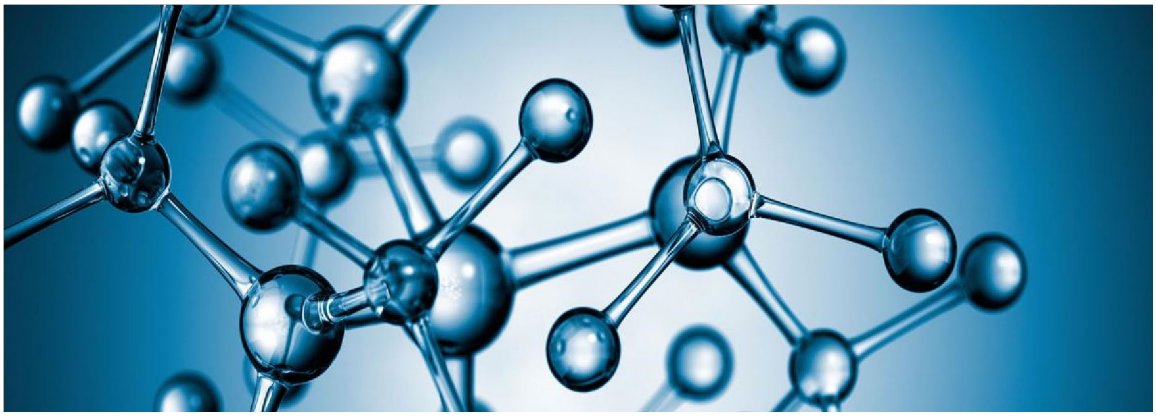
"Faisalabad Medical University Integrated Modular Curriculum Block A 1st year MBBS"

Contents

Foundation I Module:



Module Committee:

Chairperson curriculum committee	Dr. Humaira Gulnaz	Professor and Head of Anatomy department
Curriculum coordinator	Dr. Ayesha Ayub	Senior Demonstrator medical education
Module coordinator	Dr.Tehmina Aslam	Senior Demonstrator Biochemistry department
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Pharmacology	Dr. Nabila	APWMO pharmacology department
Forensic medicine	Dr. Zuneera Misbah	Senior demonstrator forensic medicine department
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1st year MBBS	Mr. Mushayyad Hussain Mr. Zaid	Students

Foundation I Module:

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

Rationale

Before students go on to complex issues related to organ systems, it becomes necessary for them to have clear knowledge about concepts underlying them. This module provides that opportunity to the new entrants. It is designed so that it proceeds from simple to more complex basic issues. Concepts dealt with in this module will be revisited in many other modules in the future. The module has been designed such that the normal Physiological changes are taught with reference to common disease processes.

General Learning Outcomes

By the end of this module the students would be able to;

Knowledge

1. Familiarize with the integrated modular curriculum
2. Recognize the role of different disciplines in studying human body and its diseases.
3. Describe the structure, function and Biochemistry composition of cell.
4. Describe the cell division, its types and genetic material along with its clinical correlation.
5. Describe the basic organization of human body.
6. Explain the maintenance of homeostatic mechanism.
7. Describe the various stages of pre embryonic human development and correlate them with various malformations.
8. Describe the importance of buffer and PH system.

Skills

1. Describe the basic laboratory techniques and use of microscope.
2. Follow the basic laboratory protocols.
3. Perform Biochemistry analysis of carbohydrates.

Attitude

1. Follow the basic laboratory protocols.
2. Participate in class and practical work efficiently.
3. Maintain discipline of the college.
4. Follow the norms of the college properly.
5. Communicate effectively in a team with colleagues and teachers.
6. Demonstrate professionalism and ethical values in dealing with patients, cadavers, colleagues and teachers.
7. Communicate effectively in a team with colleagues and teachers.
8. Demonstrate the ability to reflect on the performance.

Themes for foundation Module

Sr. NO.	Theme	Duration
1	**Orientation**	1 week
2	**Cell and Genetics**	1 week
3	**Growth & Development of Human Body**	2 weeks
4	**Human Body tissues, bones & joints**	2 weeks

Orientation Week

Medical Education	Study Skills	Define study skills or study strategies (how to study?) • Describe the: Methods based on memorization such as rehearsal and rote learning Methods to retain the content in long term memory Methods based on communication skills e.g. reading and listening	Interactive Lecture	1 Hr.	--------
Medical Education	Introduction to Professionalism and Ethics	Briefly describe main attributes of professionalism	Interactive Lecture	1 Hr.	---------
IT	IT skills	Define IT and its importance Prepare the assignment on MS word Prepare the presentation on power point Use the excel sheet	IT Skill lab	2 Hr.	Presentation

Library	Literature Search	• Discuss about literature search skills	Visit to Library		_____
Anatomy	Principals of Anatomy	Define various developmental periods Develop the concept map of structures met in dissection	Lecture	1 Hr.	MCQs
Pathology	Introduction to Pathology Department and its Branches	Define Pathology And its branches. Identify different sampling and processing techniques in different branches of Pathology. Enlist different tests performed in each field of pathology	Visit to Pathology Department		
Pharmacology	Introduction to Pharmacology and its role in Medicine	Define Pharmacology and role of Pharmacology in medicine. Define the Pharmacology dynamics and Pharmaco kinetics	Visit to Pharmacology Department		
Community Medicine	Introduction to community Medicine and its implication	• Describe Role of community medicine/public health in health care system.	Visit to Community Med Department		
Forensic Medicine	Introduction to Forensic Medicine and Toxicology	Define Forensic Medicine and its various branches	Visit to Forensic Department		

Cell and Genetics

Biochemistry.	Cell Membrane 1	Structure and function of cell membrane Describe the Biochemistry composition of the membrane	Interactive lectures	1 hrs.	MCQ
Biochemistry.	Cell Membrane 2	Name the major lipids and their functions. Explain the fluid mosaic model of cell with diagram.	Interactive lectures	1 hrs.	MCQ
Biochemistry.	Water, pH and buffers	Describe pH and pH scale: Concept of pH and related topics (determination of pH), and concept of pi (isoelectric pH)	Interactive Lectures	1 hrs.	MCQ

		Define pKa value, dissociation constant (Ka), and titration curve of weak acids			
Biochemistry	Ionization of water; weak acids and bases	• Describe determination of pH of buffer: Henderson-Hasselbalch equation and its applications (derivation not required).	Small Group Discussion	1 hrs.	MCQ
Biochemistry	Body buffer systems	• Evaluate Body buffer systems (bicarbonate, ammonia, phosphate, and proteins) and their mechanism of action.	Interactive Lectures	1 hrs.	MCQ
Physiology	Homeostasis	Define homeostasis Describe homeostatic mechanism & body system contribution to homeostasis	Interactive Lectures	1 hrs.	MCQ
	control systems of the body	Describe the characteristics of control systems Describe negative feedback, positive feedback and feed forward mechanism.	Interactive Lectures	1 hrs.	MCQ
Physiology	Cell junction	Define cell junctions. Classify cell junctions. Explain the structure of each type of cell junctions. Discuss the importance of each type of junction in relation to its location.	Interactive Lectures	1 hrs.	MCQ
Histology	Cell surface Modifications	Classify the cell surface modification Explain the structure of each	Interactive Lectures	1 hrs.	MCQ
Biochemistry	Nucleotides and nucleic acids Purines 1	Describe chemistry of purines and pyrimidines; their types and structure Describe tautomerism and predominant tautomric forms in nucleic acids. Descrbe different linkages in nucleotides and their roles. Describe predominant conformers with respect to stearic hinderance.	Interactive Lectures	1 hrs.	MCQ
Biochemistry	Nucleotides nucleic acids Purines 2	•Discuss Structure and functions of nucleotides and nucleosides (EXCLUDING metabolism of nucleotides).	Interactive Lectures	1 hrs.	MCQ
Biochemistry	Natural and synthetic	•Describe Natural and synthetic derivatives of purines and	Interactive Lectures	1 hrs.	MCQ

	derivatives of purines and pyrimidines 1	pyrimidines and their biomedical role.			
Biochemistry	Natural and synthetic derivatives of purines and pyrimidines 2	•Describe Structure, functions and types of nucleic acids (EXCLUDING metabolism).	Interactive Lectures	1 hrs.	MCQ
Histology	Cell cycle	Define cell cycle. Enlist various stages of cell cycle and factors affecting them Define various types of growth and give their mechanisms	Interactive Lectures	1 hrs.	MCQ
Biochemistry	Lipids and fatty acids.	•Classify lipids and enumerate their general biological functions	Interactive Lectures	1 hrs.	MCQ
Pathology	Cell injury and cell death	Define the following terms: • Etiology • Pathogenesis • Morphology Describe the cellular response of a normal cell to stress and noxious stimuli Describe the various causes of cell injury: • Oxygen deprivation • Physical agents • Chemical agents • Drugs • Infectious agents • Immunological reactions • Genetic abnormalities • Nutritional imbalances • The progression of cell injury and death Define briefly different type of cellular adaptations Define necrosis and apoptosis. Differentiate between apoptosis and necrosis	Interactive Lectures	1 hrs.	MCQ
Pharmacology	Henderson-Hasselbalch equation	Describe the significance of HH equation Significance of ion trapping	Interactive Lectures	1 hrs.	MCQ
Pharmacology	Transmembrane drug transport	explain how drugs are transported across cell membrane and factors	Interactive Lectures	1 hrs.	MCQ

		affecting it			
Growth And Development					
Embryology	Mitosis	Discuss the events of mitosis	Interactive Lectures	1 hrs.	MCQ
Embryology	Meiosis	Describe meiosis Enlist the differences between mitosis and meiosis. Describe the structural abnormalities in chromosomes like Aneuploid Trisomy Nondisjunction Translocation Co relate the structural abnormalities with clinical conditions like Downs Syndrome, Klinefelter's Syndrome, Turner syndrome	Interactive Lectures	1 hrs.	MCQ
Embryology	Spermatogenesis	•Describe the events of spermatogenesis Describe the events of spermiogenesis Describe the Morphological Changes during Maturation of the Gametes Enlist the differences between spermiogenesis and spermatogenesis Describe the relationship of sub-fertility with production of abnormal sperms • Define terms Azoospermia, ➢ oligospermia	Interactive Lectures	1 hrs.	MCQ
Embryology	Oogenesis	➢ Describe the Maturation of Oocytes Before Birth Describe the Maturation of Oocytes at Puberty Describe the relation of ovarian cycle with maturation of follicles.	Interactive Lectures	1 hrs.	MCQ
Biochemistry	Carbohydrates 1	Describe carbohydrates and give their Biochemistryical importance. Classify Carbohydrates	Interactive Lectures	1 hrs.	MCQ

		Explain carbohydrate and its Bio-chemical structure. Describe the different isomers of monosaccharides. e.g. Galactose, mannose, fructose, dextrose. Describe the role of dextrose in I/V infusion. Describe the role of mannitol in cerebral edema.			
Biochemistry	Carbohydrates 2	• Describe the structure of disaccharides and oligosaccharides.	Interactive Lectures	1 hrs.	MCQ
Biochemistry	Carbohydrates 3	Relate the structure of polysaccharides with its clinical importance. List the functions of carbohydrates in cell membrane, energy provision and nutrition supply to different parts of body.	Interactive Lectures	1 hrs.	MCQ
Biochemistry	Detection of Monosaccharides	Define Monosaccharide's Discuss structure and types Perform the sequence of tests to identify the monosaccharides in a given solution.	Skill lab	2 hrs.	OSPE
Biochemistry	Detecting of Reducing and nonreducing Sugars	Define reducing sugars, types. Discuss structure and types of reducing sugars Perform Benedicts test	Skill lab	2 hrs.	OSPE
Biochemistry	Detection of Monosaccharides	Define Monosaccharide's Discuss structure and types Perform the sequence of tests to identify the monosaccharides in a given solution.	Skill lab	2 hrs.	OSPE
Biochemistry	Detection of Polysaccharides in a given Solution	Define Polysaccharides. Discuss structures and types of Polysaccharides Perform the sequence of tests to identify the polysaccharides in a given solution.	Skill lab	2 hrs.	OSPE
Embryology	First week of development	Describe the stages of follicular maturation Primary Preantral	Interactive Lectures	1 hrs.	MCQ

		Secondary ➢ Preovulatory. Describe the structure and formation of corpus luteum and corpus albicans Describe the mechanism of ovulation and transport through fallopian tubes Describe the middle pain (mittelshimerz) associated with ovulation			
Embryology	Fertilization	Explain the processes of Passage of spermatozoa through the corona radiata barrier; penetration of spermatozoa through the zonapellucida; penetration of the spermatozoa through the oocyte membrane Explain the acrosome reaction and capacitation reaction	Interactive Lectures	1 hrs.	MCQ
		Explain the restoration of the diploid number of chromosomes, determination of the sex and initiation of cleavage as a result of fertilization. Explain the terms like IVF and assisted IVF.	Interactive Lectures	1 hrs.	MCQ
Embryology	First week of development 2	Describe the sequential phases of human development during first week. Describe the changes in uterus at time of implantation. Explain the process of cleavage Explain the formation of morula and blastula Describe the formation of inner and outer cell mas within the blastocyst cavity Describe the mechanism of abnormal implantation • Define ectopic pregnancy Explain pluripotent and multipotent cells, abnormal zygotes, PCR for genetic defects.	Interactive Lectures	1 hrs.	MCQ
Embryology	Second week development	Describe the sequential phases of human development during second week	Interactive Lectures	1 hrs.	MCQ

		Explain why the second week is known as week of two's Explain the formation of syncytio and cytotrophoblast. Explain the characteristics of growth of sycytiotrophoblast			
Embryology	Development Uteroplacental Circulation Chorion	Explain the establishment of uteroplacental circulation Describe the mechanism of transformation of connecting stalk into umbilical cord Explain the gastrulation, formation of ectoderm and endoderm and amniotic cavity • Explain the formation of chorion, secondary yolk sac and chorionic plate. Explain the clinical relevance of production of βhcg by the syncytiotrophoblast and pregnancy test.	Interactive Lectures	1 hrs.	MCQ

Embryology	Third week of development	Describe the sequential phases of human development during 3rd to 8th weeks • Describe the formation of neural tube and gastrulation. Enumerate the derivatives of ectoderm, mesoderm and endoderm.	Interactive Lectures	1 hrs.	MCQ
`	Third week of development	Describe the formation of notochord from prechordal plate Describe the formation of paraxial, lateralplate and intermediate mesoderm Describe the involvement of germ disc layers in teratogenesis associated with gastrulation like Situsinversus and caudal dysgenesis.	Interactive Lectures	1 hrs.	MCQ
Embryology	4th To 8th Week of Development-I	Describe the mechanism of folding of embryo Describe the formation of primary and secondary villus Describe the formation of somite Describe them mechanism of Estimation of the age of embryo at this stage of development.	Interactive Lectures	1 hrs.	MCQ
Embryology	4th to 8th week of development	Describe the process of neurulation. Corelate the process of neurulation with closure of caudal and cranial neuropore Describe the process of separation of neural crest cells from neural tube Enumerate the derivatives of neural crest cells Describe the malformations associated with non-closure of cranial and caudal neuropore.	Interactive Lectures	1 hrs.	MCQ
Embryology	Fetal period	• Explain terms like crown rump length & CHL s • Describe the external appearance of fetus during third to ninth month	Interactive Lectures	1 hrs.	MCQ

		Determine the time of birth from LNMP Explain the Estimation of the age of embryo from BPD Explain the clinical relevance of (IUGR)variation in fetal length and weight, with chromosomal abnormalities, teratogens; congenital infections.			
Embryology	Twin pregnancy	Define monozygotic and dizygotic twins Explain the arrangement of fetal membranes in mono and dizygotic twins. Explain terms like vanishing twins and twin transfusion syndrome. Explain the role of partial splitting of primitive node and streak in development of congenital anomalies like Craniopagus Pyopagus Thoracopagus Describe the development of oligo and polyhydramnios with special reference to formation and swallowing of amniotic fluid by the fetus.	Interactive Lectures	1 hrs.	MCQ
Embryology	Placental development-1	Describe the changes in the Interactive trophoblast with emphasis on Lectures formation of intervillous spaces • Explain the formation of decidua basalis and chorionic frondosum Differentiate between decidua parietalis and decidua capsularis • Describe the characteristics of fetal and maternal portion of placenta.	Interactive Lectures	1 hrs.	MCQ
Embryology	Placental development-2	• Describe the features of full term placenta. • Describe the significance of placental barrier • Describe hemolytic disease of new born in relation to placental barri.	Interactive Lectures	1 hrs.	MCQ

		• Describe the malformations of placental development.			
Community Med	Determinants of health	• Define health • Describe the Determinants of Health	Interactive Lectures	1 hrs.	MCQ.
Community Med	Disease causation	Describe Spectrum of Disease Explain Natural History of Disease Explain Theories of Disease Causation. Differentiate between Disease Elimination and Eradication.	Interactive Lectures	1 hrs.	MCQ.
Community Med	Chain of infection	• Describe reservoirs of infection & chain of infection	Interactive Lectures	1 hrs.	MCQ.
Community Med	Levels of prevention	• Discuss /describe Levels of Prevention	Interactive Lectures	1 hrs.	MCQ.
Human Body tissues, bones & joints (weeks-2)					
Histology	Simple Epithelium	Classify the body tissues into 4 main categories. Classify epithelium Explain the histological structure of simple epithelium. • Enumerate examples of each type of simple epithelium. Relate location of each type with its function	Interactive lecture	1 hrs.	MCQ.
Histology	Stratified Epithelium	Classify stratified epithelium Explain the histological structure of stratified epithelium. Enumerate examples of each type of stratified epithelium. • Relate location of each type with its function	Interactive lecture	1 hrs.	MCQ.
General Anatomy	General anatomy of bones-1	▪ Describe the general features of bone. ▪ Describe the blood supply of long ▪ bones.	Interactive lecture	1 hrs.	MCQ.
General Anatomy	General anatomy of bones-1	• Classify bones according to o Development o Gross appearance o Shape and size Ossification	Interactive lecture	1 hrs.	MCQ.
Histology	Simple Epithelium	• Identify types of epithelial tissue under microscope	Skill lab	2 hrs.	OSPE

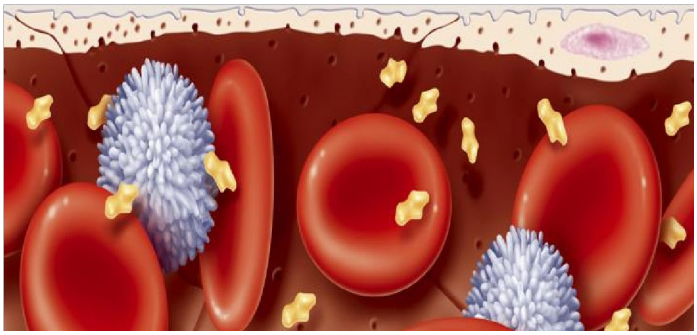
		○ simple squamous ○ Simple cuboidal ○ Simple columnar • Enlist two points of identification for each type			
Histology	Stratified Epithelium	• Identify types of epithelial tissue under microscope ○ stratified squamous ○ Stratified cuboidal ○ Stratified columnar • Enlist two points of identification for each type	Skill lab	2 hrs.	OSPE
General Anatomy	General anatomy of muscle	▪ Classify muscles with ▪ examples according to ▪ Shape ▪ Histology ▪ Describe the general features of skeletal muscle ▪ Describe the blood supply and nerve supply of muscle ▪ Explain the actions of ▪ Prime mover or ▪ agonist ▪ Fixators ▪ A synergist ▪ An antagonist with examples. • Describe the anatomical structures of the muscle tissue (atrophy) involved in atrophy of a limb			
Biochemistry	Structure and function of GAGS	• Describe the structure and function of GAGS and its clinical importance	Interactive lecture	1 hrs.	MCQ.
Histology	Connective tissue 1	• Explain the components of connective tissue • Classify the connective tissue with examples	Interactive lecture	1 hrs.	MCQ.
Histology	Connective tissue II	Explain the types of loose CT & Dense CT Classify and describe Embryonic CT	Interactive lecture	1 hrs.	MCQ.
Histology	Connective tissue 1	Identify loose connective tissue	Skill lab	2	OSPE

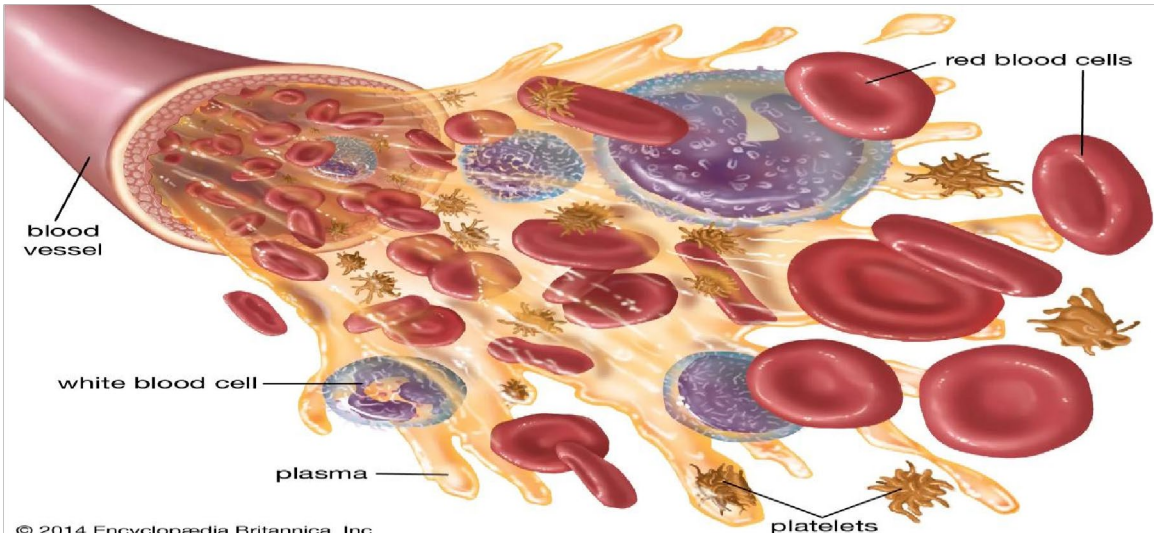
		• list two points of identification for each slide		Hrs.	
Histology	Connective tissue 2	Identify dense connective tissue under microscope • list two points of identification for each slide	Skill lab	2 Hrs.	OSPE
General Anatomy	General Anatomy of joints	• Classify joints giving examples according to Structure Function Movements Describe the components of joints along with their clinical importance.	Interactive lecture	1 hrs.	MCQ.
General Anatomy	Synovial joints	Describe the components of synovial joints Classify synovial joints with examples	Interactive lecture	1 hrs.	MCQ.
General Anatomy	General Anatomy of Nervous tissue	• Classify nervous tissue • Describe the structure of typical spinal nerve	Interactive lecture	1 hrs.	MCQ.
General Anatomy	General Anatomy Blood vessels	• Classify blood vessels • Classify types of circulation • Describe types of Anastomosis	Interactive lecture	1 hrs.	MCQ.
General Anatomy	Fascia and Skin	• Define Superficial Fascia &Deep Fascia • Describe involvement of skin structures in conditions like • Paronychia • Boils • Sebaceous cyst • Describe the importance of cleavage lines and wound healing • Enlist the structures involved in first, second and third degrees of burns. • Describe the skin lines	Interactive lecture	1 hrs.	MCQ.
Histology	Skin	• Describe the structure of skin and differentiate between thick and thin skin • Describe the layers and gross structures present in epidermis and dermis of skin	Lecture	1 hrs.	MCQ

Embryology	Development of skin	▪ Describe the development of integumentary system Skin and associated structures (Hair, nails, glands) Describe the anomalies of development ○ Hypertrichosis ○ Atrichia ○ Ichthyosis • Explain the relation of dermal appendages and finger prints	Lecture	1 hrs.	MCQ
Histology	Skin appendages	• Describe the histological structure of dermal appendages ○ Hair ○ Nails • Describe the histological features of glands associated with skin ○ Sweat glands ○ Sebaceous glands • Describe the histological changes in skin layers in skin diseases like psoriasis	Lecture	1 hrs.	MCQ
Histology	Skin	• Identify thick and thin skin • Identify skin appendages Draw and label histological features of the skin			
Physiology	Body temperature regulation	• Describe normal body temperature and their control mechanisms ▪ Explain role of hypothalamus in regulation of body temperature	Interactive lecture	I hrs.	MCQ.
Physiology	Abnormalities in body temperature	• Discuss abnormalities of body temperature regulation • Mechanism of Action of pyrogens in Causing Fever and Chills Crisis or flush Heat stroke Frostbite Artificial hypothermia	SGD	2 hrs.	MCQ.
Physiology	Recording of body temperature	• Record core body temperature	Skill lab	2 hrs.	MCQ.
Pathology	Inflammation	• Describe acute inflammation • Describe vascular events of acute inflammation • Describe chronic inflammation Differentiate between acute and chronic inflammation.	Interactive Lectures	1 Hrs.	MCQ.

Forensic Medicine	Death	Define death. Describe stages of death. Describe medico legal importance of stages of death.	Interactive Lectures	1 Hrs.	MCQ.

BLOOD I MODULE





Module Committee:

Chairperson curriculum committee	Prof.Dr. Humaira Gulnaz	Head of Anatomy department
Curriculum coordinator	Dr. Ayesha Ayub	Senior Demonstrator medical education
Module coordinator	Dr. Tehmina Aslam	Senior Demonstrator Biochemistry Department
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Biochemistry	Dr. Tehmina Aslam	Senior Demonstrator Biochemistry department
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1st year MBBS		Students

Introduction to Module:

Blood is a specialized connective tissue that delivers necessary substances such as nutrients and oxygen to the cells and transports metabolic waste products away from those same cells. Blood accounts for 8% of the human body weight, with an average density of approximately 1060 kg/m3, very close to pure water's density of 1000 kg/m3 The average adult has a blood volume of roughly 5 liters (1.3 gal), composed of plasma and several kinds of cells (occasionally called corpuscles); these formed elements of the blood are erythrocytes (red blood cells, RBCs), leukocytes (white blood cells), and thrombocytes (platelets). By volume, the red blood cells constitute about 45% of whole blood, the plasma about 54.3%, and white cells about 0.7%.

White blood cells are part of the body's immune system; they destroy and remove old or aberrant cells and cellular debris, as well as attack infectious agents (pathogens) and foreign substances.

Whole blood (plasma and cells) exhibits flow properties that are adapted to flow effectively through tiny capillary blood vessels with less resistance than plasma by itself. In addition, if all human hemoglobin were free in the plasma rather than being contained in RBCs, the circulatory fluid would be too viscous for the cardiovascular system to function effectively.

Rationale:

The rationale behind is to introduce the students the basic constituents, functions and transport of various substances through blood.

General Learning Outcomes

Knowledge:

By the end of BLOOD Module, the student should be able to:

1. Identify & describe the various cellular and non-cellular components of blood in relation to its Anat., Physiology & Biochemistry
2. Describe structure, synthesis and degradation of Hemoglobin
3. Describe the regulatory mechanisms of normal hemostasis and coagulation
4. Describe the conditions associated with dysfunction of cellular and non-cellular components of blood
5. Describe the basic characteristics of immune system.
6. Discuss the structure, functions and Biochemistry aspects of the Lympho-reticular system.
7. Explain the principles and clinical significance of ABO/RH blood grouping system
8. Explain the pathophysiology of various bleeding disorders
9. Identify the role of pharmacology in anemia and bleeding disorders.

Skill

By the end of BLOOD Module, the student should be able to:

1. Carry out practical work as instructed in an organized and safe manner
2. Make and record observations accurately.
3. Identify slide of Lymph node, thymus, tonsils and spleen under microscope
4. Identify slide of Gut associated lymphoid tissue 5. Determine percentage of formed blood elements.
6. Identify RBC and should be able to do its counting on counting chamber and to know normal values. And also classify Anemia morphologically.
7. Determine the Hemoglobin with the apparatus and have knowledge of normal and abnormal value.
8. Identify WBC morphology and its different types, should be able to count them on counting chamber and to know the normal values. Diagnostic importance of each WBC.
9. Identify Platelets and should be able to do its counting on counting chamber and to know normal values. Its diagnostic importance in relation to bleeding disorders
10. Perform bleeding time and clotting time and to know normal values and its diagnostic importance in relation to bleeding disorders.
11. Perform Blood groups typing and Rh factor.
12. Perform ESR and to know its normal value and prognostic importance.
13. Detect blood, bile pigments & bile salts in the given sample of urine

Attitude

By the end of BLOOD Module, the student shall gain the ability and carry responsibility to:

1. Demonstrate ability to give and receive feedback, respect for self and peers.
2. Demonstrate empathy and care to patients.
3. Develop respect for the individuality and values of others - (including having respect for oneself) patients, colleagues and other health professionals
4. Organize& distribute tasks
5. Exchange opinion & knowledge
6. Develop communication skills and etiquette with sense of responsibility.
7. Equip themselves for teamwork
8. Demonstrate good laboratory practices

THEMES FOR BLOOD MODULE

Sr. no.	Theme	Duration
.	**Anemias**	2 weeks
2.	**Infection and immunity**	2 weeks
3.	**Bleeding disorders and transfusion reactions**	1 weeks

Theme 1 Anemias

SR no.	Discipline	Topic	Learning objectives	Teaching strategy	Duration/ time allocated	Assessment tool
	Physiology	Composition and function of blood	• Describe the composition of blood • Discuss general functions of blood • Enlist the components of plasma • Explain the difference between Serum and plasma	Interactive lecture	1 hour	MCQ
	Physiology	Red blood cells & erythropoiesis	• Describe the structure, function, life span and normal count of Red Blood Cells. • Define hemopoiesis • Classify hematopoietic stem cells • Describe the erythropoiesis & factors affecting it • Explain the role of Erythropoietin in RBC production.	Interactive lecture	1 hour	MCQS
	Physiology	Hemoglobin	• Describe functions of hemoglobin & its different types • Describe role of iron & various elements in Hemoglobin synthesis	Interactive lecture	1 hour	MCQ
	Physiology	Hemoglobinopathies	• Explain the hemoglobinopathies • Discuss iron storage diseases	SGD	2 hours	MCQS

	Physiology	Anemias and polycythemias	• Classify anemia • Explain its types, clinical interpretation • Discuss effects of anemia on body • Define and classify polycythemia • Differentiate between primary and secondary Polycythemia	SGD	2 hours	MCQS
	Physiology	Blood Indices	• Describe various red cell indices • Describe blood indices in various disorders	Lecture	1 hours	MCQS
	Physiology	Estimation of Hb.	Perform the steps to determine the Hb levels in each blood sample.	Skill lab	2 hours	OSPE
	Physiology	Hematocrit or PCV	• Perform the steps to calculate the hematocrit in the given blood sample • Interpret its clinical importance	Skill lab	2 hours	OSPE
	Physiology	Neubauer chamber	• Describe the counting chamber and the dimensions of different squares on the counting grid • Charge the counting chamber • Focus the counting grid for RBC and WBC	Skill lab	2 hours	OSPE
	Physiology	Measurement of osmotic fragility of RBC	• Perform the steps to measure the osmotic fragility of RBC • Interpret the clinical importance of this test	Skill lab	2 hours	OSPE

	Biochemistry.	Hemoproteins functions and structure	• Describe important hemoproteins found in body along with their principal biologic functions, structure and function of hemoglobin and myoglobin, and types of hemoglobin	SGD	2 Hours	MCQS
	Biochemistry.	Heme chemistry	• Describe the Biochemical features of the hemoglobin molecules Describe the concept of • Oxygen binding with hemoglobin Describe the normal picture of blood • chemistry	Interactive lecture	1 hour	MCQS
	Biochemistry.	Heme synthesis	• Describe Heme Synthesis on cellular and molecular level • Describe the Regulation of Heme Synthesis	Interactive lecture	1 hour	MCQS
	Biochemistry.	Heme degradation	• Describe Heme Degradation • Describe the Regulation of Heme Degradation	Interactive lecture	1 hour	MCQS
	Biochemistry.	Introduction of Porphyrins	• • Define Porphyrins Describe Chemistry of • Porphyrins Enlist the types, metabolic causes and clinical presentation of different types of Porphyria.	Interactive lecture	1 hour	MCQS

	Biochemistry.	Bilirubin and associated diseases I	• Describe Bilirubin Metabolism • Degradation of heme, synthesis, hepatic uptake conjugation, and excretion of bilirubin and fate of bilirubin in intestine	Interactive lecture	1 hour	MCQS
	Biochemistry.	Bilirubin and associated diseases II	• Define and explain Hyperbilirubinemias • Causes of hyperbilirubinemias along with the acquired and congenital disorders	Interactive lecture	1 hour	MCQS
			leading to hyperbilirubinemias • jaundice and kernicterus			
	Biochemistry.	Hemoglobinopathies I	• Define Hemoglobinopathies and enlist the variants of hemoglobin • Describe causes of hemoglobinopathies • Describe two major categories of hemoglobinopathies • Describe the amino acid substitution in sickle cell disease	Interactive lecture	1 hour	MCQS
	Biochemistry.	Hemoglobinopathies II (thalassemia)	• Define thalassemia's. Classify thalassemia's. • Explain the genetic defects in α and β • thalassemia's. Enlist the clinical features of α and β • thalassemia's	Interactive lecture	1 hour	MCQS

	Biochemistry	Abnormal Constituents of urine (hematuria)	• Detect qualitative presence of blood in urine through dipstick and Rothera's test Discuss clinical • implementation of hematuria	Skill lab	2 hours	OSPE
	Biochemistry	Iron metabolism	• Describe the iron metabolism (sources, absorption, transport, storage, Biochemical functions) Memorize the RDA of iron in different • propositions	Interactive lecture	1 hour	MCQS
	Pathology	Classification of anemia according to underlying mechanism	Define anemia Classification of anemia according to underlying mechanism • Blood loss • Increased red cell reduction • Decreased red cell production	Interactive lecture	1 hour	MCQS
	Pathology	Pathophysiology of anemias	• Briefly discuss megaloblastic anemia, anemia of folate deficiency, iron deficiency anemia and anemia of chronic inflamation	Interactive lecture	1 hour	MCQS
	Pharmacology	Drug treatment of iron deficiency anemia's and role of erythropoietin in anemias	▪ Enlist the drugs used in the treatment of iron deficiency ▪ Describe the pharmacological basis/ role of iron in iron deficiency anemia (hypochromic normocytic anemia ▪ Describe the role of Erythropoietin in the treatment of Anemia (normochromic normocytic anemia)	Interactive lecture	1 hour	MCQS

	Community medicine	Epidemiology of blood borne diseases	• Describe Epidemiology of Iron Deficiency Anemia • Describe prevention of different types of anemia's in community	Interactive lecture	1 hour	MCQS

Theme 2 Infection & immunity

	Physiology	White blood cells	• Classify white blood cells • Describe the structure, function, life span and normal count of White Blood Cells • Describe the stages of differentiation of white blood cells (leukopoiesis) • Describe the general characteristics of leucocytes • Define granulocytes and agranulocytes.	Interactive lecture	1 hour	MCQS
	Physiology	Neutrophils and monocyte's role in infection	• Explain the steps involved in mechanism of action of neutrophils and monocytes against infection	Interactive lecture	1 hour	MCQS
	Physiology	Leukocytosis	• Explain leukocytosis • Discuss pathophysiology of leukemias	SGD	2 hours	MCQ
	Physiology	WBC count	• Perform the steps to determine the normal TLC count in blood sample by Neubauer chamber	Skill lab	2 hours	OSPE

	Physiology	DLC count	• Perform the steps to determine the normal DLC count in blood sample by Neubauer chamber • Identify different blood cells in a film and indicate the identifying features of each type of leucocyte. • Express results in their percentages and absolute numbers	Skill lab	2 hours	OSPE
	Physiology	Reticuloendothelial system	• Enlist the components of Reticuloendothelial system Describe • the functions of Reticuloendothelial system Describe the role of • monocyte macrophage system in immunity Explain the role of • neutrophils, macrophages, basophils, eosinophils and monocytes in providing immunity against infections (immune system)	Interactive lecture	1 hour	MCQS
	Physiology	Inflammation	• Define inflammation Describe characteristics of inflammation (hallmark of • inflammation) Describe the causes, sequence of events and cardinal signs of inflammation	Interactive lecture	1 hour	MCQS

	Physiology	Immunity	• Describe the functions of immune system Describe • the structure and function of lymphatic system Classify cells of • immune system with respect to their origin Enlist the innate • defenses Describe the basic • types of Acquired immunity: Humoral and Cell mediated Compare the • characteristics of innate and acquired immunity Compare the active • and passive immunity mechanism	Interactive lecture	1 hour	MCQS
	Histology	Histology Of Lymphoid Tissue	• Enumerate the major lymphoid organs. Describe the • location and Anat. of major lymphoid organs in relation to their function. Describe the • components of lymphoid tissue and a lymphoid nodule. Discuss the MALT, • GALT and their role in immunity.	Lecture	1 hour	MCQS
			Describe the histological features of thymus • Discuss the role of thymus in terminal differentiation and selection of T lymphocytes.			

	Histology	Histology Of Lymphoid Tissue 2	• Discuss the role of lymph node in facilitating the interaction of afferent lymph and lymphocytes • Describe the histological features of spleen and the role of spleen in facilitating intimate contact between blood and lymphocytes. • Describe the histological features of tonsil	Lecture	1 hour	MCQS
	Histology	Lymphoid system I	• Identify lymphatic nodule in lymph node • Identify thymic lobule • Histological Diagram of Lymph Node and Thymus	Skill Lab	2 hours	OSPE
	Histology	Lymphoid System II	• Identify lymphatic nodule in Spleen and Palatine Tonsil • Identify Red and White Pulp in Spleen • Histological Diagram of Palatine Tonsil and Spleen	Skill Lab	2 hours	OSPE
	Physiology	Role of lymphocytes in immunity 1	• Describe the role of lymphocytes in development of immunity. • Describe the role of Helper T-cells in overall regulation of immunity • Explain the mechanism of	Interactive lecture	1 hour	MCQS
			action of cytotoxic T cells • Explain mechanism of action of suppressor T-cells			

	Physiology	Role of lymphocytes in immunity 2	• Describe the specific contribution of B lymphocytes in humoral immunity and antibody formation • Differentiate between humoral and cell mediated immunity	Interactive lecture	1 hour	MCQS
	Physiology	Complement system	• Explain the functions of complement system • Explain how the complement system elicits the inflammatory response, lyses foreign cells, and increases phagocytosis • Discuss, draw and compare classical and alternate pathways	Interactive lecture	1 hour	MCQS
	Physiology	Autoimmune diseases	• Describe pathophysiology of autoimmune diseases	Lecture	1 hours	MCQS
		Allergy and hypersensitivity reactions	• Discuss the pathophysiology of allergies • Define and classify the hypersensitivity reaction Compare • the immediate and delayed hypersensitivity reactions List the diseases associated • with hypersensitivity reactions	Lecture	1 hours	MCQS

	Biochemistry.	Immunoglobulin	• Define Immunoglobulin's	SGD	2 hours	MCQS
			Describe Types of Immunoglobulins • Describe Structure of Immunoglobulins			
	Biochemistry.	Immunoglobulin Antibodies	• Describe the mechanism of action of antibodies • Explain Biochemistryical role of each immunoglobulin in immunity	Interactive lecture	2 hour	MCQS
	Biochemistry.	vitamin Cobalamin	• Illustrate sources, chemistry and mechanism of action of vitamin Cobalamin and their Biochemistryical functions in body • Define Disorders associated with vitamin Cobalamin deficiency and hypervitaminoses	Interactive lecture	2 hours	MCQS
	Biochemistry.	vitamin folic acid	• Illustrate sources, chemistry and mechanism of action of vitamin folic acid and their Biochemistryical functions in body • Define Disorders associated with vitamin folic acid deficiency and hypervitaminoses	Interactive lecture	2 hours	MCQS

	Community medicine	Vaccinology	• Define vaccine and immunization • Explain the expanded program of immunization (EPI) in Pakistan	Interactive lecture	1 hour	MCQS
Theme 3 Bleeding disorders &transfusion reactions						
	Physiology	Hemostasis	• Describe the structure, function, life span and normal count of Platelets.	Interactive lecture	1 hour	MCQS
			Describe the sequence of events involved in hemostasis • Describe the role of platelet in coagulation			
	Physiology	Platelet count	• Perform the steps to determine the normal Platelet count in the blood sample by Neubauer chamber	Interactive lecture	1 hour	MCQS
	Physiology	Blood coagulation mechanisms 1	• Enlist the clotting factors of the body • Outline the sequence of processes during blood coagulation Explain the intrinsic • pathways of clotting	Interactive lecture	1 hour	MCQS
	Physiology	Blood coagulation mechanisms 2	• Explain the extrinsic pathways • of clotting Describe the factors involved in preventing clotting of blood under normal homeostatic • condition. Explain how the mechanism of clot dissolution.	Interactive lecture	1 hour	MCQS

	Physiology	Thromboembolic diseases and bleeding disorders	• Discuss pathophysiology of hemophilia Describe • the abnormalities of clotting factors in Hemophilia	Lecture	1 hour	MCQS
	Physiology	Bleeding time & clotting time	• Perform the steps to determine the BT and CT in blood sample • Indicate the clinical importance of doing BT and CT	Skill lab	2 hours	OSPE
	Physiology	Blood groups 1	• Define agglutinin, agglutinogen Describe the role of agglutinin and • agglutinogen in blood grouping Describe different • types of blood groups Describe the physiological basis of ABO blood grouping	Interactive lecture	1 hour	MCQS
	Physiology	Blood groups 2	• Interpret the plausible blood groups (A-B-O) in children of parents with known blood groups. • Interpret the types of agglutinins present in individuals with a specific blood group Describe the • physiological basis of Rh blood grouping	Interactive lecture	1 hour	MCQS

	Physiology	Transfusion reactions Erythroblastosis fetalis	• Describe the mechanism involved in transfusion reaction • Explain universal donor and universal recipient blood groups • Enlist the manifestations of transfusion reaction • Discuss erythroblastosis fetalis	Lecture	1hour	MCQS
	Physiology	Blood groups	• Perform, the steps to identify ABO and Rh typing of a given blood sample	Skill lab	2 hours	OSPE
	Biochemistry	Plasma proteins	Classify plasma proteins • Enumerate functions of plasma proteins	Interactive lecture	1 hour	MCQS
	Pharmacology	Coagulation cascade drugs relevant to intrinsic and extrinsic pathway of coagulation cascade	Identify the site of action of following drugs in coagulation cascade Heparin Warfarin Rivaroxaban	Interactive lecture	1 hour	MCQS
	Forensic medicine	Medico-legal importance of blood groups	• Describe the Medico-legal importance of blood groups in forensic work that is ○ Personal Identity ○ inheritance claims ○ DNA profiling ○ Disputed paternity and maternity	Interactive lecture	1 hour	MCQS

	Community medicine	epidemiology of blood borne diseases	• Identify important blood borne pathogens and how they are spread • Discuss the epidemiology of blood borne disease transmission and the potential for HIV, HBV and HCV transmission. • Identify routes of transmission of blood borne pathogens Discuss • the best practices to perform safe blood transfusion. • Identify potential exposure risks List important • safeguards against blood borne pathogen disease	Interactive lecture	1 hour	MCQS

Assessment Format:

Subject	Foundation 1	Blood module	Total MCQs
Gross Anatomy	**12**	**1**	**13**
Histology	**10**	**4**	**14**
Embryology	**15**	**0**	**15**
Physiology	**10**	**22**	**32**
Biochemistry	**14**	**12**	**26**
PRIME Including Research	**5**	**3**	**8**
Pharmacology	**1**	**1**	**2**
Pathology	**2**	**4**	**6**
Community Medicine	**1**	**2**	**3**
Forensic Medicine	**0**	**1**	**1**
Total	**70**	**50**	**120**

Final distribution of OSPE stations for year-1 (Foundation and Blood modules)					
Subject	**Foundation module**	**Viva stations**	**Blood module**	**Viva stations**	**Total OSPE stations (for final exam*)**
Gross Anatomy	**0**	**1**	**0**	**1**	**4**
Histology	**7**		**2**		
Embryology			**0**		
Physiology	**1**	**1**	**7**	**1**	**4**
Biochemistry	**4**	**1**	**2**	**1**	**4**
Total	**14**	**3**	**11**	**3**	**12+6 (viva)=18**
*out of total of 25 OSPE stations, 12 will be allocated for final exam plus 6 viva stations. A minimum of 18 stations will be used in final exams.					

Internal Assessment

Sr. No.	Criteria	Numbers
Theory:		
1.	Attendance (>90%=3,80-89%=2,70-79%=1,<70%=0)	3
2.	Creative work/assignments/Task	2
3.	Continuous Assessment throughout block (Formative assessments, Viva Voce, departmental activities)	2
4.	Block examination theory	3
5.	Pre prof Examination of block	4
	Total	**14**
Sr. No.	**Criteria**	**Numbers**
OSPE:		
1.	Attendance (>90%=3,80-89%=2,70-79%=1,<70%=0)	3
2.	Log Book/practical copy	2
3.	Discipline, Responsibility and team work	1
4.	Block examination OSPE	2
5.	Pre prof Examination OSPE	2
	Total	**10**