Study Guide
MBBS YEAR I
Block I
MODULE II
&
MODULE III
2026-2030

Contents

VISION

National University of Medical Sciences envisions a world with a better quality of life for all by enhancing our contribution to healthcare, education, innovation, and research.

MISSION

To produce competent medical professional graduates equipped with sound knowledge & research capabilities based on scientific principles, imbued with ethics and moral values primed to serve the community through the profession and pursue research & advanced training in any branch of medicine".

Program Learning outcomes (PLOs)

By the end of 5-year MBBS program the WMC student should be able to:

PLO 1. Independently manage common, non-critical clinical problems.

PLO 2. Assist in the management of critically ill patients & demonstrate competency in life saving procedures.

PLO 3. Exhibit the attributes of an ethical professional.

PLO 4. Conduct research which brings relevance to health care practices.

PLO 5. Act as an efficient community health promoter.

PLO 6. Exhibit scientific knowledge in all professional activities.

PLO 7. Demonstrate clear and efficient written &verbal communication skills.

PLO 8. Exhibit the habits of a lifelong learner.

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Introduction to the module:

Dear students
Welcome to the "Cell Structure and Function module" of the first year of MBBS, the first milestone in your journey to becoming healthcare providers, future physicians, and role models for your juniors. In this module, we will introduce you to fundamental concepts of medical sciences, on which you will build your learning in the coming years.
The study guide in your hand is organized around themes represented by clinical cases or vignettes, the way patients present to the clinics or emergency rooms. The learning objectives are mentioned to guide you to the relevant knowledge and skills. You should refer to these clinical cases during Small group discussions (SGDs) and Case-based learning (CBL) sessions. The module is based on themes shown in the structured summary in the next section. You will study, building on your previous knowledge from "A" levels or FSc; the details of cells, cell membranes, organelles, genetic control of cells, and the related disorders. In addition to that you will explore blood and immune system with clinical relevance, as well as general Anatomy and embryology laying the foundation for understanding how the body's structure relates to its function.
To make you a well-rounded graduate, different subjects from humanities and various generic competencies are part of the curriculum. Thus apart from Medical subjects, you will study Islamiat, Quranic studies, and Functional English, photography and videography will be taught as an elective discipline.

Some of the learning strategies you will come across may be new for you like Large Group Interactive sessions (LGIS), Flipped Classrooms, Small Group Discussions (SGDs), and the most interesting Case-based learning (CBL). CBL and SGD are scored for your active participation and critical thinking and the score is counted toward internal assessment. You will learn the clinical skills in "Skill Lab" and will do laboratory work in Laboratory sessions (practical)

You will undergo formative and summative assessments. Formative assessment will be in the form of tests, quizzes, and scoring of CBL and SGDs, while summative assessment will be done at the end of the Block, comprising both MCQs (multiple-choice questions) and SAQs (short answer questions). The performance exam will be taken at the end of Block I in the form of OSPE (Objective Structured Performance Exam).

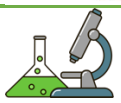
You must have heard the famous adage, "Strong footings make strong buildings." The strong footing of your medical knowledge will be possible with the combined efforts of faculty and students', but the students' continuous internal motivation is its mainstay.
Please feel free to contact for questions and comments.
Let's get started!

Structured summary of the module

Block Code	Y1B1MII
Anatomy	**Gross Anatomy:** • Body planes and terms of position, movements and laterality • General Anatomy of Skin, fascia, bone, muscles and joints • Pectoral region & Breast **Histology:** • Cell components (cell membrane, nucleus, mitochondria, organelles); Organization and structure of these parts within the cell. • Cytoskeleton • Epithelial tissue • Connective tissue **General Embryology:** • Gametogenesis, numerical and structural disorders • Embryological basis of various syndromes • Ovulation, fertilization and first week of development • Second week of development • Third week of development • Embryonic period
Physiology	**Cell Structure and Function:** • Cytoskeleton • Communication; material transport • Genetic control of cell **Homeostasis:** • Intra and extracellular fluid compartment, negative and positive feedback mechanisms **Blood:** • Composition and function of blood • Erythropoiesis • Anemia and polycythemia • WBC morphology; Inflammation, Monocyte macrophage system • Innate immunity and complement system ,Allergy and immunity, Autoimmunity and transplant rejection • Blood grouping; Rh and ABO system, Cross-matching ,Rh incompatibility Erythroblastosis fetalis

	• Hemostasis, Coagulation pathway ,Bleeding disorders, Bleeding diathesis ,Clotting factor deficiencies and their manifestations
Biochemistry	• Cell membranes and receptors and signal transduction in health and disease • Disorder of cell organelles • Biomolecules and their role • Enzymes and key biochemical pathways and reactions; How these processes sustain life at the cellular level. • Heme and porphyrin metabolism, Porphyrias, • Hyperbilirubinemias and jaundice • Plasma Proteins
Medicine Surgery/ Clinical Relevance	• Anemia and polycythemia • Edema, malnutrition, and multiple myeloma • Metaplasia and clinical importance • Cross-matching, Rh incompatibility Erythroblastosis fetalis

Icon index

Case-based learning (CBL)	
Small group discussion (SGD)	
Learning objectives	
Large Group Interactive session (SESSION)	
Demonstration	
Laboratory session (Practical)	
Skill Lab sessions	
Clinical case/vignette	
Critical Questions/Guiding Questions	
Interesting facts	
Useful links	
Important	
Self-assessment	

Week 1

Anatomy

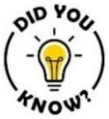
A child with compromised intellect

Mrs. Sajid is a 41-years-old woman who is seen by an obstetrician because her pregnancy test is positive. She and her husband have a 10-year-old son. Her family history is positive for a 12-year-old maternal cousin having hypotonia, heart murmurs and facial features suggestive of Down syndrome. Ultrasonography confirms an approximately 8-week pregnancy. Her obstetrician raises the possibility for chromosomal disorders because of Mrs. Sajid's age. She is told that prenatal diagnosis may also involve some invasive procedures involving a small risk of pregnancy loss. Mrs. Sajid declines invasive procedures and states that she is comfortable only with non-invasive procedures.

Have you noticed any babies around you with unusual facial features?
How do you think babies with Down syndrome should be cared for?
Do you think pregnancy at an older age is a risk factor for chromosomal abnormalities?

	**By the end of this session the first-year MBBS students will be able to:**	**Importance**
	Embryology • Explain the sequence of events of mitosis and meiosis with the help of illustrations and models. • Explain the karyotype & embryological basis of down syndrome. • Differentiate among various types of aneuploidies based on usual clinical manifestation of patient. • Identify the factors placing a woman at high risk for chromosomal aberrations. • Choose invasive and noninvasive approaches for assessment of fetal wellbeing in this scenario. • List numerical and structural chromosomal disorders • Aneuploid • Haploid • Diploid • Triploid • Polyploid • Non disjunction • Monosomy • Trisomy	Must Know

	• Mosaicism • Translocation • Explain the embryological basis and clinical presentation of following syndromes: o Down's o Kleinfelter o Turner o Angelman o Prader Willi o Cri du chat	
	Gross Anatomy • Demonstrate the anatomical position • Name various planes of the body • Define the terms of position, movement, and laterality	Must Know
	Histology • Explain the structure and function of various components of cytoskeleton. • Correlate the microscopic structure of cytoskeleton with variation in cellular modification • Define epithelium • Classify epithelium with examples of each type • Differentiate among various epithelial cells • Elucidate the basic concepts of staining.	Must Know
	• Identify all types of simple epithelia under the microscope at 10X magnification • Give two points of identification	Must Know



Down syndrome is named after John Langdon Down, the English physician who first described the condition in 1866


How Down Syndrome is Treated
Therapy
• Physical
• Speech
• Occupational
Assistive Devices
• Three-sided pencils
• Touchscreen computers
• Keyboards with large letters
Prescriptions
• Thyroid medication (if necessary)
Surgery
Only for physical issues associated with Down Syndrome such as:
• Heart defects
• Gastrointestinal issues

Physiology
Cellular basis of disease

	By the end of session the first-year MBBS students will be able to:	Importance
 	• Describe the parameters needed for the control of the 'internal environment' • Differentiate between the intracellular and extracellular fluid compartments • List the typical value and normal range for plasma Na+, K+, H+(pH), HCO3-, Cl-, Ca2+, and glucose, and the typical intracellular pH and concentrations of Na+, K+, Cl- , Ca2+, and HCO3- • Explain Homeostasis and the factors that are regulated through homeostasis • Recognize the interplay of various organ systems in maintaining homeostasis • Compare and contrast positive, negative and feed forward feedback mechanisms as the control systems of the body. • Narrate examples of each feedback control system • Discuss the outcomes of failure of the feedback control system of homeostasis. • Discuss the functional organization of human body • Differentiate membranous organelles from non-membranous organelles. • Restate the structure & function of nucleus, nuclear membrane, Chromatin & Chromosomes, Nucleoplasm & Nucleolus. • Compare the structure & function of smooth endoplasmic reticulum & RER. • Appreciate the importance of Golgi apparatus in packaging and storage of newly formed proteins. • Discuss the structure & functions of vaults. • Discuss the synthesis, types & functions of ribosomes. • Summarize the structure & functions of secretory vesicles.	Must Know

	• Discuss the physiological anatomy of mitochondria & discuss its functions in special relation to energy synthesis • Compare and contrast the functions of lysosomes & peroxisomes • Describe the composition of a human cell membrane • Diagram its cross section, and explain how the distribution of phospholipids and proteins influences the membrane permeability of ions, hydrophilic and hydrophobic compounds. • List the various functions of integral and peripheral proteins in the cell membrane • Discuss the structure & function of cell cytoskeleton (microtubules, microfilaments & intermediate filaments) • Recall movements of cells (amoeboid, ciliary & flagellar movements).	
	• Identify different parts of microscope. • Focus the microscope at 10,40 and 100X. • Describe the counting chamber in detail. • Describe the dimensions of different squares on the counting grid. • Identify the WBC and RBC pipettes, name their parts and difference between them. • Focus the counting grid for RBC and WBC counting under low and high magnification.	Must know

- Cells swell before they die, Failure of Na^+-K^+ pump → Na^+ enters → water follows, swelling is often the first sign of cell injury.
- Brain hates glucose fluctuations, neurons have no energy backup, and that's why hypoglycemia causes confusion *fast*.

Biochemistry

	By the end of this session the first-year MBBS students will be able to:	Importance
	• Identify the basic elements of biochemistry subject & Human Genome Project • List various Biomolecules	Good to know

	• Discuss composition of fluid mosaic model of cell membrane
	• Compare the biochemical significance of different types of membranes
	  ○ RBCs
	  ○ Mitochondria
	  ○ Nucleus
	  ○ Endoplasmic reticulum
	  ○ Golgi apparatus
		Must know

	• Identify different Laboratory Glassware and describe their uses	Must know

NOTES:

Important concepts:

Exam style question:

Teacher's expectation:

Week 2

Anatomy

Structure, Polarity and Junctions of Epithelial Cells

Responses to Chronic Injury

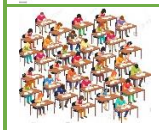
Mr. Ali, a 60-year-old male with a 40-year history of smoking, presents to the clinic with a persistent cough and difficulty breathing. Upon examination, his physician orders a biopsy of his bronchial tissue. The biopsy reveals several significant findings; the normal pseudostratified columnar epithelium of the bronchial lining has undergone metaplasia, transforming into stratified squamous epithelium and there is the loss of cilia too. Additionally, there is evidence of disrupted cell polarity, with cells exhibiting abnormal orientation. The basal cells show increased proliferation, possibly as a compensatory mechanism due to tissue damage. There are also alterations in the cellular junctions, with weakened tight junctions and desmosomes, leading to compromised tissue cohesion and barrier function.

Why has the normal epithelium transformed into some other?
What could be the damaging effect of loss of cilia?

	By the end of this session the students of first-year MBBS should be able to:	Importance
	**Histology** ● Classify and explain various types of Stratified epithelium & glands with examples. ● Define polarity and explain the structural modifications of the apical, lateral, and basal domains of the cell. ● Classify the apical modifications according to motility. ● Define metaplasia and correlate it with its clinical importance. ● Classify various types of cell junctions according to functions, providing examples of each. **Embryology** ● Elucidate the morphological changes in male gametes during their maturation	Must know
	● Identify all types of stratified epithelia under the microscope at 10X magnification ● Give two points of identification ● Differentiate between serous, mucous and mixed glands under the microscope at 10 X magnification ● Give two points of identification	Must know

As you place that papery cigarette between your lips, you inhale 4,000 chemicals, of which forty-three are known to cause cancer, with an additional 400 poisons rushing down your delicate air passages; nicotine will cause your blood vessels to contract, black tar coats air-sacs as carbon monoxide prevents oxygen from being taken up from blood, formaldehyde combines with ammonia, hydrogen cyanide arsenic to cause direct tissue damage, hacks to cause DNA damage.
Scary! Isn't it?

Physiology
Cellular basis of disease

	By the end of this session the first-year MBBS students will be able to:	Importance
	• Comprehend Genetic control of cell functions and cell division.	Good to know
	• Classify various modes of transport of substances across the cell-membrane • Compare and contrast amongst the processes of osmosis, diffusion & facilitated diffusion (transport of micro molecules) • Compare and contrast the process of exocytosis & endocytosis (transport of macromolecules) • Explain the process of primary active transport with examples • Give an account on the structure, working and important functions of Na+ / K+ pump • List other active transport pumps present in human body e.g. sarcoplasmic reticulum Ca2+ pump, and gastric H+ pump • Grasp concept of Secondary active transport. • Differentiate co-transport & counter-transport with examples • Describe how energy from ATP hydrolysis is used to transport ions such as Na+, K+, Ca2+, and H+ against their electrochemical differences (e.g., via the Na+ / K+ pump,).	Must Know
	• Identify the RBC pipette, fill it with blood and dilutant. • Determine RBCs count using Neubauer's chamber.	Must know

our brain is basically paying an electricity bill all day. It creates electricity without being a wire**.** For every cycle, it pumps 3 Na^+ out and 2 K^+ in**.** This unequal exchange makes the inside of the cell negatively charged. Yes it's *electrogenic*. It works even when you're asleep**,** No rest days, no breaks, no holidays. If it stops for even a few minutes' results in cell swelling and cell death.

Biochemistry

	By the end of this session the first-year MBBS students will be able to:	Importance
	● Explain biochemical composition and functions of various cell organelles: ○ Nucleus ○ Ribosomes ○ Peroxisomes ○ Mitochondria ○ Golgi Apparatus ○ Endoplasmic Reticulum ○ Endosomes ○ Lysosomes	Must know
	● Identify different Laboratory Equipment and Instruments and describe their uses	Must know

NOTES:

Important concepts:

Exam style question:

Teacher's expectation:

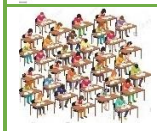
Week 3

Anatomy

A woman with difficulty conceiving

A 28-years-old female comes to your clinic with complaints of having difficulty in becoming pregnant after 5 years of happily married life. She gives history of several bouts of pelvic inflammatory disease after marriage and she has been treated with heavy doses of antibiotics. She has regular menstrual cycles and experiences midcycle pain.

- Can you explain why the conceptus, genetically distinct (foreign body) from mother, is not rejected by the uterus?
- What could be the possible causes of oocyte abnormalities?
- What are the potential consequences of these abnormalities on embryo development?

	By the end of this session the students will be able to:	Importance
	**Embryology** • Elucidate the morphological changes in female gametes during their maturation • Correlate the menstrual and ovarian cycles with each other • Describe the process of ovulation • Define corpus luteum and corpus albicans • Define fertilization. • Describe and illustrate the steps, outcomes of fertilization • Define infertility & describe the basic principles behind various techniques of in vitro fertilization • Identify the various phases of development on the given model **Histology** • Classify connective tissue. • List various CT cells and describe the characteristic features of loose connective tissue. • Explain the role of fibroblasts in wound contraction • Elucidate the role of macrophages in defense	Must know
	• Focus and identify loose connective tissue under the microscope at 10X magnification. • Give two points of identification	

Male Sperm Count Is Declining Globally

A strange and alarming phenomenon is the **global decline in male sperm counts** over the past decades. Studies suggest that the average sperm count has decreased by over **50% since the 1970s**, and the decline continues at a rate of about **1-2% per year** in many regions.

Posthumous Sperm Retrieval

Sperm can be retrieved from a man **after death** for up to 36 hours (in some cases, even longer) and used for conception through assisted reproductive technologies like IVF. This has led to ethical debates about consent and the use of reproductive material after death.

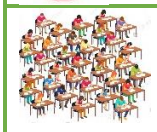
The Oldest Mother

The oldest woman to give birth is **72-year-old Eramatti Mangayamma** from India (as of 2019). She conceived twin daughters through IVF, highlighting how assisted reproductive technology can push the boundaries of biology.

Physiology
A Lady with Pallor And Shortness of Breath

A 55-year-old lady presents with fatigue, pallor, and shortness of breath on exertion. There is also history of difficulty concentrating and occasional dizziness. She reports heavy menstrual periods lasting 7–8 days each cycle for the past year. There is no history of weight loss or fever. Physical examination reveals conjunctival pallor and brittle nails. Laboratory tests showed Hb 7g/dl, MCV 60, WBC 7,000 and Platelets 250,000. She was diagnosed as case of iron deficiency anaemia

Why MCV value is important in the diagnosis of anemia?

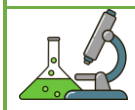
	By the end of this session the students will be able to:	Importance
 	• Make a flow sheet diagram of cellular and fluid composition and general functions of blood. • List sites of hemopoiesis in the body during different stages of life. • Make a flow sheet diagram of various stages of	Good to know
	• erythrogenesis with explanation of their relevant features and sizes during different stages of differentiation of RBC's. • List different growth & differentiation inducers involved in erythropoiesis • Identify the factors in regulation of erythropoiesis and maturation of RBC with relative importance of hypoxia in inducing erythropoiesis. • Appreciate the role of erythropoietin in regulating RBC production. • Discuss the role of vitamin B12 & folic acid in maturation of RBC.	Must know
	Clinical Relevance: • Classify anemia based on their morphological findings, RBC indices & etiology. • Determine red blood cell indices. • Compare and contrast different types of anemia on the basis of etiology, clinical presentations and blood picture. • Explain the effect of anemia on circulatory system.	Must know

	• Classify polycythemia into primary and secondary polycythemia and discuss its effects on circulatory system. • Describe etiology, pathophysiology and clinical presentation of polycythemia.	
	Determine Red Cell Indices	

You can be anemic and still look normal. The heart works overtime in anemia. Breathlessness isn't always a lung problem. In anemia, oxygen content is low even if lungs are normal. Iron deficiency anemia is the most common disease worldwide, not just anemia the most common nutritional deficiency globally. Your tongue can tell a story, Smooth, shiny tongue atrophic glossitis, Classic sign of iron or B12 deficiency.

Shape matters as much as number, In sickle cell anemia, Hb is present but shape ruins function.

Biochemistry

	By the end of this session the first-year MBBS students will be able to:	Importance
	• Describe the chemistry of cell surface receptors and related signaling mechanism • Describe the chemistry of intra-cellular receptors and related signaling mechanism • Compare biochemical basis of various membrane transport mechanisms: - GLUTs - SGLT - Carnitine shuttle - H/K ATPase pump - Cl ion channels - Malate shuttle - Receptor-mediated endocytosis - Aquaporins - ATP-sensitive K Channel	Must know
	• Perform separation of cell/biomolecules/ cell biomarkers by using centrifugation at different RPM with time	Must know

NOTES:

Important concepts:

Exam style question:

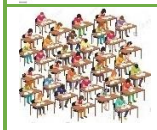
Teacher's expectation:

Week 4

Anatomy

A woman with sudden acute abdominal pain

A 25-years-old woman comes to emergency with complain of vaginal bleeding and acute pain in her right lower abdominal quadrant. History reveals that she has missed her two menstrual periods and she has slight pain in the lower abdomen for about four weeks. She also has history of nausea & vomiting in the morning for about six weeks. She came today due sudden severe pain & feeling of fainting.

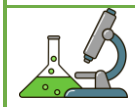
	By the end of this session the students will be able to:	Importance
	**Embryology** • Define cleavage, morula, blastula • Explain the events of 1st week of development in a sequence • Describe the process of implantation. • List the sites of abnormal implantation and describe the clinical significance. • Identify the various phases of development on the given model **General Anatomy:** • Comprehend the general concept of structure of skin, fascia, muscle **Histology** • List various CT fibers and describe the characteristic features of dense connective tissue. •	Must know
	• Focus and identify dense connective tissue under the microscope at 10X magnification. • Give two points of identification	Must know

Physiology
High grade fever and abdominal discomfort

A 35-year-old male presents with a 10-day history of continuous high-grade fever, abdominal discomfort, and fatigue. He also reports anorexia, constipation, and a feeling of abdominal distension. On examination, his temperature is 39.5°C (103°F), pulse is 72 beats/min, and there are faint rose-colored maculopapular lesions on his trunk. His abdomen is mildly tender with hepatosplenomegaly. Blood tests reveal leukopenia and mildly elevated liver enzymes. She was diagnosed as a case of enteric fever.

Why is he in bradycardia despite of having fever?

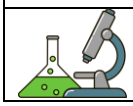
	By the end of this session the students will be able to:	Importance
 	• List different types of white blood cells and discuss their physiological characteristics. • Define the terms: leukopenia, leukocytosis, Neutrophila, neutropenia, eosinophilia, eosionpenia, Basophilia & basopenia. • Make a flow sheet diagram showing steps involved in leukopoiesis. • List the factors necessary for leukopoiesis. • Describe the role and functions of white blood cells in providing protection to the body against invading organism. • Identify morphological features of various types of WBCs for identification. • Define innate immunity. • Discuss the mechanisms involved in innate immunity. • Comprehend basis of innate immune system of the body and tissues related with innate immunity. • Discuss the role of natural killer cells & interferons in innate immunity. • Identify the specific role of interferons against virus infected cells and discuss their mechanism of action. • Appraise the composition and functions of reticulo-endothelial system.	Must Know

	• Explain the lines of defense against infection: role of neutrophils & macrophages, eosinophils & basophils. • Define inflammation. • Discuss causes, cellular features and five cardinal signs of inflammation. • Explain the process of inflammation. • Give an account on process of "walling-off" involved in inflammation. • Describe pathophysiology of necrosis	
	Clinical Relevance • Interpret the significance of altered level of leucocytes.	
	• Identify the WBC pipette, fill it with blood and dilutant. • Determine WBCs count using Neubauer's chamber.	Must Know

Neutrophils are the first responder, they arrive first, die first. Pus is mostly dead neutrophils. They love bacteria **especially good at killing** pyogenic (pus-forming) bacteria**.** Stress increases neutrophils **Yes, your WBCs panic too. They are most common WBC in adults.**

Lymphocytes are the Smart Strategists. They remember past infections they are the **Only WBCs with** immune memory**. That's how vaccines work.** They live for years. They are Most common WBC in children (**age matters!)**

Biochemistry

	By the end of this session the first-year MBBS students will be able to:	Importance
	• Classify Carbohydrates and explain their biochemical functions • Discuss the structure and functions of Monosaccharides and enumerate their various derivatives • Discuss the structure and functions of Disaccharides & Oligosaccharides • Discuss the structure and functions of Polysaccharides and give their biochemical role • Explain digestion and absorption of Carbohydrates	Must know
	• Collect & Preserve Clinical Specimens	Must know

NOTES:

Important concepts:

Exam style question:

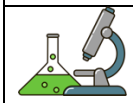
Teacher's expectation:

Week 5

Anatomy

A fetus with Caudal dysgenesis

A 26-year-old primigravid woman with gestational diabetes is first seen at 21 weeks of gestation. Her ultrasound examination shows a single fetus with normal facial & thoracic regions but caudal structures are abnormal & high-ending, club-shaped spinal cord. Kidneys are absent, lumbar & sacral vertebrae are missing and the hind limbs are fused.

	By the end of this session the students will be able to:	Importance
	**Embryology** ● Justify the statement that the second week is known as "week of two's." ● Enumerate the sequential phases of human development during third week ● Define Gastrulation ● Identify the various phenomenon during second and third week of development on the given model and diagrams ● Recognize the embryological basis of sacrococcygeal teratoma, Holoprosencephaly, caudal dysgenesis, Situs in versus **General Anatomy:** ● Comprehend the general concept of structure of joints and spinal nerve. **Histology** ● Describe the characteristic features of various types of connective tissue proper. ● Explain the composition of the ground substance	Must know
	● Focus and identify dense connective tissue under the microscope at 10X magnification. ● Give two points of identification	Must Know

The Mermaid Myth Connection:

Caudal dysgenesis, especially in its extreme form (sirenomelia), has been speculated to inspire legends of mermaids due to its characteristic fused lower limbs. This adds a strange cultural angle to a medical condition.

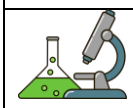
Physiology

A Patient with intermittent fever and flu-like symptoms

A 48-years-old shopkeeper presented in medical OPD with 5 months history of on and off fever associated with flu like symptoms. Several antibiotic courses and malaria treatment had already been prescribed to the patient with no cure. He also gave history of two pint blood transfusion one year back when he suffered a road traffic accident. . His wife informed that all his clothes have become loose in last few months. On examination the patient was pale with macular skin lesions on neck and abdomen. There was lymphadenopathy and splenomegaly. Along with the routine blood tests, the physician advised for HIV (Human immunodeficiency virus) serology that was found positive. CD 4 /CD8 ratio was decreased with leukopenia. A diagnosis of acquired immunodeficiency syndrome was made.

What does the decrease in CD 4 /CD8 ratio signifies?

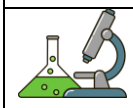
	By the end of this session the students will be able to:	Importance
 	• List the types of immunity. • Discuss the mechanism involved in development of immunity. Discuss the processing of T & B lymphocytes in human body. • Give a brief account on lymphocyte cloning. • Define immunization & List its types. • Discuss the role of memory cells involved in the process of immunization. • Compare & contrast active and passive immunity. • Describe the physiological basis of vaccination. • Comprehend the concept of humoral immunity. • Discuss the structure of antibodies. • Classify antibodies. Discuss their functions. • Explain the role of antibodies in B-cell immunity • Discuss the mechanisms through which antibodies directly attack an invading agent. • Give an account on the indirect action of antibodies on invading agent through complement system. • List the various complement proteins and their functions. • Discuss the role of antigen presenting cells in cell mediated immunity.	Must know

	• Explain role of helper T cells, cytotoxic T cells and suppressor T cells in T cells immunity. • Discuss the role of interleukins released by helper T cells in facilitating both B & T cell immunity. • Comprehend the role of CD4 & CD8 markers in identification of an invading agent.	
	• Explain different types of allergies. • Discuss the mechanism involved in development of an allergy & hypersensitivity. • Explain the role of basophils and mast cells in the release of inflammatory mediators in response to allergens reagent binding. • Discuss the anti-allergic role of eosinophil.	Must know
	• Define autoimmunity. Discuss the pathophysiological process involved in development of autoimmunity • Discuss the pathophysiological process involved in transplant rejection of tissues by human body. • Discuss the mechanisms involved in immune tolerance.	Good to know
	● List the components of Leishman's stain. ● Prepare satisfactory blood films, fix and stain them ● Identify different blood cells in a film and indicate the identifying features of each type of leukocytes. ● Determine differential count and express results in their percentages and absolute numbers.	Must Know

CD4 is the brain, CD8 is the muscle. CD4 cells don't fight they give orders. They release cytokines that switch on B cells, CD8 cells, Macrophages. They are True immune influencers. **HIV specifically targets CD4 cells** That's why CD4 count reflects immune strength. They recognize MHC Class II**.** They are Found on antigen-presenting cells (APCs). Memory trick **CD4 → 4 letters → Class II**

CD8 cells kill infected cells directly**.** They cause "clean kills"**.** They induce apoptosis using Perforin, Granzymes. They target virus-infected & tumor cells**.**They recognize MHC Class I**.** they are Present on all nucleated cells**.** Memory trick: **CD8 → 8 letters → Class I**

Biochemistry

	By the end of this SESSION the first-year MBBS students will be able to:	Importance
	• Classify enzymes in relation to medical biochemistry • Write down the mechanism of action of enzymes • Write down the mechanism of action of enzymes • Explain the components of enzymes (apoenzyme, holoenzyme, coenzymes, co factors and prosthetic group) with their biochemical importance •	Must know
	• Explain role of minerals as cofactors • Describe role of Vitamins as coenzymes I (B1, B2, B3, B6, biotin, pantothenic acid)	Good to know
	• Describe the factors affecting enzyme activity Define Michaelis-Menten equation & Lineweaver Burk plot and its application in enzyme kinetics (no derivation of equations) • Compare & contrast different types of enzyme inhibitions with examples & biomedical importance • Explain regulatory enzymes	Must know
	• Demonstrate protein separation by Electrophoresis	Must Know

NOTES:

Important concepts:

Exam style question:

Teacher's expectation:

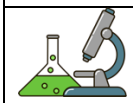
Week 6

Anatomy

A male with fractured Clavicle

A 23-year-old male arrives at the emergency department following a motorcycle accident involving a collision with a car. He felt a sudden sharp pain in his right shoulder and noticed a visible deformity soon after collision. He is having limited range of movements in his right arm due to pain. Examination reveals significant swelling in right shoulder with palpable deformity (visible step-off) and tenderness to palpation. There is no sign of neurovascular compromise. Radiological examination shows a transverse fracture of the right clavicle in the middle third, with significant displacement.

- Why is determining the age of an embryo important?
- How do you believe embryonic age is determined?

	By the end of this session the students will be able to:	Importance
	**Embryology** ● Enumerate the sequential phases of human development during third week ● Describe the establishment of body axis. ● Define neurulation and describe process of formation of neural plate, neural tube and neural crest cells. **Gross Anatomy** ● Introduction to upper limb bones. ● Side determination, anatomical position, features and attachments of the clavicle ● Discuss the clinical implications in fractures of this bone at different sites ● Explain the relationship of clavicle with the surrounding structures. ● Determine the side of scapula. ● Identify important bony landmarks and locate attachments of major muscles and ligaments attached on scapula. ● Describe the actions of the muscles attached to clavicle and scapula and their relevance to shoulder function. ● Describe the sternoclavicular and acromioclavicular joints.	**Must Know**
	● Focus and identify reticular and adipose tissue under the microscope at 10X magnification. ● Give two points of identification	**Must Know**

The clavicle is the only contact between our entire (axial) skeleton and the arm. Its common name, "collarbone", accurately reflects its position and shape.

- The only long bone that lies horizontally

CLAVICLE FRACTURE

- https://www.youtube.com/watch?v=rdTkcOQ3Dzk&t=40s
- https://www.youtube.com/watch?v=yxfYpoLZ3whttps://www.youtube.com/watch?v=qdVLMxuLJQQ

Physiology

A pregnant woman with Rh negative blood group

A 29-year-old pregnant woman (G2P1) at 28 weeks of gestation, presents with fatigue, paleness, and reduced fetal movements. She has no significant past medical history and her previous pregnancy was uneventful, where she delivered a healthy baby boy. Routine blood tests reveal that she is O-negative (while her husband is O-positive) and has anti-D antibodies. Given this blood type incompatibility, she is counseled on the need for cross-matching, and an ultrasound is done. The ultrasound shows signs of fluid accumulation in fetal tissues (hydrops fetalis) and an enlarged liver and spleen. Immediate intrauterine transfusions are considered to manage fetal anemia and improve the baby's chances of survival. Postpartum Rh immunoglobulin (RhIg) administration is emphasized for future pregnancies.

What can be the reason of fluid accumulation in fetal tissues (hydrops fetalis) and an enlarged liver and spleen?

	By the end of this session the students will be able to:	Importance
 	• Describe the principles of blood grouping and cross-matching. • Tabulate the various blood groups. • Tabulate the genotype & phenotypes of ABO blood group system. • Comprehend different Rh blood group systems and their significance • Tabulate the genotype & phenotypes of Rh blood group system	Must know
	Clinical Relevance • Identify the need for cross-matching to avoid blood group incompatibility. • Discuss the pathophysiology of Erythroblastosis Fetalis, its treatment and precautions	Must know

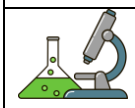
	• Describe the physiological basis of blood grouping and its clinical significance.	Must Know
	• Determine blood group by using commercially available anti-sera.	

Our blood group is decided before we are born**.** ABO antigens are genetically determined**.** Blood group O is the most common worldwide. Group O is the universal donor**.** O^- blood can be given in emergencies. But O^+ cannot be given

to Rh-negative patients. Group AB is the universal recipient. ABO mismatch causes the most severe transfusion reactions, one of the fastest medical emergencies. Naturally occurring IgM antibodies cause immediate hemolysis**.** ABO antigens are not just on RBCs**.** They are also on epithelium, saliva, and platelets.

Rh incompatibility causes hemolytic disease of newborn. Prevented with anti-D (RhoGAM**)** injection. Rh^+ is dominant genetically**.** One Rh^+ gene = Rh-positive. Rh-negative needs two negative genes.

Biochemistry

	By the end of this session the first-year MBBS students will be able to:	Importance
	• Give a brief account of chemistry of Porphyrins	Nice to know
	• Elaborate Heme Biosynthesis • Explain degradation of Heme, formation of bile pigments, their types, transport and excretion • Elaborate Hexose Mono Phosphate (HMP) shunt	Must know
	• Identify different parts of microscope.	Must know
	• Estimate and clinically Interpret the levels of Hb in Blood	

NOTES:

Important concepts:

Exam style question:

Teacher's expectation:

Week 7

Anatomy

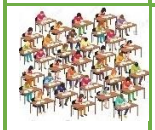
Lump in the Breast

A 52-year-old female presents with a painless lump in the left breast for 4 months which has progressively increased in size. There is no associated pain, redness, or warmth over the lump and no nipple discharge or bleeding. She gives the history of her mother, who was diagnosed with breast cancer at the age of 62.

On examination, a 4 cm hard, irregular lump is palpable in the left breast's upper outer quadrant, which is fixed to the surrounding tissue but not to the chest wall. Overlying skin shows slight dimpling and the nipple appears retracted. The right breast appears normal. A firm nodule measuring 1.5 cm is palpable in the left axilla.

Mammography shows a spiculated mass with microcalcifications. Breast Ultrasound shows a solid hypoechoic lesion with irregular margins. Core Needle Biopsy confirms Invasive ductal carcinoma with no lung and skeletal metastases. Abdominal ultrasound appears normal.

- What is the significance of family history in this case?
- What does the dimpling of overlying skin and nipple retraction show?
- What is the most likely significance of abdominal ultrasound in this case?

	By the end of this session the students will be able to:	Importance
	**Gross Anatomy** ● Comprehend the structure of breast tissue ● Describe the blood supply and lymphatic drainage of breast. ● Describe the clinical importance of sentinel lymph node. ● Trace the possible routes of metastasis of breast cancer. ● Tabulate the attachments, nerve supply and actions of muscles attaching upper limb to thoracic wall. ● Describe the attachment of pectoral fascia.	Must know
	**Embryology** ● List derivatives of Surface ectoderm, Neuroectoderm, Neural crest, Intraembryonic mesoderm (paraxial, intermediate, lateral plate), Endoderm. ● Correlate the developmental events during the embryonic period with relevant congenital anomalies.	Must know

- Breast cancer has been called the “nun’s disease” because of the high number of nuns affected. All women who never have children, are at an increased risk of dying from breast, ovarian and uterine cancers, compared with mothers. A woman's risk of getting these cancers increases with the number of menstrual cycles she experiences.
- You may be more likely to get breast cancer if you have a male relative who’s had the disease. This is especially true if it’s a close family member like a father, brother or son. If you fall in this group, talk to your doctor about genetic testing to find out if cancer runs in your family.

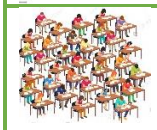
Physiology
One-year-old baby with excessive bleeding after injury

A 1-year-old boy was brought to the emergency department by his mother for oozing of blood from his mouth following a fall nearly 6 hours ago. His mother related that he tended to bleed for prolonged periods from his immunization sites, but there was no history of bruising or hematomas. There was known family history of a bleeding disorder as his other brother was diagnosed as having hemophilia A. On examination he was alert, in no apparent distress, development appropriate for age. Two small lacerations on the inside of lower lip were oozing blood. His pulse was 92/min, RR 18/min, BP 100/70 mmHg and temperature of 37ºF. He was admitted to hospital and was transfused factor VIII**.**
His laboratory findings showed:

Hemoglobin	**12.3 g/dl (10.5-13.5)**	**PT**	**11.3s (10.0-12.8)**
Hematocrit	35.4% (33.0-39.0)	APTT	37.2s (24.4-33.2)
WBC	7.9 x 10^9/L (6.0-17.5)	Factor VIII	0.8% (1- 5%)
Platelets	368 x 10^9/L (156-369)		

He was diagnosed as a case of hemophilia A.

What does PT and APTT findings suggest?

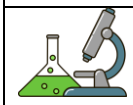
	By the end of this session the students will be able to:	Importance
 	• Discuss the four steps involved in blood coagulation. • Discuss the morphology, development & functions of platelets in all the four steps of blood coagulation. • Discuss the role of alpha & dense granules in platelet plug formation. • Comprehend the physiology of clotting factors and mechanism of blood clotting. • Compare & contrast intrinsic and extrinsic pathway of clotting. • Discuss the effect of deficiency of platelets and clotting factors in hemostasis. • Discuss the pathophysiology of blood dyscrasias like Vitamin K deficiency, Hemophilia and Thrombocytopenia	Must know

	• Compare & contrast Hemophilia with Thrombocytopenia. • Recall the functioning/changes in the coagulation pathway in case of deficiency of clotting factors	
	<u>Clinical Relevance</u> • Correlate decreases in platelet count/ functional defects of platelets and bleeding diathesis (ITP) • Correlate deficiencies of clotting factors VIII & IX with its varied clinical manifestations (Hemophilia)	
	• Indicate the clinical importance of bleeding time and clotting time.	Must know
	• Determine the bleeding and clotting time.	

Hemophilia Small cut big bleeds spread through European royal families. Queen Victoria was a famous carrier**.** It's called the royal disease.

Aspirin permanently disables platelets. Platelets aren't real cells. No nucleus, Just cytoplasmic fragments from megakaryocytes. They stick before they **clot**. Adhesion → aggregation → secretion, von Willebrand factor is their glue. Platelet granules are their mini toolkits

Biochemistry

	By the end of this session the first-year MBBS students will be able to:	Importance
	• Discuss Porphyrias • Discuss Hyperbilirubinemia and jaundice • Discuss biochemical basis of Hemolytic anemia (G6PD deficiency) • Describe Role of Iron, Vit B9 & B12 in Nutritional Anemia • Comprehend role of Vitamin C & K in bleeding disorders	Good to know
	• Describe the structure, classification and biochemical functions of Plasma proteins & Immunoglobulins	Must know
	• Estimate and clinically Interpret the levels of Bilirubin in Blood	Must know

NOTES:

Important concepts:

Exam style question:

Teacher's expectation:

Introduction to the module:

Dear students

Welcome to the "Musculoskeletal-1 (MSK-I)," the final module of Block 1. In this module, you will study the bony structures, nerves, muscles, and biomechanics of the upper limb, as well as the fundamentals of nerve and muscle action, which are important for understanding neurological deficits. Hopefully, it will be an interesting study as you will learn about:

- The most mobile joint of the body … the shoulder joint
- How two bones in the arm can bring about movements crucial for turning a door knob and a screw driver?
- The unbelievable dexterity and strength of your hands

You will also be introduced to the histology of muscles, where you will explore the
microscopic structure of various varieties of muscle, connective tissue components, and the organization of sarcomeres—the basic contractile units of muscle. Understanding muscle histology will help you link structure to function and appreciate how microscopic changes can lead to clinical consequences.
Then you will zoom in to comprehend the action of nerves and muscles by learning the basics of nerve action potential, the electrical signal through which the nervous system communicates with the muscles.

The content may seem overwhelming to you compared to the previous module (The cell-structure and function) because here you will encounter a multitude of new information that you have to process and remember. I would like to suggest a few strategies here: You can use mnemonics and acronyms for bones, as well as mind maps for remembering nerves, vessels, and their branches. I would recommend active recall and self-quizzes to memorize the information for longer.

The study guide, like the previous one, is organized around the themes represented by clinical vignettes, which must be referred to and discussed in the SGDs and CBLs. The teaching and assessment strategies are the same.

I wish you the best of luck with the hope that you will enjoy learning MSK-I

Structured summary/overview of themes

Block Code	YIBI-MIII
Prerequisite Block	**YIBI-MII**
Duration	**5 weeks**
Anatomy	**General histology** ▪ Muscle **General embryology** ▪ Somitogenesis ▪ Folding of embryo ▪ Intraembryonic coelom ▪ Angiogenesis and vasculogenesis **General Anatomy** ▪ Muscle ▪ Organization of the central and peripheral nervous system ▪ Dermatomes receptors, effectors. **Gross Anatomy** ▪ Upper limb
Physiology	**Nerve physiology:** ▪ Neuron and synapse ▪ Resting membrane potential & action potential ▪ Neuro muscular junction **Muscle physiology:** ▪ Skeletal muscle morphology, contraction, and relaxation ▪ Smooth muscle morphology, contraction, and relaxation
Biochemistry	• Chemistry of Carbohydrates • Digestion and Absorption of Carbohydrates • Metabolism of Carbohydrates
Surgery	Principles of surgical management of fractures/dislocations of the upper limb
Medicine	▪ Myasthenia gravis ▪ Upper limb nerve injuries

Week 1

Anatomy

A Middle-Aged Man with Shoulder Pain

A 52-year-old male office worker complains of persistent right shoulder pain and limited mobility for 4-6 months. The pain, initially mild and intermittent, is now constant and worsens after waking up. He reports progressive restriction in the range of motion, particularly in abduction and external rotation, especially difficulty lifting his arm and rotating it outward. No history of trauma is noted. No significant history of previous shoulder problems or injuries. Physical Examination reveals no visible deformity or asymmetry in the shoulder joint, no signs of inflammation such as redness or swelling. Palpation reveals tenderness on palpation of the anterior and lateral aspects of the shoulder joint, particularly over the capsule.

- What could be the possible clinical conditions mimicking this scenario?
- What do you think could be the reason for pain worsening at waking up?

	By the end of this session, the students will be able to:	**Importance**
	**Gross Anatomy** • Explain the anatomical basis of the signs and symptoms experienced by the patient in this clinical condition. • Describe the bony landmarks with muscular attachment on the humerus and its clinical correlates. • Explain the role of rotator cuff muscles in maintaining functional mobility and stability of the shoulder during daily activities and sports. • Explain the clinical importance of the rotator cuff muscles. • Correlate the normal anatomy of the shoulder joint with the anatomical changes that occur in adhesive capsulitis. • Explain the anatomical components of the shoulder joint emphasizing the joint capsule, ligaments, tendons, and the bursae surrounding the joint.	**Must know**

	• Elucidate the movements at shoulder joint with reference to axis and muscles producing them. • Justify the clinical presentation of shoulder joint dislocation on anatomical basis. • Justify the stability of the shoulder joint in spite of wide range of movements it offers by describing the factors responsible • Explain the neurovascular and muscular structures of the scapular and the superficial back region. • Describe scapular anastomosis & its clinical importance • Explain the scapular-humeral mechanism • Identify the boundaries and contents of the quadrangular and triangular spaces. • Appraise the shape and extent of axilla • Enumerate different structures that form the walls of the axilla and identify their inter-relationship. • Enumerate contents of axilla. • Describe the relations and distribution of the vessels in the axilla.	

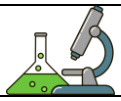
- **The "Frozen" term is misleading:** While it's called "frozen" shoulder, the joint isn't actually frozen. The term refers to the significant stiffness and loss of motion that occurs.
  Think of your shoulder like a door hinge. When it's' frozen', it doesn't swing open or closed properly. So, when you lie down, it's like someone's squeezing that hinge, putting pressure on the joint.
- **It's a Silent Thief of Motion:** Frozen shoulder often creeps up slowly, with subtle stiffness that gradually worsens. This can make it difficult to pinpoint the exact cause or when it began.

Physiology
Functional Organization of Nerve & Muscle
A young adult with episodic limb weakness and visual loss

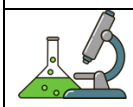
A 24-year-old woman presents with intermittent blurred vision in one eye and weakness in her right leg. Symptoms improve over weeks but recur months later. Examination shows decreased visual acuity and hyperreflexia.

What could possibly be the reason of this condition of patient?

	**By the end of this LGIS, the first-year MBBS students will be able to:**	**Importance**
	• Define and identify the following regions on a diagram of a motor neuron: dendrites, axon, axon hillock, soma, and an axodendritic synapse. • Classify synapses on anatomical & functional basis. • Elucidate structural and functional changes taking place in nerve fibers after injury. • Grasp the concept of Nernst potential and its importance in the generation of resting membrane potential. • Comprehend different mechanisms responsible for the genesis of membrane potential (role of channels, carrier proteins). • Describe the normal distribution of Na+, K+, and Cl- across the cell membrane, and using the Goldman equation, explain how the relative permeability of these ions creates a resting membrane potential. • Explain how the abnormal function of ion channels (channelopathies) can alter the resting membrane potential	**Must know**

	By the end of this SGD, the students of first-year MBBS will be able to:	Importance
	• Describe the clinical significance of ESR. • Explain the reason for red cells settling down. • Indicate factors affecting their rate of settling. • Define rouleaux formation.	• **Must know**
	• Determine the ESR of the given sample.	• **Must know**

Biochemistry

	**By the end of this LGIS, the first-year MBBS students will be able to:**	**Importance**
	● Outline the phase reactions and regulation of Glycolysis ● Describe the bioenergetics of Aerobic and Anaerobic glycolysis and their biochemical importance ● Discuss the fate of Lactic acid & Pyruvate ● Draw Cori's cycle ● Outline the reactions of the Citric Acid Cycle ● Describe the energetics, regulation, importance, anaplerotic, and amphibolic nature of the citric acid cycle	**Must know**
	● Estimate and Clinically Interpret the Proteins in Blood	**Must know**

NOTES:

Important concepts:

Exam style question:

Teacher's expectation:

Week 2

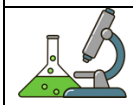
Anatomy

A Newborn with Abnormal Posture of The Upper Limb

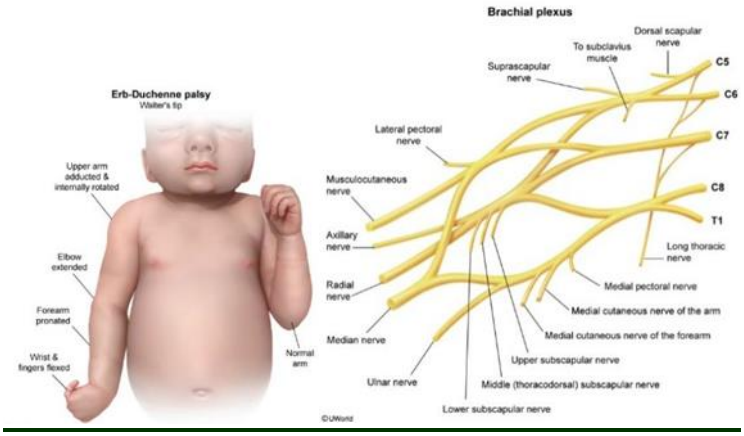
A 3-day-old infant is brought to the pediatrician for a follow-up check-up after a difficult delivery. The mother reports that the birth was prolonged, with the baby being in a breech position. The child was delivered by forceps, and the mother noticed that the baby had difficulty moving one arm shortly after birth. She noticed that the right arm is limp and the baby doesn't seem to respond to stimuli as actively on that side. The arm appears to hang loosely by the side, and the fingers on the affected hand are not gripping. On Physical Examination, the physician noticed that the infant is alert, but there is asymmetry in muscle tone and movement; the right arm is adducted and internally rotated. The forearm is pronated, the fingers are relaxed, and there is no spontaneous grasp. and there is no active movement or resistance to passive movement. On Palpation**,** there are no obvious fractures or signs of dislocation, but tenderness is noted over the upper arm and shoulder.

- Can you think of the possible causes of weakness of the arm in this patient?
- Why was the arm in this specific position?
- What is the role of forceps delivery in causing this clinical condition?

	**By the end of this session, the students will be able to:**	**Importance**
 	**Gross Anatomy** ● Describe the formation and name the branches of the brachial plexus. ● Illustrate the brachial plexus. ● Analyze the anatomical basis of clinical presentation such as Klumpke`s paralysis and Erb Duchenne Palsy in case of injury to various nerves of brachial plexus. ● Correlate the lesions of the following nerves with respective areas of sensory and motor loss and peculiar positions of upper limb: ○ Axillary ○ Long thoracic ○ Musculocutaneous ○ Ulnar ○ Median	**Must know**

	○ Radial ● Explain the Osseo fascial compartments of arm (bones, muscles, neurovascular structures) along with relevant clinicals. **General embryology:** ● Explain somitogenesis and differentiation of somites. ● Explain the development of intraembryonic coelom. ● Correlate the folding of embryo in horizontal and vertical planes with its consequences. **Histology** ● Describe the light microscopic characteristics of skeletal muscles	
	● Focus and identify striated muscles under the microscope at 10X magnification. ● Give two points of identification	● **Must know**

The "Waiter's Tip" Position: One of the most noticeable signs of Erb's palsy is the "waiter's tip" posture of the affected arm. This happens because the child can't lift their arm, so it hangs down with the hand turned inward and the fingers relaxed—looking a bit like someone waiting for a tip!



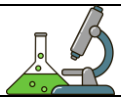
Physiology
Functional Organization of Nerve & Muscle

Numbness and Tingling

A 20-year-old female presents to the neurology OPD with progressive weakness in her arms and legs, accompanied by numbness and tingling. She also reports gait disturbance, urinary incontinence, and blurring of vision. She states that these symptoms occur in episodes lasting 5–7 days, during which she feels significantly impaired. These episodes have occurred three times in the last year and resolve completely in between attacks. On examination, there is weakness in her legs with reduced power, and cerebellar signs are positive. MRI brain showed demyelination plaques in peri-ventricular, infra-tentorial region, and spinal cord. The most probable diagnosis is multiple sclerosis.

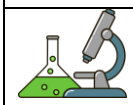
	**By the end of this LGIS, the first-year MBBS students will be able to:**	**Importance**
	• Define action potential. Draw different phases of the action potential and explain the ionic & electrical changes occurring during each phase of the action potential • Differentiate between absolute and relative refractory periods • Discuss the role of positive feedback mechanisms in initiation of an action potential • Distinguish the effects of hyperkalemia, hypercalcemia, and hypoxia on the resting membrane potential & action potential • Discuss the process of generation of nerve impulse and its transmission in different types of nerve fibers (myelinated and non-myelinated nerve fibers) with their characteristics. • Understand the concept of all or nothing principle in propagation of an action potential • Explain the concept of saltatory conduction • Discuss the properties of contiguous conduction • Differentiate between myelinated and nonmyelinated nerve fibers based on their structure and characteristics. • Illustrate neuromuscular junction, sequence of events taking place during neuromuscular transmission and factors affecting this process.	**Must know**
	Clinical Relevance • Appreciate the effect of acidosis and alkalosis on synaptic transmission.	**Must know**

	• Explain the effect of hypocalcemia on permeability of sodium Channels.	

	By the end of this SGD the students of first-year MBBS will be able to:	Importance
	● Define hematocrit. ● Give normal values of hematocrit. ● Describe the clinical importance of hematocrit.	**Must know**
	● Determination of Hematocrit of given sample.	**Must know**

It's an electrical problem, Vision problems are often the first sign. Heat can temporarily worsen symptoms called as Uhthoff's phenomenon**.** Hot shower → conduction block in demyelinated fibers.Women are affected more than men**.** More common in people living farther from the equator, sunlight & vitamin D may play protective roles. It's autoimmune but not purely genetic.

Myelin increases membrane resistance**.** Loss of myelin → current leaks → failure of saltatory conduction. Conduction becomes slower, not always absent**.** That's why symptoms can be subtle at first. Sodium channels redistribute**.** Demyelinated axons try to compensate. But this increases energy demand and fatigue. Fatigue is one of the most common symptoms**,** Not just weakness — neural conduction becomes inefficient. Plaques prefer white matter.

	**By the end of this LGIS, the first-year MBBS students will be able to:**	**Importance**
	● Discuss important bypass reactions, regulation & significance of gluconeogenesis ● Compare and contrast Glycolysis & Gluconeogenesis ● Describe the metabolism of Fructose, Galactose, and Lactose ● Describe the structure and metabolism of glycosaminoglycans, proteoglycans & glycoproteins ● Discuss Glycogen metabolism ● Write down reactions of Glycogenesis and Glycogenolysis ●	**Must know**
	● Perform Qualitative Analysis of Carbohydrates	**Must know**

NOTES:

Important concepts:

Exam style question:

Teacher's expectation:

Week 3

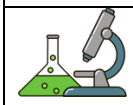
Anatomy

A 25-Year-Old Male with Elbow Pain and Swelling After a Fall

A 25-year-old male presents to the emergency department after a bicycle accident. He fell on his outstretched hand and complains of pain, swelling, and limited movement of his elbow. On examination there was visible deformity at the elbow, tenderness over the lateral aspect of the forearm, restricted flexion and extension at the elbow joint, and mild numbness over the lateral forearm and hand.

Analyze the relationship between elbow and forearm anatomy and the patient's clinical presentation, including deformity, restricted movement, and sensory deficits, to identify possible fracture sites, joint injuries and nerve involvement.

	**By the end of this session, the students will be able to:**	**Importance**
	**Gross Anatomy** ● Determine the side of radius and ulna. ● Identify important bony landmarks on these bones and locate attachments of major muscles and ligaments attached to these bones. ● Discuss the clinical implications in fractures of these bones at different sites ● Explain the boundaries of the cubital fossa and identify its contents. ● Justify the clinical importance of blood vessels present in cubital fossa with special reference to phlebotomy. ● Describe the type, capsule, ligaments, blood supply and nerve supply of elbow joint ● Explain the movements of elbow joint. With reference to axis and muscles performing these movements. ● Justify the anatomical basis of carrying angle ● Correlate the anatomy of elbow joint with clinical presentations of its dislocation **Embryology** ● Explain the process of formation of blood vessels. ● Define hemangioma and explain its embryological basis. **Histology**	**Must know**

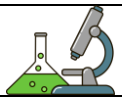
	• Describe the light microscopic characteristics of cardiac and smooth muscles • Tabulate the microscopic differences among the three types of muscles	
	• Focus and identify non-striated muscles under the microscope at 10X magnification. Give two points of identification	**Must know**

Physiology
Movement and Energy

Progressive Weakness

A 40-year-old lady presents to you with progressive weakness that worsens as the day progresses. She reports difficulty keeping her eyelids open and experiences double vision by the evening. She also has difficulty chewing food during dinner, although breakfast is easier to manage. On examination, there is bilateral ptosis and fatigable weakness in the upper limbs, but her reflexes and sensory examination are normal. The most probable diagnosis is myasthenia gravis.

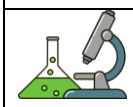
	By the end of this LGIS, the first-year MBBS students will be able to:	**Importance**
	• Illustrate the physiologic anatomy of skeletal muscle • Explain the structure of the myosin molecule& its subunits, and describe the function of the subunits • Identify the structure of the thick and thin myofilaments and label the constituent proteins • Tabulate macroscopic, microscopic, and functional differences of various types of muscles • Appreciate the ionic and chemical basis of muscle contraction and relaxation. • Explain how the cross-bridge cycle results in shortening of the muscle. • List the steps in excitation-contraction coupling in skeletal muscle, and describe the roles of the sarcolemma, transverse tubules, sarcoplasmic reticulum, thin filaments, and Ca^{++}.	**Must know**
Clinical Relevance: • Explain the pathophysiology of Myasthenia Gravis.		**Must know**

	By the end of this SGD, the students of first-year MBBS will be able to:	**Importance**
	• Explain the clinical relevance of hemoglobin estimation. • List the common causes of increased and decreased levels of Hb.	Must know
	• Determine the hemoglobin estimation of the given sample.	Must know

The nerve signal is normal. The muscle reply is weak It's a "receptor problem," not a neurotransmitter problem. Eye muscles are often first affected. It means

“grave muscle weakness but it’s treatable. The edrophonium test was once a quick diagnostic trick. More common in young women and older men**.** It has Bimodal distribution more common in young females and Older males. Myasthenic crisis can affect breathing

Biochemistry

	**By the end of this LGIS, the first-year MBBS students will be able to:**	**Importance**
	• Outline the importance of UDP-Glucose & regulation of Glycogen metabolism • Compare and contrast glycogenesis and glycogenolysis • Clinical significance of Glycolysis (Pyruvate kinase deficiency, Arsenic poisoning, Lactic acidosis) • Clinical significance of TCA • Clinical significance of Gluconeogenesis • Correlate the metabolism of Fructose, Galactose, and Lactose with relevant metabolic disorders/enzyme deficiencies • Describe the disorders of Glycogen metabolism (Glycogen Storage Diseases) •	**Must know**
	• Perform Qualitative Analysis of Carbohydrates	**Must know**

NOTES:

Important concepts:

Exam style question:

Teacher's expectation:

Week 4

Anatomy

A woman with pain and tingling in the hand

A 28-year-old dentist presents with tingling and slight pain in her right hand. The symptoms are localized to the thumb, index, middle, and lateral side of her ring finger. The sensations are more intense at night or if she overworks. Recently, she has experienced some weakness in her grasp and finds it more difficult to hold her instruments. Also, the movements of her right thumb are not as strong as before. On examination, there was loss of power in certain movements of the thumb. She has impaired appreciation of light touch and pinpricks to the thumb, index, middle, and lateral side of her ring finger, but sensations to her palm are not affected. Pressure and tapping over the flexor retinaculum cause tingling sensations. After a complete examination, the patient is diagnosed with carpal tunnel syndrome.

.

- What do you think is the correlation between this condition and certain professions?
- Why is there sensory sparing of the palm in this case?

	**By the end of this session, the students will be able to:**	**Importance**
	**Gross Anatomy** ● How do the patient's symptoms correlate with the typical presentation of carpal tunnel syndrome? ● Explain the anatomical basis of the signs and symptoms experienced by the patient in this clinical condition. ● Describe the muscles and neurovascular structures of the flexor and extensor compartments of forearm ● Elucidate the anatomical basis of clinical presentation of compartment syndrome of forearm, Volkmann's ischemic contracture, rupture of various tendons and tennis elbow. ● Highlight the clinical significance of radial artery with reference to pulse and BP monitoring and coronary angiography ● Describe the type, capsule, ligaments, blood supply and nerve supply of superior and inferior radioulnar joints.	**Good to know**

	● Explain the movements of superior and inferior radioulnar joints. With reference to axis and muscles performing these movements ● Describe the formation of the carpal tunnel with its contents. ● Explain the anatomical components of the wrist joint, emphasizing the joint capsule, ligaments, relations, movements, and clinical conditions associated with this joint. ● Explain the topographical anatomy of the skin and deep fascial modifications of the wrist and hand. ● Describe the attachments of, and structures passing deep to flexor and extensor retinacula in a sequential order. ● Explain the relations of the structures on the anterior and posterior aspects of the wrist. ● Correlate the anatomy of the flexor retinaculum with its clinical importance. ● Identify bones of an articulated hand ● Describe the course, motor and sensory supply of the median nerve. ● Two muscles affected by carpal tunnel syndrome are the abductor pollicis brevis and the Opponens pollicis. How would you test their function? ● Explain the clinical significance of injury to the scaphoid and hamate ● Explain the cutaneous innervation of the skin of the palm and dorsum of the hand ● Describe palmar aponeurosis ● Enumerate the small muscles of the hand with their actions and nerve supply.	

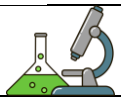
- Regular stretching can help build wrist strength and reduce pressure within the carpal tunnel. It is also a good idea to take frequent breaks during activities that involve repetitive wrist and hand movements to alleviate inflammation in the wrist.
- Carpal tunnel pain amplifies with repetitive grasping, unlike other nerve tunnel pain. And carpal tunnel syndrome symptoms are often worse at night,

which is not true of other conditions, such as tendonitis, which generally improves with rest.

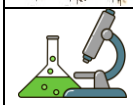
- Women are more likely to develop **CTS (Carpal tunnel syndrome)**: Women are three times more likely to develop CTS than men. This may be because women tend to have smaller carpal tunnels.

Physiology
Movement and Energy
Stiffening of muscle after death

A 55-year-old man is found unresponsive at home. On examination 4 hours after death, his jaw and neck muscles feel stiff. The stiffness gradually spreads to the trunk and limbs over the next few hours. A forensic examination 12 hours after death shows generalized stiffness of all skeletal muscles. The body posture is fixed.

	By the end of this LGIS, the first-year MBBS students will be able to:	**Importance**
	• Describe the roles of ATP in skeletal muscle contraction and relaxation. • Explain the energy expenditure during muscle contraction • Appreciate the characteristics and differences between isometric and isotonic contraction with the help of examples. • Compare and contrast slow and fast muscle fibers • Explain the relationship of preload, afterload, and total load in the time course of an isotonic contraction. • Explain the motor unit and its physiological importance. • Explain the physiological basis of rigor mortis. • Explain the concept of: ✓ Summation ✓ Treppe ✓ Skeletal muscle tone ✓ Muscle fatigue ✓ Tetanization ✓ Contracture remainder ✓ Muscle dystrophy	**Nice to know**
	By the end of this SGD, the students of first-year MBBS will be able to:	**Importance**
	• Determination of DLC	**Must know**

Biochemistry

	By the end of this LGIS the first-year MBBS students will be able to:	Importance
	● Revision	**Must know**
	● Estimate and Clinically Interpret the level of Glucose in Blood	**Must know**

NOTES:

Important concepts:

Exam style question:

Teacher's expectation:

Week 5

Anatomy

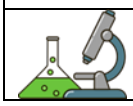
"A 50-Year-Old Male with Hand Stiffness and Numbness"

A 50-year-old male presents with gradual bending of his ring and little fingers over 6 months and tingling in the thumb, index, and middle fingers. He has difficulty gripping objects and notices tenderness along the flexor tendons.

On examination: there was flexion contractures of the ring and little fingers, positive Tinel's sign at the wrist, weak thumb abduction.

- If this patient tried to shake your hand, hold a cup or write, what movements would be most difficult and why?
- If only the thumb and index finger are numb but the ring and little finger move normally, which nerve is likely affected, and why does this pattern occur?

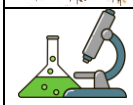
	**By the end of this session, the students will be able to:**	**Importance**
	**Gross anatomy** • Recognize the boundaries of anatomical snuff box and bony landmarks in its floor • Describe the fibrous and synovial flexor sheaths of the hand • Analyze the anatomical basis of Dupuytren's contracture, trigger finger and tenosynovitis of synovial sheaths of flexor tendons • Describe boundaries & contents of the spaces of the palm • Analyze the anatomical basis of palmar, Parona, and pulp spaces in case of wound, resultant infections, and route of surgical drainage. • Revisit the insertion of long flexor and extensor tendons • Describe the blood supply of hand. • Trace the pathway and distribution of radial, median, and ulnar nerves in hand and correlate with clinical presentation of their injuries • Blood supply and lymphatic drainage of the upper limb • Recap the veins in various parts to describe the blood supply of the upper limb as a whole. • Identify the veins commonly used for cannulation	**Must know**

	• Discuss the lymphatic drainage of the upper limb in detail in correlation with infection and malignant spread **Cutaneous innervation of the upper limb** • Correlate the dermatomes with the cutaneous innervation of specific nerves in the Arm & forearm • Illustrate cutaneous innervation and dermatomes of upper limb • Identify the area of sensory loss in case of injury to different nerves **Surface Marking** Mark the following structures on the surface of a subject or mannequin correctly: ▪ Axillary nerve ▪ Musculocutaneous nerve ▪ Median nerve ▪ Radial nerve ▪ Cephalic vein ▪ Basilic vein ▪ Median cubital vein ▪ Ulnar artery ▪ Radial artery ▪ Superficial palmar arch ▪ Deep palmar arch **Radiology:** Recognize various parts of the bones of upper limb on X-rays. **Revisit and revisions** • Identify various muscular, neurovascular, and ligamentous structures of the upper limb on models and prosected specimens • Revisits and revisions of the upper limb • MCQs and Seqs practice sessions • Exam guidelines • Models and specimens of Gross Anatomy and Embryology	
	Revision of histology slides	**Must know**

Physiology
Movement and Energy

	By the end of this LGIS the first-year MBBS students will be able to:	Importance
	• Enlist types of muscle remodeling • Summarize the effects of hypertrophy, hyperplasia & atrophy on the skeletal muscle structure and function • Explain the physiological basis of rigor mortis. • Comprehend the types of smooth muscles. • Differentiate between types of action potentials produced in different smooth muscles and appreciate the role of autonomic innervation, mechanical and humoral factors in their generation • Appreciate characteristics of smooth muscles (slow cycling of myosin crossbridge, low energy requirement to sustain contraction, latch mechanism & stress relaxation). • Illustrate the sequence of events leading to smooth muscle contraction and relaxation. • Give an account of the physiological anatomy of smooth muscle NMJ	**Must know**
	Clinical Relevance: • Explain the pathophysiological basis of Duchenne muscular dystrophy (DMD) • Explain the mechanism of recovery of muscle contraction in poliomyelitis	**Must know**
	By the end of this SGD, the students of first-year MBBS will be able to:	
	• Determine the Osmotic fragility of RBCs.	

Biochemistry

	**By the end of this LGIS the first-year MBBS students will be able to:**	**Importance**
	● Revision	**Must know**
	● Estimate and Clinically Interpret the level of Hb1Ac in Blood	**Must know**

NOTES:

Important concepts:

Exam style question:

Teacher's expectatio

Reference Books:

Subject/discipline	Title and Author	Edition
Anatomy		
Gross Anatomy	Clinical Anatomy for Medical Students by Richard Snell	12
	Essential Clinical Anatomy by Keith Moore	9
	Netter's atlas of human anatomy	8
	Last's anatomy regional and applied	12
	Grays Anatomy	42
	General Anatomy by Laiq Hussein	6
Histology	Basic Histology Text and Atlas by Luiz Carlos and Junqueira	16
	Basic Histology by Laiq Hussain Siddiqui	7
	DiFiore's atlas of histology	14
Embryology	Medical Embryology by Langman	15
	The Developing Human by Keith Moore	10

Other resources that can be explored:

- Google
- Learning resource center
- Handouts

Quick reference guide:

Apoptosis: Programmed cell death; removes damaged cells without inflammation.
Cilia: Hair-like structures; that move fluid or mucus.
Cytoskeleton: Network of protein fibers; that supports cell structure and movement.
Diploid: Two sets of chromosomes; typical of somatic cells.
Euploid: Correct number of chromosomes; normal cellular chromosome count.
Flagella: Tail-like structures; that enable cell movement.
Haploid: Single set of chromosomes; found in gametes.
Microvilli: Finger-like projections; increase surface area for absorption.
Necrosis: Unplanned cell death; causes inflammation.

Behavioral Sciences

S.#	Topic	Educational Strategies	Instructor	Importance (Must Know Good to Know Nice to Know)
1.	Metacognitive Strategies for Medical Students and Important of Metacognition	LGIS	Ms. Zunaira Naveed / Ms. Sara Rubab	Must Know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Analyze the significance of metacognition in learning and problem-solving.				
2.	Phases of Metacognition and Metacognitive Strategies for Medical Students	LGIS/Case Discussion	Ms. Zunaira Naveed / Ms. Sara Rubab	Must Know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Analyze the importance of metacognition in learning and problem-solving.				
3.	Importance of Sleep Hygiene: Define Sleep and explain Stages of Sleep	LGIS/Case Discussion	Ms. Zunaira Naveed / Ms. Sara Rubab	Must Know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Illustrate the significance of sleep hygiene in the well-being and academic performance of medical students.				
4.	Sleep Disorders and Factors contributing to Sleep Hygiene	LGIS/Case Discussion	Ms. Zunaira Naveed	Must Know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Illustrate the significance of sleep hygiene in the well-being and academic performance of medical students.				
5.	Steps for Sleep Induction and coping strategies for Insomnia	LGIS/Case Discussion	Ms. Zunaira Naveed	Must Know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Illustrate the significance of sleep hygiene in the well-being and academic performance of medical students.				

Professionalism				
1.	Introduction to Professionalism and its key elements	LGIS	Brig. Atif Bashir / Guest Speaker / BS Faculty	Good to know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Recognize the key principles of medical professionalism and articulate their significance in clinical practice. • Demonstrate an understanding of how professionalism influences patient care, communication, ethical decision-making, and the healthcare team dynamics.				
2.	Importance of Professionalism and its Attributes: 1. Self-care, Politeness, Respectfulness, Mindfulness	LGIS/Group Discussion/Small Group Discussion/Role Play	Mr. Saad Ul Hassan	Nice to Know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Recognize the key principles of medical professionalism and articulate their significance in clinical practice. • Demonstrate an understanding of how professionalism influences patient care, communication, ethical decision-making, and the healthcare team dynamics.				
3.	Attributes of Professionalism: 1. Selflessness, Professional Competency 2. Social Accountability	LGIS/Group Discussion/Small Group Discussion/Role Play	Mr. Saad Ul Hassan / Dr. Hira Munir	Must Know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Recognize the key principles of medical professionalism and articulate their significance in clinical practice.				
4.	Attributes of Professionalism: 1. Empathy/Sympathy 2. Adhere to Ethical Principles 3. Integrity & Honesty 4. Confidentiality and Trustworthiness	LGIS/Group Discussion/Small Group Discussion/Role Play	Mr. Saad Ul Hassan / Dr. Hira Munir	Must Know
Learning Outcomes with Assessment Strategy				

The students would be able to: • Recognize the key principles of medical professionalism and articulate their significance in clinical practice.				
5.	Attributes of Professionalism: 1. Moral Reasoning 2. Interaction with Patients	LGIS/Group Discussion/Small Group Discussion/Role Play	Mr. Saad Ul Hassan / Dr. Hira Munir	Must Know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Recognize the key principles of medical professionalism and articulate their significance in clinical practice.				
Leadership and Management				
1.	Introduction to Leadership and Management	Lecture/Group Discussions	Brig. Atif Bashir / Guest Speaker / BS Faculty	Must Know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Define key concepts of leadership and management and understand their roles in healthcare settings.				
2.	Foundation of Leadership and Management	LGIS/Role Play/Group Discussion	Mr. Saad Ul Hassan	Must Know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Identify various leadership styles and management strategies, • Explain how these skills contribute to effective team dynamics, patient care, and organizational success in healthcare environments.				
3.	Medical Leadership	LGIS/Role Play/Group Discussion	Dr. Hira Munir	Must Know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Analyze how these skills contribute to effective team dynamics, patient care, and organizational success in healthcare environments.				
4.	Importance of Medical Leadership in Medical Setting	LGIS/Role Play/Group Discussion	Mr. Saad Ul Hassan / Dr. Hira Munir	Must Know
Learning Outcomes with Assessment Strategy **The students would be able to:**				

• Explain how these skills contribute to effective team dynamics, patient care, and organizational success in healthcare environments.				
5.	Self-Management and its Mechanism	LGIS/Role Play/Group Discussion	Mr. Saad Ul Hassan / Dr. Hira Munir	Must Know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Analyze the importance of self-management skills and identify effective strategies for personal and professional development.				
Communication Skills				
1.	Introduction to Communication Skills: Difference b/w Verbal and Non-Verbal Communication	Lecture/Interactive Session/LGIS/Role Play	Brig. Atif Bashir / Guest Speaker / BS Faculty	Must Know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Analyze different styles of Communication skills. • Identify and overcome common communication barriers.				
2.	Effective Communication in Medical Practice	Lecture/Interactive Session	Ms. Zunaira Naveed	Must Know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Explain the principles of effective communication in medical practice. • Recognize its importance in building patient trust, fostering teamwork, and improving patient outcomes.				
3.	Communication Skills: 1. Conflict Resolution 2. Breaking Bad News	Lecture/Interactive Session/Role Play	Ms. Zunaira Naveed / Ms. Sara Rubab	Must Know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Identify the key strategies for conflict resolution and understand their application in healthcare settings. • Recognize the key principles and techniques for breaking bad news to patients and their families. • Demonstrate an understanding of the emotional and psychological impact of bad news.				
4.	Communication Skills	Interactive Session/Role Play	All Faculty	Must Know

Learning Outcomes with Assessment Strategy **The students would be able to:** • Apply strategies such as empathy, clear communication, and support to deliver difficult news with compassion and professionalism.				
5.	Communication Skills	Interactive Session/Role Play	All Faculty	Must Know
Learning Outcomes with Assessment Strategy **The students would be able to:** • Apply strategies such as empathy, clear communication, and support to deliver difficult news with compassion and professionalism.				

Learning Resources:

Reference books:

- Handbook of Behavioral Sciences (Mowadat Rana- 3rd Edition)

Recommended Readings:

- Behavioral Science (Barbara Fadem- 3rd Edition)
- High Yield Behavioral Science (Barbara Fadem-3rd Edition)

Teaching Faculty:

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Ms. Zunaira Naveed	naveedzunie@gmail.com
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Mr. Saad Ul Hassan	saadmirza101@gmail.com
Dr. Hira Munir	hiramunir144@gmail.com

Research Methodology

Topic/ Theme	Learning Outcomes	Learning Objectives/Contents	Instructional strategies
Introduction to research	Discuss historical background of research in medicine	Meaning, historical background, introduction to medical research, important terminologies	LGIS/ SGD
Importance of research	Discuss significance of research in medicine	Evidence based practice, application in health sciences	LGIS/ SGD
Introduction to research process	Explain the process and requirements of a good research for a doctor	Overview of process of research, characteristics of a good research, qualities of a good researcher	LGIS/ SGD
Types of research	Classify different types of research and its applications	Basic and applied; quantitative and qualitative, observational and interventional studies	LGIS/ SGD

Expository Writing

Learning Outcomes By the end of this course, students will be able to:	Course Contents	Instructional strategies
• Understand the essentials of the writing process integrating pre-writing, drafting, editing, and proofreading to produce well-structured essay s. • Demonstrate mastery of diverse expository types to address different purposes and audiences. • Uphold ethical practices to maintain originality in expository writing	**Introduction to Expository Writing**: • Understanding expository writing (definition, types, purpose and applications) • Characteristics of effective expository writing (clarity, coherence and organization) • Introduction to paragraph writing.	LGIS Presentation/
	The Writing Process: • Pre-writing techniques (brainstorming, free-writing, mind-mapping, listing, questioning and outlining etc.) • Drafting (three stage process of drafting techniques) • Revising and editing (ensuring correct grammar, clarity, coherence, conciseness etc.) • Proof reading (fine-tuning of the draft) • Peer review and feedback (providing and receiving critique)	
	Essay Organization and Structure: • Introduction and hook (engaging readers and introducing the topic)	

	• Thesis statement (crafting a clear and focused central idea) • Body Paragraphs (topic sentences,supporting evidence and transitional devices) • Conclusion (types of concluding paragraphs and leaving an impact) • Ensuring cohesion and coherence (creating seamless • Body Paragraphs (topic sentences, supporting evidence and transitional devices) • Conclusion (types of concluding paragraphs and leaving an impact) • Ensuring cohesion and coherence (creating seamless	
	Different Types of Expository Writing: • Description • Illustration • Classification • Cause and effect (exploring causal relationships and outcomes) • Process analysis (explaining step-by step procedures) • Comparative analysis (analyzing similarities and differences)	
	Writing for Specific Purposes and Audiences: • Different types of purposes (to inform, to	

	analyze, to persuade, to entertain etc.) • Writing for academic audiences (formality, objectivity, and academic conventions) • Writing for public audiences (engaging, informative and persuasive language) • Different tones and styles	
	Ethical Considerations: • Ensuring original writing (finding credible sources, evaluating information etc.) • Proper citation and referencing (APA,MLA, or other citation styles) • Integrating quotes and evidences (quoting, paraphrasing, and summarizing) • Avoiding plagiarism (ethical considerations and best practices)	
	Practical Applications and Capstone Project • As part of the overall learning requirements, students will be required *MBBS Curriculum Year-I (Version-IV) (2025)* Page | 104 to build a writing portfolio having a variety of expository texts and present the same at the end of the course showcasing proficiency in expository writing	

Islamiyat

- This course is designed to provide students with a comprehensive overview of the fundamental
- aspects of Islam, its beliefs, practices, history and influence on society. It will further familiarize
- the students with a solid foundation in understanding Islam from an academic and cultural
- perspective. Through this course, students will have an enhanced understanding of Islam's
- multifaceted dimensions which will enable them to navigate complex discussions about Islam's
- historical and contemporary role, fostering empathy, respect, and informed dialogue

Learning Outcomes By the end of this course, students will be able to:	Course Contents	Instructional strategies
Demonstrate enhanced knowledge of Islamic foundational beliefs, practices, historical development, spiritual values and ethical principles. • Describe basic sources of Islamic law and their application in daily life. • Identify and discuss contemporary issues being faced by the Muslim world including social challenges, gender roles and interfaith interactions.	**Introduction to Islam:** • Definition of Islam and its core beliefs. • The Holy Quran (introduction, revelation and compilation). • Hadith and Sunnah (compilation, classification, and significance). • Key theological concepts and themes (Tawhid, Prophethood, Akhirah etc.).Sirah of the Holy Prophet (Peace Be Upon Him) as Uswa-i-Hasana: • Life and legacy of the Holy Prophet PBUH. • Diverse roles of the Holy Prophet PBUH (as an individual, educator, peace maker, leader etc)	LGIS
	Islamic History and Civilization: • World before Islam. • The Rashidun Caliphate and expansion of Islamic rule.	

	• Contribution of Muslim scientists and philosophers in shaping world civilization	
	Islamic Jurisprudence (Fiqh): • Fundamental sources of Islamic jurisprudence. • Pillars of Islam and their significance. • Major schools of Islamic jurisprudence. • Significance and principles of Ijtihad.	
	Family and Society in Islam: • Status and rights of women in Islamic teachings. • Marriage, family, and gender roles in Muslim society, • Family structure and values in Muslim society	
	Islam and the Modern World: • Relevance of Islam in the modern world (globalization, challenges and prospects). • Islamophobia, interfaith dialogue, and multiculturalism.	

Clinical Photography & Video Graph

Learning Outcomes	Learning Objective/Content	Instructional Strategies	Teaching Faculty
Recognize the significance and ethical protocols of Clinical Photography and Videography	**Introduction to Clinical Photography and Videography** • Significance of clinical photography and videography in healthcare system • Ethical Protocols in healthcare system	Lecture/ Presentation	Dr. Usman ul Haq
Differentiate between various types, equipment and operating techniques of camera	**Understand Fundamentals of Photography** • Types of Camera including specifications • Understanding exposure (aperture, shutter speed, ISO) • Composition and framing techniques • Lighting considerations	• Lectures/Presentations • Interactive Video Vignettes • Large group Interactive session	
Capture highquality images and videos of medical procedures, patient interactions, and	**Understand Fundamentals of Videography** • Camera types and specifications for video recording	• Lectures/Presentations • Interactive Video Vignettes • Large group Interactive session	

other relevant clinical scenarios at workplace.	• Understanding frame rates, resolution, and video formats • Composition and framing techniques for video • Lighting considerations for video • Audio recording and considerations		
Select camera apparatus and equipment wisely	**Discuss Apparatus and Operation** • Choosing appropriate cameras and lenses • Additional apparatus • Setting up a clinical photography workspace followed by videography	• Lectures/Presentations • Interactive Video Vignettes • Large group Interactive session	
Demonstrate the awareness of cultural, social, and individual factors influencing patient participation	**Comprehend Active Patient Participation and Sanction** • Building rapport with patients • Obtaining informed consent for photography and videography • Explaining the purpose and	• Lectures/Presentations • Documentaries, Short • Films and Videos (e.g.on common ethical dilemmas) • Role-playing with peers • Case-Based Learning(CBL)	

	potential use of visual documentation		
Shoot standardized clinical images keeping in mind the advantages and limitations of different imaging modalities.	**Describe Medical Imaging Approaches** • Standardized views and angles for different body areas • Close-up and macro photography • Photographing wounds, scars, and skin conditions • Incorporating photography in	• Lecture/ Presentation • Interactive Video Vignettes	
Use video recording techniques at workplace for diagnostic, educational, and research purposes.	**Understand Videography Modalities in Clinical Settings** • Capturing medical procedures and surgeries • Planning and recording patient interviews • Recording and presenting clinical presentations	• Lecture/ Presentation • Interactive Video Vignettes	
Organize & Catalog visual media in patients' records meticulously.	**Handling and Cataloging of Images and Videos** • File formats and resolution	• Lecture/ Presentation • Interactive Video Vignettes	

	for images and videos ● Naming, organizing, and archiving visual documentation. ● Integrating photographs and videos into patient records		
Modify images & videos in accordance with ethical & professional guidelines	**Image and Video Optimization and Modification** ● Basic editing techniques for photographs and videos ● Removing identifying features and patient information ● Ethical considerations in image and video editing	● Lecture/ Presentation ● Interactive Video Vignettes	
Publish research papers on impact of adding visuals in patients' records	**Understand Research and Academic Visual Record Keeping** ● Using photography and videography for research and publications ● Integrating visuals into case reports and presentations ● Guidelines for image and video selection and	● Lecture/ Presentation ● Interactive Video Vignettes	

	presentation		
Analyze the legal & ethical implications of photography & videos in clinical practice	**Discourse Legal and Ethical Perspectives** ● Laws and regulations related to visual documentation ● Confidentiality and privacy protection ● Consent forms and documentation	● Lecture/ Presentation ● Interactive Video Vignettes	
Apply theory to practice in simulated & clinical settings.	**Hands-on Workshops and Clinical Scenarios** ● Hands-on practice with clinical photography and videography equipment ● Case-based discussions on appropriate visual documentation techniques ● Feedback and critique on photography and videography skills	● Lecture/ Presentation ● Large Group Interactions ● Worksheets ● Roll Plays ● Field Project ● Interactive Video Vignettes	

Assessment Policies:

During the block, you shall be continually formatively assessed in all three learning domains i.e., Cognitive, Psychomotor & Affective. The exam will be integrated with Anatomy , Physiology & Biochemistry as the main subjects with contribution from surgery and medicine.

- The weighting of internal assessment shall be 20% in 1st professional MBBS Examination.
- There shall be two integrated EBE and one integrated pre-annual examination. There will be no 3rd block exam.
- To be eligible to sit in the pre-annual exam a student must pass at least 50% of all the formal formative & summative assessments conducted during the year. The final decision of eligibility to sit in the pre-annual exam for the students failing to meet the requirements will be taken by the respective HODs & the DBOS. This decision will be on a case-to-case basis depending upon the student's performance in all 3 learning domains throughout the year.
- The scores of class tests, each integrated EBE & integrated pre-annual examination shall be used for calculation of the internal assessment.
- The Internal assessment will be calculated according to NUMS curriculum.

Internal Assessment Structure for theory	
Weighting 20%	
Component	**Weightings**
1. Attendance in theory learning sessions a. >90%=10 b. 80-89% = 7 c. 75-79% = 5	10%
EBE/ ECE (Theory)	45%
Continuous formal formative assessments- Average score in all the class tests or quizzes during the academic year	20%
Pre-Annual Exam	25%
Total	100%
Internal Assessment Structure for Practical	

Weighting 20%	
Component	**Weighting**
1. Attendance in practical learning sessions a. >90%=10 b. 80-89% = 7 c. 75-79% = 5	10%
2. OSPE/ OSCE conducted in EBE/ ECE	45%
3. Continuous formal formative assessments- Average score in all the skill tests during the academic year	20%
Pre-Annual Exam	25%
Total	100%

Integrated End Block and Integrated Pre-Annual Examination:

- There will be two integrated end-block examinations, one at the end of each of Y1B1 and Y1B2 blocks & one pre-annual examination at the end of the academic year.
- The structure of the paper of all the end block examination and pre-annual will be the same as that for the annual examination though syllabus will be different.
- The syllabus for integrated EBE will be announced by the department at least 02 weeks prior to examination.
- Integrated Pre-annual examination will include the whole syllabus.
- The date sheet for end block and pre-annual examinations will be prepared by coordinators of 1st & 2nd year while the examinations will be conducted by the respective departments.
- The result will be utilized for calculation of internal assessment which will be submitted to NUMS examination branch at least two weeks prior to the annual exam.

Rules &regulations:

Student's code of conduct

The Student Code of Conduct sets out the standards of conduct expected of students. It holds individuals and groups responsible for the consequences of their actions. Failure to fulfill these responsibilities may result in the withdrawal of privileges or the imposition of sanctions.

Wah Medical College is a community of students, faculty and staff involved in learning, teaching, research and other activities. All members of WMC community are expected to conduct themselves in a manner that contributes positively to an environment in which respect, civility, diversity, opportunity and inclusiveness are valued, so as to assure the success of both the individual and the community. The Student Code of Conduct reflects a concern for these values and tries to ensure that members of the WMC can make use of and enjoy the activities, facilities and benefits of WMC without undue interference from others.

WMC STUDENT CODE OF CONDUCT

- Discipline
- Decent dress
- Good Manners
- Smart Turn Out
- Healthy Activities
- No smoking
- No Abusive Language
- Cooperative Attitude
- Respect for All

Feedback on the study guide

We value your feedback and will use it for improvement of this Study guide. Kindly provide feedback for this study guide. At the email:
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dmewahmedicalcollege@gmail.com