



**LIAQUAT NATIONAL HOSPITAL AND MEDICAL COLLEGE**  
Institute for Postgraduate Medical Studies & Health Science



***Blood-1 Module***  
***13<sup>th</sup> April 2026 TO 9<sup>th</sup> May 2026***



**STUDY GUIDE FOR BLOOD-1 MODULE**

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Module name: **Blood-1**Year: **One**Duration: **4 weeks (April - May 2026)**

**Timetable hours: Lectures, Case-Based Learning (CBL), Self-Directed Learning, Team-Based Learning, Practical, Skills sessions, Demonstrations**

### MODULE INTEGRATED COMMITTEE

<b>MODULE COORDINATOR:</b>	<ul style="list-style-type: none"> <li>• <i>Prof. Zia ul Islam</i></li> </ul>
<b>CO-COORDINATOR:</b>	<ul style="list-style-type: none"> <li>• <i>Dr. Farzana Azam Khan</i></li> </ul>

### DEPARTMENTS & RESOURCE PERSONS' FACILITATING LEARNING

BASIC HEALTH SCIENCES	CLINICAL AND ANCILLARY DEPARTMENTS	
<b>ANATOMY</b> Professor Zia-ul-Islam	<b>FAMILY MEDICINE</b> Dr. Rabeeya Saeed	
<b>BIOCHEMISTRY</b> Prof. Faiza Waseem	<b>HAEMATOLOGY</b> Dr. Syed Muhammad Irfan	
<b>COMMUNITY MEDICINE</b> Dr. Saima Zainab	<b>RESEARCH &amp; SKILL DEVELOPMENT CENTER</b> Dr. Kahkashan Tahir	
<b>PATHOLOGY</b> Professor Naveen Faridi		
<b>PHYSIOLOGY</b> Professor Syed Hafeezul Hassan		
<b>FACULTY RESPONSIBLE FOR THE FACILITATION OF LEARNING.</b>		
Prof. Sobia Ali Dr. Yusra Nasir	Prof. Nighat Huda Dr. Asra Zia	Dr. Afifa Tabassum Dr. Maryam Fatima
<b>LNH&amp;MC MANAGEMENT</b> Professor KU Makki, Principal LNH&MC Dr. Shaheena Akbani, Director A.A & R.T LNH&MC		
<b>STUDY GUIDE COMPILED BY: Department of Health Professions Education</b>		

## **INTRODUCTION**

### **WHAT IS A STUDY GUIDE?**

It is an aid to:

- Inform students how the student learning program of the module has been organized
- Help students organize and manage their studies throughout the module
- Guide students on assessment methods, rules, and regulations

### **THE STUDY GUIDE:**

- Communicates information on the organization and management of the module. This will help the student to contact the right person in case of any difficulty.
- Defines the objectives which are expected to be achieved at the end of the module.
- Identifies the learning strategies such as Interactive Lectures, small group teachings, clinical skills, demonstrations, tutorials, and case-based learning that will be implemented to achieve the module objectives.
- Provides a list of learning resources such as books, computer-assisted learning programs, web- links, and journals, for students to consult to maximize their learning.
- Highlights information on the contribution of continuous and module examinations on the student's overall performance.
- Includes information on the assessment methods that will be held to determine every student's achievement of objectives.
- Focuses on information about examination policy, rules, and regulations.

## **CURRICULUM FRAMEWORK**

Students will experience an integrated curriculum similar to previous modules.

### **INTEGRATED CURRICULUM**

comprises system-based modules such as Foundation II, Blood II, Locomotor II, Respiratory system-II, CVS-II, and GIT Liver II which links basic science knowledge to clinical problems. Integrated teaching means that subjects are presented as a meaningful whole. Students will be able to have a better understanding of basic sciences when they repeatedly learn about clinical examples.

**LEARNING EXPERIENCES:** Case-based integrated discussions, and skills acquisition in the skills lab. Computer-based assignments, learning experiences in clinics, wards, and outreach centers

**INTEGRATING DISCIPLINES OF FOUNDATION MODULE-****LEARNING METHODOLOGIES**

The following teaching/learning methods are used to promote better understanding:

- Interactive Lectures
- Tutorial
- Case- Based Learning (CBL)
- Clinical Experiences
  - Clinical Rotations
- Skills session
- Self-Directed Learning

**INTERACTIVE LECTURES:** In a large group, the Interactive Lectures introduce a topic or common clinical conditions and explains the underlying phenomena through questions, pictures, videos of patients' interviews, exercises, etc. Students are actively involved in the learning process.

**TUTORIAL:** This format helps students to clarify concepts, and acquire skills or desired attitudes. Sessions are structured with the help of specific exercises such as patient cases, interviews, or discussion topics. Students exchange opinions and apply knowledge gained from Interactive Lectures, tutorials, and self-study. The facilitator's role is to ask probing questions, summarize, or rephrase to help clarify concepts.

**CASE-BASED LEARNING (CBL):** A small group discussion format where learning is focused on a series of questions based on a clinical scenario. Students discuss and answer the questions by applying relevant knowledge gained previously in clinical and basic health sciences during the module and constructing new knowledge. The CBL will be provided by the concerned department.

- **CLINICAL LEARNING EXPERIENCES:** In small groups, students observe patients with signs and symptoms in hospital wards, clinics, and outreach centers. This helps students relate knowledge of the module's basic and clinical sciences and prepare **CLINICAL ROTATIONS:** In small groups, students rotate in different wards like Medicine, Pediatrics, Surgery, Obs & Gyne, ENT, Eye, Family Medicine clinics, outreach centers & Community

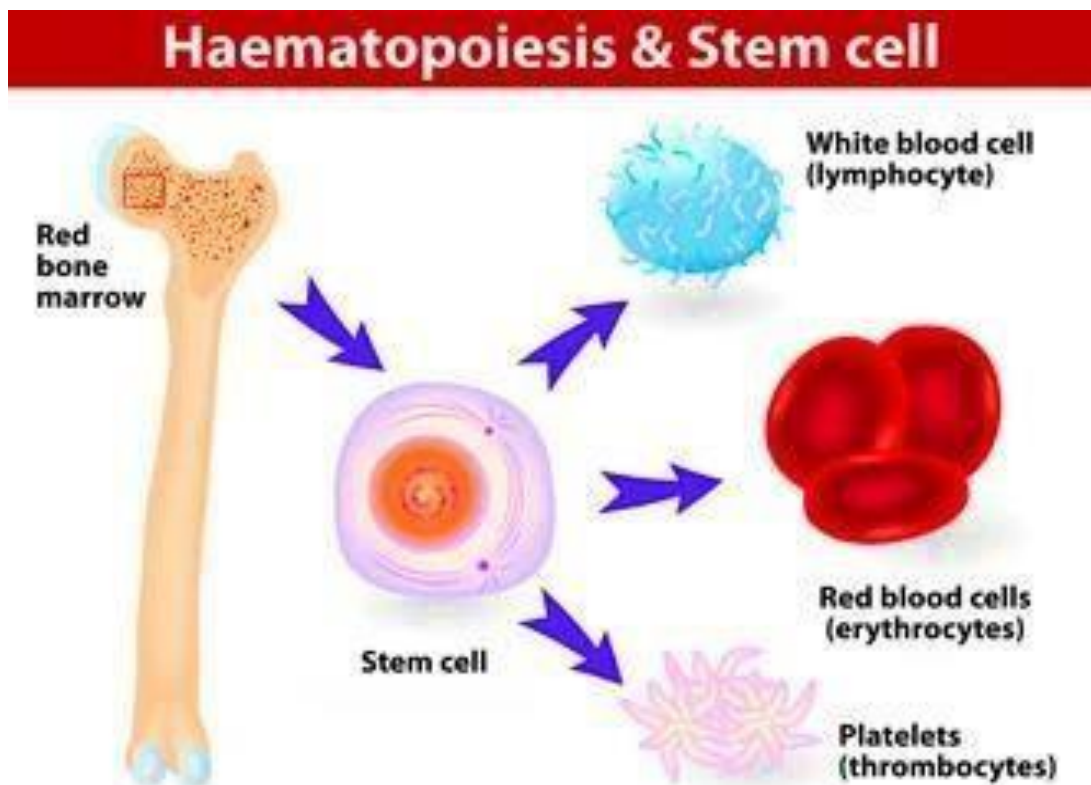
Medicine experiences. Here students observe patients, take histories and perform supervised clinical examinations in outpatient and inpatient settings. They also get an opportunity to observe medical personnel working as a team. These rotations help students relate basic medical and clinical knowledge in diverse clinical areas.

**SKILLS SESSION:** Skills relevant to the respective module are observed and practiced where applicable in the skills laboratory.

**SELF-DIRECTED LEARNING** Students assume responsibilities for their learning through individual study, sharing and discussing with peers, and seeking information from Learning Resource Center, teachers, and resource persons within and outside the college. Students can utilize the time within the college's scheduled hours of self-study.

**MODULE 2: BLOOD-1****INTRODUCTION**

This module aims to provide an overview of the hematological system and a basic understanding of hematopoiesis and hemostasis at the molecular level. The module will give the 1<sup>st</sup> year medical students, an opportunity to know the presentations of common hematological, immunological, and inflammatory disorders. Overall, it will provide the students with the necessary factual knowledge and stimulate them to apply this in the interpretation of the disease.



**COURSE OBJECTIVES AND STRATEGIES**

At the end of the module, the students will be able to:

**ANATOMY**

OBJECTIVES	LEARNING STRATEGY
<b>HISTOLOGY</b>	
<b>1. Lymphoid tissue, Immune system, and Thymus</b>	Interactive Lecture/SGD/ Practical
• List the components of the immune system and lymphoid tissue	
• Differentiate between central lymphoid organs and peripheral lymphoid organs	
• Describe the structure of lymph nodes	
• Describe the structure and histological appearance of the thymus	
• Discuss the clinical anatomy of lymphoid organs	
<b>2. Histology of Lymph Nodes and Thymus</b>	Interactive Lecture/SGD/ Practical
• Enumerate lymphoid organs	
• Discuss briefly the microscopic structure of lymphoid tissue	
• Describe the structure and histological features of lymph nodes	
• Describe the structure and histological features of the thymus	
<b>3. Histology of Spleen and Tonsils</b>	Interactive Lecture/SGD/ Practical
• Define the structure and location of tonsils and spleen	
• Describe histological features of tonsils and spleen	
<b>EMBRYOLOGY</b>	
<b>4. Development of blood</b>	Interactive Lecture/ Small Group Discussion
• Define hematopoiesis	
• List the sites and sources of hematopoiesis before and after birth	

**BIOCHEMISTRY**

OBJECTIVES	LEARNING STRATEGY
<b>HEMOGLOBIN</b>	
<b>1. Structure and types of Hemoglobin</b>	Interactive Lecture
• Explain the structure of hemoglobin	
• Describe the types of hemoglobin	
• Discuss the biochemical function of hemoglobin	
• Discuss the clinical significance of hemoglobin	
<b>2. Oxygen dissociation curves of Hemoglobin</b>	Interactive Lecture
• Explain the biochemical basis of the oxygen dissociation curve	
• Describe the oxygen dissociation curve for Hemoglobin	

<ul style="list-style-type: none"> <li>Describe the oxygen dissociation curve for Myoglobin</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the factors affecting the binding of oxygen with hemoglobin</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the allosteric effectors of the Oxygen dissociation curve</li> </ul>	
<ul style="list-style-type: none"> <li>Explain the transportation of oxygen and carbon dioxide through hemoglobin</li> </ul>	
<b>3. Abnormalities of Hemoglobin synthesis and degradation</b>	
<ul style="list-style-type: none"> <li>Explain the pathway of hemoglobin synthesis and degradation</li> </ul>	Interactive Lecture
<ul style="list-style-type: none"> <li>List the abnormalities of Hemoglobin synthesis</li> </ul>	
<ul style="list-style-type: none"> <li>Classify Porphyria</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss Porphyria</li> </ul>	
<b>4. Hemoglobinopathies</b>	
<ul style="list-style-type: none"> <li>Enumerate the Hemoglobinopathies</li> </ul>	TBL
<ul style="list-style-type: none"> <li>Explain the biochemical, genetic, and clinical significance of Thalassemia</li> </ul>	
<ul style="list-style-type: none"> <li>Explain the biochemical, genetic, and clinical significance of Sickle cell anemia</li> </ul>	
<b>VITAMINS &amp; MINERALS</b>	
<b>5. Iron metabolism</b>	
<ul style="list-style-type: none"> <li>Discuss Iron metabolism in the body with its abnormalities</li> </ul>	Interactive Lecture
<ul style="list-style-type: none"> <li>Describe the biochemical functions, dietary sources, recommended daily intake, and distribution of iron in the body</li> </ul>	
<ul style="list-style-type: none"> <li>Explain the mechanism of absorption, transport, storage, and elimination of iron</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the clinical significance of Iron deficiency and Iron overload</li> </ul>	
<b>6. Vitamin B12 &amp; Folic acid</b>	
<ul style="list-style-type: none"> <li>Discuss the factors regulating Erythropoiesis</li> </ul>	Interactive Lecture
<ul style="list-style-type: none"> <li>Discuss Vitamin B12 and Folic acid metabolism in the body</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the biochemical functions, dietary sources, and recommended daily intake of Vitamin B12 and Folic acid</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the clinical significance of Vitamin B12 and Folic acid deficiency</li> </ul>	
<b>7. Vitamins E &amp; K</b>	
<ul style="list-style-type: none"> <li>Discuss metabolism of Vitamin E &amp; Vitamin K in the body</li> </ul>	Interactive Lecture
<ul style="list-style-type: none"> <li>Describe the biochemical functions, dietary sources, and recommended daily intake of Vitamin E &amp; Vitamin K</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the clinical significance of Vitamin E &amp; Vitamin K deficiency</li> </ul>	
<b>PLASMA PROTEINS</b>	
<b>8. Plasma Proteins</b>	
<ul style="list-style-type: none"> <li>Explain the composition of plasma and plasma proteins</li> </ul>	Interactive Lecture
<ul style="list-style-type: none"> <li>Explain the difference between plasma and serum</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the separation techniques of plasma proteins</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the individual plasma proteins and their biological functions</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the clinical abnormalities related to plasma proteins</li> </ul>	
<b>9. Immunoglobulins</b>	
<ul style="list-style-type: none"> <li>Classify immunoglobulins</li> </ul>	Interactive Lecture
<ul style="list-style-type: none"> <li>Differentiate between immunoglobulins and antibodies</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the chemical structure &amp; biochemical functions of immunoglobulins</li> </ul>	

<ul style="list-style-type: none"> <li>Discuss the clinical significance of immune deficiency diseases</li> </ul>	
<b>10. Porphyria &amp; Hemoglobinopathies</b>	Interactive Lecture
<ul style="list-style-type: none"> <li>Discuss the clinical importance of Porphyria &amp; Hemoglobinopathies</li> </ul>	
<ul style="list-style-type: none"> <li>Interpret clinical conditions correlated with their laboratory investigations</li> </ul>	
<b>11. Plasma Proteins</b>	Interactive Lecture
<ul style="list-style-type: none"> <li>Discuss the clinical importance of plasma proteins</li> </ul>	
<ul style="list-style-type: none"> <li>Interpret clinical conditions correlated with their laboratory investigations</li> </ul>	
<b>12. Anemia</b>	Case-based Learning/ Tutorial
<ul style="list-style-type: none"> <li>Discuss the clinical importance of vitamins &amp; minerals in relation to Anemia</li> </ul>	
<ul style="list-style-type: none"> <li>Interpret clinical conditions correlated with their laboratory investigations</li> </ul>	
<b>13. Specimen collection</b>	Practical/ Small Group Discussion
<ul style="list-style-type: none"> <li>Discuss the samples used for biochemical analysis</li> </ul>	
<ul style="list-style-type: none"> <li>Demonstrate the uses of the blood collection tubes</li> </ul>	
<ul style="list-style-type: none"> <li>Observe the collection of blood specimens for biochemical analysis</li> </ul>	
<ul style="list-style-type: none"> <li>Separate plasma from a blood sample</li> </ul>	
<ul style="list-style-type: none"> <li>Separate serum from a blood sample</li> </ul>	
<ul style="list-style-type: none"> <li>Correlate the laboratory investigations with relevant clinical conditions</li> </ul>	
<b>14. Spectrophotometry</b>	Practical/ Small Group Discussion
<ul style="list-style-type: none"> <li>Explain the principle of Spectrophotometry</li> </ul>	
<ul style="list-style-type: none"> <li>Demonstrate the technique of Spectrophotometry</li> </ul>	
<ul style="list-style-type: none"> <li>Illustrate the parts of a Spectrophotometer</li> </ul>	
<ul style="list-style-type: none"> <li>Explain the significance of making a blank solution</li> </ul>	
<ul style="list-style-type: none"> <li>Explain the significance of transmittance and optical density</li> </ul>	
<ul style="list-style-type: none"> <li>Calculate the concentration of the analyte in the sample</li> </ul>	
<ul style="list-style-type: none"> <li>Perform analysis of an analyte in the sample by Spectrophotometry</li> </ul>	
<ul style="list-style-type: none"> <li>Correlate the laboratory investigations with relevant clinical conditions</li> </ul>	
<b>15. Flame Photometry</b>	Practical/ Small Group Discussion
<ul style="list-style-type: none"> <li>Explain the principle and technique of Flame Photometry</li> </ul>	
<ul style="list-style-type: none"> <li>Explain the significance of using de-ionized water in Flame Photometry</li> </ul>	
<ul style="list-style-type: none"> <li>Calculate the concentration of the analyte in the sample</li> </ul>	
<ul style="list-style-type: none"> <li>Demonstrate the use of a Flame photometer</li> </ul>	
<ul style="list-style-type: none"> <li>Correlate the laboratory investigations with relevant clinical conditions</li> </ul>	
<b>16. Estimation of Plasma Proteins</b>	Practical/ Small Group Discussion
<ul style="list-style-type: none"> <li>Interpret the plasma protein levels in different diseases</li> </ul>	
<ul style="list-style-type: none"> <li>Estimate the plasma protein levels by Spectrophotometry using the Kit Method</li> </ul>	
<ul style="list-style-type: none"> <li>Correlate the laboratory investigations with relevant clinical conditions</li> </ul>	
<b>17. Electrophoresis</b>	Practical/ Small Group Discussion
<ul style="list-style-type: none"> <li>Explain the principle of electrophoresis</li> </ul>	
<ul style="list-style-type: none"> <li>Demonstrate the technique of electrophoresis</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the applications of electrophoresis</li> </ul>	

<ul style="list-style-type: none"> <li>Correlate the laboratory investigations with relevant clinical conditions</li> </ul>	
<b>18. ELISA</b>	Practical/ Small Group Discussion
<ul style="list-style-type: none"> <li>Explain the principle of ELISA</li> </ul>	
<ul style="list-style-type: none"> <li>Demonstrate the technique of ELISA</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the applications of ELISA</li> </ul>	
<ul style="list-style-type: none"> <li>Correlate the laboratory investigations with relevant clinical conditions</li> </ul>	
<b>19. Biochemical Parameters in Covid 19</b>	Case-Based Learning
<ul style="list-style-type: none"> <li>Identify the type of coronavirus and its transmission</li> </ul>	
<ul style="list-style-type: none"> <li>Identify the various diagnostic markers of Covid infection and their biochemical basis</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the basic mechanism in various biochemical parameters during covid infection</li> </ul>	

### COMMUNITY MEDICINE

OBJECTIVES	LEARNING STRATEGY
<b>Epidemiology of Nutritional Anemia</b>	Interactive Lecture
<ul style="list-style-type: none"> <li>Discuss the prevalence of nutritional anemia</li> </ul>	
<ul style="list-style-type: none"> <li>Identify the risk factors of nutritional anemia</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the prevention of nutritional anemia</li> </ul>	

### FAMILY MEDICINE

OBJECTIVES	LEARNING STRATEGY
<b>Clinical Assessment of Anemia</b>	Small Group Discussion/ Practical
<ul style="list-style-type: none"> <li>Evaluate a patient with anemia based on detailed history.</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the common clinical presentation of various types of anemia.</li> </ul>	
<ul style="list-style-type: none"> <li>Interpret the common lab findings of anemia (CBC, peripheral film).</li> </ul>	

### HEMATOLOGY

OBJECTIVES	LEARNING STRATEGY
<b>1. Clinical Presentation of Thrombocytopenia</b>	Interactive Lecture
<ul style="list-style-type: none"> <li>Define purpura, patachae and ecchymosis</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the pattern of bleeding in thrombocytopenia</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the common presentation of patients with bleeding disorders</li> </ul>	
<b>2. Interpretation of CBC Report</b>	Small Group Discussion
<ul style="list-style-type: none"> <li>Discuss the common parameters calculated by CBC.</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the common conditions associated with changes in cell counts.</li> </ul>	

• Differentiate between different types of anemias based on morphology.	
<b>3. Introduction to Transfusion Medicine</b>	Interactive Lecture
• Describe the significance of voluntary blood donation.	
• Define ABO and Rh blood groups based on antigens and antibodies	
• Discuss common complications of transfusion	
<b>4. Genetic Markers in Blood Disorders</b>	Interactive Lecture
• Describe the role of genetic testing in the diagnosis of common hematological disorders	
• Differentiate between different genetic tests; cytogenetics, FISH and PCR	

## ***PATHOLOGY***

OBJECTIVES	LEARNING STRATEGY
<b>Introduction to Inflammation</b>	Interactive Lecture
• Define Inflammation	
• Discuss types of inflammation	
• Difference between acute & chronic inflammation	
• Discuss the cardinal signs of inflammation	

## ***PHYSIOLOGY***

OBJECTIVES	LEARNING STRATEGY
<b>1. Components of blood &amp; its cellular components</b>	Interactive Lecture/ Tutorial
• Enumerate the functions of the cellular components of blood	
• State the normal values of RBCs, WBCs & platelets	
• Define hematocrit, normal values & factors affecting hematocrit	
<b>2. Formation and development of RBCs (erythropoiesis)</b>	Interactive Lecture
• Discuss the different stages of RBCs formation	
• List the factors that are necessary for erythropoiesis	
• Discuss the significance of reticulocyte count	
• Discuss the role of Erythropoietin	
<b>3. Classification of anemia and significance of red cell indices</b>	Case-Based Learning
• Describe the morphological & etiological classification of anemia	
• Discuss the significance of red cell indices and their normal values	
<b>4. Hemolytic anemias (Intracorpuseular and extracorpuseular causes)</b>	
• Discuss the types of hemolytic anemia viz	

a) Hereditary spherocytosis	
b) G6PD deficiency	
c) Sickle cell anemia	
d) Erythroblastosis fetalis	
<b>5. Megaloblastic /Iron, B12, Folic acid deficiency anemia</b>	
• Discuss the etiology & microscopic features of megaloblastic and iron deficiency anemia	Interactive Lecture
• Differentiate between megaloblastic & pernicious anemia based on microscopic features and red cell indices	
<b>6. Blood groups ABO/RH system</b>	
• Explain the ABO (classical) and Rh blood grouping systems & their inheritance pattern	Interactive Lecture/ Tutorial
• Define agglutinin, agglutination & agglutination	
• List various Rh antigens & Rh immune response	
• Name the transfusion reactions associated with mismatched blood transfusion	
<b>7. Polycythemia</b>	
• Define the types of polycythemia	Case-Based Learning
• Explain the effects of polycythemia on the human body	
<b>8 Hemostasis &amp; role of Thrombocytes</b>	
• Describe the events in Hemostasis	Interactive Lecture
• Explain the mechanism of the formation of platelet plug	
• Describe the role of Prothrombin in blood coagulation and clot formation	
<b>9. Clotting cascade &amp; bleeding disorders</b>	
• Explain intrinsic and extrinsic pathways for coagulation	Interactive Lecture/ Tutorial
• Enumerate the clotting factors	
• Describe the role of clotting factors in the coagulation	
<b>10. Fibrinolytic mechanisms</b>	
• Explain the fibrinolytic mechanism and the role of plasmin in the lysis of blood clots	Interactive Lecture
• Discuss the role of fibrin & anti-thrombin III in anticoagulation	
<b>11. Hemorrhagic &amp; thromboembolic conditions</b>	
• Explain the following hemorrhagic and Thrombo-embolic conditions	Interactive Lecture
a) Hemophilia	
b) Thrombocytopenia	
c) Disseminated Intravascular Coagulation	
• Discuss the role of commonly used anticoagulants	
<b>12. Genesis and general characteristics of white blood cells</b>	
• Describe the process of leukocyte genesis	Interactive Lecture
• List the types of granulocytes and agranulocytes, their functions & normal values	
<b>13. Functions of WBCs, Monocytes macrophage cell system</b>	
• Explain the significance of the Reticuloendothelial system in the body's defense mechanism	Interactive Lecture
• List the various types of macrophages present in different tissues of the body	
• Discuss the role of passive immunity against infection	
<b>14. Types and functions of lymphocytes</b>	
• List the types of lymphocytes and their sites of origin	Interactive Lecture/ Tutorial
• Discuss the functions of T and B lymphocytes	
• Enumerate the types of T lymphocytes & their functions	

<b>15. Immunity &amp; its types (Innate)</b>	Interactive Lecture
<ul style="list-style-type: none"> <li>Define immunity</li> <li>Classify immunity</li> <li>Describe the process of innate immunity</li> </ul>	
<b>16. Cell-mediated Immunity</b>	
<ul style="list-style-type: none"> <li>Define cell-mediated immunity</li> <li>List the cells involved in this immunity type</li> <li>Describe the process of cell-mediated immunity</li> </ul>	Interactive Lecture
<b>17. Humoral immunity</b>	
<ul style="list-style-type: none"> <li>Define Humoral immunity</li> <li>List the cells involved in this immunity type</li> <li>Describe the process of humoral-mediated immunity</li> <li>List the advantages of this type of immunity</li> </ul>	
<b>18. Passive immunity and immunization</b>	Interactive Lecture
<ul style="list-style-type: none"> <li>Define passive immunity &amp; immunization</li> <li>Differentiate between passive and active immunity</li> <li>Describe the process of immunization and its advantages</li> <li>Explain the Expanded Program on Immunization (EPI)</li> </ul>	
<b>19. Allergy and hypersensitivity</b>	
<ul style="list-style-type: none"> <li>Discuss the types of hypersensitivity and allergic reactions including Urticaria, Anaphylaxis, and Hay fever</li> <li>Discuss the role of IgE antibodies in immunity</li> </ul>	
<b>20. Peripheral Blood Film</b>	Practical/ Small Group Discussion
<ul style="list-style-type: none"> <li>Explain the phlebotomy (venipuncture) procedure</li> <li>Discuss the procedure of blood sampling and its main constituents</li> <li>Enumerate Aseptic measures</li> <li>Mention the steps of formation of thin blood smear/film</li> </ul>	
<b>21. Blood grouping &amp; Cross-matching</b>	
<ul style="list-style-type: none"> <li>Identify blood group by the use of antisera</li> <li>Mention different types of blood groups</li> <li>Describe ABO (classical) &amp; Rhesus blood grouping system</li> <li>Explain the causative mechanism of Erythroblastosis Fetalis</li> <li>Discuss the significance of Blood Grouping &amp; Cross Matching</li> </ul>	
<b>22. Bleeding time and Clotting time</b>	Practical/ SGD
<ul style="list-style-type: none"> <li>Define bleeding time and its normal value</li> <li>Describe Duke's and Ivy's methods of measuring bleeding time</li> <li>List the conditions in which bleeding time is prolonged</li> <li>Define clotting time and its normal value</li> <li>Describe the Capillary tube and Modified Lee methods of measuring clotting time</li> <li>List the conditions in which clotting time is prolonged</li> </ul>	
<b>23. Differential Leukocyte Count (DLC)</b>	
<ul style="list-style-type: none"> <li>List different types of WBCs and their normal values</li> <li>Discuss the composition of Leishman's stain &amp; its significance</li> <li>Explain the methods of counting WBCs</li> </ul>	

<b>24. Erythrocyte Sedimentation Rate (ESR)</b>	
<ul style="list-style-type: none"> <li>Describe the mechanism of rouleaux formation</li> </ul>	
<ul style="list-style-type: none"> <li>Explain the methods of determination of ESR (Westergren's &amp; Wintrobe's method)</li> </ul>	
<ul style="list-style-type: none"> <li>Mention the normal value of ESR in males &amp; females and its significance</li> </ul>	

### **RESEARCH & SKILLS DEVELOPMENT CENTER**

OBJECTIVES	LEARNING STRATEGY
<b>I/V cannulation</b>	Practical
<ul style="list-style-type: none"> <li>1/3rd curriculum</li> </ul>	
<ul style="list-style-type: none"> <li>Visit to blood bank</li> </ul>	
<ul style="list-style-type: none"> <li>Visit to thalassemia center</li> </ul>	

**LEARNING RESOURCES**

<b>SUBJECT</b>	<b>RESOURCES</b>
<b>ANATOMY</b>	<p><b>A. <u>GROSS ANATOMY</u></b></p> <ol style="list-style-type: none"> <li>1. K.L. Moore, Clinically Oriented Anatomy</li> <li>2. Neuro Anatomy by Richard Snell</li> <li>3. <a href="https://www.kenhub.com/en/dashboard">https://www.kenhub.com/en/dashboard</a></li> </ol> <p><b>B. <u>HISTOLOGY</u></b></p> <ol style="list-style-type: none"> <li>1. B. Young J. W. Health Wheather’s Functional Histology</li> </ol> <p><b>C. <u>EMBRYOLOGY</u></b></p> <ol style="list-style-type: none"> <li>1. KeithL. Moore.The Developing Human</li> <li>2. Langman’s Medical Embryology</li> </ol>
<b>BIOCHEMISTRY</b>	<p><b>A. <u>TEXTBOOKS</u></b></p> <ol style="list-style-type: none"> <li>1. Harper’s Illustrated Biochemistry</li> <li>2. Lehninger Principle of Biochemistry</li> <li>3. Biochemistry by Devlin</li> </ol>
<b>PHYSIOLOGY</b>	<p><b>A. <u>TEXTBOOKS</u></b></p> <ol style="list-style-type: none"> <li>1. Textbook Of Medical Physiology by Guyton And Hall</li> <li>2. Ganong’S Review of Medical Physiology</li> <li>3. Human Physiology by Lauralee Sherwood</li> <li>4. Berne &amp; Levy Physiology</li> <li>5. Best &amp; Taylor Physiological Basis of Medical Practice</li> </ol> <p><b>B. <u>REFERENCE BOOKS</u></b></p> <ol style="list-style-type: none"> <li>1. Guyton &amp; Hall Physiological Review</li> <li>2. Essentials Of Medical Physiology by Jaypee</li> <li>3. Textbook Of Medical Physiology by Indu Khurana</li> <li>4. Short Textbook Of Physiology by Arthur</li> <li>5. NMS Physiology</li> </ol>



## ASSESSMENT METHODS:

- MCQs (Multiple Choice Questions)
- **Objective Structured Practical/Clinical Examination (OSPE or OSCE)**
- MCQs and unobserved OSPE will be conducted on the LNH&MC Moodle platform
- Observed OSPE will constitute multiple examiner-based stations

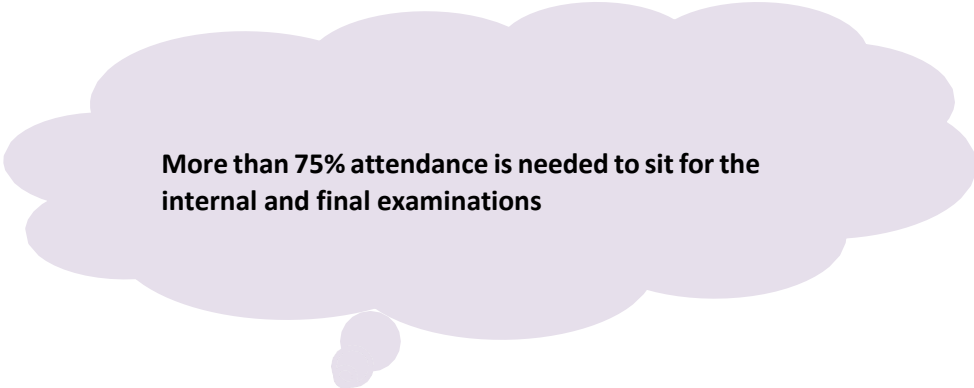
### Internal Evaluation

- Students will be assessed comprehensively through multiple methods.
- 20% marks of internal evaluation will be added to JSMU final exam. That 20% includes mid-module & end of module examinations, mid-term & pre-professional examinations.

### Formative Assessment

Individual departments may hold quizzes or short answer questions to help students assess their learning. The marks obtained are not included in the internal evaluation

**For JSMU Examination Policy, please consult the JSMU website!**



**More than 75% attendance is needed to sit for the internal and final examinations**

**LNH&MC EXAMINATION RULES & REGULATIONS**

- Students must report to the examination hall/venue, 30 minutes before the exam.
- **The exam will begin sharply at the given time.**
- No student will be allowed to enter the examination hall after 15 minutes of the scheduled examination time.
- Students must sit according to their roll numbers mentioned on the seats.
- **Cell phones are strictly not allowed in the examination hall.**
- If any student is found with a cell phone in any mode (silent, switched off, or on) he/she will not be allowed to continue their exam.
- No students will be allowed to sit in the exam without University Admit Card, LNMC College ID Card, and Lab Coat
- Students must bring the following stationary items for the exam: Pen, Pencil, Eraser, and Sharpener.
- Indiscipline in the exam hall/venue is not acceptable. Students must not possess any written material or communicate with their fellow students.

**SCHEDULE:**

WEEKS	1 <sup>ST</sup> YEAR	MONTH
WEEK 1	<b>BLOOD MODULE</b>	13 <sup>th</sup> April 2026
WEEK 2		
WEEK 3		
WEEK 4		9 <sup>th</sup> May 2026
Mid-Term Examination		12 <sup>th</sup> May – 13 <sup>th</sup> May 2026

