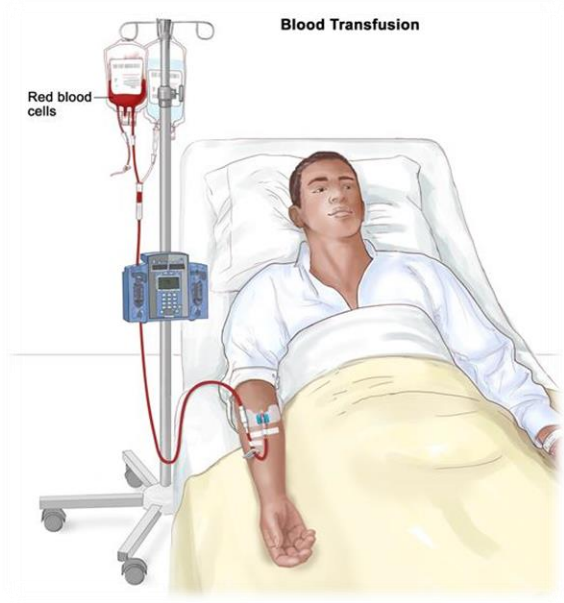
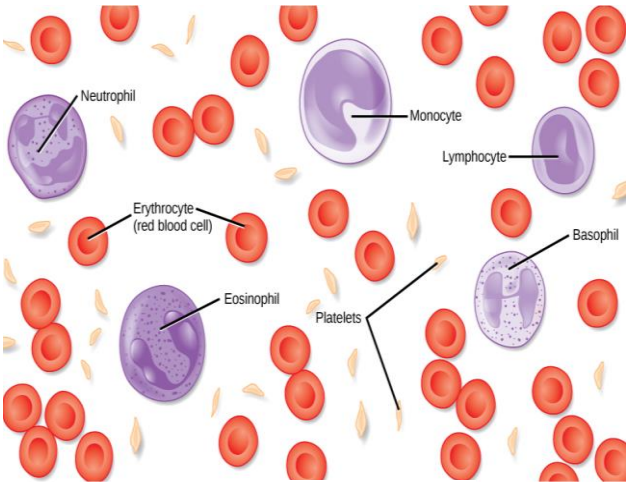


STUDY GUIDE

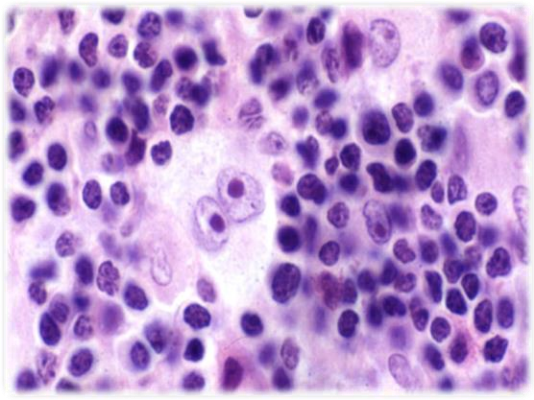
HEMATOLOGY MODULE

8th Jan – 4th Feb 2020
Duration: 4.5 Weeks

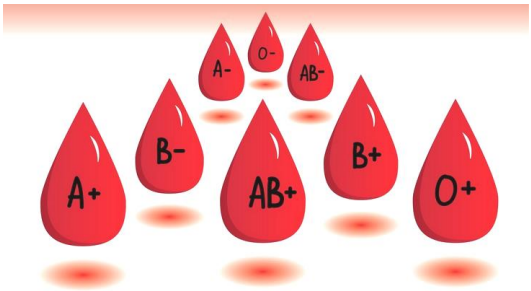
Third Year MBBS

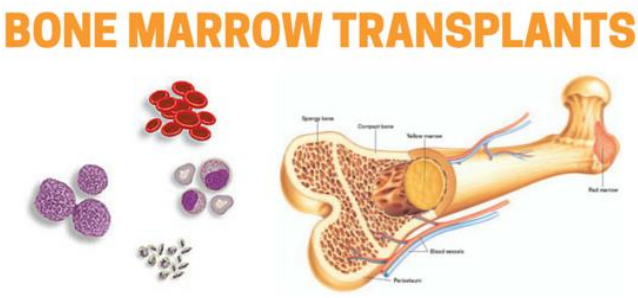


Components of Blood



Hodgkin Lymphoma





LIAQUAT NATIONAL HOSPITAL & MEDICAL COLLEGE

STUDY GUIDE FOR HEMATOLOGY MODULE

Module name: **Hematology** *Year:* ***Three*** *Duration:* ***4.5 weeks (Jan - Feb 2020)***

Timetable hours: **Lectures, Case-Based Integrated Learning (CBIL), Clinical Rotations, learning experience in LNH outreach centers, Laboratory, Practical, Demonstrations, Skills, Self-Study**

MODULE INTEGRATED COMMITTEE

MODULE COORDINATORS:	• Professor S.M. Irfan (Hematology)
CO-COORDINATORS:	• Dr. Muhammad Suleman Sadiq Hashmi (DHPE)

DEPARTMENTS' & RESOURCE PERSONS' FACILITATING LEARNING

BASIC HEALTH SCIENCES	CLINICAL AND ANCILLARY DEPARTMENTS
COMMUNITY MEDICINE • Dr. Saima Zainab	***FAMILY MEDICINE*** • Dr. Faridah Amin
FORENSIC MEDICINE • Professor Murad Zafar	***GENERAL MEDICINE*** • Prof. KU Makki
PATHOLOGY • Professor Naveen Faridi	***MOLECULAR PATHOLOGY*** • Dr. Israr Nasir • Dr. Sobia Rafiq
PHARMACOLOGY • Professor Nazir Ahmad Solangi	***HEMATOLOGY*** • Professor S.M Irfan • Dr. Naila Raza
PHYSIOLOGY • Professor Syed Hafeez-ul-Hassan	***ONCOLOGY*** • Dr. Naila Zahid • Dr. Sobia Tabassum
RESEARCH • Dr. Shaheena Akbani	***PEDIATRICS*** • Prof. Samina Shamim • Dr. Bushra Rafique
	RESEARCH & SKILLS LAB • Dr. Kahkashan Tahir • Aeman Wahid
DEPARTMENT OF HEALTH PROFESSIONS EDUCATION • Professor Nighat Huda • Dr. Afifa Tabassum • Dr. Sobia Ali • Dr. M. Suleman Sadiq • Dr. Mehnaz Umair	
LNH&MC MANAGEMENT • Professor KU Makki, Principal LNH&MC • Dr. Shaheena Akbani, Director A.A & R.T LNH&MC	
STUDY GUIDE COMPILED BY: ***Department of Health Professions Education***	• Dr. Muhammad Suleman Sadiq

INTRODUCTION

WHAT IS A STUDY GUIDE?

It is an aid to:

- Inform students how student learning program 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 Term 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.

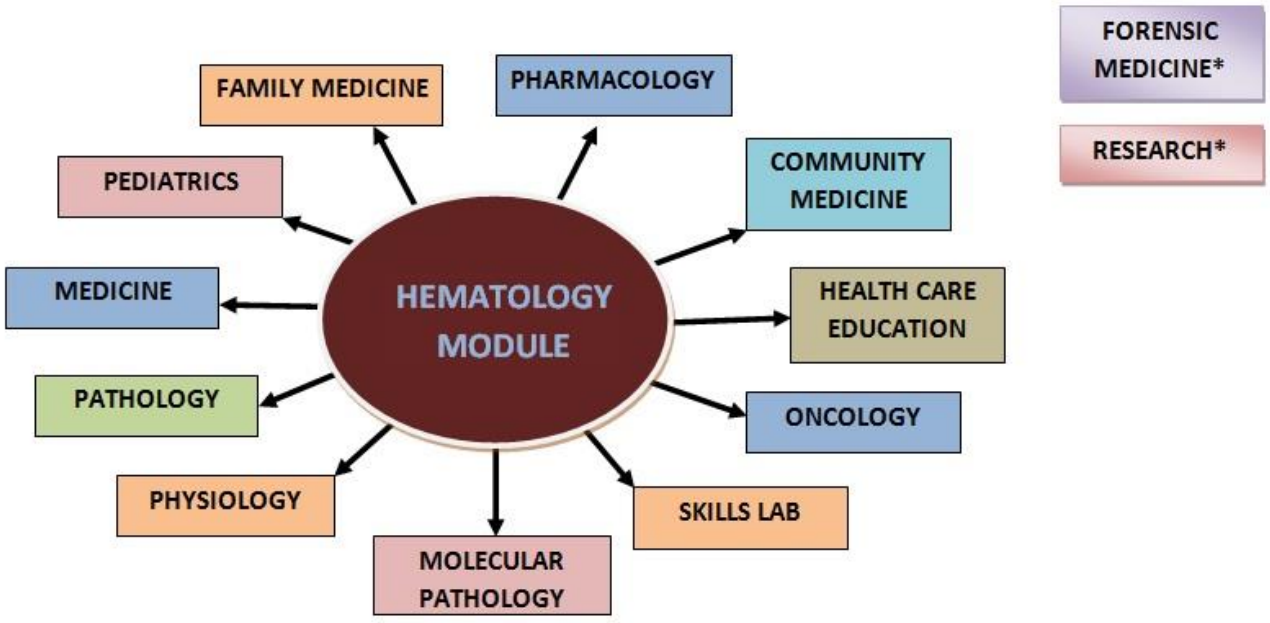
CURRICULUM FRAMEWORK

Students will experience *integrated curriculum* similar to previous modules**.**

INTEGRATED CURRICULUM comprises of system-based modules such as Infectious Diseases, Hematology, Respiratory system-II and CVS-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 better understanding of basic sciences when they repeatedly learn in relation to clinical examples.

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

INTEGRATING DISCIPLINES OF HEMATOLOGY MODULE



LEARNING METHODOLOGIES

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

- Interactive Lectures
- Small Group Discussion
- Case- Based Integrated Learning (CBIL)
- Clinical Experiences
  - Clinical Rotations
  - Experience in LNH outreach centers
- Practicals
- Skills session
- Self-Directed Study

INTERACTIVE LECTURE: 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.

SMALL GROUP SESSION: 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 rephrase to help clarify concepts.

CASE- BASED INTEGRATED LEARNING (CBIL): 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 previously in clinical and basic health sciences during the module and construct new knowledge. The CBIL will be provided by the concern department. CBIL will be provided by the concern department.

CLINICAL LEARNING EXPERIENCES: In small groups, students observe patients with signs and symptoms in hospital wards, clinics and outreach centers. This helps students to relate knowledge of basic and clinical sciences of the module and prepare for future practice.

- **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.
- **EXPERIENCES IN LNH OUTREACH CENTERS:** Learning at outreach centers of LNH have been organized and incorporated as part of training of third year medical students. The objective of these visits is to provide clinical training experiences for students in primary care settings.

PRACTICAL: Basic science practicals related to pharmacology, microbiology, forensic medicine, and community medicine have been schedule for student learning.

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

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.

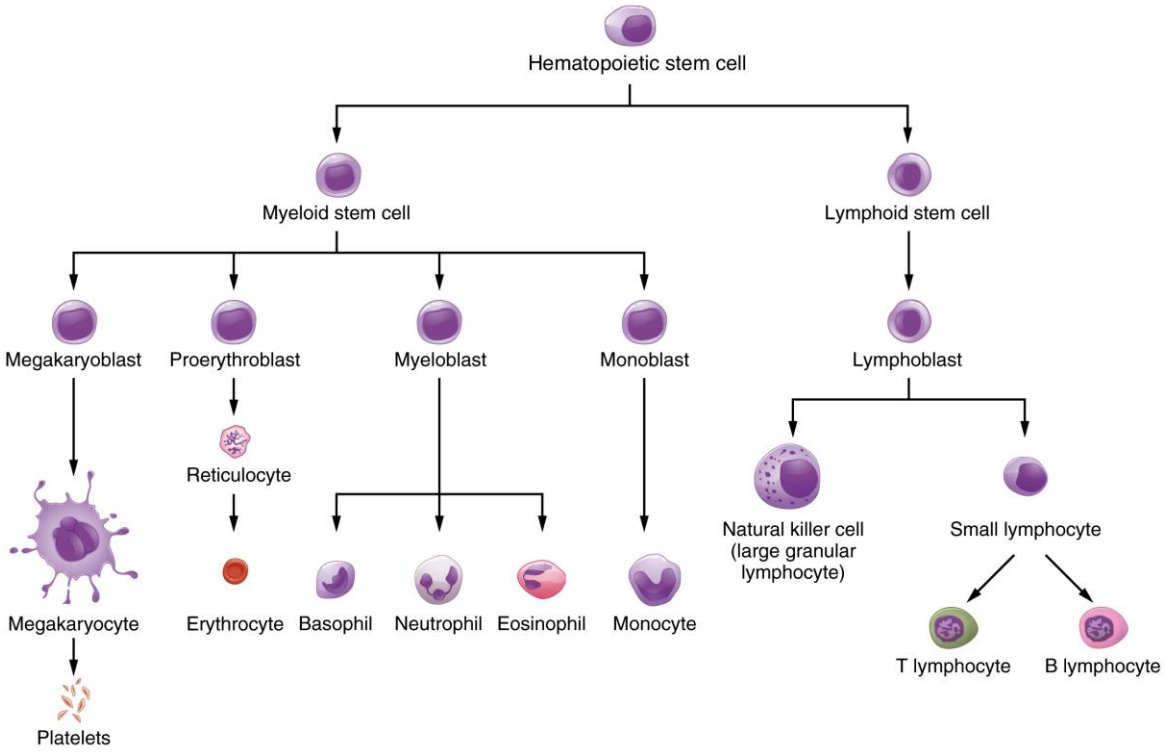
HEMATOLOGY MODULE

INTRODUCTION

For MBBS third year students, the Hematology module concentrates on knowledge and skills required for diagnosis, and outlining the management plan of common hereditary, immunological, and neoplastic disorders of blood and its components. The module covers as well the principles and techniques of laboratory investigations essential for the diagnosis, and monitoring of the treatment of hematological disorders.

In view of prevalence in Pakistan, adequate coverage is given to different types of anemia, thalassemia, and other related disorders .Moreover, the objectives include blood transfusion and blood donation practices to promote safe transfusion, and appropriate use of blood components.

The Hematology module learning objectives take into consideration previously acquired pertinent knowledge in Blood module of MBBS first year. The module integrates with related disciplines such as Community Medicine, Family Medicine, Medicine, Oncology Pathology, Paediatrics, Pharmacology, and Physiology. It is expected that different learning experiences would help students build new knowledge, and enhance students' understanding and motivation to seek further knowledge.



COURSE TOPICS, OBJECTIVES AND TEACHING STRATEGIES

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

OBJECTIVES	*FACULTY*	*TEACHING STRATEGY*
History Taking & Counseling		
• Obtain a comprehensive history of a patient presenting with symptoms of anemia • Perform general physical examination related to anemia (conjunctiva, tongue and nails for pallor, nail examination for koilonychias) • Counsel patients with regards to supplementation and dietary modification in nutritional anemia (iron, B12 and folate) • Demonstrate steps of counseling on simulator	Family Medicine	Small Group Discussion
RBCs		
• Discuss steps of normal haemopoiesis with importance of red cell indices and its correlation	Physiology	Interactive Lecture
Anemias & Hemoglobinopathies		
• Discuss the physiology of anemia (nutritional),the importance of red cell indices and its correlation	Physiology	Case-Based Discussion
• Classify clinical and pathological anemias • Describe blood loss anemia	Pathology/ Hematology	Interactive Lecture
• Describe the clinical presentation, lab investigation and their inpretation of various types of anemia by age and gender such as iron deficiency anemia, hemolytic anemia, Thalassemia, megaloblastic anemia, anemia of chronic disease	Family Medicine	Interactive Lecture/Case-Based Learning
• Interpret CBC and peripheral smear findings in microcytic, normocytic and macrocytic anemia • Discuss the causes of low and high reticulocytic count	Pathology/ Hematology	Small Group Discussion/Practical
• Define the pathogenesis of under production anemias • Describe nutritional anemia and their metabolic pathways • Differentiate nutritional anemias on their clinical features • Differentiate the morphological spectrum of various nutritional anemias • Differentiate between iron and megaloblastic anemia, based on etiology and clinicolaboratory diagnostic features	Pathology/ Hematology	Interactive Lecture

• Describe aplastic anemia, its pathophysiology, etiology and clinical course along with diagnostic and morphological features • Define pathogenesis of Anemia of Chronic disease and Chronic Renal failure	Pathology/ Hematology	Interactive Lectures
• Classify hemolytic anemia • Classify and identify intracorpuscular defects • Identify sickle cell anemia, hereditary spherocytosis and G6PD deficiency based on etiology, pathophysiology , clinical features and laboratory workup • Differentiate between intravascular and extravascular hemolysis	Pathology/ Hematology	
• Differentiate between immune and non immune hemolytic anemias, based on clinical and laboratory parameters. • Identify and describe extracorpuscular defects	Pathology/ Hematology	
• Define thalassemia & Sickle Cell Disease • Describe two general types of thalassemia including the defects of each • Describe the four types of alpha thalassemia including the defects of each	Molecular Pathology	
• Discuss the causes, clinical features and pathology for sickle cell disease		
• Discuss the symptomatology , diagnosis, differential diagnosis and integrated management of: ○ Thalassemia ○ Sickle cell anemia ○ Hereditary spherocytosis ○ G6PD deficiency ○ Pyruvate kinase deficiency ○ Acquired hemolytic anemia ○ Autoimmune hemolytic anemia	Pediatrics	
• Describe the relevant investigations for diagnosis of anemia which includes iron deficiency anemia, Thalessemia, megaloblastic anemia, anemia associated with chronic disease and hemolytic anemia)	Family Medicine	
• Discuss the management plan for the given cases of Anemias	Medicine	

WBCs		
• Distinguish between leucopenia, neutropenia and agranulocytosis • Discuss the pathogenesis of reactive proliferation of white blood cells • Enumerate the pathogenesis of neutropenia and agranulocytosis • Describe leukemoid reaction, leucoerythroblastic picture and its causes	Pathology/ Hematology	Interactive Lectures
• Identify acute and chronic infections, along with its pathogenesis and morphology • Differentiate between normal white cell and abnormal WBC conditions based on morphology		
• Differentiate between normal and abnormal bone marrow examination findings		Small Group Discussion
• Discuss the types and groups of immunomodulating agents, • Explain the diseases in which immunostimulation and suppression is required • State the rationale of immunomodulants' use • Discuss the clinical uses of immunostimulants and suppressants	Pharmacology	Interactive Lecture
Leukemia & Lymphoma		
• Classify neoplastic proliferation of white cells based on WHO classification myeloid/ lymphoid neoplasm and acute leukemias • Differentiate between chronic leukemia and acute leukemia	Pathology/ Hematology	Interactive Lectures
• Discuss clinical presentation, differential diagnosis, Incidence, Prevalence & Risk Factors for Non-Hodgkin's Lymphoma	Oncology	
• Describe myelodysplastic syndrome, its types, clinical features, morphology and prognosis • Identify different myeloproliferative disorders, their pathogenesis, hematological features, clinical behavior and disease outcome	Pathology/ Hematology	
• Differentiate between normal white cells, Leukemoid reaction and malignant cell based on microscopic features		

• Discuss Acute & Chronic Leukemia based on their basic difference & Diagnostic Criteria	Oncology	Interactive Lectures
• Discriminate between Hodgkin's and non Hodgkin lymphomas • Identify low grade and high grade lymphomas • Interpret various types of lymphoma based on its pathogenesis morphology, clinical sign and symptoms, immunophenotyping, cytogenetics and prognosis • Describe various types of non-Hodgkin lymphoma, their morphology and clinical course	Pathology/ Hematology	Interactive Lecture
• List the causes of cancer and discuss rationale of cancer chemotherapy • Classify anticancer drugs according to functions and cell cycle specificity • Discuss the mechanisms of action and major clinical uses, dose-limiting toxicities, • and notable pharmacokinetic characteristics of anticancer drugs • Explain the emergence of resistance against anticancer drugs	Pharmacology	Case-Based Discussion
Transplantation		
• Describe BMT and classify its types • Explain the indications and common complications of transplant	Pathology/ Hematology	Interactive Lectures
• Discuss the immunology basis of transplant rejection • Describe Graft versus host disease (GVHS)		
Platelets & Blood Coagulation		
• Explain the physiological pathway of hemostasis • Explain the extrinsic and intrinsic pathways of coagulation	Physiology	Interactive Lecture /Small Group Discussion
• Discuss Hemostasis • Evaluate clotting disorders in children • Explain Hemophilia • Discuss the treatment options for coagulation disorders	Pediatrics	Interactive Lectures/Small Group Discussion
• Describe signs & symptoms, differential diagnosis, investigation of patients suffering from coagulation disorders as well as for Thrombocytopenia	Medicine	

• Describe and interpret the approach to a patient with bleeding disorders based on history, examination and investigation • Delineate the diagnostic approach in bleeding diathesis, emphasis on Von-willebrand and hemophilia	Medicine	Interactive Lecture
• Discuss first and second line investigations in a bleeding patient • Interpret first line investigations for patient with bleeding disorder	Pathology	Small Group Discussion
• Describe the signs and symptoms of disseminated intravascular coagulation (DIC) • Identify management modalities for disseminated intravascular coagulation (DIC) • Discuss strategies for anticoagulation and its complications	Medicine	Interactive Lecture
Blood Grouping & Transfusion		
• Explain feto-maternal blood group incompatibility • Discuss the evaluation, management and prevention of hemolytic disease in newborn	Pediatrics	Interactive Lectures
• Describe the Blood grouping based on ABO & Rh systems • Explain the blood components therapy • Discuss the indication & contraindications of transfusion • Describe the basics of cross match	Pathology	
• Classify adverse transfusion reactions both immediate and delayed types		
Vasoactive Peptides & Serotinin		
• Classify the vasoactive peptides • Discuss the clinical importance and properties of different vasoactive peptides • Describe the basic and clinical pharmacology of vasoactive peptides • Explain the mechanism of action, therapeutic uses , adverse effects, and contraindications of serotonin agonists and antagonists • Discuss the role of serotonin, its agonist and antagonists in different clinical conditions. • Discuss the clinical aspects of serotonin agonists and antagonists	Pharmacology	Small Group Discussion
Injection Techniques		
• Demonstrate different injection techniques (Intramuscular, subcutaneous and Intravenous) on the mannequin	Skills Lab	Demonstration & Hans-On

Cancer Epidemiology		
• Describe the distribution of various types of cancer prevalent globally including Pakistan and preventive measures • Discuss the role and inter-disciplinary methods of cancer control and prevention	Community Medicine	Interactive Lecture
Vaccines & Vaccines Schedule		
• Explain different types of vaccines, and their safe and effective use for prevention of infectious diseases	Community Medicine	Interactive Lectures
• Discuss the types of immunity and vaccines with cold chain		
Expanded Program on Immunization (EPI)		
• Discuss the provision of the quality immunization services and its schedule (EPI) that promote, protect and preserve the children of Pakistan against the vaccine preventable diseases	Community Medicine	Interactive Lecture
School Health Services		
• Describe various components of school health program, and their functions for health promotion of the school children / students • Describe how community and school policies protect the health, welfare, and safety of students.	Community Medicine	Interactive Lecture
Personal Identity		
• Explain personal identity • Describe the parameters of identification • Explain circumstances where issues of Identification arise • Describe medico-legal significance of age, gender and race	Forensic Medicine	Interactive Lecture
• Discuss estimation of age and certification of an individual on medical examination of physique, teeth (dental) and radiology		Small Group Discussion/ Demonstration
• Explain the Importance of Blood Grouping in Parental Dispute		Interactive Lecture
Fixation of the Individuality in Living & Dead		
• Discuss biometric system, dactylography (fingerprints), birth marks, deformities, hair, scars, tattoo marks	Forensic Medicine	Interactive Lecture
• Determination of gender from bones/osteometeric indices		Small Group Discussion/ Demonstration

Trace Evidence		
• Describe Locard's exchange principle and Trace evidence in connection of crime reconstruction • Identification in disputed paternity and maternity cases	Forensic Medicine	Interactive Lecture
• Discuss the biometrics, DNA and finger prints		Small group Discussion/ Demonstration
Medicolegal Aspects of Death (Thanatology)		
• Define death and brain death • Identify the conditions and criteria of brain death • Define suspended animation along with examples • List Howard's criteria of death • Identify different methods used in the estimation of time since death • Define sudden and unexpected deaths • Describe immediate signs of death with special stress on somatic and clinical death • Classify and describe postmortem bodily changes according to the time of onset • Discuss putrefication, its mechanisms, changes and gases of decomposition • Estimate postmortem intervals based on knowledge about forensic entomology • Explain adipocere formation and mummification • Discuss Cause-Mechanism-Mode and Manner of death • Explain presumption of death and presumption of survivorship	Forensic Medicine	Interactive Lectures
• Explain death certificate as recommended by W.H.O		Small Group Discussion

Apart from attending daily scheduled sessions, students too should engage in self-study to ensure that all the objectives are covered

LEARNING RESOURCES

SUBJECT	*RESOURCES*
COMMUNITY MEDICINE	**TEXT BOOKS** 1. Preventive and Social Medicine by K Park 2. Community Medicine by M Illyas 3. Basic *Statistics* for the Health Sciences by Jan W Kuzma
FORENSIC MEDICINE	**TEXT BOOKS** 1. Nasib R. Awan. Principles and practice of Forensic Medicine 1st ed. 2002. 2. Parikh, C.K. Parikh's Textbook of Medical Jurisprudence, Forensic Medicine and Toxicology. 7th ed.2005. **REFERENCE BOOKS** 3. Knight B. Simpson's Forensic Medicine. 11th ed.1993. 4. Knight and Pekka. Principles of forensic medicine. 3rd ed. 2004 5. Krishan VIJ. Text book of forensic medicine and toxicology (principles and practice). 4th ed. 2007 6. Dikshit P.C. Text book of forensic medicine and toxicology. 1st ed. 2010 7. Polson. Polson's Essential of Forensic Medicine. 4th edition. 2010. 8. Rao. Atlas of Forensic Medicine (latest edition). 9. Rao.Practical Forensic Medicine 3rd ed ,2007. 10. Knight: Jimpson's Forensic Medicine 10th 1991,11th ed.1993 11. Taylor's Principles and Practice of Medical Jurisprudence. 15th ed.1999 **CDs:** 1. Lectures on Forensic Medicine. 2. Atlas of Forensic Medicine. **WEBSITES:** www.forensicmedicine.co.uk
GENERAL MEDICINE	**REFERENCE BOOKS:** 1. Hutchison's Clinical Methods, 23rd Edition 2. MacLeod's clinical examination 13th edition 3. Davidson's Principles and Practice of Medicine 4. Kumar and Clark's Clinical Medicine 5. HCAI guidelines CDC 6. WHO TB guidelines
PATHOLOGY/MICROBIOLOGY	**TEXT BOOKS** 1. Robbins & Cotran, Pathologic Basis of Disease, 9th edition. 2. Rapid Review Pathology, 4th edition by Edward F. Goljan MD
	WEBSITES: 1. http://www.hematology.org/Educators/High-School.aspx#a2 2. http://imagebank.hematology.org/

PEDIATRICS	**TEXT BOOK:** 1. Textbook of Pediatrics by PPA, preface written by S. M. Haneef 2. Basis of Pediatrics (8th Edition Pervez Akbar)
PHARMACOLOGY	**A. TEXT BOOKS** 1. Lippincot Illustrated Pharmacology 2. Basic and Clinical Pharmacology by Katzung

ADDITIONAL LEARNING RESOURCES

Hands-on Activities/ Practical	Students will be involved in Practical sessions and hands-on activities that link with the hematology module to enhance the learning.
Labs	Utilize the lab to relate the knowledge to the specimens and models available.
Skills Lab	A skills lab provides the simulators to learn the basic skills and procedures. This helps build the confidence to approach the patients. https://opentextbc.ca/clinicalskills/chapter/6-8-iv-push-medications-and-saline-lock-flush/
Videos	Video familiarize the student with the procedures and protocols to assist patients.
Computer Lab/CDs/DVDs/Internet Resources:	To increase the knowledge students should utilize the available internet resources and CDs/DVDs. This will be an additional advantage to increase learning.
Self Learning	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.

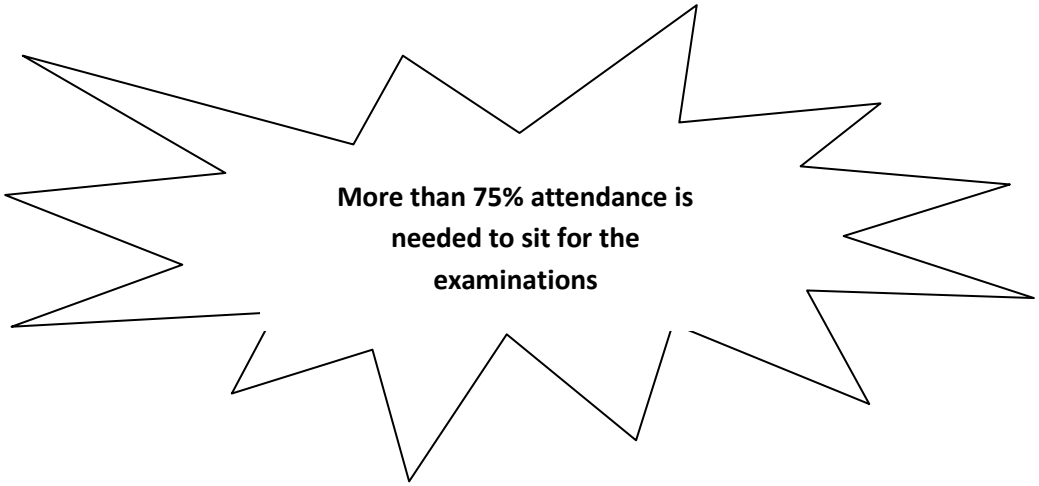
Internal Evaluation

- Students will be assessed 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!



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.

SCHEDULE:

WEEKS	3rd Year	MONTH
WEEK 1-5.5	INFECTIOUS DISEASES MODULE	2nd Dec 2019
		7th Jan 2020
WEEK 1-4.5	HEMATOLOGY MODULE	8th Jan 2020
		4th Feb 2020
WEEK 1-4.5	RESPIRATORY MODULE	6th Feb 2020
		March*
WEEK 1-4	CVS MODULE	March*
		April*
	LNHMC MID-TERM EXAM	April*

*Final dates will be announced later