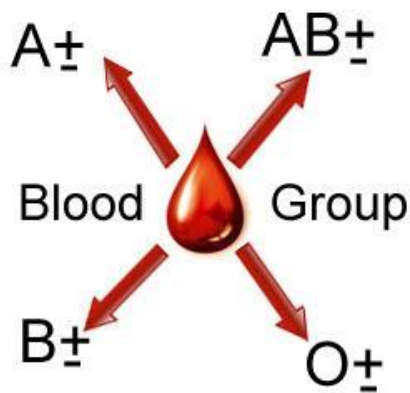
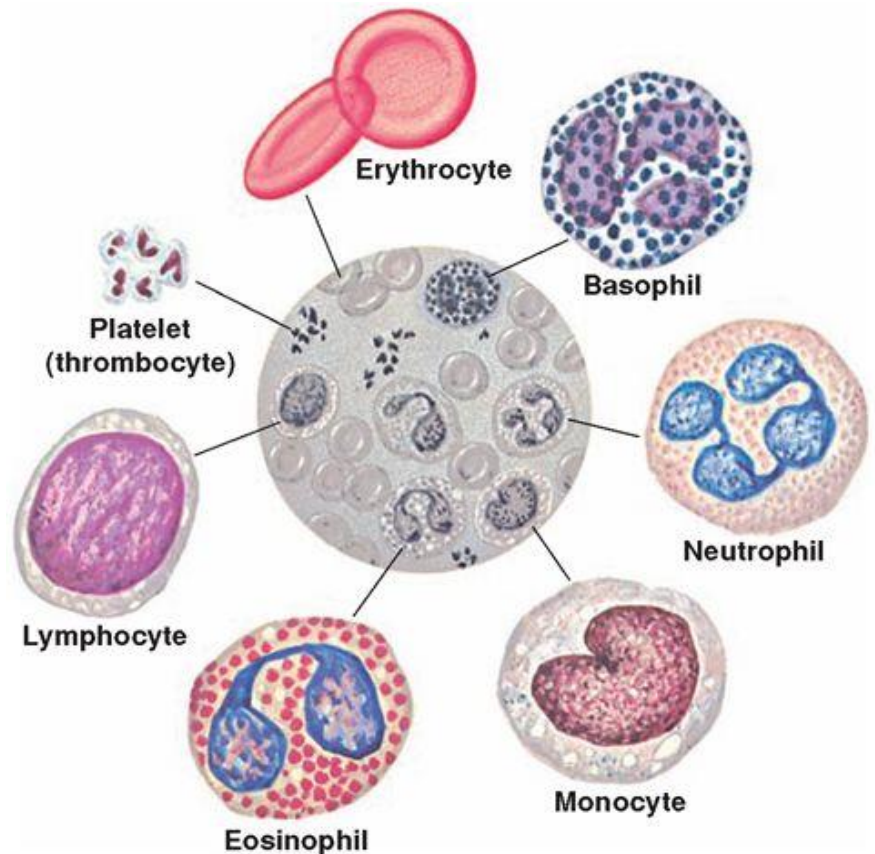
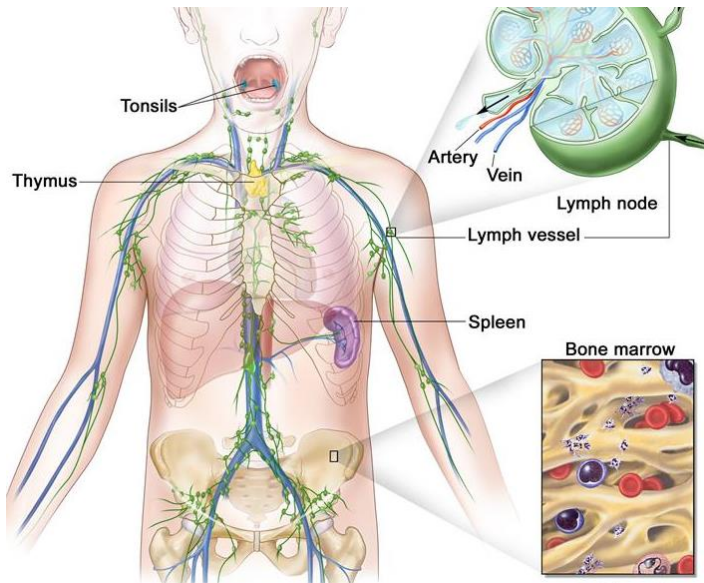


# STUDY GUIDE

## BLOOD MODULE

### FIRST YEAR MBBS

April – May 2019



LIAQUAT NATIONAL HOSPITAL  
& MEDICAL COLLEGE



**STUDY GUIDE FOR BLOOD MODULE**

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Module name: **Blood**

Semester: **One**

Year: **One**

Duration: **4 weeks (April – May 2019)**

Timetable hours: **Lectures, Case-Based Learning (CBL), Team based Learning (TBL), Self-Study, Practical, Skills, Demonstrations, Field Visits, Visit to Wards& Laboratory**

### MODULE INTEGRATED COMMITTEE

<b>MODULE COORDINATOR:</b>	<ul style="list-style-type: none"> <li>• Prof. Naheed Qadir (Biochemistry)</li> </ul>
<b>CO-COORDINATORS:</b>	<ul style="list-style-type: none"> <li>• Dr. Asad Jafri (Pathology)</li> <li>• Dr. Sobia Ali (DHCE)</li> </ul>

### DEPARTMENTS' & RESOURCE PERSONS' FACILITATING LEARNING

BASIC HEALTH SCIENCES	CLINICAL AND ANCILLARY DEPARTMENTS
<b>ANATOMY</b> <ul style="list-style-type: none"> <li>• Professor Zia-ul-Islam</li> </ul>	<b>FAMILY MEDICINE</b> <ul style="list-style-type: none"> <li>• Dr. Faridah Amin</li> </ul>
<b>BIOCHEMISTRY</b> <ul style="list-style-type: none"> <li>• Professor Naheed Qadir</li> </ul>	<b>MEDICAL EDUCATION</b> <ul style="list-style-type: none"> <li>• Professor Nighat Huda</li> </ul>
<b>COMMUNITY MEDICINE</b> <ul style="list-style-type: none"> <li>• Professor Rafiq Ahmed Soomro</li> </ul>	<b>INTERNAL MEDICINE</b> <ul style="list-style-type: none"> <li>• Professor KU Makki</li> </ul>
<b>PATHOLOGY</b> <ul style="list-style-type: none"> <li>• Professor Naveen Faridi</li> </ul>	<b>HEMATOLOGY</b> <ul style="list-style-type: none"> <li>• Professor Syed Muhammad Irfan</li> </ul>
<b>PHYSIOLOGY</b> <ul style="list-style-type: none"> <li>• Professor Syed Hafeezul Hassan</li> </ul>	
<b>PHARMACOLOGY</b> <ul style="list-style-type: none"> <li>• Professor Nazir Ahmed Solangi</li> <li>• Professor Tabassum Zehra</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:</b> <b>Department of Health Care Education</b>	<ul style="list-style-type: none"> <li>• Dr. Sobia Ali</li> <li>• Dr. Muhammad Suleman Sadiq Hashmi</li> </ul>

## **INTRODUCTION**

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

It is an aid to:

- Inform students how student learning program of the semester-wise 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:**

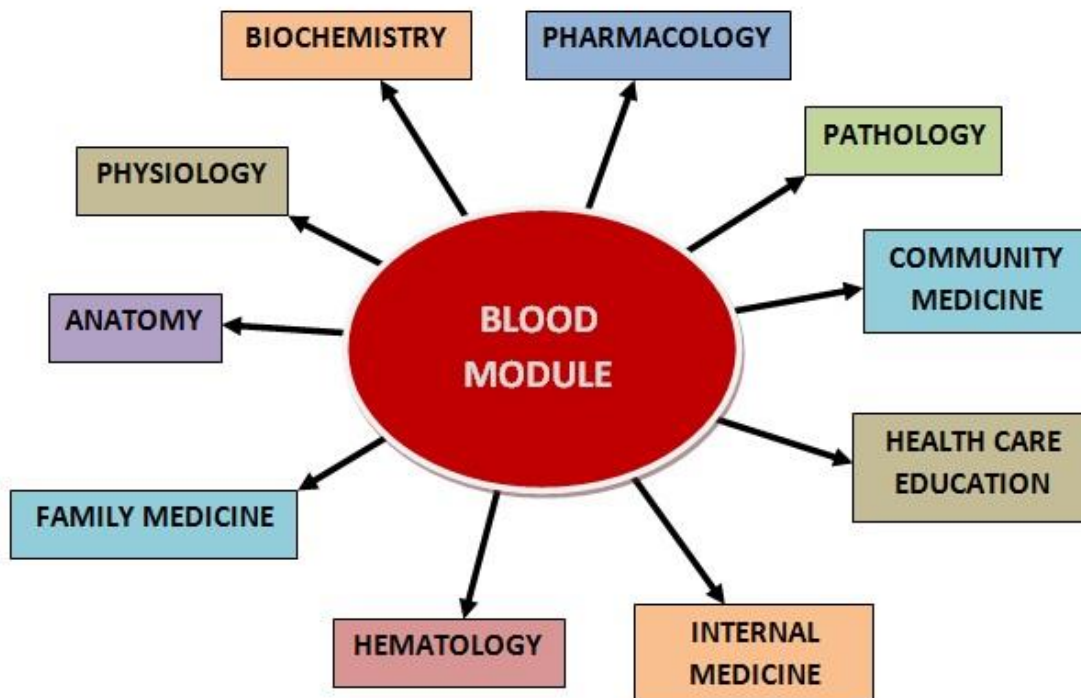
- Communicates information on organization and management of the module.  
This will help the student to contact the right person in case of any difficulty.
- Defines the objectives which are expected to be achieved at the end of the module.
- Identifies the learning strategies such as lectures, small 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 semester 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 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.

DISCIPLINES OF BLOOD MODULE**LEARNING METHODOLOGIES**

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

- Interactive Lectures
- Hospital/Clinic visits
- Small Group Discussion
- Case- Based Learning
- Practicals
- Skills session
- E-Learning
- Self-Directed Study

**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.

**HOSPITAL VISITS:** In small groups, students observe patients with signs and symptoms in hospital or clinical settings. This helps students to relate knowledge of basic and clinical sciences of the relevant module.

**SMALL GROUP DISCUSSION (SGD):** 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.

**TEAM-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.

- a) **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.
- b) **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.
- c) **Instructor Feedback:** The instructor reviews material from the RAT that seems to be difficult for students.
- d) **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.

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

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

**SELF DIRECTED STUDY:** 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.

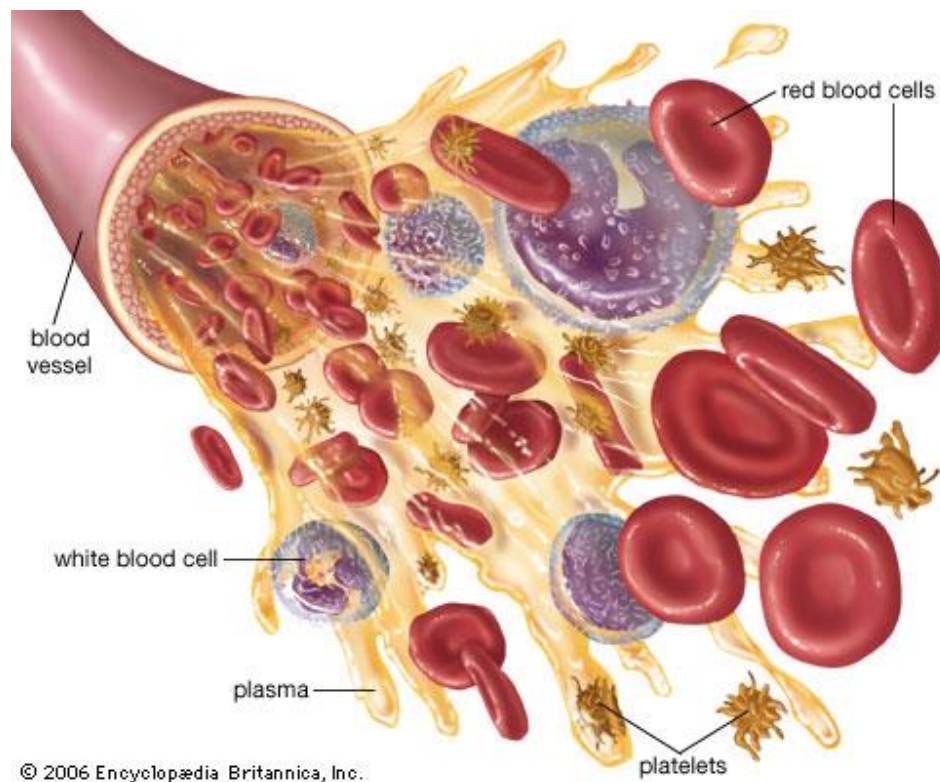
**E-LEARNING:** E-Learning is a strategy by which learning occurs through the utilization of electronic media, typically the Internet. The basic aspects of medical professionalism and ethics will be addressed through an e-learning course.



**SEMESTER 1 MODULE 2: BLOOD****INTRODUCTION**

This module aims to provide the basic understanding of hematopoiesis and hemostasis at the molecular level. It will also outline the basic pathological processes in the development of cancers. It will deal with the basic pathophysiology and pharmacological aspects of infections and chemotherapeutic agents and integrate it with clinical sciences.

The module will give the 1<sup>st</sup> year medical students, an opportunity to know the presentations and principles of management of common hematological, immunological, inflammatory and neoplastic 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:

<i>TOPICS &amp; OBJECTIVES</i>	<i>FACULTY</i>	<i>LEARNING STRATEGY</i>
<b>Lymphoid tissue &amp; Immune system</b>		
<ul style="list-style-type: none"> <li>Name the components of immune system and lymphoid tissue</li> </ul>	Anatomy	Interactive Lecture
<ul style="list-style-type: none"> <li>Differentiate between central lymphoid organs and peripheral lymphoid organs</li> </ul>		Interactive Lecture/Small Group Discussion
<ul style="list-style-type: none"> <li>Describe the structure of lymph nodes</li> </ul>		Interactive Lecture
<ul style="list-style-type: none"> <li>Describe the structure and histological appearance of thymus</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the clinical anatomy of lymphoid organs</li> </ul>		
<ul style="list-style-type: none"> <li>Define the structure and locations of tonsils</li> </ul>		
<ul style="list-style-type: none"> <li>Describe histological features of tonsils</li> </ul>		Small Group Discussion/Practical
<ul style="list-style-type: none"> <li>Define the structure and locations of spleen</li> </ul>		Practical/Skill
<ul style="list-style-type: none"> <li>Describe the histological appearance of spleen</li> </ul>		
<ul style="list-style-type: none"> <li>Enumerate lymphoid organs</li> </ul>		Practical
<ul style="list-style-type: none"> <li>Briefly describe microscopic structure of lymphoid tissue</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the structure of lymph nodes</li> </ul>		
<ul style="list-style-type: none"> <li>Explain the histological features of lymph nodes</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the structure of thymus</li> </ul>		
<ul style="list-style-type: none"> <li>Explain the histological features of Thymus</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the structure and locations of tonsils</li> </ul>		
<ul style="list-style-type: none"> <li>Identify the histological features of tonsils</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the location and structure of spleen</li> </ul>		
<ul style="list-style-type: none"> <li>Identify the histological features of spleen</li> </ul>		



<ul style="list-style-type: none"> <li>Define immunoglobulins</li> </ul>	Biochemistry	Practical/Skill
<ul style="list-style-type: none"> <li>Classify immunoglobulins</li> </ul>		Interactive Lecture
<ul style="list-style-type: none"> <li>Describe the chemistry and structure of immunoglobulins</li> </ul>		Practical
<ul style="list-style-type: none"> <li>Discuss the use and applications of Electrophoresis</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the use and application of ELISA</li> </ul>		
<ul style="list-style-type: none"> <li>Define immunity &amp; its types</li> </ul>	Physiology	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> <li>Explain innate immunity with examples</li> </ul>		
<ul style="list-style-type: none"> <li>Describe cell mediated immunity &amp; its attributes</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the role of passive immunity against infection</li> </ul>		
<ul style="list-style-type: none"> <li>Explain the development and processing of B lymphocytes</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the role of B lymphocyte clone and memory cells</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the mechanism of action of antibodies</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the Classical &amp; Alternate pathways of complement cascade &amp; its attributes</li> </ul>		
<ul style="list-style-type: none"> <li>Perform Leucocytes Count</li> </ul>		Practical
<b>Cells</b>		
<ul style="list-style-type: none"> <li>Define hematopoiesis</li> </ul>	Anatomy	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> <li>List the sites and source of hematopoiesis before and after birth</li> </ul>		
<ul style="list-style-type: none"> <li>Explain the structure and types of hemoglobin</li> </ul>	Biochemistry	Interactive Lecture/Small Group Discussion
<ul style="list-style-type: none"> <li>Explain the Allosteric Properties of Hemoglobin</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the synthesis of hemoglobin and its abnormalities</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the biochemical abnormalities in hemoglobinopathies</li> </ul>		
<ul style="list-style-type: none"> <li>Classify plasma proteins</li> </ul>		
<ul style="list-style-type: none"> <li>Differentiate between plasma and serum based on their compositions</li> </ul>		
<ul style="list-style-type: none"> <li>Summarize the clinical features of diseases due to abnormalities of plasma protein</li> </ul>		
<ul style="list-style-type: none"> <li>Enumerate the functions of the cellular components of blood</li> </ul>	Physiology	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> <li>State the normal values of RBCs, WBCs &amp; platelets</li> </ul>		
<ul style="list-style-type: none"> <li>Define hematocrit, normal values&amp; factors affecting hematocrit</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the different stages of RBCs formation</li> </ul>		
<ul style="list-style-type: none"> <li>List factors necessary for erythropoiesis</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the significance of Reticulocyte count</li> </ul>		

<ul style="list-style-type: none"> <li>Discuss the role of Erythropoietin</li> </ul>	Physiology	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> <li>Describe the process of leukocyte genesis</li> </ul>		
<ul style="list-style-type: none"> <li>List various types of granulocytes and agranulocytes, their functions &amp; normal values</li> </ul>		
<ul style="list-style-type: none"> <li>Explain the significance of Reticuloendothelial system in body defense mechanism</li> </ul>		
<ul style="list-style-type: none"> <li>List various macrophages in different tissues of body</li> </ul>		
<ul style="list-style-type: none"> <li>Define inflammation</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the signs of inflammation</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the "walling off" effect of inflammation</li> </ul>		
<ul style="list-style-type: none"> <li>Explain the neutrophil &amp; macrophage response during inflammation</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the lines of defense during inflammation</li> </ul>		
<ul style="list-style-type: none"> <li>List types of inflammation</li> <li>Describe the process of inflammation</li> </ul>	Pathology	Interactive Lecture
<ul style="list-style-type: none"> <li>List the types of lymphocytes and their site of origin</li> </ul>	Physiology	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> <li>Discuss the functions of T and B lymphocytes</li> </ul>		
<ul style="list-style-type: none"> <li>Enumerate types of T lymphocytes &amp; their functions</li> </ul>		Practical
<ul style="list-style-type: none"> <li>Demonstrate peripheral blood smear</li> </ul>		
<ul style="list-style-type: none"> <li>Determine Erythrocyte Sedimentation Rate</li> </ul>	Biochemistry	Practical
<ul style="list-style-type: none"> <li>Describe the steps of how to collect and store blood specimen for biochemical analysis</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the use and applications of Spectrophotometer</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the use and applications of Flame photometer</li> </ul>		
<b>Anemia</b>		
<ul style="list-style-type: none"> <li>Discuss Iron metabolism in the body</li> </ul>	Biochemistry	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> <li>Describe abnormalities of iron metabolism</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the functions and biochemical importance of Vitamin B12 &amp; folic acid</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the effects of deficiency of Vitamins B12 and Folic acid (Pernicious and Megaloblastic anemias)</li> </ul>		

<ul style="list-style-type: none"> <li>Define Anemia</li> </ul>	Family Medicine	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> <li>Describe the clinical features of anemia</li> </ul>		
<ul style="list-style-type: none"> <li>Check for anemia on each other</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the morphological &amp; etiological classification of anemia</li> </ul>	Physiology	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> <li>Discuss the significance of red cell indices and their normal values.</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the etiology, microscopic picture and principles of management of common hemolytic anemias</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the etiology &amp; microscopic picture of Megaloblastic and iron deficiency anemia</li> </ul>		
<ul style="list-style-type: none"> <li>Differentiate between Megaloblastic &amp; Pernicious Anemia based on microscopic picture and red cell indices.</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the mechanism of action and uses of hematinics</li> </ul>	Pharmacology	Interactive Lectures
<ul style="list-style-type: none"> <li>Assess the anemia on the basis of history, examination and investigation</li> </ul>	Internal Medicine	
<ul style="list-style-type: none"> <li>Devise life course health education of blood related communicable and non-communicable diseases</li> </ul>	Community Medicine	
<b>Polycythemia</b>		
<ul style="list-style-type: none"> <li>Define types of polycythemia</li> </ul>	Physiology	Interactive Lecture
<ul style="list-style-type: none"> <li>Explain the effects of polycythemia on human body</li> </ul>		
<b>Hemostasis &amp; its disorders</b>		
<ul style="list-style-type: none"> <li>Describe biochemical functions of Vitamins K and its deficiency</li> </ul>	Biochemistry	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> <li>Classify Eicosanoids</li> </ul>		
<ul style="list-style-type: none"> <li>Describe their Biochemical role in platelet aggregation</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the events in Hemostasis</li> </ul>	Physiology	
<ul style="list-style-type: none"> <li>Explain the mechanism of formation of platelet plug</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the role of Prothrombin in blood coagulation and clot formation</li> </ul>		

<ul style="list-style-type: none"> <li>• Explain intrinsic and extrinsic pathway for coagulation</li> </ul>	Physiology	Interactive Lecture/Small Group Discussion
<ul style="list-style-type: none"> <li>• Enumerate the clotting factors</li> </ul>		
<ul style="list-style-type: none"> <li>• Describe the role of clotting factors in coagulation</li> </ul>		
<ul style="list-style-type: none"> <li>• Explain the fibrinolytic mechanism and role of plasmin in lysis of blood clots</li> </ul>		
<ul style="list-style-type: none"> <li>• Discuss the role of fibrin &amp; anti-thrombin III in anticoagulation</li> </ul>		
<ul style="list-style-type: none"> <li>• Explain the following hemorrhagic and Thrombo-embolic conditions:               <ol style="list-style-type: none"> <li>I. Hemophilia</li> <li>II. Thrombocytopenia</li> <li>III. Disseminated Intravascular Coagulation</li> </ol> </li> </ul>		
<ul style="list-style-type: none"> <li>• Discuss the role of commonly used anticoagulants</li> </ul>		
<ul style="list-style-type: none"> <li>• Perform tests of bleeding time and clotting time</li> </ul>		Practical
<ul style="list-style-type: none"> <li>• List the use of anticoagulants</li> </ul>	Pharmacology	Interactive Lecture
<ul style="list-style-type: none"> <li>• Describe the various clinical presentations of thrombocytopenia</li> </ul>	Hematology	
<b>Antioxidants</b>		
<ul style="list-style-type: none"> <li>• Explain the role of major antioxidants in the plasma</li> </ul>	Biochemistry	Interactive Lecture
<b>Blood groups &amp; ABO</b>		
<ul style="list-style-type: none"> <li>• Explain the ABO(classical) and Rh system of blood grouping &amp; their inheritance pattern.</li> </ul>	Physiology	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> <li>• Define Agglutinin, agglutinin &amp; agglutination</li> </ul>		
<ul style="list-style-type: none"> <li>• List various Rh antigens &amp; Rh immune response</li> </ul>		
<ul style="list-style-type: none"> <li>• Name the transfusion reactions associated with mismatched blood transfusion</li> </ul>		
<ul style="list-style-type: none"> <li>• Perform tests for A,B,O, &amp; Rh blood grouping</li> </ul>		

Allergy and hypersensitivity		
<ul style="list-style-type: none"> <li>• Discuss the following types of hypersensitivity and allergic reactions:               <ul style="list-style-type: none"> <li>i) Urticaria</li> <li>ii) Anaphylaxis</li> <li>iii) Hay fever</li> </ul> </li> </ul>	Physiology	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> <li>• Discuss the role of Ig E in Immunity</li> </ul>		
Enzymes		
<ul style="list-style-type: none"> <li>• Explain the clinical application of enzymes</li> </ul>	Biochemistry	Interactive Lecture
<ul style="list-style-type: none"> <li>• Perform the Salivary Amylase test (qualitative) to detect factors affecting enzyme activity</li> </ul>		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>
<b>PATHOLOGY/MICROBIOLOGY</b>	<p><b>A. <u>TEXT BOOKS</u></b></p> <ol style="list-style-type: none"> <li>1. Robbins &amp; Cotran, Pathologic Basis of Disease, 9th edition.</li> <li>2. Rapid Review Pathology, 4th edition by Edward F. Goljan MD</li> </ol> <ol style="list-style-type: none"> <li>1. <a href="http://library.med.utah.edu/WebPath/webpath.html">http://library.med.utah.edu/WebPath/webpath.html</a></li> <li>2. <a href="http://www.pathologyatlas.ro/">http://www.pathologyatlas.ro/</a></li> </ol>
<b>PHARMACOLOGY</b>	<p><b>A. <u>TEXT BOOKS</u></b></p> <ol style="list-style-type: none"> <li>1. Lippincot Illustrated Pharmacology</li> <li>2. Basic and Clinical Pharmacology by Katzung</li> </ol>



**OTHER LEARNING RESOURCES**

<b><u>Hands-on Activities/ Practical</u></b>	Students will be involved in Practical sessions and hands-on activities that link with the blood module to enhance the learning.
<b><u>Labs</u></b>	Utilize the lab to relate the knowledge to the specimens and models available.
<b><u>Skills Lab</u></b>	A skills lab provides the simulated learning experience to learn the basic skills and procedures. This helps build the confidence to approach the patients.
<b><u>Videos</u></b>	Video familiarize the student with the procedures and protocols to assist patients.
<b><u>Computer Lab/CDs/DVDs/Internet Resources:</u></b>	To increase the knowledge, students should utilize the available internet resources and CDs/DVDs. This will be an additional advantage to increase learning.
<b><u>Self Learning</u></b>	Self Learning is scheduled to search for information to solve cases, read through different resources and discuss among the peers and with the faculty to clarify the concepts.

**ASSESSMENT METHODS:****Theory:**

- **Best Choice Questions (BCQs)** also known as MCQs (Multiple Choice Questions) are used to assess objectives covered in each module.
  - A BCQ has a statement or clinical scenario followed by four options (likely answer).
  - Students after reading the statement/scenario select ONE, the most appropriate response from the given list of options.
  - **Correct answer carries one mark, and incorrect 'zero mark'. There is no negative marking.**
  - Students mark their responses on specified computer-based/OMR sheet designed for LNHMC.

**OSPE/OSCE: Objective Structured Practical/Clinical Examination:**

- Each student will be assessed on the same content and have same time to complete the task.
- Comprise of 12-25 stations.
- Each station may assess a variety of clinical tasks, these tasks may include history taking, physical examination, skills and application of skills and knowledge
- Stations are observed, unobserved, interactive and rest stations.
- Observed and interactive stations will be assessed by internal or external examiners.
- Unobserved will be static stations in which there may be an X-ray, Labs reports, pictures, clinical scenarios with related questions for students to answer.
- Rest station is a station where there is no task given and in this time student can organize his/her thoughts.

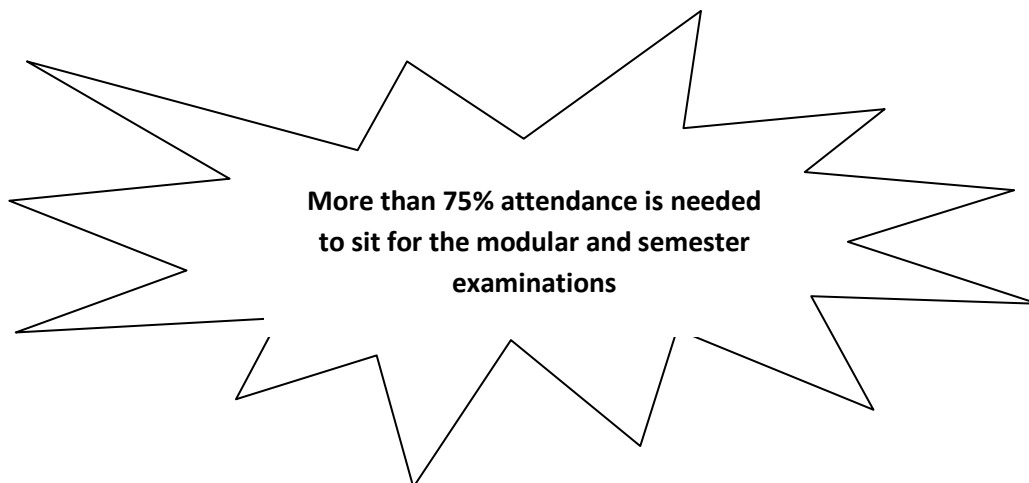
**Internal Evaluation**

- Students will be assessed to determine achievement of module objectives through the following:
  - **Module Examination:** will be scheduled on completion of each module. The method of examination comprises theory exam which includes BCQs and OSPE (Objective Structured Practical Examination).
  - **Graded Assessment of students by Individual Department:** Quiz, viva, practical, assignment, small group activities such as CBL, TBL, TOL, online assessment, ward activities, examination, and log book.
- Marks of both modular examination and graded assessment will constitute 20% weightage.
- As per JSMU policy, this 20% will be added by JSMU to Semester Examination.

Example : Number of Marks allocated for Semester Theory and Internal Evaluation			
Semester	Semester Examination Theory Marks	Internal Evaluation (Class test + Assignments + Modular Exam)	Total (Theory)
	80%	20%	100%

### 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



**MODULAR EXAMINATION RULES & REGULATIONS (LNH&MC)**

- 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.

**JSMU Grading System**

- It will be based on GPA – 4 system

Marks obtained in Percentage range	Numerical Grade	Alphabetical Grade
80-100	4.0	<b>A+</b>
75-79	4.0	<b>A</b>
70-74	3.7	<b>A-</b>
67-69	3.3	<b>B+</b>
63-66	3.0	<b>B</b>
60-62	2.7	<b>B-</b>
56-59	2.3	<b>C+</b>
50-55	2.0	<b>C</b>
<50 Un-grade-able	0	<b>U</b>

- A candidate obtaining GPA less than 2.00 (50%) is declared un-graded (fail).
- Cumulative transcript is issued at the end of clearance of **all** modules.

**SCHEDULE:**

<b>WEEKS</b>	<b>1<sup>ST</sup> YEAR</b>	<b>MONTH</b>
<b>WEEK 1</b>	<b>FOUNDATION MODULE</b>	<b>9<sup>th</sup> Feb 2019</b>
<b>WEEK 2</b>		
<b>WEEK 3</b>		
<b>WEEK 4</b>		
<b>WEEK 5</b>		
<b>WEEK 6</b>		<b>26<sup>th</sup> March 2019</b>
	<b>MODULAR EXAM</b>	<b>28<sup>th</sup> &amp; 29<sup>th</sup> March</b>
<b>WEEK 1</b>	<b>BLOOD MODULE</b>	<b>1<sup>st</sup> April 2019</b>
<b>WEEK 2</b>		
<b>WEEK 3</b>		
<b>WEEK 4</b>		<b>1<sup>st</sup> May 2019</b>
	<b>MODULAR EXAM</b>	<b>3<sup>rd</sup> &amp; 4<sup>th</sup> May 2019*</b>

\*Final dates will be announced later