



# Study Guide- First Year MBBS

- 18<sup>th</sup> April- 19<sup>th</sup> May 2022
- Duration: 4 Weeks

# ***BLOOD MODULE I***



**LIAQUAT NATIONAL HOSPITAL AND MEDICAL COLLEGE**

Institute for Postgraduate Medical Studies & Health Science



**STUDY GUIDE FOR BLOOD-1 MODULE**

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Module name: **Blood-1**Year: **One**Duration: **4weeks (April– May 2022)**

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

### MODULE INTEGRATED COMMITTEE

<b>MODULE COORDINATOR:</b>	<ul style="list-style-type: none"> <li>Prof. Kashif Nisar (<b>Biochemistry</b>)</li> </ul>
<b>CO-COORDINATOR:</b>	<ul style="list-style-type: none"> <li>Dr. Amina Raza (<b>Biochemistry</b>)</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> Professor Kashif Nisar	<b>HAEMATOLOGY</b> Dr. Naila Raza
<b>COMMUNITY MEDICINE</b> Dr. Saima Zainab	
<b>PATHOLOGY</b> Professor Naveen Faridi	
<b>PHYSIOLOGY</b> Professor Syed Hafeezul Hassan	
<b>DEPARTMENT OF HEALTH PROFESSIONS EDUCATION</b>	
<ul style="list-style-type: none"> <li>Professor Nighat Huda</li> <li>Professor Sobia Ali</li> <li>Dr. Afifa Tabassum</li> <li>Dr. Sana Shah</li> </ul>	
<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 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 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 lectures, small group teachings, clinical skills, demonstration, tutorial 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, journals, for students to consult in order to maximize their learning.
- Highlights information on the contribution of continuous and 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 pertaining to examination policy, rules and regulations.

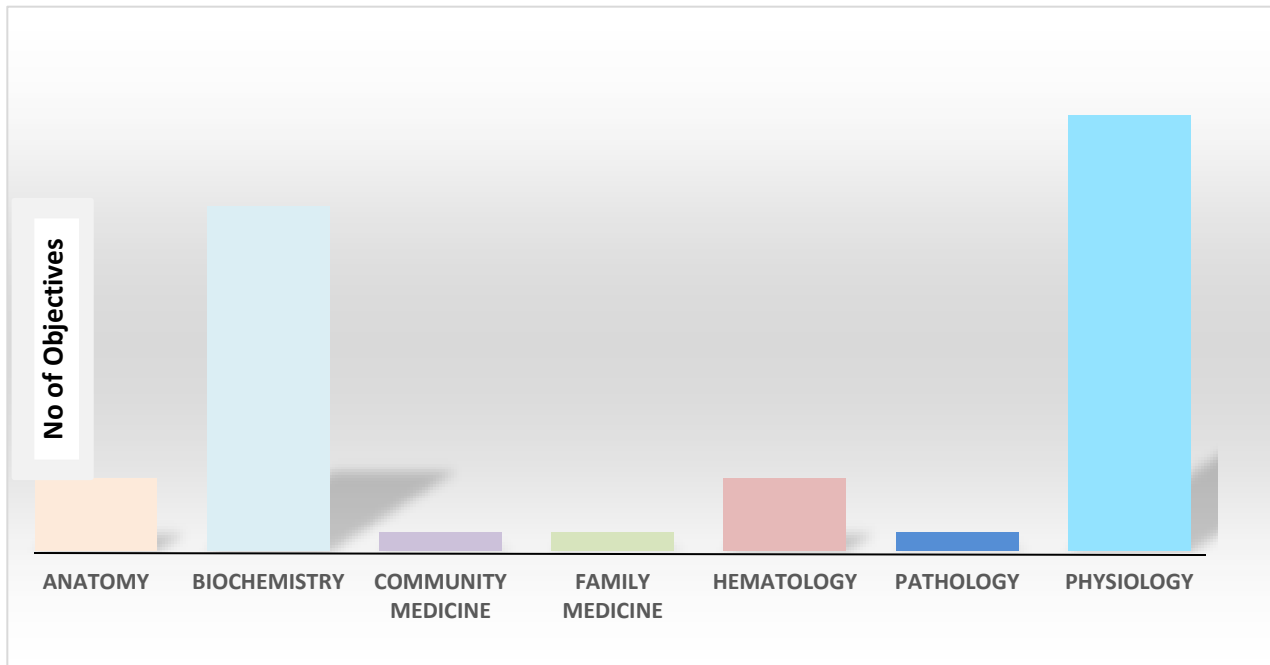
### **CURRICULUM FRAMEWORK**

Students will experience integrated curriculum.

**INTEGRATED CURRICULUM** comprises of system-based modules such as foundation and blood-1 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 better understanding of basic sciences when they repeatedly learn in relation to clinical examples.

Case-based discussions, computer-based assignments, early exposure to clinics, wards, and skills acquisition in skills lab and physiotherapy department are characteristics of integrated teaching program.

## INTEGRATING DISCIPLINES OF BLOOD-1 MODULE



### LEARNING METHODOLOGIES

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

- Interactive Lectures
- Team- Based Learning
- Small Group Discussion
- Case- Based Learning
- Practicals
- Skills session
- E-Learning
- Self-Directed Learning

### INTERACTIVE LECTURES

In large group, the lecturer introduces 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.

**TEAM- BASED LEARNING:** Team-Based Learning is an evidence based collaborative learning teaching strategy designed around units of instruction, known as "modules," that are taught in a three-step cycle: preparation, (b) in-class readiness assurance testing, and (c) application-focused exercise.

Preparation before class: Students must complete preparatory materials before a class or the start of the module. Materials may be text, visual or other, and set at a level that is appropriate to the students and the course.

In-class Readiness Assurance Testing: Students complete an individual readiness assurance test (IRAT), consisting of 5 to 20 multiple choice questions. After submitting their individual answers, and they take the same test, the team RAT (TRAT), with their team. All members of each team share the same TRAT score, and both IRAT and TRAT scores count toward the students' grades.

Instructor Feedback: The instructor reviews material from the RAT that seems to be difficult for students.

In-class application focused exercise: The remainder of the session is taken up with exercises that help students learn how to apply and extend the knowledge that they have pre-learned and tested. Teams are given an appropriate problem or challenge, and must arrive at a consensus to choose a "best" solution out of options provided. Teams then display their answer choice, and the educator facilitates a classroom discussion between teams to explore the topic and the possible answers to the problem.

**SMALL GROUP DISCUSSION:** This format helps students to clarify concepts acquire skills or attitudes. Sessions are structured with the help of specific exercises such as patient case, interviews or discussion topics. Students exchange opinions and apply knowledge gained from lectures, tutorials and self-study. The facilitator role is to ask probing questions, summarize, or re phrase to help clarify concepts.

**CASE- BASED LEARNING:** A small group discussion format where learning is focused around a series of questions based on a clinical scenario. Students' discuss and answer the questions applying relevant knowledge gained in clinical and basic health sciences during the module.

**PRACTICAL:** Basic science practicals related to anatomy, biochemistry and physiology are scheduled for student learning.

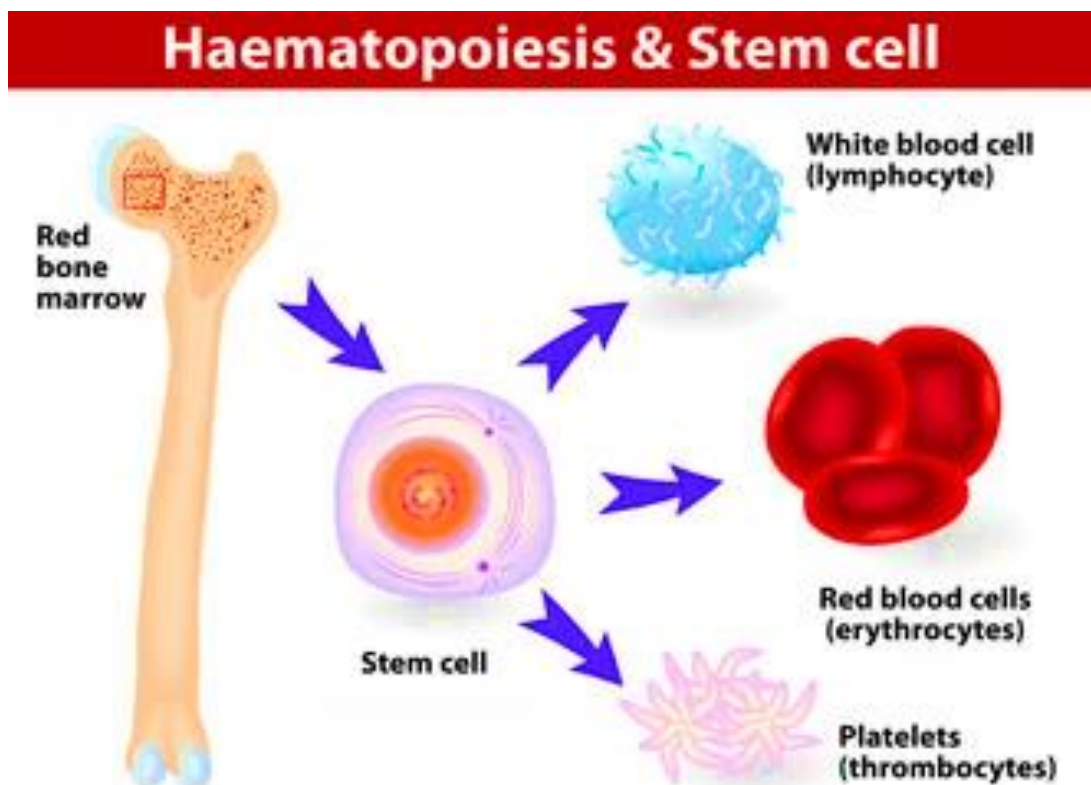
**SKILLS SESSION:** Skills relevant to respective module are observed and practiced where applicable in skills laboratory.

**E-LEARNING:** E-Learning is a strategy by which learning occurs through the utilization of electronic media, typically the Internet. The basic aspects of medical professionalism and ethics will be addressed through an e-learning course.

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

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

This module aims to provide an overview of the haematological system and 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>	Interactive Lecture/ Small Group Discussion/Case - Based Learning/ Practical
<b>1. Lymphoid tissue, Immune system and Thymus</b>	
• List the components of 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 thymus	
• Discuss the clinical anatomy of lymphoid organs	
<b>2. Histology of Lymph Nodes and Thymus</b>	
• Enumerate lymphoid organs	
• Discuss briefly microscopic structure of lymphoid tissue	
• Describe the structure and histological features of lymph nodes	
• Describe the structure and histological features of thymus	
<b>3. Histology of Spleen and Tonsils</b>	
• Define the structure and location of tonsils and spleen	
• Describe histological features of tonsils and spleen	
<b>EMBRYOLOGY</b>	Interactive Lecture/ Small Group Discussion
<b>4. Development of blood</b>	
• Define hematopoiesis	
• List the sites and sources of hematopoiesis before and after birth	

**BIOCHEMISTRY**

OBJECTIVES	LEARNING STRATEGY
<b>HEMOGLOBIN</b>	Interactive Lecture/ Small Group Discussion
<b>1. Structure and types of Hemoglobin</b>	
• 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>	
• Explain the biochemical basis of oxygen dissociation curve	
• Describe the oxygen dissociation curve for Hemoglobin	
• Describe the oxygen dissociation curve for Myoglobin	



<ul style="list-style-type: none"> <li>Describe the factors affecting binding of oxygen with hemoglobin</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the allosteric effectors of Oxygen dissociation curve</li> </ul>	
<ul style="list-style-type: none"> <li>Explain 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>	
<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>	
<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>	Interactive Lecture
<b>5. Iron metabolism</b>	
<ul style="list-style-type: none"> <li>Discuss Iron metabolism in the body with its abnormalities</li> </ul>	
<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>	
<b>6. Vitamin B12 &amp; Folic acid</b>	Interactive Lecture/ Case-Based Learning
<ul style="list-style-type: none"> <li>Discuss the factors regulating Erythropoiesis</li> </ul>	
<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>	Interactive Lecture
<ul style="list-style-type: none"> <li>Discuss metabolism of Vitamin E &amp; Vitamin K in the body</li> </ul>	
<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>	Small Group Discussion
<b>8. Plasma Proteins</b>	
<ul style="list-style-type: none"> <li>Explain the composition of plasma and plasma proteins</li> </ul>	
<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>	
<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>	Tutorial
<ul style="list-style-type: none"> <li>Discuss the clinical importance of Porphyria &amp; Hemoglobinopathies</li> <li>Interpret clinical conditions correlated with their laboratory investigations</li> </ul>	
<b>11. Plasma Proteins</b>	
<ul style="list-style-type: none"> <li>Discuss the clinical importance of plasma proteins</li> <li>Interpret clinical conditions correlated with their laboratory investigations</li> </ul>	
<b>12. Anemia</b>	
<ul style="list-style-type: none"> <li>Discuss the clinical importance of vitamins &amp; minerals in relation to Anemia</li> <li>Interpret clinical conditions correlated with their laboratory investigations</li> </ul>	
<b>13. Specimen collection</b>	Practical
<ul style="list-style-type: none"> <li>Discuss the samples used for biochemical analysis</li> <li>Demonstrate the uses of the blood collection tubes</li> <li>Observe collection of blood specimen for biochemical analysis</li> <li>Separate plasma from a blood sample</li> <li>Separate serum from a blood sample</li> <li>Correlate the laboratory investigations with relevant clinical conditions</li> </ul>	
<b>14. Spectrophotometry</b>	
<ul style="list-style-type: none"> <li>Explain the principle of Spectrophotometry</li> <li>Demonstrate the technique of Spectrophotometry</li> <li>Illustrate the parts of a Spectrophotometer</li> <li>Explain the significance of making blank solution</li> <li>Explain the significance of transmittance and optical density</li> <li>Calculate the concentration of the analyte in the sample</li> <li>Perform analysis of analyte in the sample by Spectrophotometry</li> <li>Correlate the laboratory investigations with relevant clinical conditions</li> </ul>	
<b>15. Flame Photometry</b>	
<ul style="list-style-type: none"> <li>Explain the principle and technique of Flame Photometry</li> <li>Explain the significance of using de-ionized water in Flame Photometry</li> <li>Calculate the concentration of the analyte in the sample</li> <li>Demonstrate the use of Flame photometer</li> <li>Correlate the laboratory investigations with relevant clinical conditions</li> </ul>	
<b>16. Estimation of Plasma Proteins</b>	
<ul style="list-style-type: none"> <li>Interpret the plasma protein levels in different diseases</li> <li>Estimate the plasma protein levels by Spectrophotometry using the Kit Method</li> <li>Correlate the laboratory investigations with relevant clinical conditions</li> </ul>	
<b>17. Electrophoresis</b>	
<ul style="list-style-type: none"> <li>Explain the principle of electrophoresis</li> <li>Demonstrate the technique of electrophoresis</li> <li>Discuss the applications of electrophoresis</li> <li>Correlate the laboratory investigations with relevant clinical conditions</li> </ul>	

<b>18. ELISA</b>	
• Explain the principle of ELISA	
• Demonstrate the technique of ELISA	
• Discuss the applications of ELISA	
• Correlate the laboratory investigations with relevant clinical conditions	
<b>19. Biochemical Parameters in Covid 19</b>	
• Identify the type of corona virus and its transmission	Case- Based Learning
• Identify the various diagnostic markers of Covid infection and their biochemical basis	
• Describe basic mechanism in various biochemical parameters during covid infection	

### **COMMUNITY MEDICINE**

OBJECTIVES	LEARNING STRATEGY
<b>Epidemiology of Nutritional Anemia</b>	Interactive Lecture
• Discuss the prevalence of nutritional anemia	
• Identify the risk factors of nutritional anemia	
• Discuss the prevention of nutritional anemia	

### **FAMILY MEDICINE**

OBJECTIVES	LEARNING STRATEGY
<b>Clinical Assessment of Anemia</b>	Small Group Discussion
• Evaluate a patient with anemia on the basis of detailed history.	
• Describe the common clinical presentation of various types of anemia.	
• Interpret the common lab findings of anemia (CBC, peripheral film).	

### **HEMATOLOGY**

OBJECTIVES	LEARNING STRATEGY
<b>1. Clinical Presentation of Thrombocytopenia</b>	Interactive Lecture
• Define purpura, patachae and ecchymosis	
• Describe the pattern of bleeding in thrombocytopenia	
• Describe the common presentation of patients with bleeding disorders	
<b>2. Interpretation of CBC Report</b>	
• Discuss the common parameters calculated by CBC.	
• Describe the common conditions associated with changes in cell counts.	
• Differentiate between different types of anemias based on morphology.	

<b>3. Introduction to Transfusion Medicine</b>	
• 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>	
• Describe the role of genetic testing in 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. Composition of blood &amp; its cellular components</b>	Interactive Lecture/ Small Group Discussion
• 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>	Interactive Lecture
• 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>	Case- Based Learning
• 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>	Interactive Lecture	
<ul style="list-style-type: none"> <li>Discuss the etiology &amp; microscopic features of megaloblastic and iron deficiency anemia</li> <li>Differentiate between megaloblastic &amp; pernicious anemia based on microscopic features and red cell indices</li> </ul>		
<b>6. Blood groups ABO/RH system</b>	Interactive Lecture/ Small Group Discussion/Case - Based Learning	
<ul style="list-style-type: none"> <li>Explain the ABO (classical) and Rh blood grouping systems &amp; their inheritance pattern</li> <li>Define agglutinin, agglutination &amp; agglutination</li> <li>List various Rh antigens &amp; Rh immune response</li> <li>Name the transfusion reactions associated with mismatched blood transfusion</li> </ul>		
<b>7. Polycythemia</b>		Case- Based Learning
<ul style="list-style-type: none"> <li>Define the types of polycythemia</li> <li>Explain the effects of polycythemia on human body</li> </ul>		
<b>8 Hemostasis &amp; role of Thrombocytes</b>	Interactive Lecture	
<ul style="list-style-type: none"> <li>Describe the events in Hemostasis</li> <li>Explain the mechanism of formation of platelet plug</li> <li>Describe the role of Prothrombin in blood coagulation and clot formation</li> </ul>		
<b>9. Clotting cascade &amp; bleeding disorders</b>		Interactive Lecture/ Small Group Discussion
<ul style="list-style-type: none"> <li>Explain intrinsic and extrinsic pathway for coagulation</li> <li>Enumerate the clotting factors</li> <li>Describe the role of clotting factors in coagulation</li> </ul>		
<b>10. Fibrinolytic mechanisms</b>	Interactive Lecture	
<ul style="list-style-type: none"> <li>Explain the fibrinolytic mechanism and the role of plasmin in lysis of blood clots</li> <li>Discuss the role of fibrin &amp; anti-thrombin III in anticoagulation</li> </ul>		
<b>11. Hemorrhagic &amp; thromboembolic conditions</b>		Interactive Lecture
<ul style="list-style-type: none"> <li>Explain the following hemorrhagic and Thrombo-embolic conditions               <ol style="list-style-type: none"> <li>Hemophilia</li> <li>Thrombocytopenia</li> <li>Disseminated Intravascular Coagulation</li> </ol> </li> <li>Discuss the role of commonly used anticoagulants</li> </ul>		
<b>12. Genesis and general characteristics of white blood cells</b>		
<ul style="list-style-type: none"> <li>Describe the process of leukocyte genesis</li> <li>List the types of granulocytes and agranulocytes, their functions &amp; normal values</li> </ul>		
<b>13. Functions of WBCs, Monocytes macrophage cell system</b>	Interactive Lecture/ Small Group Discussion	
<ul style="list-style-type: none"> <li>Explain the significance of Reticuloendothelial system in body defense mechanism</li> <li>List the various types of macrophages present in different tissues of body</li> <li>Discuss the role of passive immunity against infection</li> </ul>		
<b>14. Types and functions of lymphocytes</b>		Interactive Lecture
<ul style="list-style-type: none"> <li>List the types of lymphocytes and their sites of origin</li> <li>Discuss the functions of T and B lymphocytes</li> <li>Enumerate the types of T lymphocytes &amp; their functions</li> </ul>		
<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>	
• Define cell mediated immunity	
• List the cells involved in this immunity type	
• Describe the process of cell mediated immunity	
<b>17. Humoral immunity</b>	
• Define Humoral immunity	
• List the cells involved in this immunity type	
• Describe the process of humoral mediated immunity	
• List the advantages of this type of immunity	
<b>18. Passive immunity and immunization</b>	
• Define passive immunity & immunization	
• Differentiate between passive and active immunity	
• Describe the process of immunization and its advantages	
• Explain the Expanded Program on Immunization (EPI)	
<b>19. Allergy and hypersensitivity</b>	
• Discuss the types of hypersensitivity and allergic reactions including Urticaria, Anaphylaxis, and Hay fever	
• Discuss the role of IgE antibodies in immunity	
<b>20. Peripheral Blood Film</b>	
• Explain the phlebotomy (venipuncture) procedure	
• Discuss the procedure of blood sampling and its main constituents	
• Enumerate Aseptic measures	
• Mention the steps of formation of thin blood smear/film	
<b>21. Blood grouping &amp; Cross matching</b>	
• Identify blood group by the use of antisera	
• Mention different types of blood groups	
• Describe ABO (classical) & Rhesus blood grouping system	
• Explain the causative mechanism of Erythroblastosis Fetalis	
• Discuss the significance of Blood Grouping & Cross Matching	
<b>22. Bleeding time and Clotting time</b>	
• Define bleeding time and its normal value	
• Describe Duke's and Ivy's methods of measuring bleeding time	
• List the conditions in which bleeding time is prolonged	
• Define clotting time and its normal value	
• Describe the Capillary tube and Modified Lee methods of measuring clotting time	
• List the conditions in which clotting time is prolonged	
<b>23. Differential Leukocyte Count (DLC)</b>	
• List different types of WBCs and their normal values	
• Discuss the composition of Leishman's stain & its significance	
• Explain the methods of counting WBCs	
<b>24. Erythrocyte Sedimentation Rate (ESR)</b>	
• Describe the mechanism of rouleaux formation	
• Explain the methods of determination of ESR (Westergren's & Wintrobe's method)	
• Mention the normal value of ESR in males & females, and its significance	
	Practical

**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 InduKhurana</li> <li>4. Short Textbook Of Physiology by Mrthur</li> <li>5. NMS Physiology</li> </ol>



**ASSESSMENT METHODS:**

- **Best Choice Questions(BCQs)** also known as MCQs (Multiple Choice Questions)
- **Objective Structured Practical/Clinical Examination (OSPE or OSCE)**

**Internal Evaluation**

- Students will be assessed comprehensively through multiple methods.
- 20% marks of internal evaluation will be added to JSMU final exam. That 20% may include class tests, assignment, practicals and the internal exam which will all have specific marks allocation.

**Formative Assessment**

Individual department may hold quiz or short answer questions to help students assess their own learning.

The marks obtained are not included in the internal evaluation

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

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



**LNH&MC EXAMINATION RULES & REGULATIONS**

- Student must report to examination hall/venue, 30 minutes before the exam.
- **Exam will begin sharp at the given time.**
- No student will be allowed to enter the examination hall after 15 minutes of scheduled examination time.
- Students must sit according to their roll numbers mentioned on the seats.
- **Cell phones are strictly not allowed in examination hall.**
- If any student is found with cell phone in any mode (silent, switched off or on) he/she will be not be allowed to continue their exam.
- No students will be allowed to sit in exam without University Admit Card, LNMC College ID Card and Lab Coat
- Student 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	FOUNDATION MODULE	28 <sup>th</sup> February 2022
WEEK 2		
WEEK 3		
WEEK 4		
WEEK 5		
WEEK 6		
WEEK 7		16 <sup>th</sup> April 2022
WEEK 1	BLOOD MODULE	18 <sup>th</sup> April 2022
WEEK 2		
WEEK 3		
WEEK 4		19 <sup>th</sup> May 2022
<b>Mid Term Exam*</b>		

\*Final dates will be announced later

