contraception
F-A-019	Describe the anatomical and physiological basis of male and female infertility Define assisted reproductive techniques Describe the mechanisms of In vitro fertilization (IVF) & embryo transfer Explain the correlation of multiple births with assisted reproductive techniques	Integrate with Gynecology	Infertility & assisted reproductive techniques

F-A-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
	Compare and contrast the villi.	Integrate with Gynaecology	
	Describe the process of Compaction. Describe the Formation of morula (division into inner and outer cell mass)	Embryology	
F-A-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
F-A-022	Describe the Establishment of uteroplacental circulation.		Utero-Placental circulation
F-A-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.	Embryology Integrate with Gynaecology	Gastrulation
F-A-024	Describe the Invagination and movement of prenotochordal cells Describe the Notochordal plate formation Describe the Neuroenteric canal formation Describe the fate of the notochord Describe the Establishment of body axis	Embryology	Formation of notochord

	Draw and label the fate map establishment Describe the Fate map establishment.		
	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		
F-A-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 important Neural tube defects	Embryology	Derivatives of ectoderm
F-A-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
F-A-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
F-A-028	Describe the Cephalo-caudal folding Describe the Lateral folding	Integrate with Gynaecology	Folding of embryo
F-A-029	Enlist 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

	Enlist & describe the derivatives of ectoderm	Integrate with Gynaecology/ Pediatrics	
F-A-030	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	Embryology	Folding of Embryo Embryonic period
F-A-031	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)		Fetal Period
F-A-032	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
F-A-033	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	Integrate with Gynaecology	Placenta
	Enlist & correlate the Functions of placenta with its structure		

	Describe the Microscopic anatomy of Placental membrane Describe the Placental circulation (fetal & maternal) Embryologically justify the hemolytic disease of the neonate (Erythroblastosis fetalis) Describe the functions of placenta		
F-A-034	Describe the Formation & fate of 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 Gynecology	Fetal membranes
F-A-035	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
F-A-036	Define preterm Birth Describe parturition & three stages of Labor. Describe the Various methods of prenatal diagnosis Describe the Fetal therapy Describe Maternal serum Screening Corelate levels of Alpha feto protein levels and fetal anomalies Describe stem cell transplantation and gene therapy		Prenatal diagnosis and fetal therapy

F-A-037	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: 1. Drugs 2. Environmental agents 3. Chemicals & heavy metals 4. Infectious agents 5. Radiation 6. Hormones 7. Maternal diseases Describe the basis for male-mediated teratogens Describe prevention of birth defects		Teratogenicity
CODE	**MICROSCOPIC ANATOMY (HISTOLOGY AND PATHOLOGY)**	**TOTAL HOURS = 08**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
F-A-038	Describe different types of microscopies Describe Staining methods and their significance	Basic technique in Histology	Introduction to microscopy & Basic staining technique
F-A-039	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	Cell membrane
	Explain different modes of transport across the cell membrane	Integrate with Pathology	

F-A-040	List the membranous and non-membranous cellular organelles Describe the structure of the following cellular organelles and correlate with their function: 1. Ribosomes 2. Endoplasmic reticulum (rough & smooth) 3. Golgi apparatus 4. Lysosomes 5. Proteasomes 6. Mitochondria 1. Peroxisomes		Cell organelles
	Describe the structural components of cytoskeleton, and correlate them with their functions Explain the histological basis of immotile cilia syndrome		
	Describe the histological features of cytoplasmic inclusions	Integrate with Pathology	
	Describe the structure of nuclear envelope and nuclear pores	Integrate with Physiology	
F-A-041	Describe the structure of chromatin Describe the structure of chromosome Describe the structure of nucleolus Describe the structure and types of DNA (Deoxy Ribonucleic Acid) and RNA (Ribonucleic Acid) Describe the histological basis for apoptosis and necrosis	Histology	Cell nucleus
	Describe structure of different types of cell junctions	Integrate with Pathology	
	Describe the cell cycle & cell division Define important clinicopathological terms: Atresia, Hypertrophy, Atrophy, Hyperplasia, Metaplasia, Anaplasia, Neoplasia, Inflammation, Metastasis		
F-A-042	Describe the histological structure and function of basement membrane (light and electron)	Histology	Epithelium

	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		
	Describe the electron microscopic structure & functions of the following apical cell surface specializations: 1. Microvilli 2. Stereocilia 1. Cilia	Integrate with Biochemistry	
	Classify and exemplify the epithelia with their histological structure, locations and functions	Integrate with Pathology	
	Describe the structure of exocrine glands Explain the mechanism of transport across the epithelia Describe the classification of exocrine glands on the basis of: 1. Shape of secretory portions and ducts 2. Mode of secretion 1. Type of secretion	Histology	
F-A-043	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
	Describe the structure, distribution, and functions of the cells of macrophage mononuclear phagocytic system	Integrate with Biochemistry/ Physiology	

	Describe the role of macrophages in innate immunity & formation of foreign body Giant cell Describe the structure & functions of Mast cells. Role of Mast cells in 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	Histology	
	Describe lipid storage and mobilization in and from adipocytes and compare the brown and white adipose tissue	Integrate with Pathology	

NORMAL FUNCTION			
MEDICAL PHYSIOLOGY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 40**	
		DISCIPLINE	**TOPIC**
F-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	Medical Physiology	Cell Biology
	Define normal body temperature, mechanism of heat production and heat loss. Describe regulation of body temperature (role of hypothalamus) Explain abnormalities of body temperature regulation.		
	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 (Sodium), K (Potassium) and Cl (Chloride) 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 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.		
F-P-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
F-P-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		Red Blood Cells
F-P-004	Enumerate the types of normal hemoglobin in different ages of life	Medical Physiology	Hemoglobin

	Explain the role of Iron in Hemoglobin formation. Define blood indices, give their normal values & enumerate the conditions in which these values are disturbed (corelate with anemias). Enlist the abnormal types of hemoglobin		
F-P-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 leukopenia Explain the effects of leukemia on body 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 Explain the characteristics and functions of basophils Explain the characteristics and functions of eosinophils and enlist conditions in which these cells are raised.	Medical Physiology	White Blood Cells
F-P-006	Enumerate different blood group types. Explain the basis of ABO and Rh blood system Explain the Landsteiner law	Medical Physiology	Blood Types

MEDICAL BIOCHEMISTRY			
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 36	
		DISCIPLINE	TOPIC
F-B-001	Explain the concept of organization of cells to tissue, tissues to organ, organs to system. Differentiate between the eukaryotic and prokaryotic cells.	Biochemistry Cell Biology	Structure of cell
F-B-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 particular reference to the role of 1. Lipids 2. Carbohydrates 3. Proteins Explain why the cell membrane is called fluid mosaic model		Cell Membrane
F-B-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 I e. Gs, Gi and Gq) Describe cell to cell adhesion.		Signal transduction
F-B-004	Explain the biochemical markers and importance of subcellular organelles and their inherited disorders especially: 1. I cell disease 2. Refsum disease 3. Parkinsonism 1. Progeria		Subcellular organelles
F-B-005	Describe the chemistry of purines and pyrimidines and their linkage in nucleic acid synthesis.		Chemistry of purine and pyrimidines
F-B-006	Discuss the organization of DNA with special reference to Watson and crick model, composition, structure, role of Pairing		DNA (Deoxy Ribonucleic Acid)

	Describe the structural forms of DNA		
F-B-007	Discuss the structure of different types of RNAs with special reference to composition, linkage, functions of RNA, micro-RNA Illustrate the structure and functions of various types of RNAs Describe the functions of various small RNAs present in cell	Biochemistry Cell Biology	RNA (Ribonucleic Acid)
F-B-008	Explain the structure and nomenclature of nucleotides, biomedical importance of natural and synthetic analogues	Biochemistry Cell Biology	Nucleotides
F-B-009	Explain the higher organization of DNA. Difference between DNA, chromatid and chromosome		Chromosome
F-B-010	Describe enzymes with reference to: 1. Active sites 2. Specificity 3. Catalytic efficiency 4. Cofactor 5. Coenzyme 6. Holoenzyme 7. Apoenzyme 8. Prosthetic group 9. Zymogens 1. Location		Enzymes
	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: 1. Substrate concentration 2. Temperature 3. PH 1. 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 Km/V max) 1. Competitive 2. Non competitive 1. Uncompetitive		
	Explain the application of enzyme in clinical diagnosis and therapeutic use		
F-B-011	Classify amino acids based on polarity, nutritional importance and glucogenic/Ketogenic properties	Biochemistry Cell Biology	Amino acids
	Explain the structure, physical, chemical properties of amino acids and their biomedical importance		
F-B-012	Classify proteins on the basis of functions, solubility and physicochemical properties and their biomedical importance.		Protein
	Explain the structural levels of proteins 1. Differentiate between alpha helix and beta pleated protein structures 1. 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 1. Describe the biochemical basis of Alzheimer's disease/ prion disease	Biochemistry Cell Biology	
F-B-013	Classify and explain the bio-chemical role of each class of plasma proteins		Plasma proteins
F-B-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 (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		Immunoglobulins

PATHOLOGY			
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 6+6=12	
		DISCIPLINE	TOPIC
F-Pa-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 and mechanism of apoptosis. Compare apoptosis with necrosis. Define different types and mechanism of cellular adaptations (Hypertrophy, Atrophy, Hyperplasia and Metaplasia) Define dysplasia and Neoplasia. Discuss the mechanism and types of intracellular accumulations and pathological calcifications	General Pathology	Cell Injury
F-Pa-002	Describe the basic structure of bacteria and virus. Enlist medically important microbes causing infectious diseases. Differentiate cell walls of gram positive and gram-negative bacteria. Compare the structure of bacterial cell and virus Discuss the growth curve of bacteria and virus. Enlist steps of viral replication Enlist stages of infectious diseases Enlist stages of bacterial pathogenesis Discuss the determinants of bacterial pathogenesis	General Microbiology	Introduction to Microorganisms
F-Pa-003	Define sterilization and disinfection. Describe the principles of sterilization and disinfection.		Sterilization & Disinfection

	Describe clinical uses of common disinfectants and their mode of sterilization. Discuss physical and chemical agents of sterilization		
PHARMACOLOGY AND THERAPEUTICS			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 04**	
		DISCIPLINE	**TOPIC**
F-Ph-001	Define Basic terms of General Pharmacology: Drug, Pro-Drug, Placebo, Prototype drug, Orphan Drug, Essential drug, Pharmacology, First Pass effect, Volume of Distribution, Pharmacokinetics, Absorption, Distribution, Metabolism, Elimination, Excretion, Biotransformation.	General Pharmacology	Pharmacokinetics
F-Ph-002	Define the following terms: Pharmacodynamics, Receptor, Potency, Efficacy, Affinity, Agonist, Partial Agonist, Inverse Agonist, Antagonist.	General Pharmacology	Pharmacodynamics
F-Ph-003	Classify types of autonomic receptor (adrenergic and cholinergic) along with their location, actions and post-receptor mechanism		Autonomic System
COMMUNITY MEDICINE & PUBLIC HEALTH			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 08**	
		DISCIPLINE	**TOPIC**
F-CM-001	Describe the changing concepts and new philosophy of health Explain responsibility for health	Community Medicine and Public Health	Concept of Health
F-CM-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
F-CM-003	Describe the importance of health indicators Classify health indicators Define Morbidity and Mortality Describe Disability indicators Compare indicators among countries		Health indicators
F-CM-004	Conceptualize disease causation and natural history of disease	Community Medicine and Public	Disease causation

	Explain Germ theory & multifactorial causation Describe Epidemiological Triad Discuss Web of disease causation Describe Gradient of infection	Health	
F-CM-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	Community Medicine and Public Health	Disease Prevention

IMPACT (EPIDEMIOLOGY, SOCIOLOGY/SOCIETY, COMMUNITY MEDICINE, BEHAVIORAL SCIENCE, & PUBLIC HEALTH)			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 08**	
		DISCIPLINE	**TOPIC**
F-BhS-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	Biological Basis of Behavior
F-BhS-002	Identify the burden of mental illness on the person, family and society Describe Intellectual disability, Mental Disorders and Personality Disorders		Psychological Disorders
F-BhS-003	Identify the role of psychosocial factors in various illnesses Describe psychosocial aspects of various system diseases such as Cardio-vascular system (CVS), Central Nervous System (CNS), Gastro Intestinal Tract (GIT), Respiration, renal, endocrine and Cancer		Psychology and Disease
F-BhS-004	Identify the behavioral factors associated with pharmacological treatment of diseases		Behavioral Factors & Pharmacological Treatment

	Discuss Health belief model, treatment compliance and its psychosocial factors, social factors in drugs prescription and drug resistance		
F-BhS-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	Behavioral Sciences	Palliative Care
F-BhS-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

AGING			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 01**	
		DISCIPLINE	**TOPIC**
F-Ag-001	Discuss telomeres and telomerase and their clinical significance in aging.	Geriatrics Integrate with Biochemistry	Process of Aging


Practicals

PRACTICAL

ANATOMY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 03	
		DISCIPLINE	TOPIC
F-A-044	Demonstrate the anatomical terms of position and movement, in particular on limbs.	Anatomy	Osteology Imaging and cross-sectional Anatomy Arthrology
	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.		

CODE	EMBRYOLOGY	TOTAL HOURS = 05	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
F-A-045	Calculate fertilization age, gestational age, embryonic/fetal age and expected date of delivery.	Anatomy	Embryology
	On models, charts, aborted embryos and fetal specimens, identify the events of embryonic period, i.e., cleavage, morula and blastula formation, yolk sac, amniotic cavity, connecting stalk, Placenta and it's positional & Implatational variations, umbilical cord and its contents		
	Describe the USG (Ultrasonography) report for the: Fetal features, fetal age estimation, placental attachment with variations, fetal membranes and multiple pregnancies		

	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). Fetal features during fetal period. Determine age of fetus based on these features.		
CODE	**HISTOLOGY**	**TOTAL HOURS = 14**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
F-A-046	Describe different types of staining techniques and their significance with special emphasis on H&E (Hematoxylin and Eosin) staining	Microscopic Anatomy	Staining techniques
F-A-047	Enlist important features of different parts of light microscope		Microscope
F-A-048	Identify and draw & label different cell shapes under the microscope		Cell shape
F-A-049	Identify under light microscope and Draw & Label the following types of epithelia: i. Simple squamous ii. Simple cuboidal iii. Simple columnar (ciliated & non-ciliated) iv. Pseudostratified columnar (ciliated & non-ciliated) v. Stratified squamous (keratinized & non keratinized) vi. Stratified cuboidal vii. Stratified columnar viii. Transitional		Epithelium
F-A-050	Identify under light microscope and Draw & Label serous & mucous secreting glands under light microscope	Microscopic Anatomy	Epithelium
F-A-051	Identify under light microscope and Draw & Label the various types of connective tissue		Connective tissue

PHYSIOLOGY			
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 12	
		DISCIPLINE	TOPIC
F-P-007	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
F-P-008	Determine Erythrocyte Sedimentation Rate and packed cell volume		RBCs (Red Blood Cells)
F-P-009	Determination of blood group		Blood Group
F-P-010	Identify various types of WBCs in a prepared DLC (Differential Leukocyte Count)		WBCs (White Blood Cells)

BIOCHEMISTRY			
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 09	
		DISCIPLINE	TOPIC
F-B-015	Demonstrate the step taken to prevent or rectify the Laboratory Hazards	Biochemistry	Lab hazards
F-B-016	Identify the methods of isolation of cell organelles'		Cell organelles
F-B-017	Identify the different parts of equipment i.e., centrifuge, Microlab, Electrophoresis, Hot Oven, water bath		Equipment
F-B-018	Detect amino acids by paper chromatography Prepare different types of solution Molar, Molal, Normal and %		Chromatography Solutions

PATHOLOGY			
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 02	
		DISCIPLINE	TOPIC
F-Pa-004	Identify the salient morphological features of: Caseous necrosis (Gross & microscopic features), Coagulative necrosis (Gross), Fat necrosis (microscopic)	Pathology	Cell Injury

	Identify the salient morphological features of Dystrophic calcification. Identify the salient microscopic features of the following: Intestinal metaplasia, Squamous metaplasia, Hyperplasia Identify the salient microscopic and gross features of Anthracosis		

PHARMACOLOGY AND THERAPEUTICS			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 03**	
		DISCIPLINE	**TOPIC**
F-Ph-004	Identify Sources of drugs through pictures: Animal, Plant, Microbiological, Minerals, Synthetic and genetically engineered sources. **Plant sources:** Atropa Belladona, Pilocarpus microphyllus, Papaver somniferum / Opium poppy, Erythroxylum coca, Cinchona bark, Digitalis Purpurae / Fox glove plant, Rawulfia serpentine, Ephedra vulgaris, Curare, Catharanthus roseus, Podophyllum, Nux Vomica **Animal sources:** Heparin (Pig/ Bovine), Insulin (Cow/Pig), Thyroxin (Sheep/Pig), Estrogen, Progesterone, Testosterone, Vitamin A, D (Cod liver), Vaccines **Microbiological sources:** Penicillins, Cephalosporins, Tetracyclines, Streptomycin, Streptokinase, Cyclosporine **Mineral sources:** Iron, Magnesium, Zinc, Copper, Silver nitrate, Arsenic, Gold salts, Bismuth salts, Sulfur, Iodine, Calcium salts **Recombinant / Genetically engineered drugs:** Human insulin, Erythropoietin, Growth hormone, Alteplase	Pharmacology	Sources of drugs

	Synthetic: Sulfonamides**,** Anti-histamines**,** Benzodiazepines**,** Anti-epileptics		
F-Ph-005	Identify and define the following Active Principles of drugs (alkaloids, glycosides, volatile oils, fixed oils) through pictures. **Alkaloids:** Atropine, Caffeine, Morphine, Nicotine, Quinine, Reserpine, Codeine, Tubocurarine **Glycosides**: Digoxin, Senna, Cascara **Volatile oils:** Clove oil , Peppermint oil, Coriander oil, Dill oil**,** Ginger oil **Fixed oils:** Coconut oil, Mustard oil, Olive oil, Castor oil, Cod liver oil	Pharmacology	Active Principles of drugs
F-Ph-006	Identify different dosage forms of drugs along with examples. Tablet, Capsule, Syrup, Suspension, Inhaler, Injection, Infusion, Ointment, Cream, Lotion, Lozenges, Suppository, Enema.	Pharmacology	Dosage
F-Ph-007	Identify the types of transmembrane receptors (diagram) and give example.	Pharmacology	Types of receptors

Modular Integrated Curriculum 2K23

Volume-01

MODULE 02

HEMATOPOIETIC & LYMPHATIC-I

MODULE RATIONALE

"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 of 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

- 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
- Explain the etiology and pathogenesis of common blood & lymphatic diseases, particularly those of importance in Pakistan.
- Explain the rationale for the use of common therapeutic agents for the diseases related to Blood and immunity.
- Describe the role of immunity in the body
- Discuss the working & uses of laboratory instruments in diagnostic lab visit
- Relate red cell indices with health and disease
- Recognize ABO/RH blood grouping system
- Describe the role of Reticuloendothelial system in the body
- Describe the events of hemostasis
- Extrapolate the biochemical aspects of plasma proteins
- Discuss the pharmacological treatment of iron deficiency anemia
- Discuss Blood composition and function
- Discuss the role of liver in hemolytic anemia
- Practice history taking of a patient presented with blood disorders

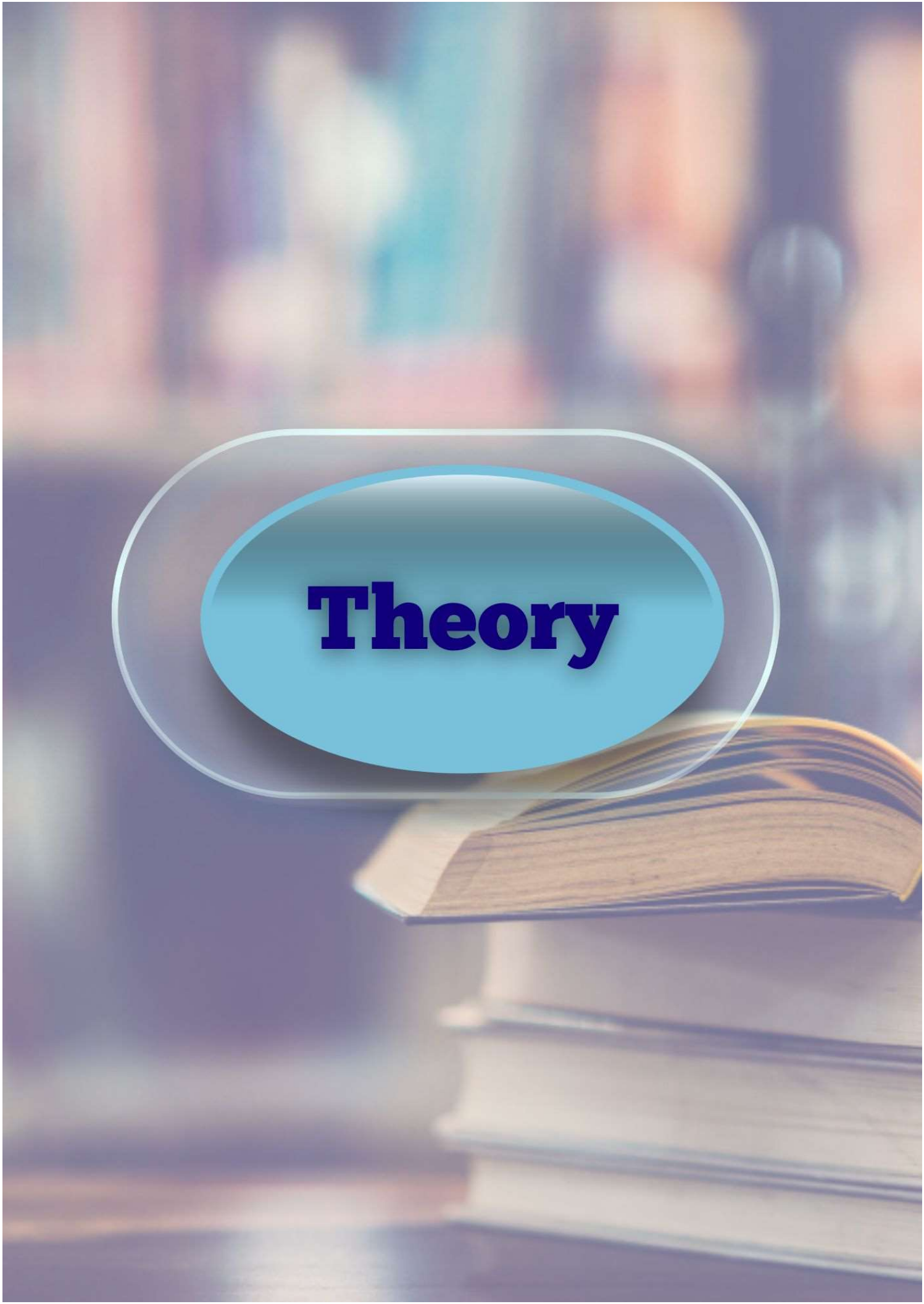
THEMES

- Red blood cell
- Platelets
- White blood cell

CLINICAL RELEVANCE
• Aplastic anemia • Hemolytic anemia • Blood loss anemia • Nutritional anemia • Polycythemia • Hemoglobinopathies • Jaundice • Acute and chronic lymphocytic and myelogenous Leukemia • Allergy (Type I, Type II & Type III)

IMPLEMENTATION TORs
• The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1200. • The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. • However, the level of cognition can be kept at a higher level by the institution. • The Table of Specifications provided will be used for the three papers of the first professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.


Syllabus


Theory

NORMAL STRUCTURE			
GROSS ANATOMY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 02**	
		DISCIPLINE	**TOPIC**
HL-A-001	Identify and describe the components of the Hematopoietic & Lymphoid Tissue and their function	Human Anatomy	Hematopoietic & Lymphoid Tissue
	Describe the location, coverings, relations of Spleen		
	Describe the origin, course branches and distribution of Splenic artery		
	Describe the venous drainage of Spleen, Portal vein formation, tributaries, and area of drainage.		
	Describe the location and relations of Thymus. Age related changes in Thymus		
CODE	**EMBRYOLOGY & POST-NATAL DEVELOPMENT**	**TOTAL HOURS = 01**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
HL-A-002	Describe the Intrauterine Development of spleen	Embryology	Developmental Anatomy of Spleen
NORMAL FUNCTION			
MEDICAL PHYSIOLOGY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 20**	
		DISCIPLINE	**TOPIC**
HL-P-001	Define, classify and explain anemia on the basis of morphology and cause	Medical Physiology	Anemia
	Discuss the effects of anemia on the body		
HL-P-002	Define polycythemia		Polycythemia
	Explain types of polycythemias		
	Discuss the effects of polycythemia on the body		

HL-P-003	Define hemostasis		Hemostasis
	Describe the mechanisms by which hemostasis is secured		
HL-P-004	Discuss the characteristics and functions of platelets		Platelets
	Explain the mechanism of formation of platelet plug		
HL-P-005	Enlist the clotting factors in blood		Coagulation factors
	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 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, International Normalized Ratio (INR), and its clinical significance.		
HL-P-006	Enlist and explain the conditions that cause excessive bleeding		Coagulation disorders
	Define thrombocytopenia	Integrated with Medicine	
	Enlist the causes and consequences of Thrombocytopenia		
HL-P-007	Define immunity	Integrated with microbiology	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.		
HL-P-008	Elaborate Immune tolerance	Integrated with pathology	Tolerance
	Explain the process of clone selection during T cell processing		
	Discuss the failure of tolerance mechanism		
HL-P-009	Discuss immunization.	Integrate with microbiology	Immunization
	Define passive Immunity		Immunization
	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.		
HL-P-010	Discuss the pathophysiology, features and treatment of ABO and RH incompatibility. Enlist the changes that take place in the stored Blood.	Medical Physiology	Blood group Incompatibility
HL-P-011	Discuss the features and complications of mismatched blood transfusion reaction Describe the Hazards of blood transfusion.	Integrate with Pathology	Blood mismatch Transfusion reactions
	Elaborate the Transplantation of Tissues and Organs		
HL-P-012	Explain the process of tissue typing	Integrate with pathology	Transplantation of tissues
	Explain the prevention of Graft Rejection by suppressing immune system		

MEDICAL BIOCHEMISTRY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 19**	
		DISCIPLINE	**TOPIC**

HL-B-001	Explain the steps of synthesis of heme Interpret porphyrias on the basis of sign, symptoms and data. Discuss the biochemical role and types of hemoglobin 1. Differentiate Hemoglobin and myoglobin 2. Explain oxygen dissociation curve of hemoglobin and myoglobin 3. Enlist the factors regulating oxygen dissociation curve of hemoglobin and myoglobin 4. Interpret Carbon monoxide (CO) toxicity on the basis of sign and symptoms 5. Explain the role of 2,3 Bisphosphoglycerate (2,3 BPG) in fetal circulation	Medical Biochemistry	Hemoglobin and its types/ RBCs
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 on the basis of signs and symptoms and laboratory data: 1. Hypochromic microcytic 2. Normochromic microcytic 3. Normochromic normocytic 4. Macrocytic (megaloblastic)	Medical Biochemistry Integrate with Pathology	Hemoglobinopathies/ RBCs/ Homeostasis
HL-B-003	Explain the iron metabolism with mechanism of absorption and factors affecting it. 1. Interpret iron deficiency anemia on basis of given data and microscopic findings 2. Interpret folic acid and cobalamin in relation to anemias on given data and microscopic findings 3. Discuss biochemical role of pyridoxine and vitamin C & K in microcytic anemia	Medical Biochemistry Integrate with medicine	Iron Metabolism/ RBCs
HL-B-004	Discuss the degradation of heme in macrophages of reticuloendothelial system 1. Describe the formation of bile pigments, their types and transport 2. Discuss the fate of bilirubin	Medical Biochemistry	Heme Degradation/ RBCs

HL-B-005	Discuss hyperbilirubinemias and their biochemical basis 1. Differentiate types of jaundice on basis of sign/symptoms and data 2. Evaluate the genetic basis of jaundice on the basis of lab investigations		Hyperbilirubinemias / RBCs/ Blood Groups
HL-B-006	Explain and interpret pedigree of single gene defect i.e. sickle cell anemia (Autosomal recessive) and Beta Thalassemia (X linked recessive)		Genetics
PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 2+5=07**	
		DISCIPLINE	**TOPIC**
HL-Ph-001	Describe the oral and parenteral iron preparations including their pharmacokinetics, uses, adverse effects and Iron Antidotes	Pharmacology & Therapeutics	Anemia
	Describe Vitamin B12 preparations		
HL-Pa-001	Define the terms: Hematopoietic growth factors, their name, mechanism of actions, uses and adverse effects	Pathology	Blood Cells, Platelets and Blood Group
	Define and classify anemias according to underlying mechanism and Mean Corpuscular Volume/ Mean Corpuscular Hemoglobin (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 on the basis of 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		
DISEASE PREVENTION AND IMPACT			
CODE	**COMMUNITY MEDICINE & BEHAVIORAL SCIENCE**	**TOTAL HOURS = 05**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
HL-CM-01	Describe the nutritional aspects of iron deficiency anemia and psychological aspects of diseases	Community Medicine and Public Health	Anemia
HL-CM-02	Enlist most common blood borne diseases in Pakistan Describe the routes of spread of blood borne diseases		communicable diseases
HL-CM-03	Genetic counseling of parents		Genetic diseases
HL-BhS-01	Psychological Counselling of patients and their families	Behavioral Sciences	Counselling, informational care
HL-BhS-02	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
AGING			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 01**	
		DISCIPLINE	**TOPIC**
HL-Ag-01	Discuss the role of platelets in Platelet-Rich Plasma (PRP) treatment in old age (for skin, hairs and joints)	Biochemistry /Dermatology	Platelet Rich Plasma Therapy
HL-Ag-02	Explain the role of glutathione in skin whitening		Glutathione


Practicals

PRACTICAL

HISTOLOGY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 02	
		DISCIPLINE	TOPIC
HL-A-003	Describe the light microscopic structure of Spleen, thymus, Lymph nodes, tonsils and Mucosa Associated Lymphoid Tissue (MALT) including appendix.	Histology	Histological features of lymph node, spleen & thymus

PHYSIOLOGY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 6	
		DISCIPLINE	TOPIC
HL-P-013	Interpret the report of Red Blood Cell Count, Hemoglobin concentration, Hematocrit and RBC Indices by Automated Cell Counter	Medical Physiology	Jaundice & Anemias/ RBCs/ Homeostasis
	Interpret the report of Total Leucocyte Count, Differential Leucocyte Count, & Platelet Count by Automated Cell Counter.		
HL-P-014	Determine Bleeding Time. Determine Clotting Time.		Bleeding/ Clotting time

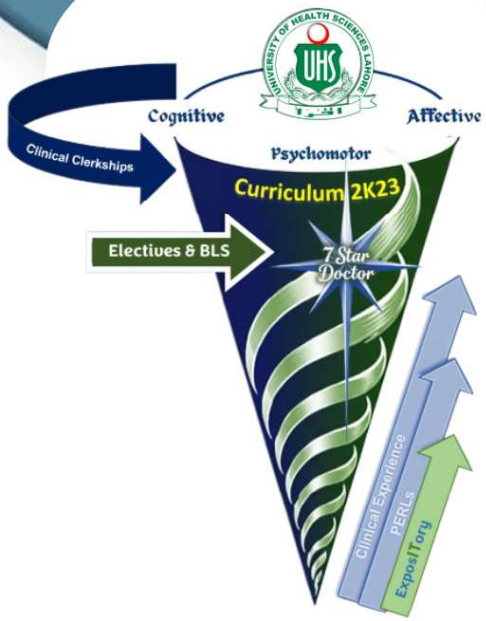
BIOCHEMISTRY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 6	
		DISCIPLINE	TOPIC
HL-B-007	Estimate serum bilirubin and interpret types of jaundice on the basis of data.	Medical Biochemistry	Jaundice & Anemias
	Estimate serum ALP level		
	Estimate serum AST level		
	Estimate serum ALT level		

Modular Integrated Curriculum 2K23

MBBS Year-01

BLOCK-2



Modular Integrated Curriculum 2K23

Volume-01

MODULE 03

MUSCULOSKELETAL & LOCOMOTION-I

MODULE RATIONALE

The musculoskeletal system comprises the bones, muscles, cartilage, tendons, ligaments, and other connective tissues that provide the framework, support, and movement of the body. The initial learning activities will help in understanding the normal structure, development, and normal physiological mechanisms of the organs of the system. This will help in better understanding the possible pathological conditions of the system, including common injuries, diseases, and disorders that affect it, followed by discussion on some important group of drugs used for treatment and/or prevention of these conditions (administration route, mechanism of action and side effects). The impact of musculoskeletal diseases on society and the effect of ageing on occurrence of musculoskeletal diseases will be discussed. Emphasis has been given to incorporate deranged laboratory and imaging findings into the clinical problem solving.

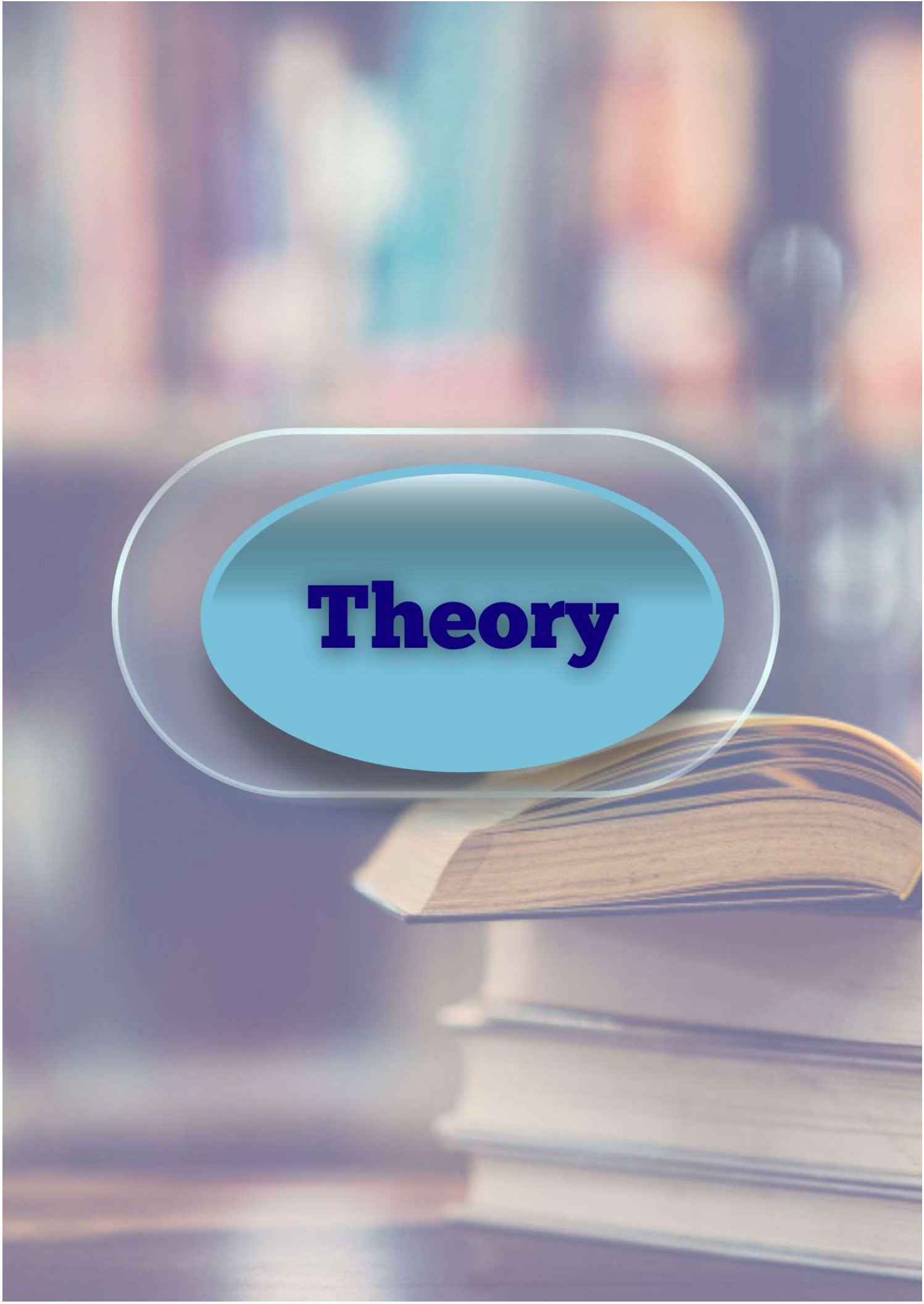
MODULE OUTCOMES

- Develop an understanding of the fundamental components of the musculoskeletal system.
- Explain the development of the structure & function of the musculoskeletal components of limbs, back & correlate it with organization and gross congenital anomalies of the limbs.
- Identify the anatomical features of bones, muscles & neurovascular components of the limbs with clinical correlation.
- Describe how injury and disease alter the Musculoskeletal structure & function.
- Integrate concepts relating to various metabolic processes, their disorders and relevant lab investigations in the study of human Musculoskeletal system.
- Describe the role of the limbs (upper/lower) in musculoskeletal support, stability, and movements.
- Describe the types, formation, stability, function & clinical significance of joints of the upper and lower limb.
- Describe the basic histology of muscle fibers including their molecular structure (Sarcomere).
- Explain the mechanism of excitation and contraction of skeletal and smooth muscles.
- Discuss the psychosocial impact of musculoskeletal diseases in society.

THEMES
• Pectoral Region & Axilla • Upper limb • Pelvic Girdle • Lower Limb
CLINICAL RELEVANCE
• Congenital anomalies of limb • Joint Dislocation • Fracture • Multiple Sclerosis, Astrocytoma, Alzheimer's Disease • Myopathy, Muscular Dystrophy

IMPLEMENTATION TORs
• The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1200. • The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. • However, the level of cognition can be kept at a higher level by the institution. • The Table of Specifications provided will be used for the three papers of the first professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.


Syllabus


Theory

NORMAL STRUCTURE			
GROSS ANATOMY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 105**	
		DISCIPLINE	**TOPIC**
UPPER LIMB			
MS-A-001	Describe the topographical anatomy of Pectoral Region	Human Anatomy	Pectoral Region
	Perform dissection of the Pectoral Region or use models to identify the key structures		
	Describe muscles of the Pectoral Region with their origin, insertion, nerve supply and actions.		
MS-A-002	Describe the cutaneous nerves. and Superficial veins of the Upper Limb.	Human Anatomy	Dermatomes and cutaneious innervation of Upper Limb
	Describe the extent, attachments, and structures passing through Clavipectoral Fascia	Human Anatomy	
MS-A-003	Define the boundaries of auscultation and state its clinical significance	Integrate with Medicine	Pectoral region & Back
	Describe the osteology of the bones in pectoral region. Enumerate the superficial muscles of back, connecting shoulder girdle with vertebral column. Describe the 1. Attachments 2. Nerve supply Actions of Trapezius, Latissimus Dorsi, Rhomboid major and minor. Mention the neurovascular supply of pectoral region and Correlate with important clinical conditions. Describe superficial muscles of the back with their origin, insertion, nerve supply and actions.	Human Anatomy	
MS-A-004	Describe the Osteology of Clavicle	Human	

	(Morphological features, side determination, attachments, ossification)	Anatomy	Bones of Upper Limb: Clavicle & Scapula
	Describe the correlates functions of Clavicle (clavicle fracture, its role in terms of weight transmission of upper limb, compression of neurovascular structures)		
	Describe the Osteology of Scapula (morphological features, attachments, ossification)		
	Determine the side and identify the landmarks of scapula		
	Describe the movements of Scapula associated with movements of Shoulder Girdle		
	Tabulate the muscles of scapular region and give their attachments, nerve supply and action		
	Tabulate the attachments, origin, insertion, innervation, and actions of Anterior Axio-appendicular Muscles		
MS-A-005	Describe the Sternoclavicular Joint in terms of articulating surfaces, ligaments, articular disc, nerve supply.	Human Anatomy	Bones of thorax, Joints of Upper Limb: Sternoclavicular Joint
MS-A-006	Develop clear concepts of the topographical anatomy of Axilla and its contents	Human Anatomy	Axila
	Describe the boundaries of Axilla. (Identification of muscles forming the boundaries of axilla)		
	List the contents of Axilla		
	Perform dissection/ Identify the Axilla and its contents		
	Describe Axillary Artery with reference to its 3 parts – their relations, branches, and anastomoses		
	Describe the formation, tributaries, and drainage of Axillary Vein	Human Anatomy	
	Identify and demonstrate the course/ relation and branches/tributaries of axillary vessels		
	Describe the Axillary Lymph Nodes in terms of location, grouping, areas of drainage and clinical significance		

	Describe the course, relations, root value and distribution of Axillary nerve. Describe the boundaries and contents of quadrangular space.		
MS-A-007	Describe the Osteology of Humerus (Side Determination, morphological features, attachments, ossification)	Human Anatomy	Bones of upper limb: Humerus
MS-A-008	Describe the Shoulder Joint under the following headings: Articulation, Type/ Variety, Capsule, Ligaments, Innervation, Blood supply, Movements.		Joints of Upper Limb: Shoulder Joint
	Describe the 3 parts of Deltoid Muscle and correlate them with its unique functions. Explain its role in abduction of shoulder joint. Explain mechanism of Abduction of arm		
	Identify and demonstrate the movements of scapula and shoulder joint.		
	Draw and label the arterial anastomosis around shoulder joint		
	Describe, in detail, the Scapula-Humeral Mechanism in relation to movement of abduction. Discuss important clinical conditions		
MS-A-009	Describe Rotator Cuff Muscles, state their Anatomical significance and explain Rotator Cuff Tendinitis	Human Anatomy	Rotator Cuff
	Clinical correlates of shoulder joint. (shoulder joint stability, dislocation and shoulder pain)	Integrate with Surgery	
MS-A-010	Describe the formation of Brachial Plexus; Infra and Supraclavicular parts. Discuss Brachial plexus injuries	Human Anatomy	Nerves of Upper Limb
	Demonstrate and identify the formation of brachial plexus and its branches		
	List the branches of brachial plexus and give their areas of distribution and muscles they innervate		

	Enlist and tabulate the muscles of anterior compartment of arm with their attachments, nerve supply and action. Identify & Describe Musculocutaneous Nerve in terms of its Origin, Course, Termination, Relations, Branches, and distribution. Describe and illustrate the cutaneous innervation of the arm.		
MS-A-011	Describe the Brachial Artery in terms of its course, relations, branches, and distribution	Human Anatomy	Blood supply of arm
	Tabulate the attachments, innervation, and actions of Triceps brachii as a muscle of Posterior Fascial Compartment of Arm		
	Identify & Describe the Profunda Brachii Artery giving its course, relations, branches, and distribution		
MS-A-012	Describe Cubital Fossa with emphasis on its boundaries, contents, and clinical significance		Muscles of Arm
	Demonstrate surface marking of superficial veins of arm and forearm for IV (Intra venous) injections		
	Demonstrate biceps brachi reflex, triceps reflex and brachioradialis reflex		
MS-A-013	Determine the side and identify the landmarks of radius and ulna. Describe the Osteology of Radius (Side Determination, morphological features, attachments).	Human Anatomy	Bones of Forearm
	Describe the Osteology of Ulna (Side Determination, morphological features, attachments).		
MS-A-014	Describe osseofascial compartment of forearm. Tabulate flexor and pronators muscles of forearm, their attachments, actions and nerve supply. Describe the action of paradox with examples	Human Anatomy	Muscle of Anterior/Flexor Compartment of Forearm
MS-A-015	Tabulate the attachments, innervation, and actions of Extensor Muscles of the Forearm		Muscle of Lateral and Posterior/Extensor
	Tabulate the attachments, innervation, and actions of Lateral Muscles of the Forearm		

			Compartment of Forearm
MS-A-016	Identify the muscles and nerves of flexor and extensor compartments of forearm		Nerves of Forearm
	Describe and illustrate the cutaneous innervation of the Forearm		
	Describe ulnar, median and radial nerves in fore arm.		
MS-A-017	Describe the Origin, Course, Relations, and branches of Ulnar and radial Artery in Forearm Describe the Origin, Course, Relations and list the tributaries of veins of Forearm. Surface marking of Brachial artery, Cephalic, Median cubital, Basilic Vein, Radial & Ulnar arteries, anterior &posterior interosseous artery		Blood supply of forearm
MS-A-018	Identify the Extensor & Flexor Retinacula and describe their attachments and relations	Human Anatomy	Retinacula of Forearm
MS-A-019	Demonstrate the formation of carpal tunnel and identify the contents Describe Carpel Tunnel Syndrome	Human Anatomy- Integrate with surgery	Carpal tunnel syndrome
	Describe the features, attachments, relations and structures passing under Flexor Retinaculum		
MS-A-020	Describe the Origin, Course, Relations, and branches of Ulnar Artery in Forearm	Human Anatomy	Forearm: Blood supply and Venous drainage
	Describe the Origin, Course, Relations and list the tributaries of veins of Forearm		
	Surface marking of Brachial artery, Cephalic, Median cubital, Basilic Vein, Radial & Ulnar arteries, anterior &posterior interosseous artery		
	Describe the Elbow Joint in terms of articular surfaces, type, variety, ligaments, muscles producing movements, blood supply {Anastomosis around elbow joint}, nerve supply and radiological imaging.	Human Anatomy	Joints of Upper Limbs: Elbow Joint

MS-A-021	Describe Carrying Angle and justify its importance in limb movement	Integrate with Surgery	
MS-A-022	Describe the Radioulnar Joints in terms of articular surfaces, type, variety, ligaments, muscles producing movements, nerve supply and radiological imaging. Describe the wrist joint in terms of articular surfaces, type, variety, ligaments, muscles producing movements, nerve supply and radiological imaging. Demonstrate mechanisms of movements of Pronation & Supination	Human Anatomy	Joints of Upper Limbs: Radioulnar Joint
MS-A-023	Describe the features of Interosseous Membrane with structures that pierce through it	Human Anatomy	Interosseous membrane
MS-A-024	Describe the features and explain the importance of Fibrous Flexor Sheaths, synovial flexor sheaths and extensor expansion	Human Anatomy	Fascia & Muscles of Hand
MS-A-025	Demonstrate the attachments and actions of the muscles of hand Identify the muscles and neurovasculature of palm. Explain the morphology and tabulate the attachments, innervation and actions of intrinsic muscles of hand. Explain the fascial spaces of palm and pulp space of fingers Describe Dupuytren contracture, mallet finger and buttonaire deformity. Describe hand as a functional unit. (position of hand, movement of thumb and fingers while performing different functions) Discuss cupping of hand and fist formation.	Human Anatomy	Hand & Actions of Muscles of Upper Limb as a Functional Unit
MS-A-026	Draw the Radial Artery course, relation and termination in hand with its clinical significance in the region	Human Anatomy	Blood vessels of forearm and hand

	Describe the Ulnar Artery's Course, relation and termination in hand with its clinical significance in the region		
	Describe the formation, branches, and areas of distribution of Superficial and Deep Palmar Arch		
MS-A-027	Describe the course, relations and branches of Ulnar, Median and Radial Nerves in the Hand	Human Anatomy	Nerves of forearm and hand
MS-A-028	Describe the First Carpometacarpal Joint in terms of; Type, Variety, Articular Surfaces, Ligaments, Relations, Blood Supply, Innervation, movements.	Human Anatomy	Joints of Hands
	Demonstrate the movements of the 1st carpometacarpal joint		
	Describe the Metacarpophalangeal & interpharyngeal Joints in terms of; Type, Variety, Articular Surfaces, Ligaments, Relations, Blood Supply, Innervation & Movements		
MS-A-029	Palpate the arteries of the upper limb on a subject	Integrate with Medicine	Skills
	Identify the topographical features of upper limb in a cross-sectional model/ specimen.	Integrate with Radiology	
	Demonstrate and identify the anatomical landmarks of upper limb on radiographs/ CT (Computed tomography)/ MRI (Magnetic resonance imaging)		
	Mark the anatomical landmarks and surface marking on a subject/ simulated model	Human Anatomy	
LOWER LIMB			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DISCIPLINE**	**TOPIC**
MS-A-030	Draw and label the Parts of the hip bone, with its attachments.	Human Anatomy	Hip Bone
	Describe the parts, attachments of hip bone		
	Identify the parts and bony features of the hip bone, with its attachments, important relations		
	Demonstrate the side determination of hip bone, its bony features, attachments		

MS-A-031	Describe the parts, attachments, side determination of femur	Human Anatomy	Femur
	Identify the parts and bony features of the femur, with its attachments.		
	Demonstrate the side determination of femur, its bony features, attachments, and important relations (correlate these with fractures)		
	Describe coxa Vara and coxa valga and their clinical significance		
MS-A-032	Describe the extent, attachments, and modifications of Fascia Lata	Human Anatomy	Fascia Lata
	Demonstrate the attachment of fascia Lata, iliotibial tract		
MS-A-033	Describe the cutaneous nerves and vessels of thigh	Human Anatomy	Neurovascular Supply of thigh
	Draw and label the cutaneous nerve supply of thigh and lumbar plexus.		
	Describe the formation, course, relations, tributaries, and termination of the superficial veins		
	Explain the anatomical justification of venesection, varicose veins, and saphenous venous grafts		
	Describe the lymphatic drainage of the region with special emphasis on afferent and efferent of inguinal lymph nodes		
	Identify the superficial and deep lymph nodes		
	Explain the anatomical justification for enlargement of inguinal lymph nodes		
MS-A-034	Describe and identify the Boundaries and contents of femoral triangle	Human Anatomy	Femoral Triangle & Canal
	Draw and label the Boundaries and contents of femoral triangle		
	Identify the femoral sheath with its compartments		
	Describe the formation of femoral sheath and its significance		

	Describe the formation of femoral canal and its contents and significance		
	Describe the formation and significance of femoral ring		
	Compare and contrast the anatomical features of femoral and inguinal hernias	Integrate with Surgery	
MS-A-035	Tabulate the muscles of anterior compartment of thigh with their attachments, nerve supply and actions	Human Anatomy	Muscles of Anterior Compartment of Thigh
	Demonstrate and identify the muscles of anterior compartment of thigh with their proximal and distal attachments		
	Demonstrate the actions of muscles of anterior compartment of thigh		
	Explain the anatomical basis of psoas abscess	Integrate with Surgery	
MS-A-036	Identify and demonstrate the nerves and vessels of anterior compartment of thigh along with their branches	Human Anatomy	Neurovascular supply of Anterior Compartment of Thigh
	Describe the origin, course, relations, branches, distribution, and termination of femoral artery		
	Describe the origin, course, relations, tributaries, area of drainage and termination of femoral vein		
	Describe the origin, course, relations, branches, distribution, and termination of femoral nerve		
	Tabulate the muscles of anterior compartment of thigh with their attachments, nerve supply and actions.		
MS-A-037	Describe the formation, boundaries, contents of adductor canal	Human Anatomy	Adductor Canal
	Identify and demonstrate the boundaries and contents of adductor canal		
MS-A-038	Describe Muscles of medial compartment of thigh with their proximal and distal attachments, innervation and actions		Muscles of Medial Compartment of Thigh

	Identify the muscles of medial compartment of thigh with their proximal and distal attachments		
	Demonstrate the actions of the muscles of the compartment on self/ subject		
MS-A-039	Describe the origin, course, relations, branches/ tributaries, distribution, and termination of neurovascular structures of medial compartment of thigh	Human Anatomy	Neurovascular supply of Medial Compartment of Thigh
	Identify the nerves and vessels of medial compartment of thigh along with their branches		
	Describe and identify the lumbar and sacral plexus and its branches supplying the lower limb		
	Describe the cutaneous nerve supply and lymphatics of the region		
MS-A-040	List the structures passing through the greater and lesser sciatic foramen.		Gluteal Region
	Describe the muscles of gluteal region with their proximal and distal attachments, innervation, and actions		
	Identify the muscles of gluteal region with their proximal and distal attachments		
	Describe the origin, course, relations, branches/ tributaries, distribution, and termination of neurovascular structures of gluteal region		
	Demonstrate the actions of the muscles of gluteal region		
	Explain the anatomical basis of the consequences of wrongly placed gluteal intramuscular injections Damage to Gluteus medius & minimus due to poliomyelitis	Integrate with Medicine	
	Demonstrate and identify the origin, course, relations, branches/tributaries and termination of nerves and vessels of gluteal region	Human Anatomy	
MS-A-041	Describe the Attachments of muscles of posterior compartment of thigh with the innervation and action	Human Anatomy	Muscles of Posterior

	Identify the muscles of posterior compartment of thigh with their proximal and distal attachments		Compartment of Thigh
	Demonstrate the actions of muscles of posterior compartment of thigh		
	Describe the anatomical basis of signs and symptoms of sciatica.	Integrate with Surgery	
MS-A-042	Describe the origin, course, relations, branches, distribution, and termination of Profunda femoris artery	Human Anatomy	Blood supply of Posterior compartment thigh
	Describe blood supply on back of thigh		
MS-A-043	Describe the origin, course, relations, branches, distribution, and termination of sciatic nerve	Human Anatomy	Sciatic Nerve
	Describe the anatomical basis, signs and symptoms of compression of or injury to sciatic nerve	Integrate with Surgery	
MS-A-044	Describe the hip joint with its type, articulations, ligaments, stabilizing factors		Hip Joint
	Movements, and neuro-vascular supply with clinical significance.	Human Anatomy	
	Perform the movements of hip joint at various angles and be able to describe the muscles producing the movement. Discuss important associated clinical conditions (Hip dislocation, Arthritis, Hip joint stability and Trendelenburg sign) movements, and neuro-vascular supply with clinical significance.		
MS-A-045	Describe the Boundaries and contents of popliteal fossa. Discuss clinical correlates (Popliteal aneurysm, Palpation of Popliteal artery, semi membranous bursa swelling and Baker's cyst	Human Anatomy	Popliteal Fossa
	Draw and label boundaries and contents of popliteal fossa		
	Identify the boundaries and contents of popliteal fossa		

	Describe the origin, course, relations, branches/tributaries, distribution and termination of popliteal artery and vein		
MS-A-046	Describe parts of tibia and fibula, with their attachments, important relations and side determination	Human Anatomy	Knee Joint
	Identify the parts and bony features of the tibia & fibula, their bony features, attachments, important relations.		
	Draw and label Parts of patella with its attachments		
	Describe features of patella, and name the factor responsible for stabilizing Patella		
	Describe the knee joint with its type, articulations, ligaments, movements, and neuro-vascular supply		
	Explain the mechanism of locking and unlocking of knee joint with the foot on ground and off the ground Describe the attachments and role of popliteus in locking and unlocking of the knee joint		
	Describe the factors responsible for stability of knee joint. Discuss important associated clinical conditions.		
MS-A-047	Describe the Muscles of anterior, lateral, and posterior compartments of leg with their proximal & distal attachments, innervation, and actions	Human Anatomy	Muscles of leg
	Identify the muscles of anterior, lateral, and posterior compartments of leg with their proximal and distal attachments		Neurovascular supply of Leg
MS-A-048	Describe the origin, course, relations, branches/tributaries and termination of nerves and vessels of anterior, lateral, and posterior compartments of leg- Compartment Syndrome, Foot Drop		Neurovascular supply of Leg
	Describe the cutaneous nerves and veins of leg.		

	Draw and label the cutaneous nerve supply and dermatomes of leg		
MS-A-049	Identify the extensor, flexor, and peroneal retinacula and demonstrate the structures related to them		Flexor, Extensor, and peroneal Reticula
	Describe the attachments, relations, and structures passing under cover of, extensor, peroneal, and flexor retinacula		
	Identify and demonstrate the nerves and vessels of anterior, lateral, and posterior compartments of leg along with their branches		
	Describe the formation of noncalcareous (Achilles tendon)		
MS-A-050	Describe the articulations, muscles and nerve supply and movements at Tibiofibular joints	Human Anatomy	Tibio-fibular Joint
MS-A-051	Describe the ankle joint with its type, articulations, ligaments, movements, and nerve supply	Human Anatomy	Ankle Joint
	Describe the factors stabilizing the ankle joint. Discuss important associated clinical conditions.		
	Identify and demonstrate the articulating surfaces and ligaments of ankle joint		
MS-A-052	Describe the formation, attachments, and clinical significance of plantar aponeurosis	Human Anatomy	Plantar Fascia
	Explain the anatomical basis of the signs and symptoms of plantar fasciitis.	Integrate with Orthopedics	
MS-A-053	Identify the parts and bony features, attachments, and important relations of the articulated foot	Human Anatomy	Muscles of foot
	Describe the muscles of the dorsum and sole of foot with their proximal & distal attachments, innervation and actions emphasizing the role of interossei and lumbricals.		
	Draw and label the muscles of the layers of sole of foot		
	Demonstrate and identify the muscles and tendons with their proximal and distal attachments in the sole of foot		

MS-A-054	Describe the interphalangeal, subtalar and midtarsal joints with their types, articulation, movements, ligaments.	Human Anatomy	Small joints of foot
MS-A-055	Describe the formation, components, stabilizing and maintaining factors of the arches of foot	Integrate with Orthopedics	Arches of foot
	Describe the clinical significance of arches of foot with respect to flat foot, claw foot.		
MS-A-056	Describe the fibrous flexor sheaths, extensor expansions and synovial flexor sheaths	Human Anatomy	Retinacula of foot
MS-A-057	Describe the origin, course, relations, branches/tributaries, distribution, and termination of plantar vessels	Human Anatomy	Neurovascular supply of foot
	Identify the nerves and vessels on the foot along with their branches		
	Describe the cutaneous nerves of foot		
	Draw and label the cutaneous nerve supply and dermatomes of foot		
	Identify the nerves and vessels in the sole of foot along with their branches		
	Describe the palpation of dorsalis pedis artery &explain the clinical significance of dorsalis pedis artery		
MS-A-058	Describe the surface anatomy, course, relations, tributaries, and communications of the superficial veins of the lower limb	Human Anatomy	Arterial and Venous drainage of lower limb
	Draw a concept map of the superficial veins of lower limb		
	List the factors favoring venous return of the lower limb		
MS-A-059	Explain the anatomical basis of the formation,		
	and signs and symptoms of deep venous thrombosis	Integrate with Surgery	Human Gait
	Discuss Clinical correlations of Lower Limb Arteries (palpation of femoral, popliteal, posterior tibial &	Integrate with Medicine	

	dorsalis pedis arteries, collateral circulation, intermittent claudication, occlusive arterial disease)		
MS-A-060	Draw a concept map of the lymphatic drainage of lower limb	Human Anatomy	Lymphatic drainage of lower limb
MS-A-061	Draw and label the cutaneous nerves & dermatomes of the lower limb Discuss clinical correlates of Lower limb nerves (Femoral nerve injury, Sciatic Nerve injury, Common fibular, tibial & obturator nerve injury) Describe the anatomical basis of knee jerk, ankle jerk, and plantar reflex	Human Anatomy	Cutaneous dermatomes & nerve supply of lower limb
MS-A-062	Demonstrate the surface marking of nerves and vessels of lower limb		Topographical and radiological anatomy of lower limb
	Demonstrate the surface marking of bony landmarks of lower limb		
	Identify the topographical features of lower limb in a cross-sectional model		
	Demonstrate and identify the features of bones and joints of lower limb on radiograph/ CT scan/ MRI	Integrate with Radiology	
MS-A-063	Describe the common fractures of the following bone with the risk factors, clinical presentations, and management: 1. Clavicle 2. Humerus 3. Radius 4. Ulna 5. Small bones of hand 6. Hip bone 7. Femur 8. Tibia 9. Fibula 1. Small bones of foot	Orthopedics and trauma	Bone Fracture

MS-A-064	Describe the dislocations of the following joints with the risk factors and clinical presentations, and brief management: Shoulder joint 1. Elbow joint 2. Interphalangeal joint of hand 3. Hip joint 4. Knee joint 1. Ankle joint	Orthopedics and trauma	Joint Dislocation
EMBRYOLOGY & POST-NATAL DEVELOPMENT			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 06**	
		DISCIPLINE	**TOPIC**
MS-A-065	Describe the development of skeletal muscle and innervation of axial skeletal Muscles-developmental basis of myotome	Human Embryology	Development of Muscles
	Briefly discuss the development of cardiac and smooth muscle (Detail to be covered in respective modules later).		
MS-A-066	Describe the process of limb development and limb growth	Human Embryology	Development of Limb
MS-A-067	Describe the embryological basis of cutaneous innervation of limb	Human Embryology	Development of Nerve supply of limbs
	Describe the embryological basis of blood supply of limbs and concept of axial artery		
MS-A-068	Describe the embryological basis of congenital anomalies related to muscular system.	Human Embryology	Congenital anomalies of limbs
	Describe the clinical presentations and embryological basis of; i. Amelia ii. Meromelia iii. Phocomelia	Integrate with Paedriatics	

	iv. Cleft Hand and Foot v. Polydactyly, Brachydactyly, Syndactyly i. Congenital club foot		
MS-A-069	Describe the developmental process of cartilage and bone	Human Embryology	Development of Cartilage
	Describe the process of histogenesis of cartilage and bone		

MICROSCOPIC ANATOMY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 06**	
		DISCIPLINE	**TOPIC**
MS-A-070	Describe the microscopic structure and ultramicroscopic structure of skeletal muscle	Histology	Histology of Muscles
	Explain the basis of myasthenia gravis.	Integrate with Medicine	
	Describe the microscopic and ultramicroscopic structure of cardiac muscle	Histology	
	Describe the microscopic and ultramicroscopic structure of smooth muscle		
	Compare and contrast the histological features of three types of muscle tissue		
MS-A-071	Describe Myosatellite Cells & their role in regeneration of muscle, hyperplasia, and hypertrophy of muscle fiber	Histology/ Integrate with Pathology	Functional Histology
	Explain the histopathological basis of leiomyoma	Histopathology	
MS-A-072	Describe the light and electron microscopic structure of bone cells Describe the light and electron microscopic structure of compact and spongy bone	Histology	Histology of Osseous tissue
	Describe the histological justification for osteoporosis, Osteopetrosis	Integrate with Pathology	
	Describe the histological basis for bone repair after fractures.		

MS-A-073	Compare and contrast the microscopic features of compact and spongy bone	Histology	Histology of Bone
	Explain the characteristic features of ossification (Intramembranous & Endochondral ossification)		
	Describe the zones seen in an epiphyseal growth plate		
MS-A-074	Describe the metabolic role of bone -	Integrate with Medicine	Functional Histology of Bone
	Describe the clinical presentation of osteoporosis, osteopenia	Integrate with Orthopedics	
MS-A-075	Describe the microscopic and ultramicroscopic structure of all types of cartilage	Histology	Histology of Cartilage
	Compare and contrast the structure of cartilage and bone matrix		
	Tabulate the differences between three types of cartilage		
MS-A-076	Describe the histological basis for bone & Cartilage growth and repair	Histology	Mechanism of Bone growth

NORMAL FUNCTION

MEDICAL PHYSIOLOGY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 32	
		DISCIPLINE	TOPIC
MS-P-001	Explain the Physiological basis of membrane potential	Medical Physiology	Diffusion / Equilibrium Potentials
	Explain diffusion potentials of Na & K		
MS-P-002	Define Nernst potential		Nernst potential
	Explain Physiological Basis of Nernst potential		
	Write the Nernst equation.		
	Calculate Nernst potential for Na & K		
	Explain the effects of altering the concentration of Na+, K+, Ca on the equilibrium potential for that ion		
MS-P-003	Describe the normal distribution of Na+, K+, Ca and Cl- across the cell membrane		Goldman Equation

	Explain physiological basis of Goldman equation		
	Clarify the role of Goldman equation in generation of Resting Membrane Potential (RMP).		
MS-P-004	Describe the Physiological basis of generation of RMP.		Resting Membrane Potential in Neurons
	Explain the effects of hyperkalemia and Hypokalemia on the Resting Membrane Potential (RMP)		
	Name the membrane stabilizers		
	Explain the physiological basis of action of Local Anesthetics.	Medical Physiology Integrate with Anesthesiology	
MS-P-005	Describe the Physiological anatomy of Neurons	Medical Physiology	Neurons
	Discuss the axonal transport		
	Enlist & give functions of Neuroglial cells		
	Explain process of myelination in Central Nervous System (CNS) & Peripheral Nervous System (PNS)		
MS-P-006	Classify neurons functionally.		Classification of Neurons & Fibers
	Classify nerve fibers according to Erlanger & Gasser Classification		
	Enlist properties of nerve fibers.		
MS-P-007	Discuss Components of ANS (Autonomic nervous system) Explain the physiological anatomy of sympathetic and parasympathetic nervous system Describe the types of adrenergic and cholinergic receptors and their functions Explain the effects of sympathetic and parasympathetic on various organs/ system of body		Autonomic nervous system
MS-P-008	Define Action Potential		Action Potential of Neurons
	Enlist the properties of action potential		
	Describe the ionic basis of an action potential.		
	Explain the phases of action potential.		
	Explain the effects of hyperkalemia and Hypokalemia on the action potential.		

	Draw monophasic action potential.		
	Explain absolute and relative refractory period		
MS-P-009	Explain the role of other ions in action potential.		Role of other ions in action potential
	Elaborate the effect of hypocalcemia on neuron excitability.		
MS-P-010	Explain Physiological basis& properties of Graded potential		Local / Graded potentials
	Draw & explain Physiological basis & properties of compound action potential.		
	Contrast between action potential and graded potential		
	Describe the ionic basis of excitatory Post Synaptic Potential (EPSP), Inhibitory Post Synaptic Potential (IPSP), End Plate Potential (EPP).	Medical Physiology	
MS-P-011	Classify and explain Physiological basis of different types of synapses		Synapse
	Elaborate how signal transmission takes place across chemical synapse		
MS-P-012	Explain the mechanism of conduction of Nerve impulse in myelinated and unmyelinated nerve fibers.		Conduction of Nerve Impulse
	Elaborate significance of saltatory conduction		
MS-P-013	Enlist the types of nerve injury		Nerve Degeneration
	Explain Wallerian degeneration.		
	Describe the process of regeneration of nerve fiber.		
	Describe the causes, features & pathophysiology of Multiple sclerosis, GB syndrome.	Medical Physiology Integrate with Medicine	
MS-P-014	Discuss the physiological anatomy of skeletal muscles.	Medical Physiology	Skeletal muscle
	Discuss the physiological anatomy of skeletal, smooth, and cardiac muscles.		
	Describe the structure of Sarcomere		
MS-P-015	Differentiate between isometric and isotonic contraction by giving examples.		

	Compare the fast and slow muscle fibers.		Characteristics of whole muscle contraction
MS-P-016	Explain the mechanism of summation and Tetanization.	Medical Physiology	Mechanics of muscle contraction
	Describe staircase effect/Treppe phenomena		
	Discuss the mechanism of skeletal muscle fatigue.		
	Explain the remodeling of skeletal muscle to match the function. Describe the development of macro motor units in poliomyelitis.		
	Explain the physiological basis of rigor mortis	Medical Physiology Integrate with Forensic Medicine	
MS-P-017	Describe the physiological anatomy of Neuro Muscular Junction (NMJ)	Medical Physiology	Neuromuscular junction
	Mechanism of Neuromuscular transmission & generation of End Plate Potential		
	Explain features, pathophysiology & treatment of myasthenia Gravis	Medical Physiology Integrate with Medicine	
	Describe the enhancers or blockers of neuromuscular transmission at the neuromuscular junction.	Medical Physiology	
	Discuss the steps/ events of excitation contraction coupling in skeletal muscle.	Medical Physiology	
MS-P-018	Differentiate between types of smooth muscles.	Medical Physiology	Smooth Muscle
	Describe mechanism of smooth muscle contraction in comparison to skeletal muscle.		
	Explain the physiological anatomy of neuromuscular junction of smooth muscle		
	Explain the excitatory and inhibitory transmitters secreted at Neuro Muscular Junction (NMJ) of smooth muscles.		
	Explain the depolarization of multiunit smooth muscles without action potentials.		

	Explain the local tissue factors and hormones that can cause smooth muscle contraction without action potential.		
	Explain the regulation of smooth muscle contraction by calcium ions.		
	Explain membrane potential and action potentials in smooth muscles.		
	Explain the phenomena of stress relaxation and reverse stress relaxation in smooth muscles.		
	Explain the LATCH mechanism		
	Describe the significance of LATCH mechanism.		
	Explain the nervous and hormonal control of Smooth Muscle Contraction.		

MEDICAL BIOCHEMISTRY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 30**	
		DISCIPLINE	**TOPIC**
MS-B-001	Classify carbohydrates along with the structure and biomedical importance of each class	Biochemistry	Classification carbohydrates
MS-B-002	Explain the isomerization of carbohydrates	Biochemistry	Carbohydrates
MS-B-003	Describe the physical and chemical properties of carbohydrates	Biochemistry	Extracellular matrix
	Differentiate between proteoglycan and glycoproteins		
	Describe the components of extracellular matrix: 1. Describe structure, functions and clinical significance of glycosaminoglycans 2. Discuss structure and functions of Fibrous proteins (collagen and Elastin) 3. Interpret diseases associated with them on basis of sign/symptoms and data 4. Interpret the importance of vitamin C in collagen synthesis 5. Describe sources, active form, functions and deficiency diseases of vitamin C	Biochemistry	

	1. Identify the defects in collagen synthesis based on given data (Ostegenesis Imperfecta)		
	Interpret genetic basis of Duchene muscular dystrophy	Biochemistry	
	Explain the transport and uptake of glucose in cells, steps of glycolysis and citric acid cycle along with enzymes, co enzymes and cofactors involved		
MS-B-004	Discuss the provision of energy to the muscles and cells through glycolytic pathway and TCA cycle	Biochemistry	Glycolysis and Tricarboxylic acid cycle (TCA)
MS-B-005	Describe the digestion and absorption of proteins Discuss the uptake of amino acids by cells Define amino acid pool and nitrogen balance. Explain ATP -dependent & ATP independent systems of protein degradation.	Biochemistry	Protein Digestion & Transport across cell
MS-B-006	Explain following reactions with enzymes involved in it: 1. Transamination 2. Deamination decarboxylation 3. Deamidation 4. Trans deamination. 1. Oxidative deamination.	Biochemistry	Reactions involve in catabolism
MS-B-007	Explain the role of pyridoxal phosphate, glutamate, glutamine, alanine and discuss the mechanism of transport of ammonia to liver	Biochemistry	Transportation of ammonia to liver
MS-B-008	Illustrate steps of urea cycle with enzymes and its importance Discuss ammonia intoxication	Biochemistry	Urea cycle
MS-B-009	Interpret different types of hyperammonemia on basis of sign symptoms and data		
MS-B-010	Discuss the metabolism of aliphatic, aromatic, branched chain, sulfur containing, hydroxyl group containing amino acids with the products formed and enzymes and vitamins involved in them	Biochemistry	Protein metabolism

MS-B-011	Interpret the following on basis of given data: 1. Phenylketonuria 2. Tyrosinemia 3. Albinism 4. Homocystinuria 5. Maple syrup urine disease 1. Alkaptonuria	Biochemistry	Inborn errors of amino acid metabolism
PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS			
THEORY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 4+7=11**	
		DISCIPLINE	**TOPIC**
MS-Ph-001	Explain the mechanism by which drugs can stimulate NMJ.	Pharmacology & Therapeutics	Drugs acting on Neuromuscular Junction (NMJ)
	Explain the mechanism by which drugs can block NMJ.		
MS-Ph-002	Discuss briefly the therapeutic effect of drugs used in myasthenia gravis.		Drugs in Myasthenia Gravis
MS-Ph-003	Discuss briefly the therapeutic effect of drugs used as local anesthetics.		Local Anesthetics
MS-Pa-001	Describe the hyperplasia, hypertrophy, and atrophy of muscle fiber	Pathology	Muscle remodeling
	Explain the histopathological basis of leiomyoma		
MS-Pa-002	Describe the histological basis of Duchenne Muscular Dystrophy.		Diseases of Muscle
MS-Pa-003	Describe the clinical presentation and histological justification for osteoporosis, osteopetrosis		Diseases of Bone
	Briefly enlist the steps of repair.		
MS-Pa-004	Describe the histological basis for bone repair after fracture and cartilage growth and repair		Disease of Cartilage
AGING			
THEORY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 04**	

		DISCIPLINE	TOPIC
MS-Ag-01	Discuss the effect of age on bone fragility and its implications with management.	Geriatrics/ Medicine/ Biochemistry	Bone
MS-Ag-02	Discuss the effect of age on loss of cartilage resilience and its implications and management		Cartilage
MS-Ag-03	Discuss the effect of age on Muscular strength and its implications and management		Muscle
MS-Ag-04	Explain the protective effect of estrogen (female sex hormone) on bone mineral density and relate it to increased prevalence of postmenopausal fractures in women.		Effect of estrogen on BMD
DISEASE PREVENTION AND IMPACT			
CODE	**COMMUNITY MEDICINE & BEHAVIORAL SCIENCE**	**TOTAL HOURS = 14+3=17**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
MS-CM-001	Explain causes of low back pain	Community Medicine and Public Health	Back Pain
	Describe prevention of low back pain		
MS-CM-002	Describe work related musculoskeletal disorders addition with its burden/epidemiology		Work related Musculoskeletal disorders
	Identify risk factors of Musculoskeletal disorders MSD at workplace		
	Describe prevention of exposure to risk factors related to workplace		
MS-CM-003	Describe MSD related to mobile addition with its burden/epidemiology	Community Medicine and Public Health	MSD related to mobile usage
	Describe MSD related to mobile usage (Text neck, Trigger thumb, DeQuervain Syndrome, Carpel Tunnel Syndrome) Identify risk factors related to MSD due to excessive mobile usage.		
	Describe the preventive strategies for mobile addiction-related MSD.		

MS-CM-004	Describe the application of ergonomics in MSD related to the above disorders.	Community Medicine and Public Health	Ergonomics
MS-CM-005	Describe the concept of non-communicable Musculoskeletal diseases		Noncommunicable disease
MS-CM-006	Identify the risk factors in the community for Osteoporosis Learn and apply interventions to prevent the risk factors for various musculoskeletal diseases in the community.		Risk factor assessment of Musculoskeletal diseases
MS-BhS-001	Identify and deal with the various psychosocial aspects of Musculoskeletal conditions (such as Osteoarthritis, Osteomyelitis, Rheumatoid arthritis, Gout, chronic back pain, psychosomatic complaints) and Neuromuscular conditions (Muscular dystrophy, Myasthenia Gravis, Sclerosis) on Individual, Family and Society	Behavioral Sciences	Psychosocial factors influencing chronic illnesses
MS-BhS-002	Identify the psychosocial risk factors as mediating factors between illness and its effect. Discuss the role of psychological variables like coping, social support, and other health cognitions in mediating between illness and its effect.		Psychosocial Impact of Disease and its management


Practicals

PRACTICAL

HISTOLOGY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 08	
		DISCIPLINE	TOPIC
MS-A-077	Draw and label the histology of skeletal muscle	Histology	Histology of Muscles
	Draw and label the histology of smooth muscle		
	Draw and label the histology of cardiac muscle		
MS-A-078	Draw and label the histological picture of compact bone	Histology	Histology of Bones
	Draw and label the histological picture of spongy bone		
MS-A-079	Draw and label the microscopic structure of hyaline cartilage	Histology	Histology of Cartilage
	Draw and label the microscopic structure of elastic cartilage		
	Draw and label the microscopic structure of fibro cartilage		

PHYSIOLOGY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS=02	
		DISCIPLINE	TOPIC
MS-P-019	Demonstrate and categorize the following movements: Pushing against the wall, Biceps curls, squats, yoga chair pose, standing on toes, running on an inclined treadmill, yoga tree pose, deadlift as isotonic and isometric skeletal muscle contraction.	Physiology	Locomotion
MS-P-020	Interpret the graph of local/action potential/compound action potential from the recording of nerve fibers, & nerve trunk.	Physiology	Nerve Fibers

MS-P-021	Interpret the graph of local/action potential from the recording of skeletal, & smooth muscles.	Physiology	Muscles
MS-P-022	Interpret the graph of frequency summation and tetanization	Physiology	

BIOCHEMISTRY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS=04**	
		DISCIPLINE	**TOPIC**
MS-B-012	Estimate total proteins by kit method.	Biochemistry	Total proteins
MS-B-013	Estimate serum albumin level. Calculate serum globulin level.		Albumin/ globulin

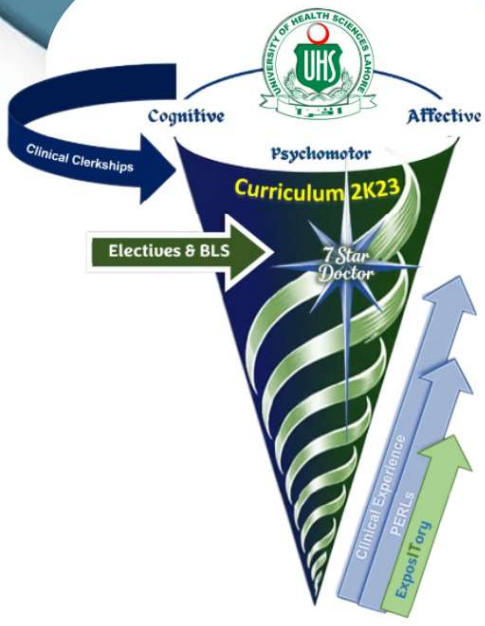
PHARMACOLOGY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS=03**	
		DISCIPLINE	**TOPIC**
MS-Ph-004	Label the diagram of the neuromuscular junction showing non depolarizing/depolarizing blockage.	Pharmacology	NMJ Blockers
	Enumerate drugs for Myasthenia Gravis. Label the diagram to show the effect of Neostigmine in the treatment of Myasthenia Gravis		
	Identify Ampules of neuromuscular blocking agents (e.g., Succinylcholine and Atracurium) and local anesthetics (or their pictures) with their MOA, clinical uses and adverse effects.		

PATHOLOGY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS=02**	
		DISCIPLINE	**TOPIC**
MS-Pa-005	Identify the salient gross and microscopic features of Leiomyoma.	Pathology	Leiomyoma
MS-Pa-006	Identify the salient gross and microscopic features of steps of bone healing (Pictorial) with factors and complications affecting bone healing.		Bone healing

Modular Integrated Curriculum 2K23

MBBS Year-01

BLOCK-3



Modular Integrated Curriculum 2K23

Volume-01

MODULE 04

CARDIOVASCULAR-I

MODULE RATIONALE

The Cardiovascular system comprises the study of the heart & circulatory system. The initial learning activities will help in understanding the normal structure & development of the organs of the system. Understanding of anatomical details of each component of Cardiovascular System (CVS) will be accompanied by study of normal physiological mechanisms. This will help in better understanding the possible pathological conditions of the system, including some of the most prevalent conditions in society like ischemic heart disease, hypertension, shock, heart block, heart failure. This will be followed by discussion on some important group of drugs used for treatment and/or prevention of these conditions (administration route, mechanism of action and side effects). The impact of cardiovascular diseases on society and the effect of ageing on cardiovascular system will be discussed.

MODULE OUTCOMES

- Describe the normal structure of heart including development, topographical anatomy, neurovascular supply, and histology.
- Review the arrangement of circulatory system (arteries, veins, lymphatics).
- Define the congenital anomalies of cardiovascular system with reference to normal development and early circulation.
- Define functions of cardiac muscle along with its properties
- Interpret pressure changes during cardiac cycle along with regulation of cardiac pumping.
- Interpret normal & abnormal Electrocardiogram (ECG), ST-T changes, and its abnormalities.
- Identify the risk factors and role of lipids in coronary blockage and atherosclerosis (hyperlipidemia/ dyslipidemia).
- Define cardiac output and its modulating/controlling factors.
- Differentiate left and right sided heart failure and correlate it with the importance of pressure differences.
- Enumerate different types of arrhythmias and describe the electrical events that produce them.
- Discuss the psychosocial impact of cardiovascular diseases in society.

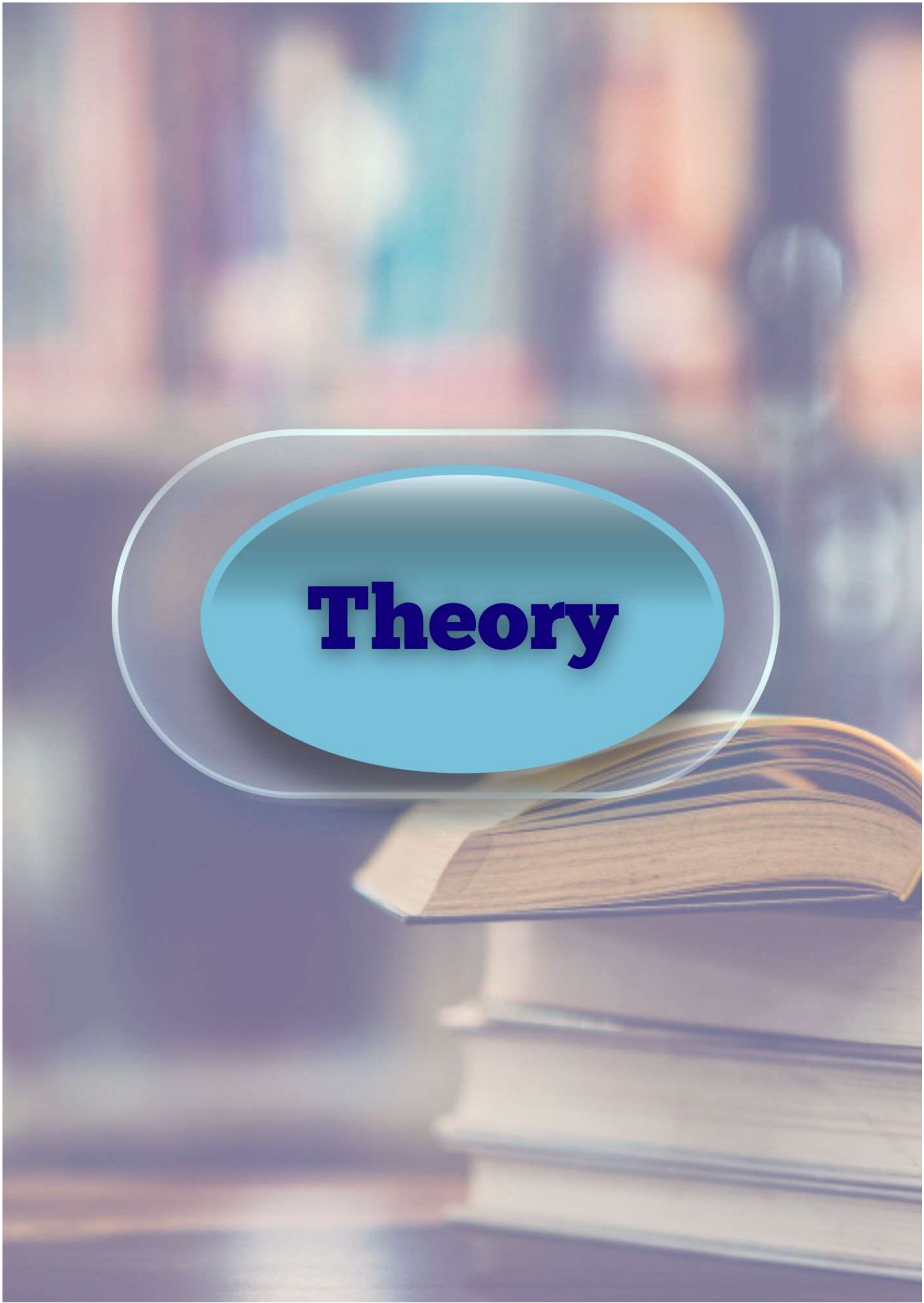
THEMES

- Heart
- Circulation

CLINICAL RELEVANCE
• Cardiac Failure • Arrhythmias • Atherosclerosis and Ischemic heart diseases • Hypertension • Shock • Congenital Heart diseases • Peripheral arterial diseases

IMPLEMENTATION TORs
• The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1200. • The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. • However, the level of cognition can be kept at a higher level by the institution. • The Table of Specifications provided will be used for the three papers of the first professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.


Syllabus


Theory

NORMAL STRUCTURE			
GROSS ANATOMY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 10**	
		DISCIPLINE	**TOPIC**
CV-A-001	Define mediastinum giving its boundaries and compartments. List the contents of its various compartments.	Human Anatomy	Mediastinum
	Describe the formation, tributaries, and termination of superior vena cava		
	Describe the formation, branches, and relations of ascending aorta, aortic arch and descending thoracic aorta.		
	Discuss the distribution of ascending aorta, aortic arch and descending thoracic aorta in reference to their branches		
	Describe formation, course and tributaries of azygous, hemizygous and accessory hemizygous veins.		
	Describe the course, relations, and distribution of vagus and thoracic splanchnic nerves in relation to nerve supply of heart.		
CV-A-002	Describe Pericardium and its parts with emphasis on their nerve supply.	Human Anatomy	Pericardium
	Describe the pericardial cavity mentioning transverse and oblique sinuses. Discuss their clinical significance		
	Describe the anatomical correlates of various pericardial conditions like pericardial rub, pericardial pain, pericarditis, pericardial effusion, and cardiac tamponade.	Integrate with Medicine	
	Describe the anatomical basis for Paracentesis /pericardiocentesis.		
CV-A-003	Describe the external features of heart.	Human Anatomy	Heart
	List various chambers of heart mentioning their salient features and openings.		

	Describe the arterial supply of heart: coronary arteries and their distribution with special emphasis on collaterals established during ischemia.		
	Describe the sites of anastomosis between right and left coronary arteries with the participating vessels.		
	Discuss the anatomical correlates of cardiac arterial supply	Integrate with cardiology/ Medicine	
	Describe the anatomical correlates of electrocardiography, cardiac referred pain.	Integrate with Cardiology/ Medicine	
	Describe the anatomical basis for angioplasty, and coronary grafts.		
	Describe the features of angina pectoris and myocardial infarction and correlate them anatomically	Human Anatomy	
	Describe the venous drainage of heart.		
	Describe the alternative venous routes to the heart		
	Identify the vessels supplying the heart with their origins/terminations.		
	Describe the formation, relations, and distribution of cardiac plexus.		
	Describe components and significance of fibrous skeleton of heart		
	Describe the cardiac valves		
	Explain the anatomical basis for valvular heart diseases	Integrate with Cardiology/ Medicine	
	Perform surface marking of various anatomical landmarks of heart and great vessels	Human Anatomy	
	Perform percussion and auscultation of heart	Integrate with Medicine	
	Identify the salient features of heart and great vessels on Computed tomography/ Magnetic Resonance Imaging CT/ MRI	Integrate with Radiology	

EMBRYOLOGY & POST-NATAL DEVELOPMENT			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 14	
		DISCIPLINE	TOPIC
CV-A-004	Describe the early development of heart and blood vessels	Human Embryology	Introduction
	Describe the development of pericardial cavity	Human Embryology	
CV-A-005	Define parts of primitive heart tube and give its folding	Human Embryology	Development of Heart
	Describe the development of various chambers of heart with emphasis on their partitioning		
	Identify various parts of developing heart tube and structures derived from them during embryonic and fetal life (Models and specimens)		
CV-A-006	Describe the embryological basis of dextrocardia and ectopia cordis	Human Embryology	Development of Heart and Development of Lymphatic System
	Describe the partitioning of primordial heart: atrioventricular canal and atrium		
	Describe the development of sinus venosus		
	List clinically significant types of atrial septal defects along with their embryological basis and features. Describe probe patent foramen ovale	Integrate with Pediatrics	
	Describe the partitioning of truncus arteriosus and bulbus cordis	Human Embryology	
	Describe the formation of ventricles and interventricular septum		
	Describe the clinical features and embryological basis of ventricular septal defects	Integrate with Pediatrics	
	Describe the development of cardiac valves and conducting system.	Human Embryology	
	Describe the development of lymphatic system	Human Embryology	
CV-A-007	Describe the embryological correlates and clinical presentation of developmental defects of heart:	Integrate with Pediatrics	

	Tetralogy of Fallot, Patent ductus arteriosus, Unequal division of arterial trunks, Transposition of great vessels and Valvular stenosis, Coarctation of aorta		Development of Arteries
	Describe the formation and fate of pharyngeal arch arteries	Human Embryology	
	Describe the anomalies of great arteries emerging from heart: Coarctation of aorta, anomalous arteries	Integrate with Cardiology/ Medicine	
CV-A-008	Describe the development of embryonic veins associated with developing heart: Vitelline veins, Umbilical Veins and Common cardinal vein and their fate	Human Embryology	Development of Veins
	Describe the formation of superior & inferior vena cava and portal vein with their congenital anomalies		
	With the help of diagrams illustrate the development of superior vena cava, inferior vena cava and portal vein		
CV-A-009	List the derivatives of fetal vessels and structures: Umbilical vein, ductus venosus, umbilical artery, foramen ovale, ductus arteriosus	Human Embryology	Fetal Vessels & Circulation
	Describe Fetal and neonatal circulation mentioning transitional neonatal circulation with its clinical implication	Integrate with Pediatrics/ Obgyn	
CV-A-010	List clinically significant types of atrial septal defects along with their embryological basis and features. Describe patent foramen ovale.	Pediatrics	Congenital Heart defects
	Describe the embryological correlates and clinical presentation of developmental defects of heart: Tetralogy of Fallot, Persistent ductus arteriosus, Unequal division of arterial trunks, Transposition of great vessels and Valvular stenosis		

MICROSCOPIC ANATOMY (HISTOLOGY & PATHOLOGY)			
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 04	
		DISCIPLINE	TOPIC
CV-A-011	Describe microscopic structure of Heart wall (Endocardium, Myocardium, Epicardium) Describe histology of Cardiac skeleton, SA (sinoatrial) node, AV (atrioventricular) node, Purkinje fibers.	Histology	Heart & Cardiac Muscle
	Describe the microscopic and ultramicroscopic structure of cardiac muscle emphasizing on Tubules, sarcoplasmic reticulum and intercalated discs. Identify, draw and label histological structure of cardiac muscle		
CV-A-012	Describe general histological organization of blood vessels: Tunica intima, media and adventitia.	Histology	Blood Vessels Organization
	Identify, draw and label histological sections of elastic artery, muscular artery, arterioles, vein, capillaries and sinusoids		
CV-A-013	Describe histological features of arteries: Muscular arteries, elastic arteries, Arterioles	Histology	Arteries
CV-A-014	Describe histological features of veins and exchange vessels: large veins, medium sized veins, venules, Capillaries, and sinusoids	Histology	Veins
	Compare and contrast the light microscopic structure of arteries and veins		
CV-A-015	Describe the histopathological basis of thrombus and embolus formation.	Integrate with Pathology	Thrombus/ Embolus formation
CV-A-016	Explain the histological basis of arteriosclerosis and atherosclerosis. Describe role of arterioles in hypertension	Histology	Arteriosclerosis atherosclerosis Hypertension
CV-A-017	Describe histological features of Lymph vascular system (Lymph capillaries, Lymph vessels & Lymphatic duct)		Lymph vascular System

NORMAL FUNCTION			
MEDICAL PHYSIOLOGY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 68**	
		DISCIPLINE	**TOPIC**
CV-P-001	Explain the physiological anatomy of cardiac muscle.	Physiology	Cardiac Muscle
	Explain the functional importance of intercalated discs.		
	Discuss the properties of cardiac muscles.		
	Describe and draw the phases of action potential of ventricle.		
	Describe and draw the phases of action potential of SA node along with explanation of the mechanism of self-excitation/ Auto rhythmicity of SA node.		
	Define and give the duration of the Absolute and relative refractory period in cardiac muscle.		
	Describe the mechanism of excitation-contraction coupling and relaxation in cardiac muscle.		
	Draw & explain pressure & volume changes of left ventricle during cardiac cycle.		
	Explain & draw relationship of ECG (Electrocardiography) with cardiac cycle.		
	Explain & draw the relationship of heart sounds with cardiac cycle.		
	Enlist, draw, and explain the physiological basis of atrial pressure waves in relation to cardiac cycle.		
	Define & give the normal values of the cardiac output, stroke volume, end diastolic volume & end systolic volume	Integrate with Medicine	
CV-P-002	Describe the Frank starling mechanism.	Physiology	Regulation of heart pumping
	Describe the autonomic regulation of heart pumping.		
	Describe the effect of potassium, calcium ions & temperature on heart function.		
	Define chronotropic effect- positive and negative.		

	Define the inotropic effect: positive and negative.		
	Define dromotropic effect: positive and negative		
	Describe the location of adrenergic & cholinergic receptors in heart.		
	Name the receptors present in coronary arterioles.		
	Explain sympathetic & parasympathetic effects on heart rate & conduction velocity		
CV-P-003	Draw and explain the conducting system of heart	Physiology	Conducting system of heart
	Describe the physiological basis and significance of AV nodal delay.		
CV-P-004	Explain the ectopic pacemaker	Integrate with Cardiology/Medicine	Fundamentals of ECG
	Enlist, draw, and explain the physiological basis & give durations of waves, intervals, and segments of normal ECG.	Physiology	
	Describe the standard limb leads, Augmented limb leads & precordial leads.		
	Define Einthoven's Triangle & Einthoven's law.		
	Explain the physiological basis of upright T wave in normal ECG.		
	Describe the location and significance of J point in ECG.		
	Explain the physiological basis of current of injury.		
	Enlist the ECG changes in angina pectoris.	Integrate with Medicine	
	Enlist the ECG changes in myocardial infarction.		
	Plot the mean cardiac axis.	Physiology	
	Enlist the physiological & pathological causes of right axis deviation of heart.		
	Enlist the physiological & pathological causes of left axis deviation of heart		
	Describe the abnormalities of T wave and their causes	Integrate with Medicine	
CV-P- 005	Describe the effect of hypokalemia and hyperkalemia on ECG		

	Describe the effect of hypocalcemia and hypercalcemia on ECG.	Integrate with Biochemistry	Effect of electrolyte on ECG
CV-P- 006	Define tachycardia and enlist its causes.	Integrate with Medicine	Cardiac arrhythmia
	Define bradycardia and enlist its causes.		
	Classify arrhythmias	Physiology	
	Explain the physiological basis of sinus arrythmia.		
	Explain the physiological basis of reflex bradycardia in Athletes.		
	Explain the carotid sinus syndrome.		
	Enlist the causes of atrioventricular block.	Integrate with Cardiology/ Medicine	
	Explain the types of atrioventricular blocks.		
	Explain the ECG changes in 1st, 2nd & 3rd degree heart block.		
	Explain the cause, physiological basis & ECG changes in Stokes Adam syndrome/ventricular escape.	Physiology	
	Enlist the causes of premature contractions.	Integrate with Cardiology/ Medicine	
	Explain the causes and ECG changes of premature atrial contractions.		
	Explain the physiological basis of pulses deficit.	Physiology	
	Explain the causes and ECG changes in Premature Ventricular Contraction (PVC)	Integrate with Cardiology/ Medicine	
	Enlist the causes and ECG findings in Long QT syndrome.		
	Explain the causes, physiological basis, features, ECG changes & management of premature heartbeat.		
	Explain the causes, physiological basis, features, ECG changes & management of atrial fibrillation.		
	Explain the causes, physiological basis, features & ECG changes of ventricular fibrillation.		
	Explain the physiological basis, features & ECG changes of atrial flutter.	Physiology	
	Compare Flutter and Fibrillations	Physiology	

CV-P-007	Explain the functional parts of circulation (arteries, arterioles, capillaries, veins, venules).	Physiology	Organization of Circulation
CV-P-008	Explain the pressures in systemic & pulmonary circulation.	Physiology	Blood flow
	Explain the types of Blood flow and significance of Reynolds number.		
CV-P-009	Describe local control of blood flow according to tissue needs.	Physiology	Local & Humoral Control of Blood flow
	Discuss humoral control of local blood flow.		
	Explain long term control of local blood flow.		
	Describe vascular control by ions and other chemical factors.		
	Name the organs in which auto regulation of blood flow occurs during changes in arterial pressure (metabolic & myogenic mechanisms).		
CV-P-010	Explain the role of autonomic nervous system for regulating the circulation.	Physiology	Nervous Regulation of circulation
	Explain the vasomotor center.		
	Explain the control of vasomotor center by higher nervous centers.		
	Explain emotional fainting/vasovagal syncope.		
	Identify vessels constituting micro-capillaries. Enumerate hydrostatic and osmotic factors that underlie starling's hypothesis for capillary function.		
CV-P-011	Explain the role of nervous system in rapid control of arterial blood pressure.	Physiology	Rapid control of arterial blood pressure
	Explain the regulation of arterial blood pressure during exercise.		
	Enlist different mechanisms for short term regulation of arterial blood pressure.		
	Explain the role of baroreceptors in regulation of arterial blood pressure.		
	Explain the role of chemoreceptors in regulation of arterial blood pressure.		

	Make a flow chart to discuss the role of Atrial volume reflexes/ Bainbridge reflex in control of blood pressure.		
	Make a flow chart to show the reflex responses to increased blood volume which increase blood pressure and atrial stretch.		
	Describe the role of CNS ischemic response in regulation of the blood pressure.		
	Explain the Cushing reflex		
	Explain the role of abdominal compression reflex to increase the arterial blood pressure.		
CV-P-012	Make a flow chart to discuss the role of renin angiotensin system for long term control of blood pressure.	Physiology	Role of kidneys in long term Regulation of Arterial Blood Pressure
	Make a flow chart to show the regulation of blood pressure in response to increase in ECF (Extra Cellular Fluid) volume.		
	Make a flow chart to show the regulation of blood pressure in response to increase in salt intake.		
CV-P-013	Define cardiac output, cardiac index & venous return with their normal values.	Integrate with Cardiology/ Medicine	Cardiac output
	Discuss the factors regulating cardiac output		
	Discuss factors regulating venous return	Physiology	
CV-P-014	Explain the regulation of skeletal muscle blood flow at rest & during exercise.	Physiology	Skeletal muscle Circulation
CV-P-015	Explain the physiological anatomy of coronary circulation.	Physiology	Coronary circulation
	Explain the regulation of coronary blood flow.		
	Explain the physiological basis of angina, myocardial & subendocardial infarction		
CV-P-016	Define & enlist different types of shock.	Physiology	Circulatory shock
	Explain the causes, features, and pathophysiology of hypovolemic/hemorrhagic shock.		

	Explain the causes, features, and pathophysiology of septic shock.		
	Explain the causes, features, and pathophysiology of neurogenic shock.	Integrate with Pathology	
	Explain the causes, features, and pathophysiology of anaphylactic shock.		
	Discuss the treatment of different types of shock.	Integrate with Medicine	
	Explain the different stages of shock.	Physiology	
	Explain the mechanisms that maintain the cardiac output & arterial blood pressure in non-progressive shock.		
	Enlist different types of positive feedback mechanisms that can lead to the progression of shock.		
CV-P-017	Enlist the different types of heart sounds and explain the physiological basis of each.	Physiology	Heart sounds
	Enlist the causes of 3rd and 4th heart sounds.		
	Explain the causes & physiological basis of murmurs caused by valvular lesions.		
	Enumerate abnormal heart sounds and describe the physiological basis of each.	Integrate with Medicine	

MEDICAL BIOCHEMISTRY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 21	
		DISCIPLINE	TOPIC
CV-B-001	Classify lipids	Biochemistry	Classification of lipids
CV-B-002	Discuss the biomedical functions & properties of lipids	Biochemistry	Functions of lipids & Properties of lipids
CV-B-003	Classify fatty acids. Discuss the role of trans saturated, saturated, poly- and mono-unsaturated fatty acids in diet on lipid profile.	Biochemistry	Classification of fatty acids &

CV-B-004	Discuss lipid peroxidation and its significance	Biochemistry	Lipid peroxidation
CV-B-005	Explain the biochemical and therapeutic roles of eicosanoids (prostaglandins, leukotrienes, thromboxane, and prostacyclin)	Biochemistry	Eicosanoids
CV-B-006	Discuss Lipoprotein metabolism	Biochemistry	Lipoprotein metabolism
	Discuss role of oxidized LDL in atherosclerosis	Biochemistry	
CV-B-007	Discuss the signs and symptoms of hyperlipidemia	Biochemistry	Type I to V hyperlipidemias
	Interpret data related to hyperlipidemia		
CV-B-008	Discuss the sources, biomedical importance, active states, deficiency and excess of fat-soluble vitamins (excluding Vitamin K).	Biochemistry	Fat soluble vitamins
CV-B-009	Discuss the sources, biomedical importance, active states, deficiency and excess of water-soluble vitamins (excluding B6, B9 & B12 and Vitamin C).	Biochemistry	Water soluble vitamins
CV-B-010	Discuss the sources, biomedical importance, active states, deficiency and excess of minerals and trace elements especially zinc, Mg, Na, K, I, Ca, P, Se, S, Cu and Cl.	Biochemistry	Minerals and trace elements

AGING			
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 05	
		DISCIPLINE	TOPIC
CV-Ag-001	Discuss the effect of age on blood vessels with reference to hypertension	Physiology/ Geriatrics/ Medicine	Hypertension
CV-Ag-002	Discuss the risk of cardiac attack in old age and weather conditions		Cardiac Attack
CV-Ag-003	Discuss the effect of age on valvular system of the heart.		Valvular diseases
CV-Ag-004	Discuss the effect of age on neural conduction of the heart in relation to arrythmia.		Arrythmia
CV-Ag-005	Discuss the protective role of female hormone against CVS diseases in women of reproductive age group	Physiology/ Obstetrics and Gynecology	Role of female hormone on CVS disease

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS			
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 14	
		DISCIPLINE	TOPIC
CV-Pa-001	Define Inflammation Enumerate cardinal signs of acute inflammation Enlist types of Inflammation	Pathology	Inflammation
	Enumerate causes & outcomes of inflammation Differentiate acute & chronic inflammation		
	Describe general concept of vascular & cellular events of acute inflammation Enumerate chemical mediators of inflammation along with their principal functions		
CV-Pa-002	Classify types of thrombosis, embolism, and infarction	Pathology/	Atherosclerosis
	Discuss the pathophysiology of thrombosis, embolism, and infarction		
	Identify the types and causes of hypertension		

CV-Pa-003	Discuss the clinical consequences of hypertension and atherosclerosis	Integrate with medicine	Hypertension
CV-Pa-004	Discuss the pathophysiology of shock		Shock
CV-Pa-005	Classify the types of heart failure		Cardiac Failure
	Identify the causes leading to heart failure		
CV-Pa-006	Identify the types of ischemic heart disease		Ischemic Heart Disease
	Discuss the pathophysiology of different types of ischemic heart disease		
CV-Pa-007	Explain the pathological causes of high & low cardiac output.		Cardiac Output
CV-Ph-001	Classify antihypertensive drugs.	Pharmacology	Anti-hypertensive drugs
CV-Ph-002	Classify antianginal drugs.		Antianginal drugs
CV-Ph-003	Classify antiarrhythmic drugs.		Antiarrhythmic mics drugs
CV-Ph-004	Classify drugs used in cardiac failure.		Drugs for cardiac failure

DISEASE PREVENTION AND IMPACT

CODE	COMMUNITY MEDICINE & BEHAVIORAL SCIENCE	TOTAL HOURS = 11+2=13	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
CV-CM-001	Describe the various strategies and models to prevent diseases.	Community Medicine and Public Health	Disease Prevention Models
CV-CM-002	Describe primordial prevention and its application to preventing CVS diseases.		Primordial Prevention
	Depict the concept of primary prevention in context to CVS and able to apply on CVS diseases.		
CV-CM-003	Discuss the basic concept of health promotion and its application to CVS.		Health Promotion
CV-CM-004	Discuss various methods of behavioural change interventions at community level.		Behavioural Change Intervention

CV-CM-005	To apply secondary and tertiary preventions on CVS diseases (coronary heart disease, ischemic heart disease, hypertension)		Secondary & Tertiary Prevention
CV-CM-006	Describe the concept of cardiovascular diseases as non-communicable diseases		Noncommunicable disease
CV-CM-007	Identify the risk factors in the community for CVS diseases.		Risk factor assessment of CVS diseases
	Learn and apply interventions to prevent the risk factors in community.		
CV-BhS-001	Identify and deal with the various psychosocial aspects of Cardiovascular conditions (such as Hypertension, Coronary artery disease, Heart failure, Arrythmias, and other cardiovascular conditions) on Individual, Family and Society.	Behavioral Sciences	Personal, Psychosocial and vocational issues
CV-BhS-002	Psychological basis of emotional fainting & its impact		Emotional fainting


Practicals

PRACTICAL

HISTOLOGY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 03	
		DISCIPLINE	TOPIC
CV-A-018	Identify, draw and label histological structure of cardiac muscle	Histology	Histological features of Cardiac Muscle
CV-A-019	Identify, draw and label histological sections of elastic artery, muscular artery, arterioles, vein, capillaries and sinusoids	Histology	Histological features of Blood Vessels

PHYSIOLOGY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 10	
		DISCIPLINE	TOPIC
CV-P-018	Record an electrocardiogram (ECG) by correct lead placement and connections. Perform auscultation of the chest to recognize normal heart sounds.	Physiology	ECG & Heart Sounds
CV-P-019	Determine the effect of posture and exercise on blood pressure by auscultatory method.		Blood Pressure
CV-P-020	Measure the blood pressure of the subject by palpatory and auscultatory methods.		Blood Pressure
CV-P-021	Examine arterial pulse to recognize normal characteristics of pulse.		Arterial Pulse
CV-P-022	Examine neck veins to determine Jugular Venous Pulse (JVP)		JVP

BIOCHEMISTRY			
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 10	
		DISCIPLINE	TOPIC
CV-B-011	Perform cardiac markers Creatine Kinase and Lactate Dehydrogenase (CK and LDH) Interpret lab reports based on enzymes for diseases like cardiac disorders and hyperlipidemias	Biochemistry	Performance Interpretation of Lab report

PATHOLOGY			
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 01	
		DISCIPLINE	TOPIC
CV-Pa-008	Identify the pathological changes of infarction (microscopic)	Pathology	Hemodynamics
	Identify the pathological changes of thrombosis (microscopic)		

PHARMACOLOGY			
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 01	
		DISCIPLINE	TOPIC
CV-Ph-004	Illustrate mechanism of action of antihypertensive drugs.	Pharmacology	Anti-hypertensive drugs
CV-Ph-005	Illustrate mechanism of action of antianginal drugs.		Antianginal drugs
CV-Ph-006	Illustrate mechanism of action of drugs used in cardiac failure.		Drugs for cardiac failure

Modular Integrated Curriculum 2K23

Volume-01

MODULE 05

RESPIRATORY-I

MODULE RATIONALE

The diseases related to the respiratory system are on the rise not only in developing countries but also in developed countries. The infant mortality rate in Pakistan is highest in Southeast Asia and one of the important reasons is common respiratory infections in children. With the world suffering from COVID-19 not only physically but also mentally, it is very important for medical students to study in detail the structures, functions, prevention, epidemiology, genetic basis of diseases and their management.

The respiratory system is responsible for bringing oxygen into the body and removing carbon dioxide. It is made up of several organs and structures, including the nose, pharynx, larynx, trachea, bronchi, lungs, and diaphragm.

MODULE OUTCOMES

- Apply basic sciences` knowledge to understand the causes of common respiratory problems.
- Explain the pathogenesis of respiratory diseases.
- Enlist the main investigations relevant to respiratory disorders.
- Recognize risk factors and preventive measures of main respiratory diseases.

THEMES

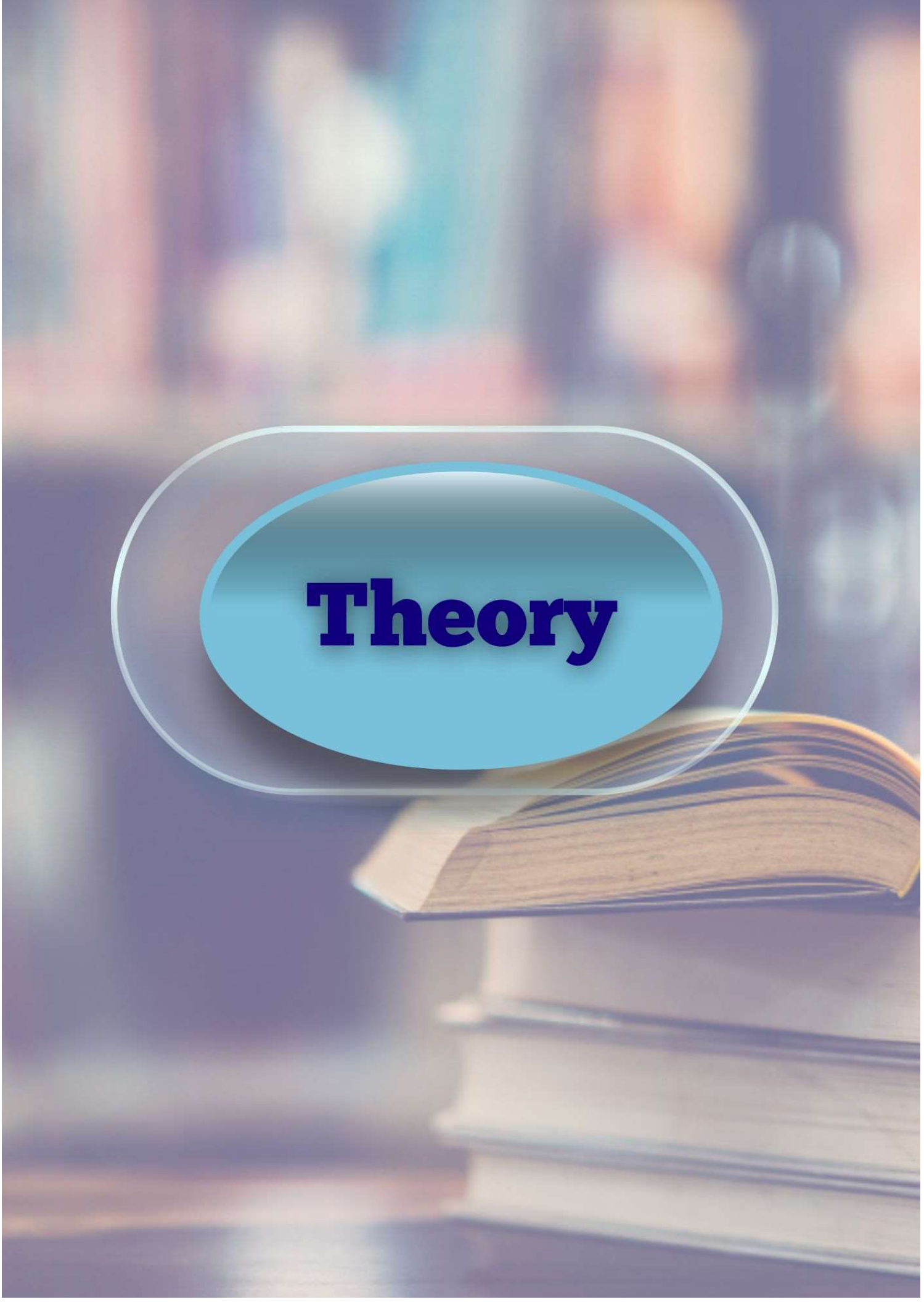
- Rib cage
- Thoracic vertebrae
- Upper respiratory system
- Lower Respiratory system

CLINICAL RELEVANCE

- Acute Respiratory Distress Syndrome
- Bronchial Asthma
- Tuberculosis
- Pneumonia

IMPLEMENTATION TORs
• The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1200. • The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council. • The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. • However, the level of cognition can be kept at a higher level by the institution. The Table of Specifications provided will be used for the three papers of the first professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.


Syllabus


Theory

NORMAL STRUCTURE			
GROSS ANATOMY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 24**	
		DISCIPLINE	**TOPIC**
Re-A-001	Give the boundaries of thoracic cavity, superior and inferior thoracic apertures and list the structures contained/ traversing them.	Human Anatomy	Thoracic Cavity
	Describe the anatomical correlates of Thoracic outlet syndrome	Integrate with Surgery	
Re-A-002	Identify and differentiate the typical from atypical ribs.	Human Anatomy	Rib Cage
	Describe the anatomical features of ribs		
	Describe the anatomical correlates of supernumerary cervical rib.	Integrate with Surgery	
	Classify the articulations of the ribs.	Human Anatomy	
	Describe the anatomical features of these articulations.		
	Describe the movements with the muscles producing articulations.	Human Anatomy	
	Describe the effects of fracture to the neck of rib and give its anatomical justification	Integrate with Orthopedics	
	Describe the anatomical correlates of Flail Chest.		
Re-A-003	Describe the anatomical correlates of Thoracotomy	Integrate with Surgery	Intercostal space
	Define the attachments, relations, nerve supply and actions of intercostal muscles	Human Anatomy	
	Define an intercostal space and give details of its contents		
Re-A-004	Describe the anatomical features of typical & atypical thoracic vertebrae.	Human Anatomy	Thoracic Vertebrae
	Differentiate between typical and atypical vertebrae		
	Explain the thoracic part of the vertebral column (normal curvature, intervertebral joints & fascia of the back, blood supply, lymphatic drainage, nerve supply of back) Associated Clinical conditions -Kyphosis, Scoliosis		
Re-A-005	Describe the bony features of the sternum	Human Anatomy	Sternum

	Describe the anatomical correlates of sternal biopsy. and sternotomy	Integrate with Surgery	
	Describe the presentation of sternal fractures and correlate it anatomically	Integrate with Orthopedics	
Re-A-006	Define endo thoracic fascia	Human Anatomy	Connective tissue of Thorax
	Describe the supra-pleural membrane with its attachments.		
Re-A-007	Classify the joints of the thorax mentioning their articulations, movements with the muscle producing them.		Joints of Thorax
	Describe the mechanics of inspiration and expiration		
Re-A-008	Describe the origin, course, relations and distribution of intercostal nerves and vessels		Neurovascular supply of Thorax
	Describe the alternate routes of venous drainage in blockage of superior/ inferior vena cava		
Re-A-009	Describe the cutaneous nerve supply and dermatomes of thorax.	Integrate with Medicine	
	Give anatomical justification of the manifestations of herpes zoster infection on thoracic wall.	Human Anatomy	Cutaneous nerve supply of Thorax
	Discuss anatomical correlates of intercostal nerve block	Integrate with Medicine	
Re-A-010	Describe the anatomical features of the Trachea with its extent, relations, neurovascular supply and lymphatics.	Human Anatomy	Trachea
Re-A-011	Name the parts of diaphragm mentioning their attachments and neurovascular supply	Integrate with Anesthesia	Diaphragm
	Explain the role of diaphragm in respiration	Human Anatomy	
	Enumerate the diaphragmatic apertures with their vertebral levels, mentioning the structures traversing them.		
Re-A-012	Describe the pleura giving its parts, layers, neurovascular supply, and lymphatic drainage		Pleural cavity
	Describe the pleural cavity giving its recesses and the lines of pleural reflection		

	Describe the anatomical correlates of pleural pain pleurisy, pneumothorax, pleural effusion	Human Anatomy	
	Describe the anatomical features, relations of lungs	Integrate with Medicine	
Re-A-013	Describe the neurovascular supply and lymphatic drainage of lungs.	Human Anatomy	Lungs
	Compare and contrast the anatomical features and relations of right and left lung		
	Describe the root of the lung and pulmonary ligament with arrangement of structures at the hilum		
	Define Bronchopulmonary segments. Give their vascular supply, lymphatic drainage and clinical significance		
	Describe the anatomical correlates of chest tube intubation	Integrate with Surgery	
	Describe the anatomical correlates of thoracentesis		
	Describe the anatomical correlates of bronchoscopy	Integrate with Pulmonology	
	Describe the anatomical basis for medicolegal significance of lungs in determining the viability of newborn	Integrate with Forensic Medicine	
	Identify various anatomical landmarks on chest X-Rays, CT and MRI	Integrate with Radiology	

EMBRYOLOGY & POST-NATAL DEVELOPMENT			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 05	
		DISCIPLINE	TOPIC
Re-A-014	Describe the development of ribs, sternum, and thoracic vertebrae. Give the associated congenital malformations	Human Embryology	Bony components of Thoracic cavity
Re-A-015	Describe the developmental process of Vertebral Column		Development of Vertebral Column
Re-A-016	List the embryological sources of the diaphragm. Describe the events taking place in the development and descent of the diaphragm	Human Embryology	Diaphragm & Thoracic cavity
	Describe the development of Thoracic cavities (Pleural and Pericardial cavities)	Integrate with Pediatrics	
Re-A-017	Describe the development of trachea.	Human Embryology	Upper Respiratory Tract
	Describe congenital anomalies of Trachea-Tracheoesophageal fistulas of different types	Integrate with Pediatrics	
Re-A-018	List the phases of lung development with their time periods. Describe the events taking place in each phase	Human Embryology	Lungs
	Describe the embryological basis of respiratory distress syndrome/Hyaline membrane disease, Ectopic Lung lobes, Congenital cysts of Lung	Integrate with Pediatrics	
MICROSCOPIC STRUCTURE			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 04	
		DISCIPLINE	TOPIC
Re-A-019	Give the general histological organization of respiratory system.	Histology	Organization of respiratory system
Re-A-020	Describe the microscopic features of respiratory epithelium & Olfactory epithelium	Histology	Respiratory epithelium
Re-A-021	Describe histology of Nasopharynx	Histology	Nasopharynx
Re-A-022	Describe the histological features of epiglottis and larynx	Histology	Epiglottis & larynx

Re-A-023	Describe the histological features of trachea and lungs Describe histology of blood-air barrier	Histology	Trachea & lungs blood-air barrier
Re-A-024	Explain the histological basis of: 1. Laryngitis 2. Singer's nodules 3. Emphysema 4. Pneumonia 5. Atelectasis 1. Infant respiratory distress syndrome	Integrate with Pathology	Clinical correlates

NORMAL FUNCTION			
MEDICAL PHYSIOLOGY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 45**	
		DISCIPLINE	**TOPIC**
Re-P-001	Enlist the muscles of inspiration and expiration in quiet breathing	Integrate with Anatomy	Breathing
	Enlist the muscles of inspiration and expiration in labored breathing		
	Explain the components of the work of breathing	Medical Physiology	
	Discuss the mechanics of pulmonary ventilation		
	Explain periodic breathing		
	Explain the causes and pathophysiology of sleep apnea	Integrate with medicine	
Re-P-002	Define and explain lung compliance	Medical Physiology	Lung Compliance
	Enlist the factors that affect lung compliance		
	Draw the compliance diagram of air filled and saline filled lungs		
	Enlist the components of surfactant		
	Describe the role of surfactant in lung compliance		
	Explain the role of surfactant in premature babies	Integrate with Pediatrics	
Re-P-003	Define the different lung volumes and capacities and their clinical significance	Medical Physiology	Lung volumes and Capacities
	Discuss Forced Expiratory Volume 1/ Forced Vital Capacity (FEV1/FVC) ratio and its clinical significance		
	Enlist the lung volumes and capacities that cannot be measured by spirometer.		
	Define dead space & explain its types		
	Discuss FEV1/FVC ratio in relation to Bronchial Asthma.	Integrate with Pulmonology	
	Discuss FEV1/FVC ratio in relation to Chronic Obstructive Pulmonary disease/restrictive lung diseases		
	Discuss Forced Expiratory Volume 1/ Forced Vital Capacity (FEV1/FVC) ratio in relation to pulmonary embolism	Integrate with medicine	

Re-P-004	Define alveolar ventilation. Define minute respiratory volume Describe the pressures in the pulmonary system.	Medical Physiology	Pulmonary ventilation
Re-P-005	Describe the blood volume of the Lungs Describe the distribution and regulation of blood flow through the lungs. Describe the mechanics of blood flow in the three blood flow zones of the lung Describe the effect of heavy exercise on pulmonary arterial pressure. Describe the function of pulmonary circulation when left atrial pressure rises as a result of left-sided heart failure. Explain pulmonary capillary dynamics.	Medical Physiology	Pulmonary Circulation
Re-P-006	Discuss pathophysiology and common causes of pulmonary edema Explain the safety factors that prevent pulmonary edema. Explain the physiological basis of the presence of fluid normally in the pleural cavity. Define pleural effusion and give its causes.		Pulmonary Edema, and Pleural Fluid
Re-P-007	Explain the ultrastructure of respiratory membrane Discuss the factors affecting diffusion of gases across the respiratory membrane Explain the diffusion capacity of respiratory membrane for oxygen and carbon dioxide Define alveolar, pleural and transpulmonary pressure. Explain differences in the partial pressures of atmospheric, humidified, alveolar air and explain physiological basis of change in each pressure	Medical Physiology	Principles of Gaseous Exchange
Re-P-008	Explain the different forms of transport of oxygen in the blood	Medical Physiology	Transport of oxygen in the blood
Re-P-009	Draw and explain oxyhemoglobin dissociation curve Enlist the factors that cause the rightward shift of oxyhemoglobin dissociation curve		oxyhemoglobin dissociation curve &

	Enlist the factors that cause the leftward shift of oxyhemoglobin dissociation curve		oxyhemoglobin dissociation curve & Bohr`s effect & Cyanosis
	Discuss the P50 in relation to oxygen hemoglobin dissociation curve		
	Explain the Bohr`s effect		
	Define, enlist the types and causes of cyanosis	Integrate with Medicine	
Re-P-010	Enlist different forms in which Carbon dioxide CO_2 is transported in the blood	Medical Physiology	Transport of CO_2 in blood
	Explain carboxyhemoglobin dissociation curve		
	Explain the Haldane effect		
	Explain the chloride shift/Hamburger phenomenon		
	Define the respiratory exchange ratio (RER)		
Re-P-011	Explain the alveolar oxygen and carbon dioxide pressure when Pulmonary ventilation (V) and Perfusion (Q), VA/Q= infinity, zero, and normal	Medical Physiology	VA/Q (ventilation perfusion ratio)
	Explain the concept of physiological shunt when VA/Q ratio is above normal		
	Explain the concept of physiological dead space when VA/Q ratio is above normal		
Re-P-012	Enlist the respiratory and non-respiratory functions of the lung	Medical Physiology	Protective reflexes
	Explain the nervous control of bronchiolar musculature		
	Trace the reflex arc of cough reflex and sneeze reflex		
Re-P-013	Explain the principle means by which acclimatization occurs	Medical Physiology	Aviation and space
	Explain the events that occur during acute mountain sickness		
	Enlist the features of chronic mountain sickness		
Re-P-014	Explain the pathophysiology, features, prevention and treatment of decompression sickness.	Medical Physiology	Deep sea diving
Re-P-015	Draw and explain the effect of CO poisoning on oxyhemoglobin dissociation curve	Medical Physiology	Carbon monoxide poisoning
	Explain the pathophysiology, features, and treatment of CO poisoning.	Integrate with Medicine	

Re-P-016	Enumerate the components of respiratory centers and explain their functions. Explain the inspiratory RAMP signal Explain the Herring Breuer reflex/lung inflation reflex and its clinical significance	Medical Physiology	Nervous regulation of respiration
Re-P-017	Explain the location of chemo sensitive area (central chemoreceptors) and peripheral chemoreceptors Explain the effect of hydrogen ions & carbon dioxide on the chemo- sensitive area Explain the role of oxygen in the control of respiration/peripheral chemoreceptors	Medical Physiology	Chemical control of respiration
Re-P-018	Explain the regulation of Respiration during Exercise	Medical Physiology	Exercise and Respiration
Re-P-019	Enlist the effects of acute hypoxia Explain the hypoxia inducible factor a master switch for body response to hypoxia	Medical Physiology	Hypoxia
	Define and explain different types of hypoxias	Integrate with Medicine	
Re-P-021	Discuss the bacteria and viruses that cause Pneumonia	Integrate with microbiology	Pneumonia
Re-P-022	Define Dyspnea Enlist different causes of dyspnea Differentiate between cardiac and respiratory dyspnea Outline management strategies for dyspnea	General Medicine	Dyspnea
Re-P-023	Explain the pathophysiology of emphysema	Integrate with pathology	emphysema
Re-P-024	Explain the pathophysiology of Atelectasis.		Atelectasis
Re-P-025	Enlist the causes of Pneumothorax Describe the signs and symptoms of Pneumothorax	General Medicine	Pneumothorax
Re-P-026	Enlist the causes of Pleuritis Describe the signs and symptoms of Pleuritis Discuss the management of Pleuritis		Pleuritis
Re-P-027	Enlist the causes of Bronchitis Discuss the signs and symptoms of Bronchitis Discuss the management of Bronchitis	Integration with General Medicine	Bronchitis

Re-P-028	Classify different types of pneumonia Discuss the sign symptoms of pneumonia Discuss the management of pneumonia		Pneumonia
Re-P-029	Classify different types of asthma Discuss the signs and symptoms of asthma Discuss the management of asthma		Asthma
Re-P-030	Classify different types of Tuberculosis Discuss the signs and symptoms of tuberculosis Discuss the management of Tuberculosis		Tuberculosis
Re-P-031	Classify different types of acute respiratory distress syndrome Discuss the signs and symptoms of acute respiratory distress syndrome Discuss the management of acute respiratory distress syndrome	Integration with General Medicine	Acute respiratory distress syndrome
Re-P-032	Define respiratory failure Describe various types of respiratory failure Enlist various causes of respiratory failure Outline management strategies of respiratory failure	Integration with General Medicine	Respiratory Failure
Re-P-033	Describe ABC in a trauma patient	Integration with Surgery	First Aid in Surgical Patients

MEDICAL BIOCHEMISTRY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 14	
		DISCIPLINE	TOPIC
Re-B-001	Describe the biochemical basis of emphysema, Chronic obstructive pulmonary disease (COPD) and cystic fibrosis Explain and interpret the pedigree of single gene defect i.e., Emphysema and cystic fibrosis (autosomal recessive) Discuss the biochemical basis of Respiratory Distress syndrome	Medical Biochemistry	Genetic defects
Re-B-002	Describe ionization of water and elaborate its significance. Discuss water and electrolyte balance in health and disease.	Integrate with Physiology	Water, pH, Buffers/ Ionization of water

Re-B-003	Define pH and describe the concept of pH scale.		Water, pH, Buffers/ pH and pH scale
Re-B-004	Define weak acids and conjugate base.		Water, pH, Buffers/ weak acids and their significance
Re-B-005	Define Ka and pKa and give their significance.		Water, pH, Buffers/ Ka And pKa
Re-B-006	Describe Henderson-Hasselbach (HH) equation. (no derivation required) along with its application/use. Interpret the titration curve for amino acids (alanine, histidine& acetic acid)		Water, pH, Buffers/ HH equation and its applications
Re-B-007	Define buffers. Enumerate the component of a buffers system and describe their mechanism of action. Enlist important buffers present in blood, plasma, ECF (Extra Cellular Fluid), ICF (Intra Cellular Fluid) and renal tubular fluid. Elaborate the working of bicarbonate buffer and phosphate buffer.		Water, pH, Buffers/ HH equation and its applications
Re-B-008	Elaborate the role of lungs in the regulation of acid base balance.		Acid Base balance and imbalance/ Lung mechanisms for pH regulation
Re-B-009	Elaborate the concept of 1st, 2nd and 3rd line of defense against changes in H^+ ion concentration.	Biochemistry	Acid Base balance and imbalance/ Defense mechanisms against changes in H+ concentration

Re-B-010	Discuss the concept of acid base balance	Medical Biochemistry	Acid base balance

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS

THEORY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 5+3=08	
		DISCIPLINE	TOPIC
Re-Ph-001	Classify the drugs for cough suppression & expectoration	Pharmacology & Therapeutics	Cough Suppressants
	Explain the mechanism of action and adverse effects of cough suppressants		
Re-Ph-002	Explain the mechanism of action and adverse effects of anti-asthmatics		anti-asthmatics
Re-Ph-003	Classify anti-histamines		Anti asthmatics
Re-Pa-001	Describe the pathophysiology of acute respiratory distress syndrome	Pathology	Acute Respiratory Distress Syndrome
Re-Pa-002	Give the salient features of Obstructive and Restrictive Lung diseases.		Obstructive lung Disease
Re-Pa-003	Tabulate the differences between Obstructive and Restrictive lung diseases		Restrictive Lung Disease

DISEASE PREVENTION & IMPACT

CODE	COMMUNITY MEDICINE & BEHAVIORAL SCIENCES	TOTAL HOURS = 10	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
Re-CM-001	Identify the common risk factors of acute respiratory infections with emphasis on smoking	Community Medicine and Public Health	Prevention of acute Respiratory Infections (ARI)
	Discuss preventive strategies of different problems related to respiratory system		
	Enlist the common vaccines used for the prevention of ARI		
	Explain the role of vitamins in the respiratory tract infections	Integrate with Biochemistry	

Re-CM-002	Explain the effect of air pollutants on the respiratory system		Interaction of environment & Respiratory System
Re-CM-003	Describe the burden of respiratory diseases	Community Medicine and Public Health	Epidemiology of respiratory Diseases
Re-CM-004	Enlist the common respiratory diseases related to occupation		Occupational Lung Diseases
Re-BhS-001	identify the psychosocial factors leading to dyspnea.	Behavioral Sciences	Dyspnea
Re-BhS-002	Identify the psychosocial factors leading to psychogenic cough.		Psychogenic Cough
Re-BhS-003	Identify and deal with the various psychosocial aspects of Respiratory conditions (such as Asthma, COPD, Tuberculosis, Cystic Fibrosis, Sleep Apnea) on Individual, Family and Society.		Personal, Psychosocial and vocational issues

AGING

THEORY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 03	
		DISCIPLINE	TOPIC
Re-Ag-001	Discuss the microbiological basis of respiratory infections in old age in cold weather	Microbiology	Respiratory infections in old age
Re-Ag-002	Discuss how aging impairs respiratory clearance, increasing inflammation and infection risk.	Pathology	Increased vulnerability to infection
	Describe the biochemical basis of emphysema, COPD and cystic fibrosis	Chemical Pathology	Respiratory diseases


Practicals

PRACTICAL

HISTOLOGY

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 05	
		DISCIPLINE	TOPIC
Re-A-025	Identify, draw and label the histologic sections of epiglottis and larynx.	Histology	Epiglottis& Larynx
Re-A-026	Describe the histological features of bronchial tree: trachea, bronchi, bronchioles, alveoli		Trachea & Organization of Respiratory System
Re-A-027	Identify, draw and label the histological sections of bronchial tree: trachea, bronchi, bronchioles, alveoli, Lung		Bronchial tree & Lung
	Describe the mucosal changes encountered in the trachea-bronchial tree		
	Compare and contrast the histological features of various components of bronchial tree: trachea, bronchi, bronchioles, alveoli.		
Re-A-028	Describe, compare and contrast the light and electron microscopic features of type I and type II pneumocytes		Pneumocytes

PHYSIOLOGY

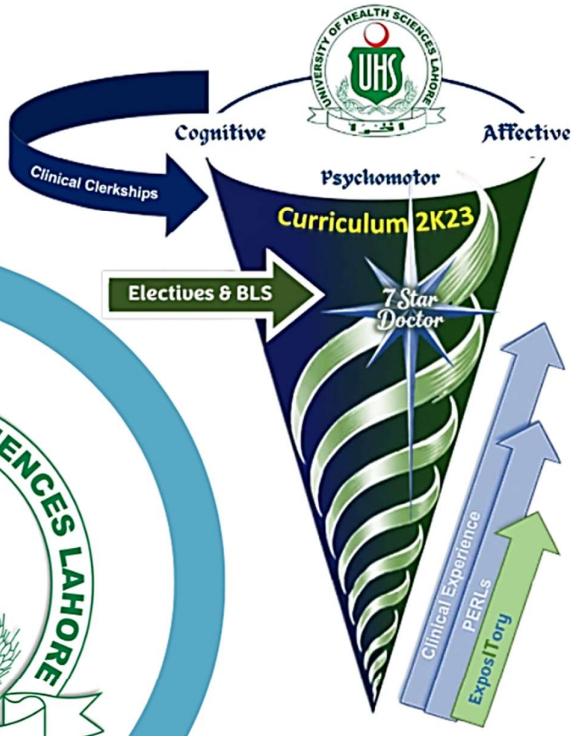
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 06	
		DISCIPLINE	TOPIC
Re-P-034	Perform the clinical examination of chest for the respiratory system (inspection, palpation, percussion, Auscultation)	Medical Physiology	Clinical Examination of Chest
Re-P-035	Determine lung volumes and capacities with a spirometer.		Lung volume & capacities
Re-P-036	Determine Blood Oxygen Saturation with finger Pulse Oximeter		Oxygen Saturation

Re-P-037	Determine Peak Expiratory Flow rate.		Peak Expiratory Flow rate
Re-P-038	Perform Cardio pulmonary Resuscitation (CPR) on adult and infant.		CPR
BIOCHEMISTRY			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 04**	
		DISCIPLINE	**TOPIC**
Re-B-011	Determine the pH of the solution by pH meter	Medical Biochemistry	Determination of pH
Re-B-012	Interpret metabolic and respiratory disorders of acid base balance on the basis of sign, symptoms and ABG findings	Biochemistry	Acid base balance Interpretations


03
Section

Modular Integrated Curriculum 2K23

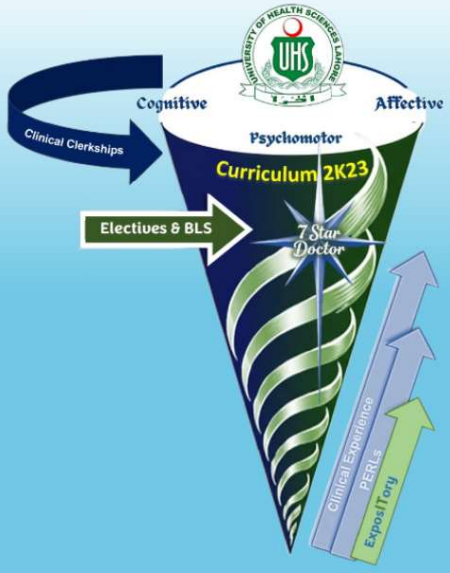
Year 1 & 2



The Holy Quran
Pakistan Studies
Islamiyat
Civics

Modular Integrated Curriculum 2K23

Year 1 & 2



The Holy Quran

1. MODULE RATIONALE

The Holy Quran provides wisdom and knowledge to be followed in every applied component of modern civilization covering Ethical, Social, Legal, Financial and Healthcare Domains. The complete Quran encompasses the guidelines, all full of 'Hikmah' (wisdom) to deal with all practical scenarios encountering patients and health professionals. As the Holy Quran is the guiding light for humanity and a way of life for all the believers of one true Allah, therefore, understanding the message of this Holy Book is mandatory for realizing the duties which one has towards other human beings in general and the profession in particular. Holy Quran is a guide for the modern society and scientific development therefore, orbiting around Quranic doctrines and axioms of Hadith, all challenges faced by modern healthcare can be solved. Therefore, this longitudinal curriculum is developed so that all health professionals can get, as enunciated by the Holy Quran itself, "the best of this world as well as the best of the Hereafter".

2. VISION & MISSION

2.1: Vision: Building the personality and character of health professionals in light of teachings of the Holy Quran and Sunnah, to alleviate human sufferings.

2.2: Mission: Teaching Holy Quran and Sunnah to undergraduate students of Health Sciences, building their personality and character, enabling them to apply these principles in patient care and innovative research.

3. CURRICULUM DESIGN AND ORGANIZATION

3.1: Course Aim: The Holy Quran course aims to imbibe Health profession students with professionalism, general and medical, based on Divine teachings. The professionals thus groomed shall be able to correlate religion with healthcare delivery and modern science with an understanding that evidence-based practice itself originated from the system by which the "Hadith" was preserved after centuries.

3.2: Mode of Delivery: The module will be taught in the form of interactive lectures.

3.3: Learning Experience: Classroom environment will be used.

3.4: Attendance: Eighty five percent (85%) attendance is mandatory to be eligible to sit in the professional examination.

3.5: Course Modules for Year 1 and Year 2

The curriculum will be taught under three Major Sections

- Faith
- Worship
- Specific Quranic Commandments

3.6: Module Credit hours & Contact hours: This will be a three (03) credit hour course where each credit hour will be equivalent to eighteen (18) contact hours distributed over two years.

3.7: Assessment Portfolio

The assessment will be done through student portfolios based on four written assignments and two quizzes per year. The portfolio submission to the Quran teacher will be mandatory for sending admission to the university and sitting in the professional examination. The assignments will be based on the topics discussed during the year. One will be given after first half of the course will be completed for the year and second will be given at the completion of the Quran course.

3.8: Reference Material

- Translations of the Holy Quran approved by the Quran Board
- Six Authentic Books of Hadith

3.9. Module Faculty

At least one full time faculty member (Lecturer or above) will be hired for running the Holy Quran course throughout four years. The qualifications of the faculty member will be certified by the academic council of the college/institution to be declared as the teacher of Holy Quran course.


Syllabus

Quran: Year-1

SECTION ONE: FAITH (AQAID)

LEARNING OUTCOMES

a. Oneness of Allah (SWT) (Tawheed)

i. Describe Unity of Allah in being
ii. Describe Unity of Allah in attributes
iii. Describe concept of Shirk
iv. Impact of Tawheed in human life

b. Prophethood (Risalat)

i. Explain Significance of Risalat
ii. Identify Prophets as role models
iii. Recognize finality of Prophethood - Prophet Muhammad (PBUH)

c. Belief in Hereafter (Aakhirat)

i. Appraise continuity of life beyond material world
ii. Concept of Doomsday and its various stages
iii. Concept of Day of Judgment and accountability in the Hereafter
iv. Concept of “Meezan”

d. Divine Revelations (Holy Books)

i. Explain the divine decree in sending the Holy Books
ii. Identify the Holy Quran as the only preserved & authenticated divine revelation to date
iii. Interpret Quran as Furqan

e. Angels

i. Discuss belief in angels and its significance
ii. Describe the universal role of angels (their specific duties)

f. Qadr

i. Identify Taqdeer as Knowledge of Allah
ii. Explain the concept of Faith in Good and Evil

CONTENTS

1. Oneness of Allah subhan wa taala (Tawheed)
2. Prophethood (Risalat)
3. Belief in Hereafter (Akhirat)
4. Devine revelations (Holy Books)

SECTION TWO: WORSHIP (IBADAAT)

LEARNING OUTCOMES

a. Prayer (Namaz)

i. Recognize the importance of physical purity (Taharah)
ii. Discuss the philosophy of prayer and its role in purification of soul
iii. Recognize the importance of prayer in building personal character - sense of duty, patience, perseverance, punctuality and self/social discipline
iv. Spiritual, moral and social impact of prayer in building of righteous community
v. Role in creating brotherhood, equality and unity in ummah
vi. Identify the conditions in which relaxation in prayer is allowed e.g. during operation, travelling etc.

b.Obligatory Charity (Zakat)

i. Identify obligatory importance of Zakat and other items as outlined under the title of 'Infaq-fee-sabilillah'
ii. Categorize the people who can be the beneficiaries of Zakat
iii. Role of zakat in eradication of greed and love of material world
iv. Effect of Zakat and sadaqat in circulation of wealth and alleviation of poverty
v. Explain the essence of zakat and sadaqat in building just communities
vi. Describe the role of state in collection and disbursement of zakat

c. Fasting (Roza)

i. Discuss the importance and significance of fasting
ii. Relate the Holy Quran and the month of Ramadan
iii. Role of fasting in building personal qualities like self-control, piety and soft corner for the poor and needy persons
iv. Identify the applications of "Taqwa" through fasting

d. Pilgrimage (Hajj)

i. Discuss the importance and significance of Hajj
ii. Identify the conditions in which Hajj becomes an obligation
iii. Role of manasik-e-Hajj in producing discipline and complete submission
iv. Recognize the importance of Hajj in uniting the ummah
v. Sacrifice for Allah subhan wa taala (essence of qurbani)

TOPIC AREAS

1. Prayer (Salah/Namaz)

2. Obligatory charity (Zakat)
3. Fasting (Saum/Roza)
4. Pilgrimage (Hajj)

Quran: Year-2

SECTION THREE: SPECIFIC QURANIC COMMANDMENTS

LEARNING OUTCOMES

a. Importance of the protection of Human life

i. Concept of the sanctity of human life in Quran and Sunnah
ii. Importance and significance of a single human being even during war
iii. Concept of punishment in regard to the killing of a human being, voluntarily or involuntarily

b. Jihad

i. Concept of Jihad and its significance (hikmat)
ii. Different forms of Jihad and their importance
iii. Principles and preparation of Jihad
iv. Devine reward of Jihad

c. Heirship/Inheritence (Virasat)

i. Heirship and division of wealth in accordance with divine teachings
ii. Heirs and their shares
iii. Legal aspect of virasat (Hud-e-Illahi)

d. Amar-bil-maroof-wa-Nahi-anil-munkar

i. Differentiation between Maroof and Munkar
ii. Importance and significance (effects of avoiding this principle)
iii. Necessary conditions of both amar-bil-maroof and nahi-anil-munkar
iv. The different stages and the necessary prerequisites

e. Hadood-e Illahee and taazeerat

i. Meaning and various types of hadood-e-Illahee
ii. Authority for fixation of limit (hudd)
iii. Criteria and permissible relaxation in fixing the limits
iv. Difference between 'Hadood', 'Qisas' and 'Tazeerat'. Punishments which are left to the court of law
v. Benefits for the good of community

f. Justice (Adal-o-insaf)

i. Justice of Allah subhan wa taala
ii. Importance of justice for the survival of community
iii. Need of justice to be prevailed irrespective of religion
iv. Devine reward for fair justice

g. Business (Bay-o-tijarat)

i. Importance of fair business and its necessary constituents
ii. Permissible and impermissible conditions of businesses
iii. Concept of loan in businesses

h. Interest (Riba or Sudi karobar)

i. Meaning of Riba or interest and its different forms
ii. Impact of Riba on a society in general
iii. Devine declaration and its punishment both in this world and Hereafter

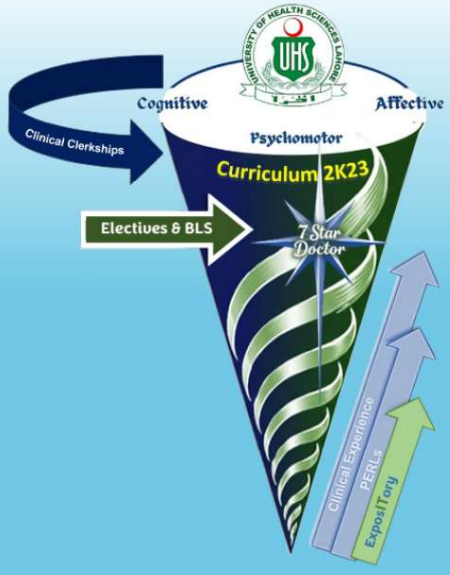
i.Nikah-o-talaq

i. Basic rulings regarding marriage and divorce
ii. Importance of Nikah and its constituents
iii. Conditions of Nikah and various forms of prohibited/impermissible nikah
iv. Misconception of dowry
v. Talaq and its various forms
vi. Meaning of Khula and its conditions

CONTENTS

Modular Integrated Curriculum 2K23

Year 1 & 2



Islamiyat & Pakistan Studies

MODULE RATIONALE

This module comprises of Islamiyat & Pakistan Studies. All the medical or other curricula relate to our core context and internal fiber. The study of religion and country endorses all relevancy and competency acquisition for the purpose of service to humanity and community orientation.

ISLAMIYAT

A short course on Islamic Studies will be completed in First and Second year with an exam at the end of second year.

Course Content:

1. Understand the basic principles of Islam.
2. Explain the concept of the Islamic state.
3. Explain the Quran as a guide for modern society and scientific development.
4. Describe the life of the Holy Prophet Peace be upon him as an example to follow.
5. Explain ethics in the Islamic prospective.
6. Describe the rights of the individual in Islam.
7. Describe the rights of women and children in Islam.
8. Explain the contribution of Islamic scholars to science and medicine.
9. Understand Islam in terms of modern scientific development.
10. Explain the concept of Rizk-e-Hilal.
11. Explain the concept of Hukook-ul-Ibad.

PAKISTAN STUDIES

A short course on Pakistan Studies will be completed in First and Second year with an exam at the end of second year.

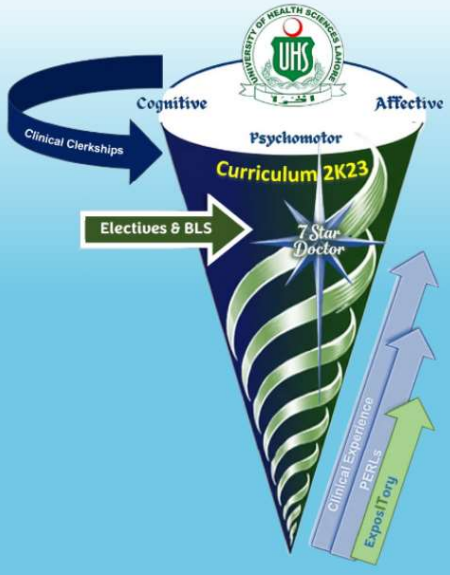
Course Content:

1. Describe brief the salient features of the Pakistan movement.
2. Explain the basis for the creation of Pakistan.
3. Give a brief account of the history of Pakistan.
4. Explain the ethnic and cultural distribution of the population of Pakistan.
5. Describe the Provinces and resources available in Pakistan.
6. Explain current problems faced by Pakistan.
7. Describe the social, economic and health problems of the rural population of Pakistan.

ISLAMIYAT AND PAKISTAN STUDIES BOOKS
• Standard Islamiyat (Compulsory) for B.A, B.Sc., M.A, M.Sc., MBBS by Prof. M.Sharif Islahi Ilmi 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 • Pakistan studies (Compulsory) for B.A, B.Sc., B.Com., B.Ed., Medical/Engineering by Prof. Shah Jahan Kahlun

Modular Integrated Curriculum 2K23

Year 1 & 2



Civics

1. MODULE RATIONALE

Civics is part and parcel of life and the study of Civics has major thrust on improvement of the quality of life and welfare of human beings. This discipline enhances the approach towards rational behavior and daily life.

There is a need for us to know role of a citizen with specific reference to Global Village, the Citizen and Daily life issues, Citizenship, Rights and Responsibility, Role of Government and State, Implementation

Issues of Devolution plan, Social Welfare Institutions/ NGOs and their role at basic level, social interactions and the new discoveries in IT and mass media, relations with International Organizations and Pakistan and its neighbors. Civics goes beyond the cognitive level to deal with social values and attitudes. From the earliest stages of the course, it is important to respect students' opinions while helping them to develop a rationale for their opinions. This curriculum is adapted from Agha Khan University Examination Board curriculum for higher secondary examination.

2. VISION & MISSION

2.1: Vision: Building the personality and character of health professionals

2.2: Mission: Teaching Civics to undergraduate students of Health Sciences, building their personality and character, enabling them to apply these principles in patient care.

3. CURRICULUM DESIGN AND ORGANIZATION

3.1: Course Aim:

- To develop understanding of the social nature and significance of civics, its key concepts and civic life.
- To emphasize learning of related themes in a way that encourages creativity, curiosity, observation, exploration and questioning.
- To create awareness of the nature of civic life and the relationship between civics and other social sciences.
- To promote understanding about the ideology of Pakistan and the struggle of an independent state.
- To inculcate the behavior patterns of national character, and qualities of a good citizen,
- self-reliance, patriotism and leadership.
- To create a strong sense of national unity, integration and cohesion.

- To prepare students as future citizens, conscious of their positive role in a society and the world at large.

3.2: Mode of Delivery: The module will be taught in the form of interactive lectures.

3.3: Learning Experience: Classroom environment will be used.

3.4: Attendance: Eighty-five percent (85%) attendance is mandatory to be eligible to sit in the professional examination.

3.5: Assessment: The assessment will be done through two written assignments and two quizzes per year. The assignments will be based on the topics discussed during the year. One will be given after first half of the course will be completed for the year and second will be given at the completion of the course.

3.7: Module Faculty: At least one full time faculty member (Lecturer or above) will be hired to run the civics course throughout four years. The qualifications of the faculty member will be certified by the academic council of the college/institution to be declared as the teacher of civics.


Syllabus

LEARNING OUTCOMES	TOPICS
i. Define civics ii. Describe how civics can improve the citizenship iii. Illustrate the scope of civics iv. Discuss the nature of civics v. Give examples how civics can help in the national development	Civics-Meaning & Nature
i. Examine the significance of civics ii. Explain how civics is important to know the problems of daily life iii. Discuss how civics can help to bring improvements in the civics life of citizens iv. Evaluate how civics can improve the sense of love and respect for human relationship v. Discuss that studying civics can develop a sense of gratitude vi. Give examples how civics is important to develop the global unity	Significance and Utility
i. Compare civics with political science, history, economics, sociology and ethics	Relationship with Social Sciences
i. Describe the term harmonic relationship ii. Explain the harmonic relationship among different members of society. (Women, children and senior citizens) iii. Explain how harmonic relationship develop for respect of religion	Harmonic Relationship
i. Define the term individual in relation to civics ii. Define the term state iii. Explain the relation between an individual and a state iv. Describe the importance of an individual in a state v. Enlist the responsibilities of an individual in a state	Individual and state
i. Identify the basic unit of social institution Discuss and characterize the different types of family ii. Give the importance of basic unit of social institution in the development of a state Enlist the responsibilities of family in general iii. Analyze your role for the betterment of the family Compare and contrast the impact of the deterioration of family in the western society and give examples	Family

i. Define community ii. Explain the nature and significance of community iii. Discuss the role of a family in community iv. Analyze the role of an individual for the betterment of the community	Community
i. Define society ii. Elaborate the relation between an individual and society and society and state iii. Analyze the role of an individual for the betterment of society	Society
i. Define the term nation, nationality and ummah differentiate between nation and nationality distinguish between nation and ummah analyze the value, behavior and the pattern of society based on religions ii. Evaluate the characteristics of society developed by religions	Nation, Nationality
i. Trace the origin of state with reference to the theories of Divine Origin, Force and Social ii. Contract (Hobbs, Lock, Rousseau) iii. Describe the elements of a state (sovereignty, population, territory, Government) iv. Compare and distinguish the role of state, society and government	Origin and elements of State
i. Describe the functions of state ii. Describe the factors which are necessary for proper functioning of state iii. Analyze the situation when a state does not function properly iv. Describe the characteristics of a welfare state Analyze how a welfare state guarantees the equity and justice on the issues of gender, religion, and social classes	Functions of state. (Defense, law and order, welfare etc.)
i. Define the concept of sovereignty in west ii. Discuss different kinds of sovereignty iii. Explain Austin's concept of sovereignty iv. Analyze critically Austin's concept of sovereignty	Sovereignty


04
Section


UNIVERSITY OF HEALTH SCIENCES LAHORE
UHS
Table of Specifications (ToS)

MBBS 1st Professional

Block-1

Theme	Subject	Written Exam		Oral/Practical/Clinical Exam			
		MCQ (1 mark)	Marks	OSPE (8 marks each observed)	OSCE (5 marks each observed)	OSVE (14 marks each observed)	Marks
Normal Structure	Anatomy applied/clinical	40	40	04	-	01	46
Normal Function	Physiology applied/clinical	37	37	03	-	01	38
	Biochemistry applied/clinical	34	34	02	-	01	30
Disease Burden & Prevention	Community Medicine & Public Health	06	06	-	-	-	-
	Behavioral Sciences	05	05	-	-	-	-
Pathophysiology & pharmacotherapeutics	Pathology	13	13	1	-	-	8
	Pharmacology	05	05	1	-	-	8
CFRC	CF-I	-	-	-	01	-	05
PERLs	PERLs-I	-	-	-	01	-	05
Total		**140**	**140**	**11 stations x 08 = 88**	**02 stations x 05 = 10**	**03 stations x 14=42**	**140**

MBBS 1st Professional

Block-2

Theme	Subject	Written Exam		Oral/Practical/Clinical Exam			
		MCQ (1 mark)	Marks	OSPE (8 marks each observed)	OSCE (5 marks each observed)	OSVE (14 marks each observed)	Marks
Normal Structure	Anatomy applied/clinical	55	55	05	-	01	54
Normal Function	Physiology applied/clinical	27	27	02	-	01	30
	Biochemistry applied/clinical	23	23	02	-	01	30
Disease Burden & Prevention	Community Medicine & Public Health	06	06	-	-	-	-
	Behavioral Sciences	04	04	-	-	-	-
Pathophysiology & pharmacotherapeutics	Pathology	15	15	01	-	-	08
	Pharmacology	10	10	01	-	-	08
CFRC	CF-I	-	-	-	01	-	05
PERLs	PERLs-I	-	-	-	01	-	05
Total		**140**	**140**	**11 stations x 08 = 88**	**02 stations x 05 = 10**	**03 stations x 14=42**	**140**

MBBS 1st Professional

Block-3

Theme	Subject	Written Exam		Oral/Practical/Clinical Exam			
		MCQ (1 mark)	Marks	OSPE (8 marks each observed)	OSCE (5 marks each observed)	OSVE (14 marks each observed)	Marks
Normal Structure	Anatomy applied/clinical	32	32	03	-	01	38
Normal Function	Physiology applied/clinical	51	51	04	-	01	46
	Biochemistry applied/clinical	29	29	02	-	01	30
Disease Burden & Prevention	Community Medicine & Public Health	06	06	-	-	-	-
	Behavioral Sciences	02	02	-	-	-	-
Pathophysiology & pharmacotherapeutics	Pathology	15	15	01	-	-	08
	Pharmacology	05	05	01	-	-	08
CFRC	CF-I	-	-	-	01	-	05
PERLs	PERLs-I	-	-	-	01	-	05
Total		**140**	**140**	**011 stations x 08 = 88**	**02 stations x 05 = 10**	**03 stations x 14=42**	**140**


05
Section

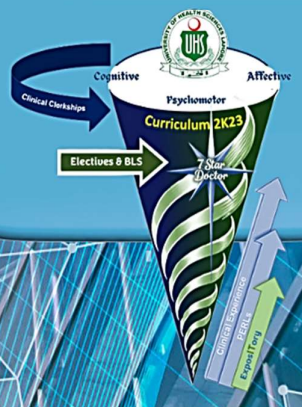
VOLUME:01

C-FRC

CLINICAL-FOUNDATION ROTATION CLERKSHIPS

UNIVERSITY OF HEALTH SCIENCES LAHORE

Modular Integrated Curriculum 2K23



YEAR-01


UNIVERSITY OF HEALTH SCIENCES LAHORE
UHS
Clerkships
Rotation
Foundation
Clinical Skills -FRC
C-FRC-01
YEAR-01
Clinical Foundation

Table of Contents

LIST OF ABBREVIATIONS

Abbreviations	Subjects
A	Anatomy
Ag	Aging
B	Biochemistry
BhS	Behavioral sciences
C	Civics
CM	Community Medicine
C-FRC	Clinical-Foundation Rotation Clerkship
CV	Cardiovascular
EnR	Endocrinology & Reproduction
ENT	Ear Nose Throat
F	Foundation
FM	Forensic Medicine
GIT	Gastrointestinal tract
GO	Gynecology and Obstetrics
HL	Hematopoietic & Lymphatic
HNSS	Head & Neck and Special Senses
IN	Inflammation
M	Medicine
MS	Musculoskeletal
NS	Neurosciences
O	Ophthalmology
Or	Orientation
P	Physiology
Pa	Pathology
Pe	Pediatrics
PERLs	Professionalism, Ethics, Research, Leadership
Ph	Pharmacology
Psy	Psychiatry
QI	Quran and Islamiyat
R	Renal
Ra	Radiology
Re	Respiratory
S	Surgery

PREAMBLE

The Aim of Medical training is to deliver the best possible patient care. This is not possible until medical students are holistically trained to deliver standardized patient care, with management and counselling skills. The competencies given by PMDC for a graduating physician include:

1. Skillful
2. Knowledgeable
3. Community Health Promoter
4. Critical Thinker
5. Professional
6. Scholar
7. Leader and Role Model

All the above cannot be accomplished without a robust Clinical clerkship program.

The purpose of this document is to provide an outline to the UHS clinical clerkship program which will serve as a vertically integrated module throughout the five years of medical college, transitioning from Clinical Foundation (CF) in the first two years to Clinical Rotations (CR) in the third and fourth year and finally to a complete clinical clerkship (CC) in final year of MBBS.

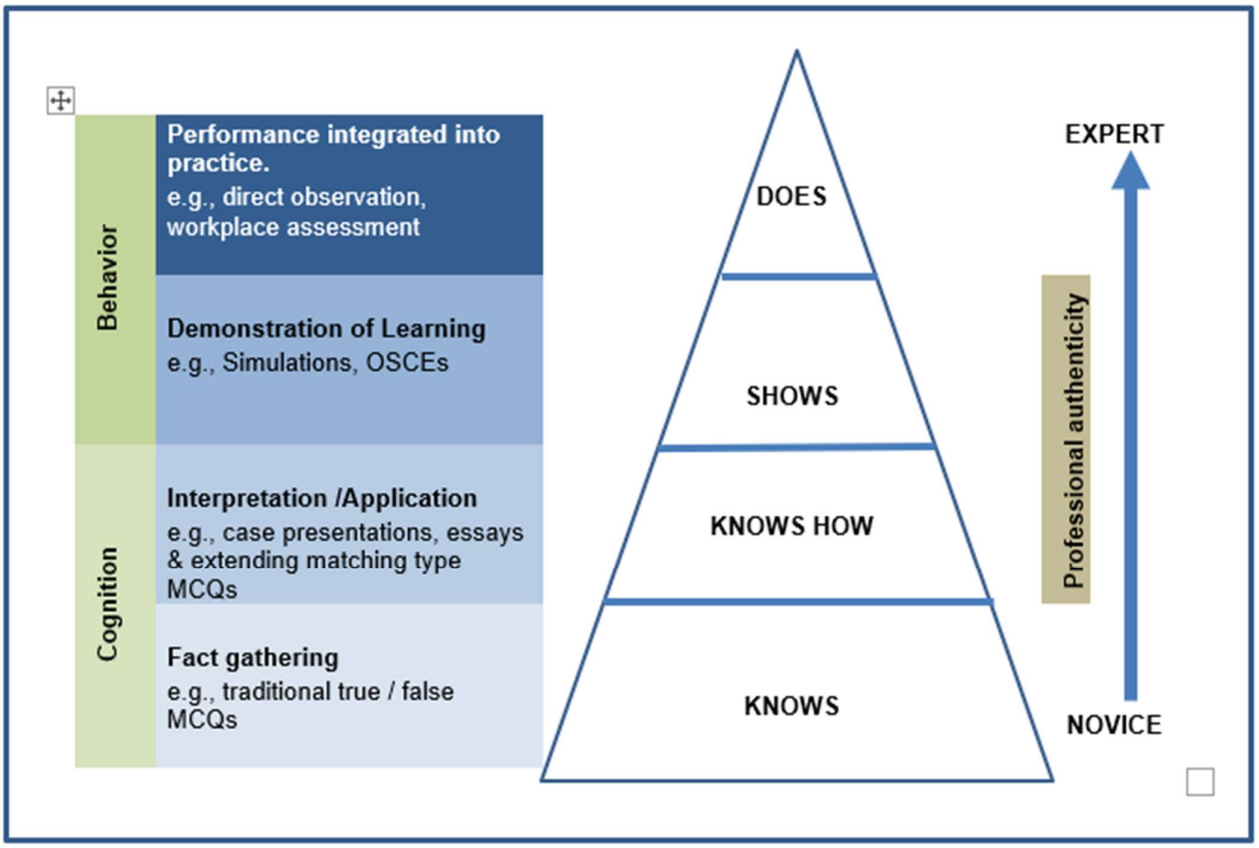
Keeping in view the 45 affiliated medical colleges under the umbrella of UHS, we have tried our best to devise a flexible program which colleges can tailor according to their capacities and resources. We are hopeful this innovative new step will lead to standardization of patient care for UHS lead colleges in the best possible way.

How to use this logbook:

- Each clinical skill has an entry in this logbook along with the checklist to be filled by the supervisor in the ward.
- Number of entries per skill is also mentioned in the modular study guides.
- The Clinical supervisor must tick all boxes deemed fulfilled and give feedback to the student regarding their performance.

MILLER'S PYRAMID

The basis to assess clinical skills is the Miller's pyramid. Different skills throughout the CFR-C module scale from Knows How (e.g., Interpretation of CXR) to does (administer IM injections etc.).




BLOCK-01

FOUNDATION MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Demonstrate steps of hand washing	Hand washing	Shows
Demonstrate the procedure of taking thepulse	Radial Pulse	Shows
Record the Respiratory Rate of patient	Respiratory Rate measurement	Shows
Demonstrate the procedure of taking theBlood Pressure	Blood Pressure	Shows
Demonstrate the process of wearing thegloves	Donning and Doffing	Shows

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR HANDWASHING **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES (Minimum 2 Entries)**	
STEP/TASK		
GETTING READY: 1. Has read the handwashing procedure and understands the 4 moments of hand hygiene. i. Before Contact with patient and/or their environment ii. Before performing a clean and/or aseptic procedure iii. After exposure to blood and/or body fluid iv. After contact with patient and/or their environment		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
THE PROCEDURE: 1. Wet hands with warm water		
2. Apply soap and lather thoroughly		
3. Rub palms, spaces between fingers, backs of hands and wrists, rubbing it vigorously.		
4. Able to identify how long handwashing procedure is		
5. Rinse under running water.		

6. Pat hands dry with paper towel.		
7. Turn off tap with paper towel		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
SIGNATURES OF SUPERVISOR		

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR RADIAL PULSE **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES (Minimum 2 Entries)**		
STEP/TASK			
GETTING READY: 1. Washed hands/sanitized hands			
2. Prepared equipment: watch with second hand.			
3. Explained procedure to the patient and take consent			
4. Determined if the patient is taking any medications that may affect the pulse rate.			
5. Assisted the patient to a comfortable position			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
THE PROCEDURE: 6. Located the radial artery. Use the tip of the index and third fingers of your other hand to feel the pulse in your radial artery between your wrist bone and the tendon on the thumb side of your wrist.			
7. Placed the tips of index and middle fingers over the vessel.			
8. Pushed lightly at first, adding pressure till feeling the pulsation			

SKILL/ACTIVITY PERFORMED SATISFACTORILY			
POST PROCEDURE: 9. Discussed the findings with the facilitator			
10. Washed hands.			
11. Recorded the results as beats / minute and comment on, rate and rhythm			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
SIGNATURES OF SUPERVISOR			

VITAL SIGNS REFERENCE RANGES

(Ref: EMT National Training - National Exams)

Ages	Heart Rae	Respiratory Rate	Systolic Blood Pressure	Temperature
Infancy (Birth to 1 Year)	100 to 160 (first 30 minutes) Settling around 120 bpm	40 to 60 initially 30-40 after first few minutes. 20-30 by one year	70 at Birth to 90 at 1 year	98-100
Toddler (12 to 36 Months) and Preschool Age (3 to 5 Years)	20 to 130 bpm 20 to 120 bpm	20 to 30 20 to 30	70 to 100 mmHg 80 to 110 mmHg	96.8 – 99.6
School-age Children (6 to 12 Years)	70 to 110 bpm	20 to 30	80 to 120 mmHg	98.6
Adolescence (13 to 18 Years)	55 to 105 bpm	12 to 20	100 to 120 mmHg	98.6
Early Adulthood (20 to 40 Years)	70 bpm average	16 to 20 (12-20 normal)	120/80 mmHg average	98.6
Middle Adulthood (41 to 60 Years	70 bpm average	16 to 20 (12-20 normal)	120/80 mmHg average	98.6

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

Note: Respiratory rate is not taken in isolation, usually it is performed while checking radial pulse.

CHECKLIST FOR RESPIRATORY **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES (Minimum 3 Entries)**		
STEP/TASK			
GETTING READY: 1. Introduce yourself to the patient.			
2. Explain the procedure of radial pulse measurement and reassure the patient.			
3. Get patient's consent.			
4. Wash hands/Sanitize hands			
5. Prepare the necessary material (clock/watch)			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
THE PROCEDURE: 6. Check radial pulse (see pulse checklist for reference).			
7. Proceed with taking the Respiratory rate (RR) while your hand is still on the patient's radial artery (Do not inform your patient that you are taking			

the RR).			
8. Placed Observe the rise and fall of the patient's chest and count the number of respirations for another one full minute. (One respiration consists of one complete rise and fall of the chest, or the inhalation and exhalation of air).			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
SIGNATURES OF SUPERVISOR			

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR BLOOD PRESSURE **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
GETTING READY:			
1. Introduce yourself to the patient.			
2. Explain the procedure and reassure the patient. (blood pressure measurement)			
3. Get patient's consent.			
4. Wash hands/sanitize hands			
5. Prepare the necessary material (clock/watch)			
6. Position the patient in a sitting position and uncover one of his /her arms. (Make sure the patient is relaxed and comfortable).			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
THE PROCEDURE:			
6.Turn on the mercury valve (if it is mercury sphygmomanometer).			
7. Select an appropriately sized cuff and apply it to the upper arm ensuring that it fits securely. (The centre of the cuff bladder must be over brachial artery [the bladder should cover 80% of the circumference of the upper arm] and lower edge 2.5 cm above the			

ante-cubital fossa).			
8. Palpate the brachial or radial artery while inflating the cuff till the point where pulsation disappears and keep inflating the cuff 20-30 mmHg more.			
9. Slowly deflate the cuff, noting the pressure at which the pulse reappears. (This is the approximate level of the systolic blood pressure).			
10. Continue to deflate the cuff slowly at 2 mm Hg/second. Note the point at which Korotkoff sounds disappear completely as the diastolic pressure.			
11. Turn off the mercury valve (if it is mercury sphygmomanometer).			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
POST PROCEDURE:			
12. Wash hands.			
13. Document the findings			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR DONNING & DOFFING **(Some of the following steps/tasks should be performed simultaneously.)**	**Minimum 2 Entries**	
STEP/TASK		
GETTING READY: 1. Washed hands.		
2. Preparation: gloves, in place		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
THE PROCEDURE: (gloving) 3. Pick up one glove and place the palm away from you. Slide the fingers under the glove cuff and spread them so that a wide opening is created. Keep thumbs under the cuff.		
4. The doctor will thrust his or her hand into the glove. Do not release the glove yet		
5. Gently release the cuff (do not allow the cuff to snap sharply) while unrolling it over the wrist. Proceed with the other glove using the same technique.		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
Signatures of Supervisor		

HEMATOPOEITC AND LYMPHATIC MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Detail the steps of drawing blood from a vein.	*Venipuncture and blood collection	Knows how
Check for pallor in the conjunctiva, tongue, and palm of hands	Pallor	Shows

- These skills are at the 'Knows how' level of the miller's pyramid, meaning thereby that students need not perform them themselves but may develop a perception regarding them by observing performance/working on simulated patients/facilitation with video.

COLLECTION

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR VENIPUNCTURE **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 2 Entries)**	
GETTING READY:		
1. Identification of patient		
2. Washed hands/ sanitized hands		
3. Preparation: gloves, in place		
SKILL/ACTIVITY DESCRIBED SATISFACTORILY		
THE PROCEDURE:		
4. Explain procedure to the patient and obtain consent		
6. Clean the site with an antiseptic solution and allow it to dry		
7. Select an appropriate site for venipuncture, such as the antecubital fossa or the back of the hand		
7. Apply a tourniquet above the site to enhance vein distention		
8. Ask the patient to make a fist to further enhance vein distention		
9. Insert the needle into the vein at a 15–30-degree angle with the bevel up		

10. Once the needle is in the vein, release the tourniquet and apply pressure to the site with gauze or a cotton ball		
11. Remove the needle and apply pressure to the site for a few minutes		
12. Dispose of the needle and syringe in a sharp's container		
13. Label the specimen with the patient's information and send it to the lab for analysis		
SKILL/ACTIVITY DESCRIBED SATISFACTORILY		
Signatures of Supervisor		

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR PALLOR **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 2 Entries)**	
GETTING READY: 1. Identification of patient		
2. Presence of natural light		
SKILL/ACTIVITY OBSERVED AND DESCRIBED SATISFACTORILY		
THE PROCEDURE: 3. Obtain informed consent from the patient		
4. Examine in natural light		
EXAMINATION OF THE CONJUNCTIVA: 5. Request the patient to look upwards and simultaneously pull the lower eyelid gently downward, thereby exposing the lower palpebral conjunctiva. The lower conjunctiva has a half-moon shape and has been divided into: *i.* posterior rim: the posterior portion of the half-moon shape attached to the sclera. *ii.* anterior rim: the anterior or front portion of the half-moon shape attached to the eyelid. Normally, the anterior rim is of bright red color, in sharp contrast to the posterior rim which has relatively pale fleshy color.		

6. Report pallor (Pallor is said to be present if the anterior rim is not markedly redder as compared tothe posterior rim.) (Severe pallor is considered when both, anterior and posterior rims of the palpebral conjunctivae have the same very pale fleshy color.)		
EXAMINING THE TONGUE FOR PALLOR: 7. Ask the patient to protrude the tongue and observe the dorsal surface.		
8. Report pallor (pallor is said to be present if the tongue and oral mucosa are visibly pale)		
EXAMINING THE HANDS FOR PALLOR:		
9. Holds the patient's hand gently and checks the palm, compares the color of the palm with his/her own palm.		
10. Reports pallor (severe pallor-very pale or white, some pallor-pale)		
SKILL/ACTIVITY PERFORMED SATISFACTORILY		
Signatures of Supervisor		


BLOCK-02

MUSCULOSKELETAL AND LOCOMOTION MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Measure body temperature using a mercury/digital thermometer	Body temperature	Shows
Examine the wrist joint for functionality	Wrist joint examination	Shows
Examine strength of the upper limb	Upper limb strength and power examination	Shows
Examine strength of the lower limb	Lower limb strength and power examination	Shows
Examine the knee joint for functionality	Knee joint examination	Shows
Examine the shoulder joint for functionality	Shoulder joint examination	Shows
Examine the hip joint for functionality	Hip joint examination	Shows
*Identify common fractures showing in x rays of upper limb	X ray common fractures Upper limb	Knows how

- These skills are at the 'Knows how' level of the miller's pyramid, meaning thereby that students need not perform them themselves but may develop a perception regarding them by observing performance/working on simulated patients/facilitation with videos.

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR BODY TEMPERATURE **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 2 Entries)**		
STEP/TASK			
GETTING READY: Before proceeding further, check if the patient has recently taken cold or hot food/drink or smoked. Dip the thermometer in antiseptic (spirit) and wipe dry. If analogue thermometer, shake it until the normal temperature is pushed below 35ºC. If digital thermometer, switch it on and it will show the room temperature on the display.			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
THE PROCEDURE: 1. Explain the procedure to the patient and get a verbal consent to proceed.			
2. Keep the thermometer bulb/probe under the patient's tongue. Ask the patient to close the lips firmly around the thermometer but without biting it			

3. Keep it in place for at least 2 minutes.			
4. Read the temperature as soon as you pull out the instrument			
5. After use, clean the instrument with antiseptic and wipe it off			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR WRIST JOINT EXAMINATION (Some of the following steps/tasks should be performed simultaneously.)	**CASES (Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Explain the procedure to the patient and get a verbal consent to proceed.			
2. Adequately expose hands and wrists of the patient			
3. before starting with the examination, inquire about pain in any area.			
4. Observe both hands and wrists for any asymmetry, scars, and muscle wasting			
5. Palpate the wrists for evidence of any joint line irregularities or tenderness			
6. Ask patients to perform wrist extension "put the palms of your hands together and extend your wrists fully ". normal range of movement is 90 degrees			
7. Ask the patient to perform wrist flexion "put the backs of your hands together and flex your wrist fully", normal range of motion id 90 degrees			
8. Ask the patient to fully relax and allow you to move their hand and wrist for them. Warn them that in case any pain is felt they should report immediately.			
9. Repeat movements 6 and 7 passively.			

SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR EXAMINATION OF UPPER LIMB STRENGTH (Some of the following steps/tasks should be performed simultaneously.)	**CASES (Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Explain the procedure to the patient and get a verbal consent to proceed.			
2. Ensuring privacy, adequately expose the arms of the patient			
3. Before starting the testing for power and strength, for each muscle group check: a. appearance of the muscle (wasted, highly developed or normal) b. Feel tone of muscle (flaccid, normal, clinic)			
4. Observe both hands and wrists for any asymmetry, scars, and muscle wasting			
5. Starting with the deltoids, ask the patient to raise both their arms in front of them simultaneously as strongly as then can while the examiner provides resistance to this movement. Compare the strength of each arm.			
6. Ask the patient to extend and raise both arms in front of them as if they were carrying a pizza. Ask the patient to keep their arms in place while they close their eyes and count to 10. Normally their arms will remain in place.			
7. Test the biceps muscle flexion by holding the patient's wrist from above and instructing them to "flex their hand up to their shoulder". Provide resistance at the wrist. Repeat and compare to the opposite arm.			

8. Ask the patient to extend their forearm against the examiner's resistance. Make certain that the patient begins their extension from a fully flexed position because this part of the movement is most sensitive to a loss in strength. This tests the triceps. Note any asymmetry in the other arm			
9. Test the strength of wrist extension by asking the patient to extend their wrist while the examiner resists the movement. This tests the forearm extensors. Repeat with the other arm.			
10. Examine the patient's hands and test the patient's grip by having the patient hold the examiner's fingers in their fist tightly and instructing them not to let go while the examiner attempts to remove them. Normally the examiner cannot remove their fingers. This tests the forearm flexors and the intrinsic hand muscles. Compare the hands for strength asymmetry			
11. Test the intrinsic hand muscles once again by having the patient abduct or "fan out" all of their fingers. Instruct the patient to not allow the examiner to compress them back in. Normally, one can resist the examiner from replacing the fingers			
12. Test the strength of the thumb opposition by telling the patient to touch the tip of their thumb to the tip of their little finger. Apply resistance to the thumb with your index finger. Repeat with the other thumb and compare.			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Satisfactory: Performs the step or task according to the standard procedure or guidelines

Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR EXAMINATION OF LOWER LIMB STRENGTH (Some of the following steps/tasks should be performed simultaneously.)	**CASES (Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Explain the procedure to the patient and get a verbal consent to proceed.			
2. Ask the patient to lie down and raise each leg separately while the examiner resists. Repeat and compare with the other leg. This tests the iliopsoas muscles.			
3. Test the adduction of the legs by placing your hands on the inner thighs of the patient and asking them to bring both legs together. This test the adductors of the medial thigh.			
4. Test the abduction of the legs by placing your hands on the outer thighs and asking the patient to move their legs apart. This tests the gluteus maximus and gluteus minimums.			
5. Test the extension of the hip by instructing the patient to press down on the examiner's hand which is placed underneath the patient's thigh. Repeat and compare to the other leg. This tests the gluteus maximus			
6. Test extension at the knee by placing one hand under the knee and the other on top of the lower leg to provide resistance. Ask the patient to "kick out" or extend the lower leg at the knee. Repeat and compare to the other leg. This tests the quadriceps muscle.			
7. Test flexion at the knee by holding the knee from the side and applying resistance under the ankle and instructing the patient to pull the lower leg towards their buttock as hard as possible. Repeat with the other leg. This tests the hamstrings			
8. Test dorsiflexion of the ankle by holding the top of the ankle			

and have the patient pull their foot up towards their face as hard as possible. Repeat with the other foot. This tests the muscles in the anterior compartment of the lower leg. Holding the bottom of the foot, ask the patient to "press down on the gas pedal" as hard as possible. Repeat with the other foot and compare. This tests the gastrocnemius and soleus muscles in the posterior compartment of the lower leg			
9. Ask the patient to move the large toe against the examiner's resistance "up towards the patient's face. This tests the extensor halluces longus muscle.			
POST PROCEDURE: 1. 'Wash your hands, thank the patient'			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR EXAMINATION OF LOWER LIMB STRENGTH (Some of the following steps/tasks should be performed simultaneously.)	**CASES (Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Explain the procedure to the patient and get a verbal consent to proceed.			
2. Ensure adequate exposure of the knee joints while maintaining patient privacy.			
3. Inspect the alignment of both legs, both paellas. Check for varus/vulgus deformities, swellings. Inspect skin for any scars, plaques, erythema.			
4. Check swelling at level of joints			
5. simultaneously assess and compare knee joint temperature using the back of your hands.			
6. Measure quadriceps with an inch tape 20 cm diameter above the tibial tuberosity and compare with other side.			
7. Ask the patient regarding any pan and discomfort and then start examining normal side of patient (in supine position)			
8. Flex the knee to (0 degrees, then feel along the joint line (quadriceps tendon → patella → patella tendon → tibial tuberosity → tibial plateau → femoral epicondyles and over course of medial collateral ligament and lateral collateral ligament → popliteal fossa) for ant swelling/ thickness/tenderness			
9. Test active then passive movements, keeping one hand on the knee to feel for crepitus. 1.Flexion (140˚) 2.Extension (0˚)			
10. Passively raise leg at ankle and look for knee hyperextension			

11. Perform the patellar tap: with patients knee fully extended, empty the suprapatellar pouch by sliding your left hand down the thigh to the upper border of the patella.			
12. Keep your left hand in position and use right hand to press downwards on the patella with your fingertips. if there is fluid present you will feel a distinct tap as patella bumps against femur			
POST PROCEDURE: 1. 'Wash your hands, thank the patient'			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR EXAMINATION OF HIP JOINT EXAMINATION (Some of the following steps/tasks should be performed simultaneously.)	**CASES (Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Explain the procedure to the patient and get a verbal consent to proceed.			
2. Ensure adequate exposure of the legs while maintaining patient privacy. Provide a covering sheet for the patient. (Students examining patients of an opposite gender must be with a chaperone.)			
3. Ask the patient if they have any pain before proceeding			
4. Inspect the joint and legs for any deformity, scarring or swelling			
5. Ask the patient to walk to the end of the examination room and then turn and walk back whilst you observe their gait			
6. Ask patient to lie down for next part pf the examination.			

7. With the patient still positioned supine on the clinical examination couch simultaneously assess and compare hip joint temperature using the back of your hands.			
8. Palpate the greater trochanter of each leg for evidence of tenderness			
9. To assess apparent leg length, measure and compare the distance between the umbilicus and the tip of the medial malleolus of each limb.			
10. To assess true leg length, measure from the anterior superior iliac spine to the tip of the medial malleolus of each limb.			
11. For active hip flexion Place your hand under the lumbar spine to detect masking of restricted hip joint movement by the pelvis and lumbar spine and ask the patient to *"bring your leg to your chest as much as you can"*			
12. For active hip extension ask the patient to extend their leg so that it lies flat on the bed.			
13. Perform passive hip flexion, Whilst supporting the patient's leg, flex the hip as far as you are able, making sure to observe for signs of discomfort.			
14. For passive hip internal rotation, Flex the patient's hip and knee joint to 90° and then rotate their foot laterally.			
15. For passive hip external rotation, flex the patients hip and knee joint to 90° and rotate the foot medially			
16. To perform passive hip abduction: a. With the patient's legs straight and flat on the bed, use one of your hands to hold the ankle of the hip being assessed and place your other hand over the contralateral iliac crest to stabilize the pelvis. b. Move the patient's ankle laterally to abduct the hip until the pelvis begins to tilt.			
17. To perform passive hip adduction: a. With the patient's legs straight and flat on the bed, use one of your hands to hold the ankle of the hip being assessed and place your other hand over the contralateral iliac crest to stabilize the pelvis. b. Move the patient's ankle medially to adduct the hip until the pelvis begins to tilt.			
18. To perform passive hip extension, ask the patient to lie in a prone position, use one hand to hold the ankle and the other should be placed on the pelvis.			
19. Thank and reassure the patient			

SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Satisfactory: Performs the step or task according to the standard procedure or guidelines

Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR EXAMINATION OF SHOULDER JOINT EXAMINATION (Some of the following steps/tasks should be performed simultaneously.)	**CASES (Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Explain the procedure to the patient and get a verbal consent to proceed.			
2. Ensure adequate exposure of the shoulder and arm and provide blanket to patient for the time when they are not being examined.			
3. Position the patient standing for initial inspection and ask the patient if they have any pain before proceeding for examination.			
4. Perform a brief general inspection looking for scars, alignment, and muscle wasting			
5. Assess and compare shoulder joint temperature using the back of your hands.			
6. Palpate the various components of the shoulder girdle, noting any swelling, bony irregularities, and tenderness.			
7. To check for external rotation and abduction, ask the patient to put their hands behind their head and point their elbows out to the side			
8. To check internal rotation and adduction, ask the patient to place each hand behind their back and reach as far up their spine as they are able to			
9. For active shoulder flexion instruct the patient to raise their arms forward until they're pointing up towards the ceiling.			
10. For active shoulder extension, ask the patient to stretch their arms behind them.			

11. For active shoulder abduction, ask the patient to raise their arms out to the sides in an arc like mono until their hands touch above their head			
12. For active shoulder adduction, ask the patients to keep their arms straight and move them across the front of their body to the opposite side.			
13. For active internal rotation, ask the patient to place each hand behind their back and reach as far up the spine as they can.			
14. To check scapular movement, ask patient to abduct their shoulder while you simultaneously palpate inferior pole of the scapula.			
15. To judge passive movements, ask the patient to fully relax and allow you to move their arms for them. Go through steps 7-14 by moving the patients arm through those movements.			
16. Thank and reassure the patient			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Satisfactory: Performs the step or task according to the standard procedure or guidelines

Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR UPPER LIMB X-RAY (Some of the following steps/tasks should be performed simultaneously.)	**CASES (Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Observe the ABC's: a. Alignment and joint space b. Bone texture c. Cortices			
2. Changes in alignment will suggest a fracture/ complete or partial dislocation			
3. Describe the position of the fragment distal to the fracture site			
4. Look around the outline of each bone to see any step in the cortex as it may indicate a fracture			
5. Once a fracture is identified, describe which bone is involved and where the fracture is located (proximal/middle distal)/			
6. Recognize a fracture extending all the way through the bone as a complete fracture.			
7. Identify type of complete fracture accordingly: a. Transverse: fracture at right angles to the shaft b. Oblique: fracture at an angle to the shaft c. Spiral: caused by twisting injury d. Comminuted: 2 or more bone fragments e. Impacted: fractured bone forced together			

8. Recognize an incomplete fracture as one not involving the whole cortex.			
9. Types of incomplete fractures include: a. Torus/Buckle: a bulge in the cortex b. Bowing: associated bend in the bone shaft c. Greenstick: bending of the shaft with a fracture on the convex surface Salter-Harris: involving the growth plate			
10. Identify an open fracture as having a puncture of the skin or an open wound identify closed fractures as not having any skin opening.			
11. Identify closed fractures as not having any skin opening.			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

CARDIOVASCULAR-1 MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Auscultation of heart sounds	Heart sounds	Shows
Detection of ankle swelling/edema – pitting /non-pitting	Edema	Shows
Abdominal jugular reflex	JVP	Shows
Perform detection of pedal and carotid pulses	Pedal and carotid pulse	Shows
Perform cervical and axillary lymph node examination	Lymph node Examination	Shows

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Satisfactory: Performs the step or task according to the standard procedure or guidelines

Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR HEART SOUNDS **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Begin by introducing yourself to the patient and explaining the auscultation process to them.			
2. Take consent of the patient			
3. Position the patient in a comfortable position and expose their chest.			
4. Place the stethoscope on the patient's chest over the four auscultation points - aortic, pulmonary, tricuspid and mitral.			
5. Listen to the heart sounds in each area, first with the diaphragm and then with the bell			
6. Identify the S1 and S2 sounds. S1 is the first sound heard, which is produced by the closure of the atrioventricular valves. S2 is the second sound heard, which is produced by the closure of the semilunar valves			
7. Determine the heart rate and rhythm			
8. Assess the intensity of the heart sounds - S1 and S2. S1 should be louder than S2 at the mitral area and vice versa at the aortic area.			

9. Assess the splitting of the heart sounds - S2 may split physiologically during inspiration and be heard as two distinct sounds			
10. Listen for any additional heart sounds such as S3 or S4 which may indicate pathological conditions.			
11. Thank the patient			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR EXAMINATION OF EDEMA **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Begin by introducing yourself to the patient and explaining the procedure			
2. Take consent.			
3. Ask patient to remove shoes and socks			
4. Observe the patient's ankles for any visible swelling or changes in skin colour			
5. Release the pressure and observe the area for any indentation or "pit".			
6. If a pit Is observed that is known as pitting edema			
7. If no pit is observed that is known as non-pitting edema			
8. Assess the extent of the edema by measuring the circumference of the ankle with a tape measure.			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR EXAMINATION OF PEDAL AND CAROTID PULSE **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE: (Pedal pulse)			
1. Begin by introducing yourself to the patient and explaining the procedure			
2. Take consent.			
3. Ask the patient to lie down flat on their back or sit up with their legs dangling over the edge of the examination table			
4. Identify the pedal pulse by locating the dorsalis pedis artery on the top of the foot, just lateral to the extensor hallucis longus tendon. Alternatively, locate the posterior tibial artery by palpating the groove between the medial malleolus and Achilles tendon.			
5. Place your index and middle fingers over the identified artery and apply gentle pressure until you feel the pulse.			
6. Assess the strength and regularity of the pulse.			
THE PROCEDURE: (Carotid pulse)			
1. Identify the carotid pulse by locating the carotid artery on the side of the neck, just below the angle of the jaw			
2. Assess the strength and regularity of the pulse			

3. Record your findings accurately and thank the patient **Remember, it's important to be gentle when performing this examination and to explain the procedure to the patient beforehand. Also, it's important to avoid excessive pressure on the carotid artery to prevent potential complications, especially in elderly or hypertensive patients. DO NOT COMPRESS CAROTID SIMULTANEOUSLY ON BOTH SIDES*			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR EXAMINATION OF JVP **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Introduce yourself to the patient and explain the procedure			
2. Ask the patient to lie down flat on their back			
3. Place your right hand on the patient's upper abdomen, just below the ribcage.			
4. Apply firm pressure for about 10 seconds			
5. Observe the neck veins for any visible distension			
6. If the jugular veins in the neck become more visible or distended, this is a positive abdomin-jugular reflex and indicates an elevated JVP			
7. If there is no change in the neck veins, this is a negative abdomin-jugular reflex and indicates a normal JVP			
8. Thank the patient			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

CERVICAL AND AXILLARY LYMPH NODES

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR EXAMINATION OF LYMPH NODES **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Introduce yourself to the patient and explain the procedure			
2. Inspect the neck and axilla for any visible swelling or abnormality			
3. Palpate the cervical lymph nodes. Start by checking the pre-auricular nodes, then move on to the post-auricular, occipital, submental, submandibular, tonsillar, superficial cervical, deep cervical, supraclavicular nodes			
4. Palpate the cervical lymph nodes. Start by checking the pre-auricular nodes, then move on to the post-auricular, occipital, submental, submandibular, tonsillar, superficial cervical, deep cervical, supraclavicular nodes			
5. Note the size, shape, and consistency of the lymph nodes. Normal lymph nodes are usually small, soft, and movable. Enlarged lymph nodes may be hard, tender, or fixed			
6. Check for pain or tenderness			
7. Thank the patient			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			

Signatures of Supervisor			

RESPIRATORY-1 MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Performance of chest compressions	CPR/Chest compressions	Shows
Detection of clubbing	Clubbing	Shows
Identify main organs of the thorax on CXR	CXR	Shows
Identification of pneumonic patch on chest x ray	Pneumonia CXR	Shows
Administering inhaler to a patient	Inhaler use	Shows

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR PERFORMANCE OF CHEST COMPRESSIONS **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 2 Entries)**		
STEP/TASK			
THE PROCEDURE: 1. Position the person on their back: Place the person on their back on a hard, flat surface			
2. Kneel beside the person: Kneel beside the person's chest			
3. Place your hands: Place the heel of one hand on the center of the person's chest between the nipples. Place the other hand on top of the first hand			
4. Interlock your fingers: Interlock your fingers, making sure that pressure is not applied to the person's ribs			
5. Compress the chest: With your arms straight, press down on the person's chest using your upper body weight. Compress the chest at least two inches deep, but no more than 2.4 inches, at a rate of 100-120 compressions per minute.			
6. Allow the chest to return to its normal position: After each compression, release the pressure on the chest, but do not remove your hands.			
7. Repeat: Continue the cycle of compressions and releases until medical help arrives or the person starts breathing on their own.			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR CHECKING CLUBBING OF FINGERS **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 2 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Explain the procedure: Introduce yourself to the patient, explain what you will be doing and obtain their consent.			
2. Inspect the nails: Look at the shape of the nails. Clubbed fingers have an increased curvature of the nail bed, causing the nails to appear rounded and wider than normal			
3. Check the nail base: Look at the base of the nails. Clubbed fingers have a bulbous enlargement of the soft tissues at the base of the nails			
4. Check for other signs: Look for other signs of underlying medical conditions that can cause clubbing, such as cyanosis (blue discoloration of the skin), coughing, difficulty breathing, or chest pain			
5. Ask about symptoms: Ask the patient about any symptoms they may be experiencing, such as shortness of breath, chest pain, or chronic cough			
6. Thank the patient			
SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

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Date Observed: _____

CHECKLIST FOR IDENTIFICATION OF ORGANS ON CXR **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 3 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Orient yourself to the image by identifying the left and right sides of the chest			
2. Look for the bony structures of the chest, including the ribs, sternum, and clavicles			
3. Identify the lungs, which will appear as dark areas on the X-ray film			
4. Look for the diaphragm, which is a thin, curved line separating the chest cavity from the abdominal cavity			
5. Identify the heart, which will appear as a slightly enlarged area in the middle of the chest			
6. Look for the aorta, which is the largest artery in the body and runs down the center of the chest			
7. Identify the trachea, which is a tube that runs down the center of the chest and divides into the left and right main bronchi			
8. Look for any abnormalities such as nodules, masses, or areas of consolidation in the lungs			
9. Report your findings			

SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

IDENTIFICATION OF PNEUMONIC PATCH ON X-RAY

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines

Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR IDENTFICATION OF PNEUMONIC PATCH **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(Minimum 2 Entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Identify the location of the patch: Look for an area of increased opacity or whiteness on the chest x-ray. The patch is usually located in one or more of the lung fields			
2. Assess the shape and size of the patch: Observe the shape of the patch. It may be round, oval, or irregular in shape. Note the size of the patch and whether it is increasing or decreasing in size			
3. Determine the density of the patch: Evaluate the density of the patch. It may appear dense or fluffy, and may be surrounded by a hazy or fuzzy border			
4. Look for air bronchograms: Identify air bronchograms, which are visible air-filled bronchi within the patch. These indicate that the surrounding lung tissue is consolidated			
5. Check for pleural effusion: Assess the presence of a pleural effusion, which is a buildup of fluid in the pleural space around the lungs. This can be seen as a dark area at the bottom of the lung field			
6. Consider the patient's clinical presentation: Review the patient's symptoms, such as cough, fever, and shortness of breath, which are commonly associated with pneumonia			
7. Report your findings			

SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

INHALER USAGE

Place a **"✓"** in case box if step/task is performed satisfactorily, an **"X"** if it is not performed satisfactorily, or **N/O** if not observed.

Satisfactory: Performs the step or task according to the standard procedure or guidelines

Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Date Observed: _____

CHECKLIST FOR INHALER USAGE **(Some of the following steps/tasks should be performed simultaneously.)**	**CASES** **(minimum 2 entries)**		
STEP/TASK			
THE PROCEDURE:			
1. Explain what you are about to demonstrate to the patient			
2. Take off the cap of the inhaler			
3. Shake the inhaler well before using it to ensure proper mixing of the medication			
4. Hold the inhaler in your hand with your thumb on the bottom and your index and middle fingers on top			
5. Position the mouthpiece between your teeth and close your lips around it to form a tight seal (explain to the patient, do not insert in your mouth while doing demonstration)			
6. Begin to inhale slowly and deeply through your mouth as you press down on the canister to release the medication			
7. Wait for at least 30 seconds before repeating the above steps if another dose is required			
8. Recap the inhaler			
9. Instruct the patient, that incase a steroid inhaler is used, rinse mouth to prevent oral thrush			

SKILL/ACTIVITY PERFORMED SATISFACTORILY			
Signatures of Supervisor			

Developed by

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Director Medical Education
University Medical and Dental College
Faisalabad

Lt. Col. (R) Dr. Khalid Rahim Khan TI (M)
Ex-Director Medical Education
University of Health Sciences
Lahore

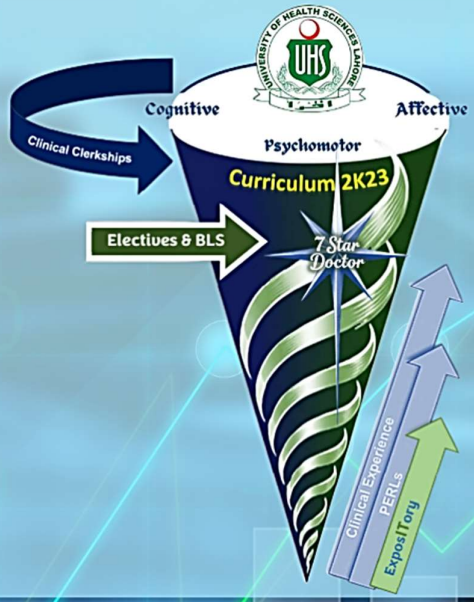

06
Section

University of Health Sciences Lahore

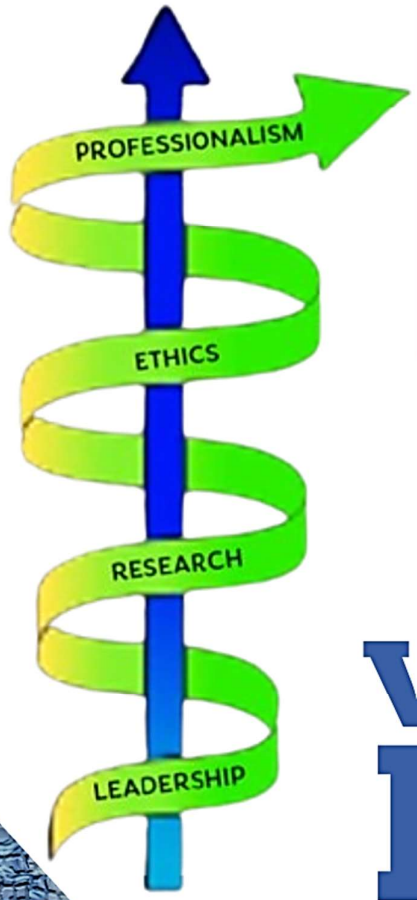
Modular Integrated Curriculum 2K23

MBBS Year-01

YEAR-1



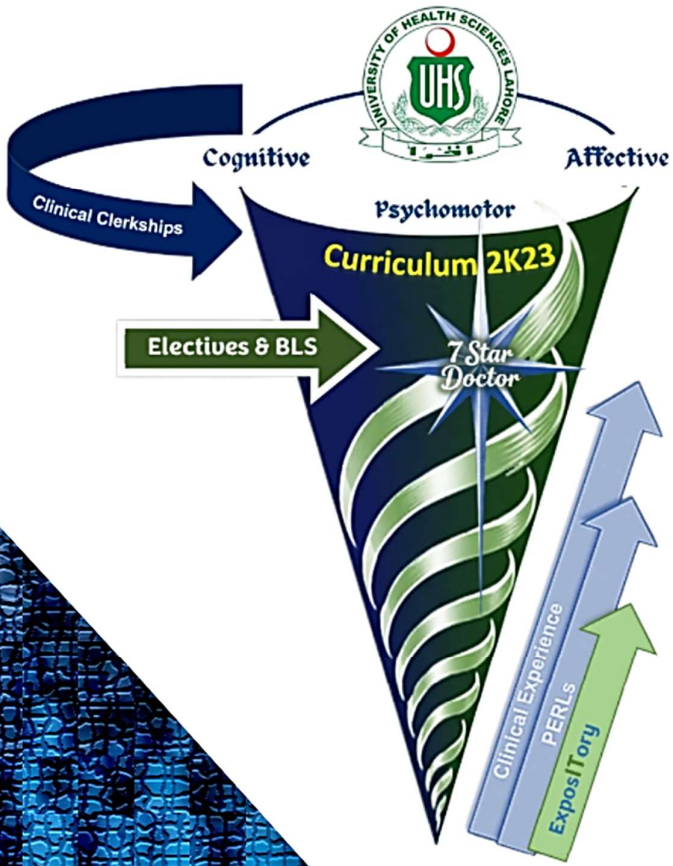
PERLs



Modular Integrated Curriculum 2K23

MBBS Year-1

Volume-1
PERLs-1



IMPLEMENTATION PLAN

This section includes the implementation strategy for the PERL Module. It is advised that the DME and facilitators from respective colleges involved in implementing PERLS should read this section carefully before initiating related instructional activities in respective colleges.

PORTFOLIO TEMPLATE

A portfolio template is hereby given with proposed activities for the colleges to use /modify as per their resources. Please note that Portfolio can be hard-bound or e-portfolio depending on the individual college's decision.


INTRODUCTION
PROFESSIONALISM
ETHICS
RESEARCH
LEADERSHIP

MODULE RATIONALE

The UHS PERL module is designed to equip medical students with essential competencies in Professionalism, Ethics, Research, and Leadership, aligning with the PMDC 7-Star Doctor (Professional, Ethical, Scholar, Leader, Communicator, Health Advocate, and Collaborator) framework. This framework emphasizes the multifaceted role of a physician, highlighting the need for a holistic approach to medical education. In an era where healthcare systems are constantly evolving, integrating these core areas is vital for developing well-rounded, responsible, and effective healthcare professionals.

1. **Importance of Professionalism:**
   Professionalism is the cornerstone of medical practice, influencing patient trust and the overall quality of care. This module emphasizes the significance of professional behavior, including accountability, integrity, and respect for diversity, ensuring that students cultivate a strong ethical foundation as they progress through their medical education.
2. **Ethical Decision-Making:**
   As future healthcare providers, students will face complex ethical dilemmas that require sound judgment and moral reasoning. This module focuses on key ethical principles, such as patient autonomy, equity, and justice in resource allocation, particularly in challenging areas like neoplasia and inflammation. Understanding these principles prepares students to advocate for their patients while navigating the intricate landscape of modern healthcare.
3. **Research Competence:**
   Research plays a critical role in advancing medical knowledge and improving patient outcomes. By emphasizing evidence-based practice, this module encourages students to engage with scientific literature, develop robust literature search strategies, conduct research projects and apply research findings to clinical decision-making. This skill set is essential for fostering a culture of inquiry and continuous improvement within the healthcare profession.
4. **Leadership Development:**
   Leadership is an integral part of effective healthcare delivery. This module prepares students to take on leadership roles, emphasizing teamwork, conflict resolution, and

effective communication. By fostering leadership skills, we aim to empower students to influence positive changes in their future workplaces and advocate for patient-centered care.

In summary, the UHS PERL module is designed to create a comprehensive learning experience that prepares medical students for the challenges and responsibilities they will face in their careers. By integrating Professionalism, Ethics, Research, and Leadership, we aim to cultivate competent, compassionate, and ethical healthcare professionals who are equipped to make informed decisions and lead with integrity in an ever-changing medical landscape.

MODULE LEARNING OUTCOMES

- Exhibit accountability, integrity, and respect for diversity in all aspects of medical practice, embodying the principles of professionalism in clinical and academic settings.
- Analyze and apply ethical principles related to patient care, including autonomy, beneficence, non-maleficence, and justice, particularly in challenging situations such as end-of-life decisions and resource allocation.
- Develop and implement effective literature search strategies, critically evaluate scientific literature, and synthesize findings to inform clinical decision-making and practice.
- Participate in a comprehensive research project, from formulating a research question to data collection and analysis, culminating in the production of a publishable manuscript that meets academic and ethical standards.
- Demonstrate leadership skills through effective communication, conflict resolution, and teamwork, fostering a collaborative environment that enhances patient care and academic performance.
- Recognize and address the social determinants of health, advocating for equity in healthcare access and outcomes for diverse patient populations.
- Engage in self-assessment and reflective practices to identify strengths and areas for improvement, creating actionable plans for personal and professional growth throughout their medical education.
- Utilize effective verbal and non-verbal communication skills to engage with patients, families, and colleagues, ensuring clear and compassionate exchanges that enhance understanding and trust.

SUBJECTS INTEGRATED IN THE MODULE

1. Professionalism
2. Ethics
3. Research
4. Leadership

LEARNING RESOURCES

1. **Professionalism**:

- Azam, M. (2021). Mind maps for medicine. Scion Publishing. https://scionpublishing.com/product/mind-maps-for-medicine/
- Bin Abdulrahman, K. A., Khalaf, A. M., Bin Abbas, F. B., & Alanazi, O. T. (2021). Study habits of highly effective medical students. *Advances in Medical Education and Practice, 12*, 627–633. https://doi.org/10.2147/AMEP.S309535
- Bandaranayake, R. C. (2013). Study skills. In K. Walsh (Ed.), *Oxford textbook of medical education* (pp. 244–254). Oxford University Press. https://doi.org/10.1093/med/9780199652679.003.0021
- American Board of Internal Medicine Foundation, American College of Physicians Foundation, & European Federation of Internal Medicine. (2005). Medical professionalism in the new millennium: A physician charter. Retrieved from https://www.abimfoundation.org/what-we-do/physician-charter:contentReference[oaicite:0]{index=0}
- Barnhoorn, P. C., Houtlosser, M., Ottenhoff-de Jonge, M. W., Essers, G. T. J. M., Numans, M. E., & Kramer, A. W. M. (2019). A practical framework for remediating unprofessional behavior and for developing professionalism competencies and a professional identity. *Medical Teacher, 41*(3), 303–308. https://doi.org/10.1080/0142159X.2018.1464133:contentReference[oaicite:1]{index=1}
- Guraya, S. S., Guraya, S. Y., Harkin, D. W., Ryan, Á., Mat Nor, M. Z. B., & Yusoff, M. S. B. (2021). Medical Education e-Professionalism (MEeP) framework; From conception to development. *Medical Education Online, 26*(1), 1983926. https://doi.org/10.1080/10872981.2021.1983926:contentReference[oaicite:2]{index=2}
- Kirk, L. M. (2007). Professionalism in medicine: Definitions and considerations for teaching. *Baylor University Medical Center Proceedings, 20*(1), 13–16. https://doi.org/10.1080/08998280.2007.11928225:contentReference[oaicite:3]{index=3}
- Al-Eraky, M. M. (2015). Faculty development for medical professionalism in an Arabian context. [Doctoral Thesis, Maastricht University]. Maastricht University. https://doi.org/10.26481/dis.20150521ma:contentReference[oaicite:0]{index=0}

- Online Journals and Reading Materials through HEC Digital Library Facility

2. **Ethics**:

- World Health Organization. (2015). Global health ethics: Key issues. World Health Organization. https://apps.who.int/iris/handle/10665/164576
- World Health Organization. (2011). Standards and operational guidance for ethics review of health-related research with human participants. World Health Organization. https://www.who.int/publications/i/item/9789241502948
- World Health Organization. (2023). WHO Code of Ethics. World Health Organization.
- Harvey, J. C. (n.d.). Clinical ethics: The art of medicine. In Military Medical Ethics, Volume 1, Chapter 3.
- National Bioethics Committee. (2017). Guidelines and teachers handbook for introducing bioethics to medical and dental students. Healthcare Ethics Committee (HCEC).
- Varkey, B. (2021). Principles of clinical ethics and their application to practice. Medical Principles and Practice, 30(1), 17-28. https://doi.org/10.1159/000509119
- Pakistan Medical and Dental Council. (2018). Professional ethics and code of conduct.
- Online Journals and Reading Materials through HEC Digital Library Facility

3. **Research**

- Medical Statistics. 2nd Ed. by R. Turkwood.
- Biddle, K., Blundell, A., & Sofat, N. (2023). Understanding clinical research: An introduction. Scion Publishing. https://scionpublishing.com/product/understanding-clinical-research/
- Harris, M., & Taylor, G. (2020). Medical Statistics Made Easy (4th ed.). Scion Publishing. https://scionpublishing.com/product/medical-statistics-made-easy-fourth-edition/
- Allen, A. K. (2012). Research skills for medical students. SAGE Publications, Inc. https://doi.org/10.4135/9781526436016
- Online Journals and Reading Materials through HEC Digital Library Facility

4. **Leadership**

- Wamboldt, R., & Loughran, N. (2017). Communication skills for OSCEs. Scion Publishing. https://scionpublishing.com/product/communication-skills-for-osces/
- Edmonstone, J. (2018). Leadership development in health care in low and middle-income countries: Is there another way? *International Journal of Health Planning and Management,* *33*(4), e1193–e1199. https://doi.org/10.1002/hpm.2606:contentReference[oaicite:0]{index=0}
- National Center for Healthcare Leadership. (2018). Health Leadership Competency Model 3.0. Chicago, IL: National Center for Healthcare Leadership. https://nchl.org:contentReference[oaicite:0]{index=0}

- Chen T. Y. (2018). Medical leadership: An important and required competency for medical students. *Ci ji yi xue za zhi = Tzu-chi medical journal*, *30*(2), 66–70. https://doi.org/10.4103/tcmj.tcmj_26_18


FACILITATOR'S
GUIDE
PROFESSIONALISM
ETHICS
RESEARCH
LEADERSHIP

INTRODUCTION

The UHS PERL Module is designed to equip medical students with essential competencies in Professionalism, Ethics, Research, and Leadership. This guide provides facilitators with an overview of the module, instructional strategies, and resources to effectively engage students in their learning journey.

MODULE OVERVIEW

- **Professionalism**: Focus on developing professional behavior and attitudes.
- **Ethics**: Emphasis on understanding and applying ethical principles in healthcare.
- **Research**: Development of research skills and critical appraisal abilities.
- **Leadership**: Enhancement of leadership qualities and communication skills.

MODULE STRUCTURE

1. **Professionalism**
    - **a.** Focus: Development of professional behavior and attitudes essential for medical practice.
    - **b.** Key Topics:
        - **i.** Professional identity formation
        - **ii.** Accountability and integrity
        - **iii.** Respect for diversity
2. **Ethics**
    - **a.** Focus: Understanding and applying ethical principles in healthcare.
    - **b.** Key Topics:
        - **i.** Virtue ethics and moral character
        - **ii.** Informed consent and patient autonomy
        - **iii.** Bioethics and clinical ethics
3. **Research**
    - a. Focus: Developing research skills and critical appraisal abilities.
    - b. Key Topics:
        - i. Basics of academic writing
        - ii. Literature searches and reviews
        - iii. Evidence-based medicine and research methodologies
4. **Leadership**

a. Focus: Enhancing leadership qualities and communication skills.
b. Key Topics:
    i. Team dynamics and conflict resolution
    ii. Patient counseling and informed consent
    iii. Work-life balance and management skills

MODULE IDEOLOGY

The UHS PERLs module is designed to provide a comprehensive and integrated approach to developing essential competencies in Professionalism, Ethics, Research, and Leadership for medical students throughout their undergraduate training.

Professionalism Module

The Professionalism module begins with the foundational attributes of a professional student or doctor, focusing on intrapersonal skills in the first year. As students progress to the second and third years, the emphasis shifts toward interpersonal skills relevant to various domains, culminating in the formation of a Professional Identity in the fourth year. This progression ensures that students develop not only self-awareness but also the ability to interact effectively and ethically with patients and colleagues.

Ethics Module

The Ethics module initiates discussions on virtue ethics, emphasizing the virtues and moral character expected of medical students and professionals. In the second year, students delve into bioethics, followed by clinical ethics and research ethics in the third and fourth years. This structure helps students navigate the complexities of ethical dilemmas in medical practice, ensuring they are prepared to make informed, compassionate decisions that respect patient autonomy and promote justice.

Research Module

The Research module begins with the basics of academic writing, introducing students to the structure of a manuscript and critical appraisal through Journal Club Meetings and presentations in the first year. In the second year, the focus shifts to literature searches, summarization, and reviews, incorporating the use of artificial intelligence to enhance research capabilities. The third

year introduces evidence-based medicine as a treatment guide in disease management, followed by research design, methodology, clinical audits, and patient safety, culminating in the development of a draft ethical approval proposal. This systematic approach equips students with the skills to conduct meaningful research and contribute to the advancement of medical knowledge.

Leadership Module

The Leadership module starts with personal qualities and communication skills in the first year, emphasizing the importance of effective interaction in healthcare settings. In the second year, the focus expands to teamwork dynamics, patient counseling, informed consent, conflict resolution, and work-life balance. The third year emphasizes management skills, including project management (aligned with research projects), entrepreneurship, and the use of innovation, such as AI in research and team leadership in healthcare setups. Finally, the fourth-year centers on professional identity, self-evaluation, digital transformation in healthcare, public health initiatives, health reforms, and advocacy. Throughout this module, mentoring sessions are integrated to provide role modeling and support, reinforcing the development of a strong professional identity among undergraduate MBBS students.

MODULE DEVELOPMENT AND VALIDATION

The UHS PERL module was developed through a scientific approach, involving the systematic identification of content via extensive literature searches, national and international guidelines, and recommendations from content contributors. This initial framework was presented to a panel of 10 invited experts in a modified e-Delphi round for validation.

During this process, the experts evaluated the module's content and provided constructive feedback, identifying areas for improvement. In the second round, a consensus was reached regarding the relevance of the module content, as well as its depth and scope tailored to the appropriate MBBS year.

Following the module development and validation, two independent reviewers were engaged to assess the sequencing and flow of the topics. Their review focused on ensuring logical coherence and identifying any additional revisions necessary to enhance the module's clarity and effectiveness. Further, the review was requested from an early career doctor who had recently graduated from an affiliated medical college in order to involve their suggestions for improvement.

This rigorous development and validation process ensures that the UHS PERL module meets the highest educational standards and effectively prepares medical students for their professional journey.

LEARNING OBJECTIVES EXPLAINATION

The learning objectives for the UHS PERL module are crafted to enhance students' comprehension and practical application of core competencies in Professionalism, Ethics, Research, and Leadership. Each objective consists of an **Initial Learning Objective** and an **Actionable Learning Objective**, guiding both instructional methods and portfolio assignments.

Example: Work-Life Balance (Leadership)

Learning Objective:

- **Understand the importance of maintaining a healthy work-life balance**, focusing on strategies for managing personal well-being while fulfilling professional commitments to ensure optimal mental and physical health.

Actionable Learning Objective:

- "Students will **create a personal plan** that outlines strategies for achieving work-life balance, including time management, self-care practices, and setting boundaries between personal and professional life."

Instructional Strategies:

- Use **interactive discussions** to explore the concept of work-life balance.
- Facilitate **workshops** where students can share experiences and strategies.
- Implement **guided planning sessions** where students can outline their personal plans with facilitator support.
- Encourage **peer feedback sessions** for students to share and refine their plans collaboratively.

Proposed Portfolio Entry:

- "Submit a reflection on your work-life balance plan. Include specific strategies you intend to implement to manage stress and maintain your well-being while meeting your academic and professional responsibilities."

Portfolio Guidance:

- Ensure students understand the importance of documenting their plans and reflections as a means to monitor their progress and make adjustments as needed.

- Provide a rubric that emphasizes clarity, depth of reflection, and practical application in their submissions.

DIVERSE INSTRUCTIONAL STRATEGIES TO FOSTER STUDENT-CENTERED LEARNING

To enhance student engagement and promote a deeper understanding of the material, the following instructional strategies can (not limited to) be employed:

1. **Active Learning**: Incorporate activities that require students to actively participate, such as problem-solving exercises, team-based in learning, group discussions, and hands-on simulations.
2. **Collaborative Learning**: Utilize small group work to encourage peer interaction and knowledge sharing, fostering a sense of community and collaborative problem-solving.
3. **Flipped Classroom**: Assign readings or videos for students to review before class, allowing class time to focus on discussions and practical applications of the material.
4. **Case-Based Learning**: Present real-world scenarios for students to analyze, encouraging critical thinking and the application of theoretical knowledge to practical situations.
5. **Technology Integration**: Leverage digital tools and online platforms to facilitate interactive learning experiences, such as virtual simulations, discussion forums, and collaborative projects.
6. **Mentoring and Peer Support**: Encourage mentorship opportunities where students can receive guidance from peers or professionals, fostering a supportive learning environment.

PORTFOLIO ENTRY WITH PEEL CONCEPT

As part of the UHS PERL module, students will maintain a portfolio that incorporates the PEEL (Point, Evidence, Explanation, Link) concept for reflective entries:

1. **Point**: State the main idea or argument you want to discuss in your reflection or analysis.
2. **Evidence**: Provide supporting evidence or examples from your experiences, coursework, or relevant literature.
3. **Explanation**: Explain how the evidence supports your point, including its significance and implications for your learning.
4. **Link**: Connect your point to broader themes in the module or your overall personal and professional development.

Portfolio Guidance:

- Portfolio can be in hard bound or e-portfolio. A template for portfolio entry has been attached.
- Encourage students to use the PEEL framework to structure their reflections clearly and coherently. This will aid in their understanding of the material and enhance their ability to articulate their thoughts and learning experiences effectively.

ROLE IN EVALUATION OF THE PERL MODULE

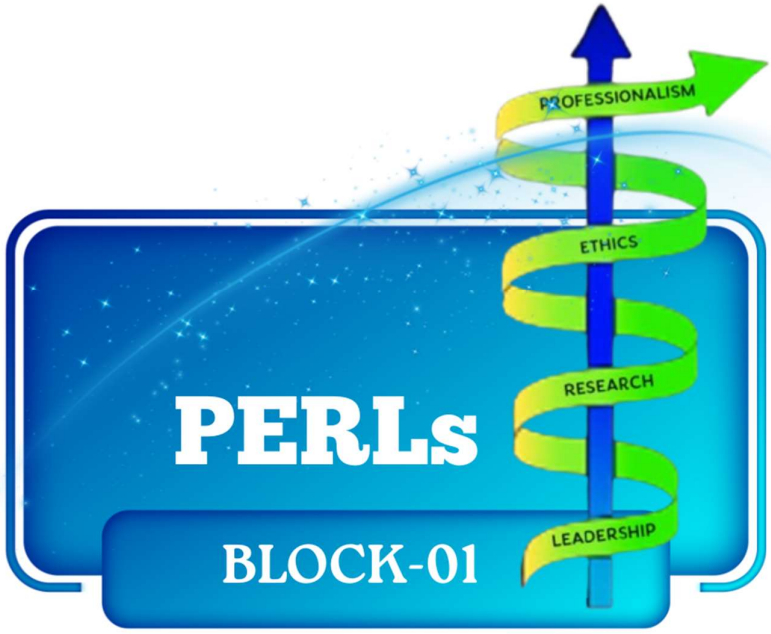
As a facilitator, your role in the evaluation of the UHS PERL module is crucial for ensuring its effectiveness and relevance. Key responsibilities include:

1. Monitoring Student Progress: Regularly assess student engagement and understanding through formative assessments, feedback, and participation in discussions and activities.
2. Collecting Feedback: Gather feedback from students regarding their learning experiences, instructional strategies, and the relevance of module content. This information is vital for continuous improvement.
3. Evaluating Learning Outcomes: Review the alignment of students' performances with the stated learning outcomes. Analyze assessment results to identify trends and areas needing improvement.
4. Reflecting on Teaching Practices: Engage in self-reflection and peer evaluation to assess your own teaching methods. Consider what strategies worked well and where adjustments may be needed to enhance student learning.
5. Implementing Changes: Based on evaluation findings, propose and implement changes to instructional methods, content delivery, or assessment strategies to better meet the needs of future cohorts.

CONCLUSION

As a facilitator of the UHS PERL module, your role is crucial in guiding students through the complexities of Professionalism, Ethics, Research, and Leadership. By utilizing diverse instructional strategies and fostering an engaging learning environment, you will help students develop the competencies necessary for their future roles as healthcare professionals.


FRAMEWORK
PROFESSIONALISM
ETHICS
RESEARCH
LEADERSHIP


PROFESSIONALISM
ETHICS
RESEARCH
LEADERSHIP
PERLs
BLOCK-01

ORIENTATION				
*Proposed Sequence of Topics Mentioned below. Medical Colleges are at liberty to manage according to their resources. Topics can switch within each Block				**Total Hours = 10.5**
***Research (R)** in the PERL curriculum will be delivered by the Department of Community Medicine as a longitudinal component from the first to the fourth year of the MBBS program. At the end of the fourth year, students' research projects will be assessed through a dedicated PERL station.*				
Code	**Domain**	**Topic**	**Specific Learning Objectives**	**Proposed Portfolio Entry**
PERLs-1-001	**Professionalism**	History of Medical Profession	• Discuss the origins of Medicine in Ancient Civilizations • Explain the key Figures in Medical History (Hippocrates, Avicenna, Florence Nightingale) • Discuss modernization of Medicine and Technological Advances • Introduce the development of Medical Education and Licensing	-
PERLs-1-002		Reflective Doctor	• Discuss the concept of reflective practice and its importance in medical professionalism, including self-awareness, critical thinking, and continuous improvement. • Write a reflective entry after a learning experience, identifying key lessons, areas for improvement, and how these insights will influence their future practice.	
PERLs-1-003	**Ethics**	Hippocratic Oath taking	• Explain the history and Significance of the Hippocratic Oath	

			• Discuss the importance of Professional Integrity and Moral Conduct • Explain the need for lifelong Commitment to Patient Care and Well-being • Describe ethical Principles in the Oath: Autonomy, Beneficence, Non-maleficence, and Justice	-
PERLs-1-004	**Research**	Introduction to Research	• Describe research, inquiry, and evidence-based medicine. • Identify the importance of research in the practice of medicine	-

PERLs-1-005	**Leadership**	The Doctor as a learner- Study Skills	• Time Management:
			  • Recognize the importance of planning and prioritizing tasks to make the most of available study time.
			  • Learn to break down complex tasks and schedule study sessions to optimize productivity.
			• Organization:
			  • Understand how to organize study materials, notes, and resources in a structured manner to make learning more efficient.
			  • Develop systems for tracking assignments, deadlines, and upcoming exams to stay on top of coursework.
			• Learning Efficiency:
				Submit a reflection on your study skills, highlighting your personal strategies for time management, organization, and learning efficiency. Include a weekly study schedule that demonstrates how you balance academic responsibilities with self-care and well-being.

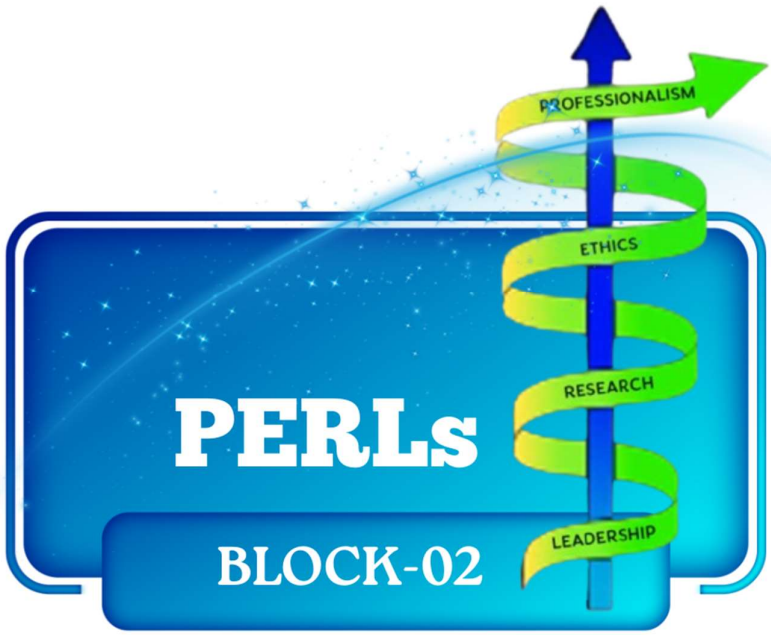
			• Explore techniques for active learning, including summarization, self-testing, and spaced repetition. • Understand how to avoid common distractions and maintain focus during study sessions.	
PERLs-1-006	**Leadership**	Role Modelling/ Mentoring Session I	• Participate in the first mentoring session. • Introduce yourself to your assigned mentor. • Discuss their strengths and weaknesses with their mentor, receive feedback, and collaboratively create an action plan for personal and professional development	Submit a summary of your mentoring session, including feedback, areas identified for improvement, and the action plan you developed with your mentor to enhance your professional growth.
PERLs-1-007	**Computer/ IT**	Academic Writing-IT Skills	• Demonstrate the use of essential IT skills for academic writing, including word processing software (e.g., Microsoft Word), formatting documents, and essential editing tools to enhance the quality of academic papers. • Practice creating and formatting a simple document using a word processing tool, applying basic formatting features like headings, bullet points, and spacing to organize their writing.	

FOUNDATION-I	
*Proposed Sequence of Topics Mentioned below. Medical Colleges are at liberty to manage according to their resources. Topics can switch within each Block	**Total Hours = 7.5**
***Research (R)** in the PERL curriculum will be delivered by the Department of Community Medicine as a longitudinal component from the first to the fourth year of the MBBS program. At the end of the fourth year, students' research projects will be assessed through a dedicated PERL station.*	

Code	Domain	Topic	Specific Learning Objectives	Proposed Portfolio Entry
PERLs-1-008	**Professionalism**	Introduction of medical Professionalism	• Define Medical Professionalism • Discuss Core Values: Altruism, Accountability, Integrity • Explain Ethical Practice and Moral Responsibility Reflect on a scenario or case study that demonstrates professionalism in healthcare, identifying key behaviours and attitudes that align with professional standards	Submit a reflective entry discussing what professionalism means in the context of healthcare. Use a case or example to highlight key professional behaviours you observed or practiced.
PERLs-1-009		Responsible & Accountable Medical Student	• Understand the importance of responsibility and accountability in maintaining regularity and punctuality as core professional behaviors expected of medical students. • Demonstrating regular attendance and punctuality in academic and clinical activities, reflecting on how this consistency contributes to their professional development.	Evidence of Attendance Record.
PERLs-1-010	**Ethics**	Code of Conduct: Duties of healthcare professionals	• Appreciate student responsibility in following the code of conduct of the college • Review the college's code of conduct and	Submit a reflective entry discussing the key points of the college's code of conduct and your responsibilities as a

			identify key responsibilities expected of them as medical students. Reflect on the importance of following these guidelines in maintaining professionalism and being aware of actions for misconduct(academic, non-academic/disciplinary).	medical student. Include how adherence to these rules shapes your journey toward becoming a responsible healthcare professional.
PERLs-1-011	**Leadership**	Personal Qualities: Self Directed Learner	• Develop the ability to become a self-directed learner by setting achievable long-term and short-term goals and effectively managing time to meet academic and personal milestones. • Create a personal plan that includes both long-term and short-term academic goals and a weekly time schedule to help manage their studies and personal responsibilities.	Submit a personal learning plan outlining your long-term and short-term goals, as well as a detailed weekly time schedule. Reflect on how this plan will support your academic success and personal development as a self-directed learner
PERLs-1-012		Verbal Communication	• Develop effective verbal communication skills, focusing on clear and concise communication in academic, clinical, and team-based settings to enhance collaboration and leadership abilities. • Practice delivering clear and concise verbal explanations of medical concepts or tasks during group activities, focusing on tone, clarity, and engagement with peers	Submit a reflection on a group activity where you practiced verbal communication skills. Highlight how you conveyed information clearly and effectively, and reflect on areas where you can improve your verbal communication in academic or clinical settings.

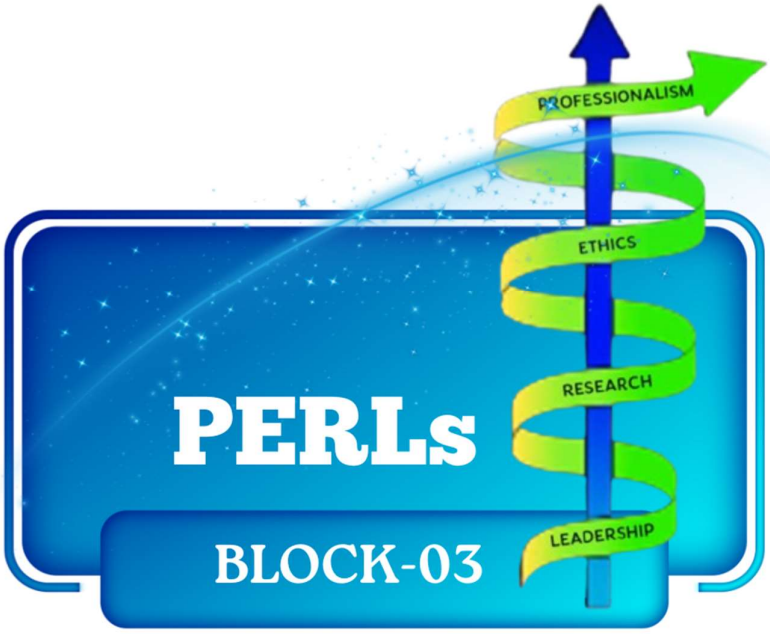
HEMATOPOETIC & LYMPHATIC				
*Proposed Sequence of Topics Mentioned below. Medical Colleges are at liberty to manage according to their resources. Topics can switch within each Block				**Total Hours =03**
***Research (R)** in the PERL curriculum will be delivered by the Department of Community Medicine as a longitudinal component from the first to the fourth year of the MBBS program. At the end of the fourth year, students' research projects will be assessed through a dedicated PERL station.*				
Code	**Domain**	**Topic**	**Specific Learning Objectives**	**Proposed Portfolio Entry**
PERLs-1-013	**Leadership**	Non-Verbal Communication	• Discuss the role of non-verbal communication, including body language, facial expressions, and gestures, in effectively conveying messages and building rapport in healthcare settings • Practice using appropriate non-verbal communication during simulated patient interactions or group discussions, such as eye contact, posture, and active listening cues.	Submit a reflection on a group activity or simulated interaction where you consciously used non-verbal communication to enhance the interaction. Discuss how it impacted your ability to lead or communicate effectively
PERLs-1-014	**Research**	Scientific Writing	• Differentiate between types of scientific publications, including editorials, original articles, systematic reviews, case reports, meta-analyses, and narrative reviews. • Identify different forms of scientific writing in published journals.	


PROFESSIONALISM
ETHICS
RESEARCH
LEADERSHIP
PERLs
BLOCK-02

MUSCULOSKELETAL AND LOCOMOTION-I				
*Proposed Sequence of Topics Mentioned below. Medical Colleges are at liberty to manage according to their resources. Topics can switch within each Block				**Total Hours = 06**
***Research (R)** in the PERL curriculum will be delivered by the Department of Community Medicine as a longitudinal component from the first to the fourth year of the MBBS program. At the end of the fourth year, students' research projects will be assessed through a dedicated PERL station.*				
Code	**Domain**	**Topic**	**Specific Learning Objectives**	**Proposed Portfolio Entry**
PERLs-1-014	**Professionalism**	Respect for the Human Body/Remain	• Understand the ethical and professional significance of respecting the human body, especially in medical education settings such as anatomy labs, and appreciate the contributions of body donors to medical science.	Write a Code of Conduct of professional behaviours in Anatomy Hall, Laboratories /museums with human tissue/remains.
PERLs-1-015	**Ethics**	Virtues of a Medical Professional	• Analyse the key virtues expected from healthcare providers, including compassion, courage, integrity, humility, patience, altruism, professional responsibility, trustworthiness, and honesty, and their role in ethical medical practice. • Reflect on a case or scenario where healthcare professionals demonstrated one or more of these virtues, discussing how these traits influenced patient care and outcomes.	Write a reflective entry on a case or scenario where healthcare professionals demonstrated one or more of these virtues, discussing how these traits influenced patient care and outcomes
PERLs-1-016	**Leadership**	Written and Electronic Communication Skills	• Appreciate effective written and electronic communication skills, focusing on clarity, professionalism, and	Submit a sample professional email or electronic communication (e.g., a message to a

			accuracy in both academic and clinical contexts, including emails and electronic health records. • Students will practice composing a clear and professional email to a faculty member or peer, ensuring correct format, tone, and content.	faculty member) that demonstrates clarity, appropriate tone, and adherence to communication protocols.
PERLs-1-017	**Leadership**	Giving Feedback	• Appreciate the importance of giving constructive feedback • Discuss the principles using techniques like the Sandwich Technique and "2 Stars and a Wish" to promote improvement while maintaining positive communication. • Practice giving feedback to a peer using the Sandwich Technique (positive-constructive-positive) or '2 Stars and a Wish' (two positive aspects and one area for improvement) during a group activity or simulated scenario.	Submit the feedback given to you by your peer during class activity with the identification of areas for improvement and an action plan.
PERLs-1-018	**Research**	Research Manuscript	• Discuss the basic structure of a research manuscript using the IMRAD format (Introduction, Methods, Results, and Discussion) and its importance in scientific communication. • Identify the components of a research manuscript using the IMRAD structure. • Apply knowledge of IMRAD by submitting	

			an original article to the portfolio, labelling its key components.	
PERLs-1-019	**Ethics**	Patient Autonomy in decision making	• Define patient autonomy and understand its foundational role in medical ethics, recognizing that every patient has the right to make informed decisions regarding their own healthcare. • Describe necessary components of informed decision-making, including the provision of accurate information, understanding of risks and benefits, patient comprehension, and the patient's ability to voluntarily make choices free from coercion. • Appreciate the responsibilities of healthcare providers in ensuring that patients receive all necessary information and support to make autonomous decisions, including effective communication and respecting cultural, religious, or personal values.	Submit a reflective case study analyzing how patient autonomy was handled in a clinical situation. Discuss whether the patient was fully informed, how their preferences were respected, and the role of healthcare providers in ensuring the patient's right to make decisions about their own care.


PROFESSIONALISM
ETHICS
RESEARCH
LEADERSHIP
PERLs
BLOCK-03

CARDIOVASCULAR-I				
*Proposed Sequence of Topics Mentioned below. Medical Colleges are at liberty to manage according to their resources. Topics can switch within each Block				**Total Hours = 09**
***Research (R)** in the PERL curriculum will be delivered by the Department of Community Medicine as a longitudinal component from the first to the fourth year of the MBBS program. At the end of the fourth year, students' research projects will be assessed through a dedicated PERL station.*				
Code	**Domain**	**Topic**	**Specific Learning Objectives**	**Proposed Portfolio Entry**
PERLs-1-020	**Professionalism**	Digital Identity	• Understand the concept of digital identity, focusing on the impact of a healthcare professional's digital footprint and the importance of maintaining professional conduct in online spaces • Analyze their current digital footprint, identify areas where they can improve their online presence to reflect professionalism and develop a plan for maintaining appropriate online conduct.	Submit evidence of your digital footprint.
PERLs-1-021	**Ethics**	Justice in Resource Allocation	• Describe the ethical principle of justice in healthcare, focusing on the fair allocation of limited resources and how healthcare professionals can make ethical decisions to ensure equity in patient care. • Analyze a case where healthcare resources e.g. Ventilators are limited in CCU, evaluating how justice and fairness principles were applied in resource allocation and proposing ways to	Submit a case analysis discussing the ethical challenges of resource allocation in healthcare, focusing on how justice was applied or compromised. Propose strategies for making fair and equitable decisions in future resource-constrained scenarios.

			ensure equitable distribution.	
PERLs-1-O22	**Leadership**	Asking for Feedback	• Discuss the importance of seeking constructive feedback as a leadership skill to foster personal growth, enhance team performance, and improve communication within healthcare settings. • Discuss the critical principles of seeking constructive feedback, including openness to criticism, active listening, and using feedback for personal and professional growth. • Practice seeking constructive feedback by asking specific, open-ended questions to peers or mentors about their performance and demonstrating active listening and reflection on the feedback received.	Submit a list of areas where you want feedback from your mentor in the upcoming mentor meeting.
PERLs-1-O23		Role Modelling/ Mentoring Session II	• Participate in a mentoring session where they will discuss their strengths and weaknesses with their mentor, receive feedback, and collaboratively create an action plan for personal and professional development	Submit a summary of your progress from your last mentoring session, including feedback, areas identified for improvement, and the action plan you developed with your mentor to enhance your professional growth.
PERLs-1-O24		Receiving Feedback	• Describe the principles of receiving feedback effectively, including openness, self-	Submit a reflection on how you received feedback during a task or project.

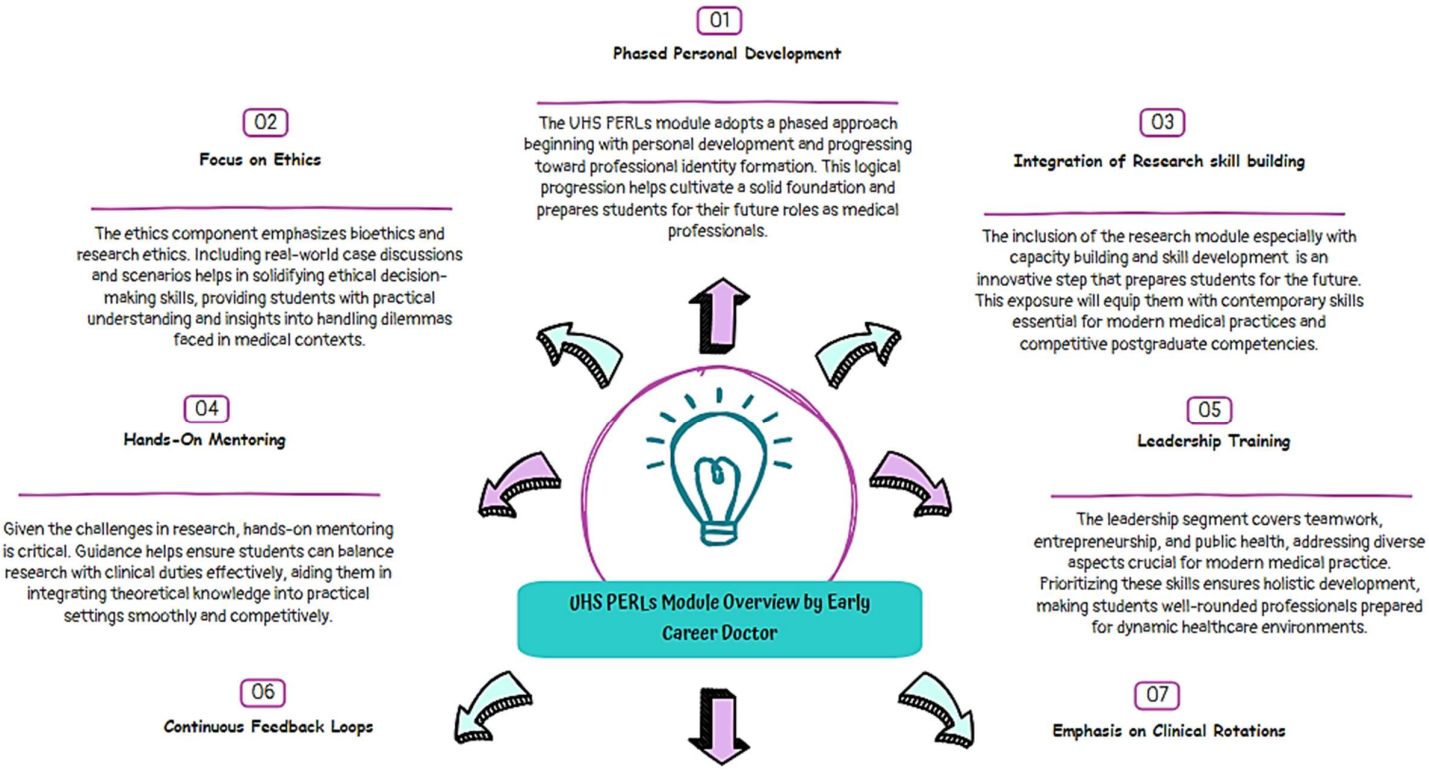
			awareness, and using feedback constructively to improve performance and personal development. • Practice receiving feedback by actively listening, acknowledging the feedback, and reflecting on how it can be applied to improve their performance in academic or clinical tasks.	Discuss how you responded to the feedback and how you plan to incorporate it into your personal or professional development
PERLs-1-025	**Research**	Research Types	• Identify different types of health research (basic, clinical, applied, public health). • Differentiate between quantitative and qualitative research approaches.	

RESPIRATORY-I				
*Proposed Sequence of Topics Mentioned below. Medical Colleges are at liberty to manage according to their resources. Topics can switch within each Block				**Total Hours = 4.5**
***Research (R)** in the PERL curriculum will be delivered by the Department of Community Medicine as a longitudinal component from the first to the fourth year of the MBBS program. At the end of the fourth year, students' research projects will be assessed through a dedicated PERL station.*				
Code	**Domain**	**Topic**	**Specific Learning Objectives**	**Proposed Portfolio Entry**
PERLs-1-026	**Ethics**	Digital Ethics	• The principles of digital ethics, including proper netiquette, maintaining confidentiality in online spaces, and the legal and ethical implications of online harassment and misconduct. • Identify examples of ethical and unethical online behaviour, focusing on netiquette, confidentiality, and how to prevent and address online harassment by relevant laws.	Make a poster for Netiquette in using your Class Social Media Groups.
PERLs-1-027	**Professionalism**	Integrity & Honesty	• Describe the importance of integrity and honesty in academic and clinical environments, focusing on demonstrating ethical behaviour in assignment submissions and during examinations. • Commit to completing and submitting assignments and exams with honesty and integrity, reflecting on the significance of these values in their academic and future professional practice.	Submit an incident report of a case of cheating in an exam and provide recommendations on how it should have been handled.

PERLs-1-O28	**Research**	Scientific article understanding & Research ethics	• Present the main features of a selected scientific article to peers, demonstrating understanding of its structure and findings. • Explain the basic principles of research ethics (e.g., consent, confidentiality, authorship, plagiarism).	


STUDENT'S
GUIDE
PROFESSIONALISM
ETHICS
RESEARCH
LEADERSHIP

What your Seniors say



Dr.Zil-e-Fatima Naeem
Medical Officer
Government City Hospital,
Toba Tek Singh, Punjab

INTRODUCTION

The UHS PERL Module is designed to equip medical students with essential competencies in Professionalism, Ethics, Research, and Leadership. This guide provides facilitators with an overview of the module, instructional strategies, and resources to effectively engage students in their learning journey.

MODULE STRUCTURE

5. **Professionalism**
    - **a.** Focus: Development of professional behavior and attitudes essential for medical practice.
    - **b.** Key Topics:
        - **i.** Professional identity formation
        - **ii.** Accountability and integrity
        - **iii.** Respect for diversity
6. **Ethics**
    - **a.** Focus: Understanding and applying ethical principles in healthcare.
    - **b.** Key Topics:
        - **i.** Virtue ethics and moral character
        - **ii.** Informed consent and patient autonomy
        - **iii.** Bioethics and clinical ethics
7. **Research**
    - a. Focus: Developing research skills and critical appraisal abilities.
    - b. Key Topics:
        - i. Basics of academic writing
        - ii. Literature searches and reviews
        - iii. Evidence-based medicine and research methodologies
8. **Leadership**
    - a. Focus: Enhancing leadership qualities and communication skills.
    - b. Key Topics:
        - i. Team dynamics and conflict resolution
        - ii. Patient counseling and informed consent
        - iii. Work-life balance and management skills

MODULE IDEOLOGY

The UHS PERLs module is designed to provide a comprehensive and integrated approach to developing essential competencies in Professionalism, Ethics, Research, and Leadership for medical students throughout their undergraduate training.

Professionalism Module

The Professionalism module begins with the foundational attributes of a professional student or doctor, focusing on intrapersonal skills in the first year. As students progress to the second and third years, the emphasis shifts toward interpersonal skills relevant to various domains, culminating in the formation of a Professional Identity in the fourth year. This progression ensures that students develop not only self-awareness but also the ability to interact effectively and ethically with patients and colleagues.

Ethics Module

The Ethics module initiates discussions on virtue ethics, emphasizing the virtues and moral character expected of medical students and professionals. In the second year, students delve into bioethics, followed by clinical ethics and research ethics in the third and fourth years. This structure helps students navigate the complexities of ethical dilemmas in medical practice, ensuring they are prepared to make informed, compassionate decisions that respect patient autonomy and promote justice.

Research Module

The Research module begins with the basics of academic writing, introducing students to the structure of a manuscript and critical appraisal through Journal Club Meetings and presentations in the first year. In the second year, the focus shifts to literature searches, summarization, and reviews, incorporating the use of artificial intelligence to enhance research capabilities. The third year introduces evidence-based medicine as a treatment guide in disease management, followed by research design, methodology, clinical audits, and patient safety, culminating in the development of a draft ethical approval proposal. This systematic approach equips students with the skills to conduct meaningful research and contribute to the advancement of medical knowledge.

Leadership Module

The Leadership module starts with personal qualities and communication skills in the first year, emphasizing the importance of effective interaction in healthcare settings. In the second year, the focus expands to teamwork dynamics, patient counseling, informed consent, conflict resolution, and work-life balance. The third year emphasizes management skills, including project management (aligned with research projects), entrepreneurship, and the use of innovation, such as AI in research and team leadership in healthcare setups. Finally, the fourth-year centers on professional identity, self-evaluation, digital transformation in healthcare, public health initiatives, health reforms, and advocacy. Throughout this module, mentoring sessions are integrated to provide role modeling and support, reinforcing the development of a strong professional identity among undergraduate MBBS students.

MODULE DEVELOPMENT AND VALIDATION

The UHS PERL module was developed through a scientific approach, involving the systematic identification of content via extensive literature searches, national and international guidelines, and recommendations from content contributors. This initial framework was presented to a panel of 10 invited experts in a modified e-Delphi round for validation.

During this process, the experts evaluated the module's content and provided constructive feedback, identifying areas for improvement. In the second round, a consensus was reached regarding the relevance of the module content, as well as its depth and scope tailored to the appropriate MBBS year.

Following the module development and validation, two independent reviewers were engaged to assess the sequencing and flow of the topics. Their review focused on ensuring logical coherence and identifying any additional revisions necessary to enhance the module's clarity and effectiveness. Further, the review was requested from an early career doctor who had recently graduated from an affiliated medical college in order to involve their suggestions for improvement.

This rigorous development and validation process ensures that the UHS PERL module meets the highest educational standards and effectively prepares medical students for their professional journey.

ASSESSMENT AND EVALUATION

- **Portfolio:** Throughout the module, you will be required to maintain a portfolio that includes reflections, case analyses, and evidence of your learning experiences. This portfolio will serve as a demonstration of your growth and understanding of the module content.
- **Participation**: Engage actively in discussions, group work, and role-playing exercises to enhance your learning and application of the concepts.
- **OSCE Exam:** At the end of the module, you will participate in an Objective Structured Clinical Examination (OSCE) as a summative assessment. This exam will evaluate your practical skills, including communication, clinical reasoning, and the application of professionalism and ethical principles in simulated patient scenarios along with leadership and research skills.

EVALUATION: YOUR FEEDBACK

As part of the UHS PERL module, we value your feedback to continually improve the learning experience. Your insights will help us understand the effectiveness of the module and identify areas for enhancement.

FEEDBACK AREAS:

1. **Module Content**:
    a. Was the content relevant and appropriate for your learning needs?
    b. Were the topics covered comprehensively?
2. **Teaching Methods**:
    a. Did the teaching methods (lectures, discussions, practical exercises) support your learning?
    b. How effective were the mentoring sessions in reinforcing your understanding?
3. **Assessments**:
    a. Did the assessments (portfolio, OSCE exam) accurately reflect your knowledge and skills?
    b. Were the expectations for the assessments clear and achievable?
4. **Resources**:
    a. Were the provided resources (reading materials, online tools) helpful for your learning?
    b. Is there any additional resource you would suggest?

5. **Overall Experience**:
    a. What aspects of the module did you find most beneficial?
    b. What suggestions do you have for improving the module in the future?

FEEDBACK SUBMISSION:

Please provide your feedback using the following format to the Department of Medical Education in your College:

- **Strengths**: What worked well?
- **Areas for Improvement**: What could be improved?
- **Additional Comments**: Any other thoughts or suggestions?

Your feedback is essential for refining the UHS PERL module and ensuring it meets the needs of future students. Thank you for your participation.

PEEL PORTFOLIO TEMPLATE

At the end of this guide, you will find the PEEL (Point, Evidence, Explanation, Link) portfolio template, which will help you structure your reflections and analyses effectively.

1. **Point**: State the main idea or point you want to discuss.
2. **Evidence**: Provide evidence or examples to support your point.
3. **Explanation**: Explain how the evidence relates to your point and its significance.
4. **Link**: Connect your point to broader themes in the module or your personal development.

CONCLUSION

The UHS PERL Module aims to equip you with the essential competencies needed to thrive as a future healthcare professional. Your engagement, critical thinking, and commitment to learning will be key to your success in this module. Embrace the challenges and opportunities for growth and make the most of the available resources and support.

Developed by

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Lt. Col. (R) Dr. Khalid Rahim Khan TI (M)
Ex-Director Medical Education
University of Health Sciences, Lahore


07
Section


UNIVERSITY OF HEALTH SCIENCES LAHORE
UHS
Modular Integrated Curriculum 2K23
MBBS Year-01
EXPOSITORY
Volume: 01
Modular Integrated
Curriculum 2K23


YEAR-01
Modular Integrated
Curriculum 2K23
EXPOSITORY

Module Rationale

To integrate Expository Writing with an Introduction to Information Technology (IT) course for undergraduate medical students, we can align the IT skills taught each year with the writing tasks and objectives. The aim is to enhance students' digital literacy and writing skills, which is crucial for modern medical practice.

This integrated spiral of Expository Writing and IT ensures that as students advance in their medical education, they also develop digital literacy skills. These skills complement their writing abilities and prepare them for modern medical practice, where digital communication, research, and data management are essential. By the end of the 4-year program, students will be proficient in writing and using technology to support their work as healthcare professionals.

Year 1: Expository Writing I – Foundations in Academic Writing + Introduction to IT: Basic Digital Literacy			
THEORY			
Code	**Subject: Expository writing & IT**		**Total Hours =10**
	Specific Learning Outcome	**Integrating Disciplines**	**Topics**
EXP-01	**Expository Writing Focus:** 1. To write expository essays using planning, prewriting, organizing, drafting, revising, editing, and proofreading strategies. 2. To edit own written work using the checklist, for fixing errors. 3. To sketch a template of a formal outline for the sequencing of the essay 4. To write patient history and simple case reports. **IT Integration:** 5. Word, Google Docs), internet search strategies, and using online libraries (e.g., PubMed, Google Scholar). **Writing Application:** 6. To use word processing tools to draft and format essays, case reports, and patient histories. 7. Introduction to citation management tools (e.g., Zotero, Mendeley) for	PERLS, Anatomy, Physiology & Biochemistry	• Step by step process of expository writing which includes planning, prewriting, organizing, drafting, revising, editing and proofreading. • Brain storming process for generating ideas for selection of topics. • idea mapping for the organization of an essay. • Self-editing of the essays. • Template for sequencing of the essay. • Writing patient history and basic case reports • Basic computer and internet skills (Microsoft Word, Google Scholar) • Use of digital writing assistance

	referencing sources in essays.		(Grammarly) - Introduction to citation tools (e.g., Zotero, Mendeley)

Developed by

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08
Section

Department of Medical Education

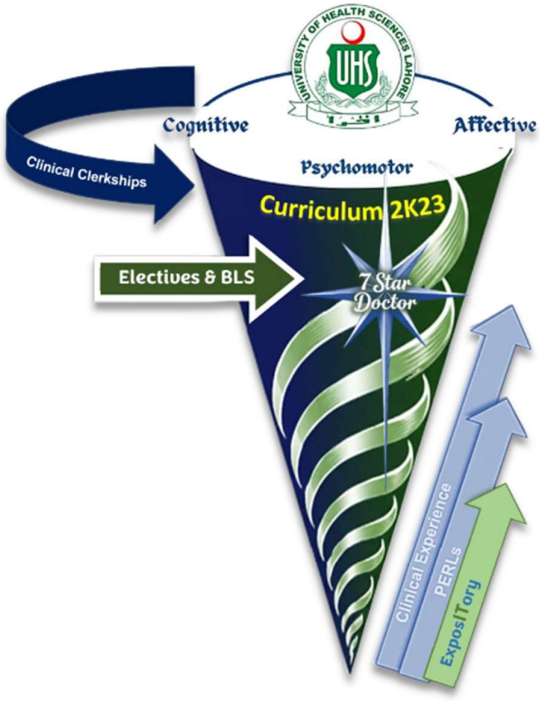
Innovating & Strategizing Healthcare Academia

Volume-01

STUDENT PORTFOLIO

YEAR-01

Curriculum 2K23 (MBBS Year-1)



MODULE: ORIENTATION

DATE FROM: _____

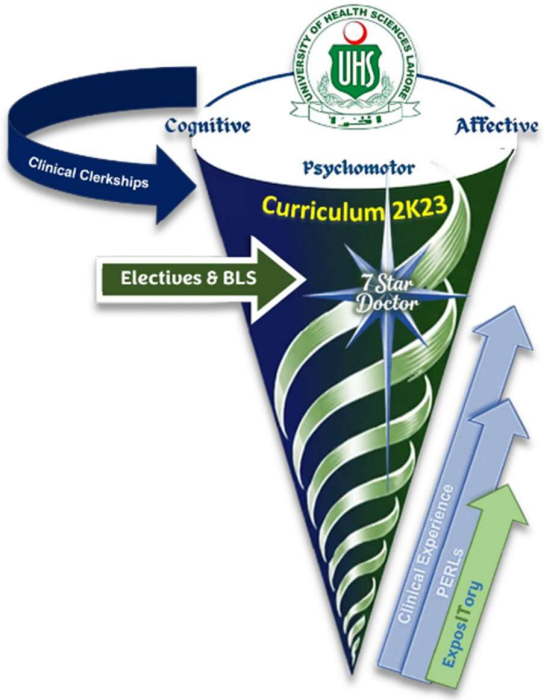
DATE TO: _____

CHECKED BY: _____

Roll No:	
Assignment Topic:	
Date:	
Submit a reflection on your study skills, highlighting your personal strategies for time management, organization, and learning efficiency. Include a weekly study schedule that demonstrates how you balance academic responsibilities with self-care and well-being.	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	
Date:	
Submit a summary of your mentoring session, including feedback, areas identified for improvement, and the action plan you developed with your mentor to enhance your professional growth.	
Facilitator Remarks:	

Curriculum 2K23 (MBBS Year-1)



MODULE: FOUNDATION-I

DATE FROM: _____

DATE TO: _____

CHECKED BY: _____

Roll No:	
Assignment Topic:	
Date:	
Submit a reflective entry discussing what professionalism means in the context of healthcare. Use a case or example to highlight key professional behaviours you observed or practiced.	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	
Date:	
Submit a reflective entry discussing what professionalism means in the context of healthcare. Use a case or example to highlight key professional behaviours you observed or practiced.	
Facilitator Remarks:	

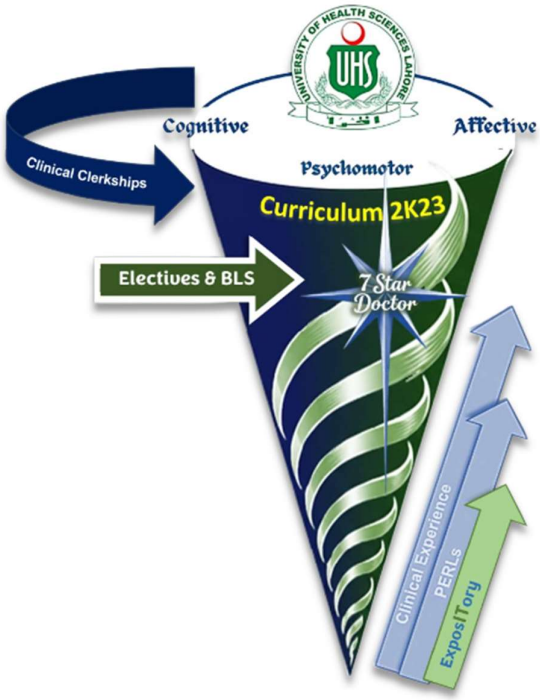
Roll No:	
Assignment Topic:	
Date:	
Submit a reflective entry discussing the key points of the college's code of conduct and your responsibilities as a medical student. Include how adherence to these rules shapes your journey toward becoming a responsible healthcare professional.	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	
Date:	
Submit a personal learning plan outlining your long-term and short-term goals, as well as a detailed weekly time schedule. Reflect on how this plan will support your academic success and personal development as a self-directed learner	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	
Date:	
Submit a reflection on a group activity where you practiced verbal communication skills. Highlight how you conveyed information clearly and effectively, and reflect on areas where you can improve your verbal communication in academic or clinical settings.	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	
Date:	
Evidence of Attendance Record.	
Facilitator Remarks:	

Curriculum 2K23 (MBBS Year-1)



MODULE: HEAMTOPOIETIC & LYMPHOID-I

DATE FROM: _____

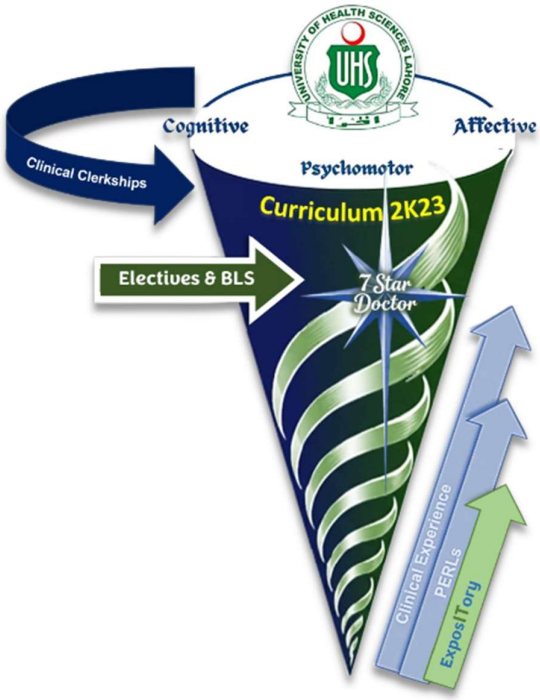
DATE TO: _____

CHECKED BY: _____

Roll No:	
Assignment Topic:	
Date:	
Submit the identified components on the manuscript	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	
Date:	
Submit a reflection on a group activity or simulated interaction where you consciously used non-verbal communication to enhance the interaction. Discuss how it impacted your ability to lead or communicate effectively	
Facilitator Remarks:	

Curriculum 2K23 (MBBS Year-1)



MODULE: MUSCULOSKELETAL & LOCOMOTION-I

DATE FROM: _____

DATE TO: _____

CHECKED BY: _____

Roll No:	
Assignment Topic:	
Date:	
Write a Code of Conduct of professional behaviours in Anatomy Hall, Laboratories /Museums with human tissue/remains	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	
Date:	
Write a reflective entry on a case or scenario where healthcare professionals demonstrated one or more of these virtues, discussing how these traits influenced patient care and outcomes	
Facilitator Remarks:	

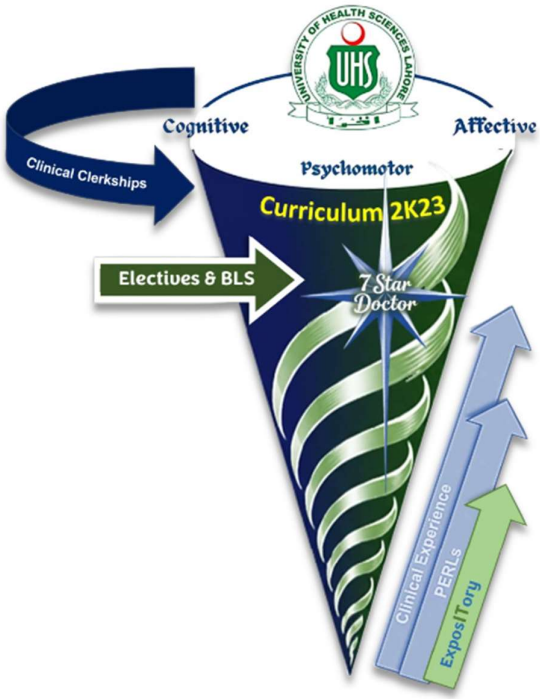
Roll No:	
Assignment Topic:	
Date:	
Submit a sample professional email or electronic communication (e.g., a message to a faculty member) that demonstrates clarity, appropriate tone, and adherence to communication protocols.	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	
Date:	
Submit the feedback given to you by your peer during class activity with the identification of areas for improvement and an action plan.	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	
Date:	
Submit an Article Critique report highlighting areas for improvement	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	
Date:	
Submit a reflective case study analyzing how patient autonomy was handled in a clinical situation. Discuss whether the patient was fully informed, how their preferences were respected, and the role of healthcare providers in ensuring the patient's right to make decisions about their own care.	
Facilitator Remarks:	

Curriculum 2K23 (MBBS Year-1)



MODULE: CARDIOVASCULAR-I

DATE FROM: _____

DATE TO: _____

CHECKED BY: _____

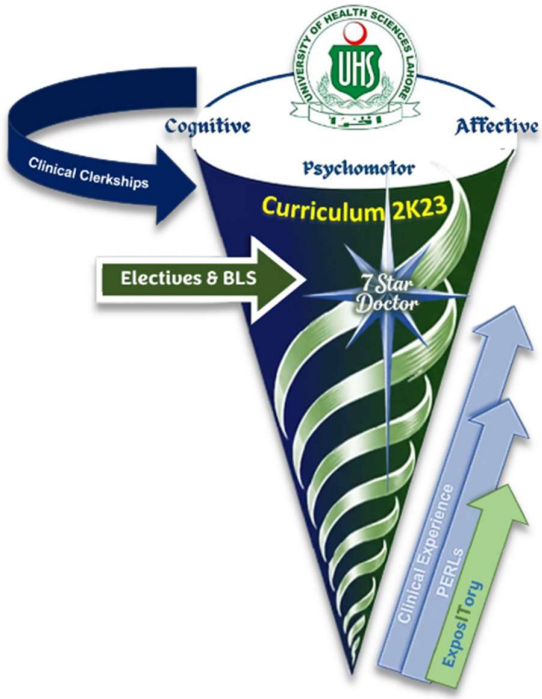
Roll No:	
Assignment Topic:	
Date:	
Submit evidence of your digital footprint.	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	
Date:	
Submit a case analysis discussing the ethical challenges of resource allocation in healthcare, focusing on how justice was applied or compromised. Propose strategies for making fair and equitable decisions in future resource-constrained scenarios.	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	
Date:	
Submit a list of areas where you want feedback from your mentor in the upcoming mentor meeting.	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	
Date:	
Submit Article Critique report	
Facilitator Remarks:	

Curriculum 2K23 (MBBS Year-1)



MODULE: RESPIRATORY-I

DATE FROM: _____

DATE TO: _____

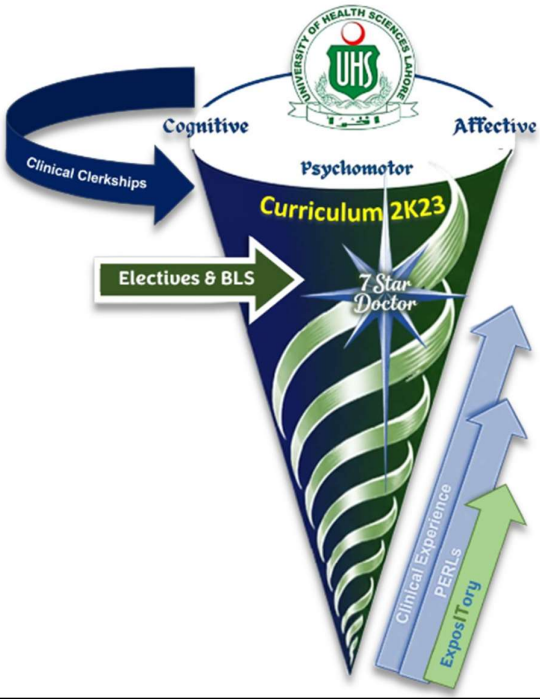
CHECKED BY: _____

Roll No:	
Assignment Topic:	
Date:	
Make a poster for Netiquette in using your Class Social Media Groups.	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	
Date:	
Submit an incident report of a case of cheating in an exam and provide recommendations on how it should have been handled.	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	
Date:	
Submit Article Critique report	
Facilitator Remarks:	

Curriculum 2K23 (MBBS Year-1)



MODULE: Portfolio Expository Writing I & Basic IT Skills

DATE FROM: _____

DATE TO: _____

CHECKED BY: _____

Roll No:	
Assignment Topic:	Patient History Template
Date:	
Complete a patient history template and submit a formatted document showing the correct use of medical terminology and clear structure.	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	Annotated Bibliography
Date:	
Create an annotated bibliography on a given medical topic using citation tools like Zotero or Mendeley.	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	IT Skills Journal
Date:	
Document learning progress in basic IT skills (e.g., using Word, performing internet research) with screenshots showing task completion.	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	Expository essay
Date:	
Edit your essay using a checklist for self-editing.	
Facilitator Remarks:	

Roll No:	
Assignment Topic:	Reflective Essay
Date:	
Write an essay reflecting on your experience regarding learning through expository writing& IT module, using word processing tools.	
Facilitator Remarks:	

SKILL ACQUISITION WORKSHOPS

Workshop Schedule for MBBS students

The Following **Skill Acquisition Workshops** are included in the "Modular Integrated Curriculum 2K23 *Final version*":

Sr. No.	Course Name	Academic Year	Duration	Eligibility
1.	Basic Life Support	1st Year / 2nd Year	2 days	Eligibility requirement for appearing in the 4th Professional Examination
2.	Advanced Life Support	3rd Year / 4th Year	1 day	Eligibility requirement for appearing in the Surgical Clerkship examination
3.	Cardiac First Response	3rd Year / 4th Year	1 day	Eligibility requirement for appearing in the Medicine Clerkship examination
4.	Trauma first responders	3rd Year / 4th Year	1 day	Eligibility requirement for appearing in the Surgical Clerkship examination
5.	Emergency Neonatal Resuscitation	3rd Year / 4th Year	1 day	Eligibility requirement for appearing in the Pediatrics Clerkship examination
6.	Emergency Obstetrics Resuscitation	3rd Year / 4th Year	1 day	Eligibility requirement for appearing in the Gynecology / Obstetrics Clerkship Examination

University of Health Sciences Lahore

Department of Medical Education

Innovating & Strategizing Healthcare Academia