LIAQUAT NATIONAL HOSPITAL AND MEDICAL COLLEGE

Institute for Postgraduate Medical Studies & Health Science

FOUNDATION MODULE II

FROM 11 DECEMBER TO 27 FEBRUARY

STUDY GUIDE FOR FOUNDATION-II MODULE

Module name: **Foundation-II** *Year:* ***Three*** *Duration:* ***10 weeks (Dec – Feb 2024)***

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 COORDINATOR:	• Dr. Saima Zainab (Community Medicine)
CO-COORDINATORS:	Dr Naila Parveen • Dr. Afifa Tabassum (DHPE)

DEPARTMENTS' & RESOURCE PERSONS' FACILITATING LEARNING

BASIC HEALTH SCIENCES
BIOCHEMISTRY Professor. Faiza Waseem
COMMUNITY MEDICINE • Dr. Saima Zainab
FORENSIC MEDICINE • Professor Syed Mukkaram Ali
PATHOLOGY • Professor Naveen Faridi
MICROBIOLOGY • Professor Shaheen Sharafat
PHARMACOLOGY • Professor Tabassum Zehra
FAMILY MEDICINE • *Dr Rabeeya Saeed*
DEPARTMENT OF HEALTH PROFESSION EDUCATION • Prof. Nighat Huda • Dr. Sobia Ali • Dr. Afifa Tabassum • Dr. Sana Farooq Shah • Dr. Ahsan Naseer. • Dr. Yusra Nasir
LNH&MC MANAGEMENT • Professor Karimullah Makki, Principal, LNH&MC • Dr. Shaheena Akbani, Director A.A & R.T LNH&MC
STUDY GUIDE COMPILED BY: Department of Health Professions Education

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

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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 CBIL 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.

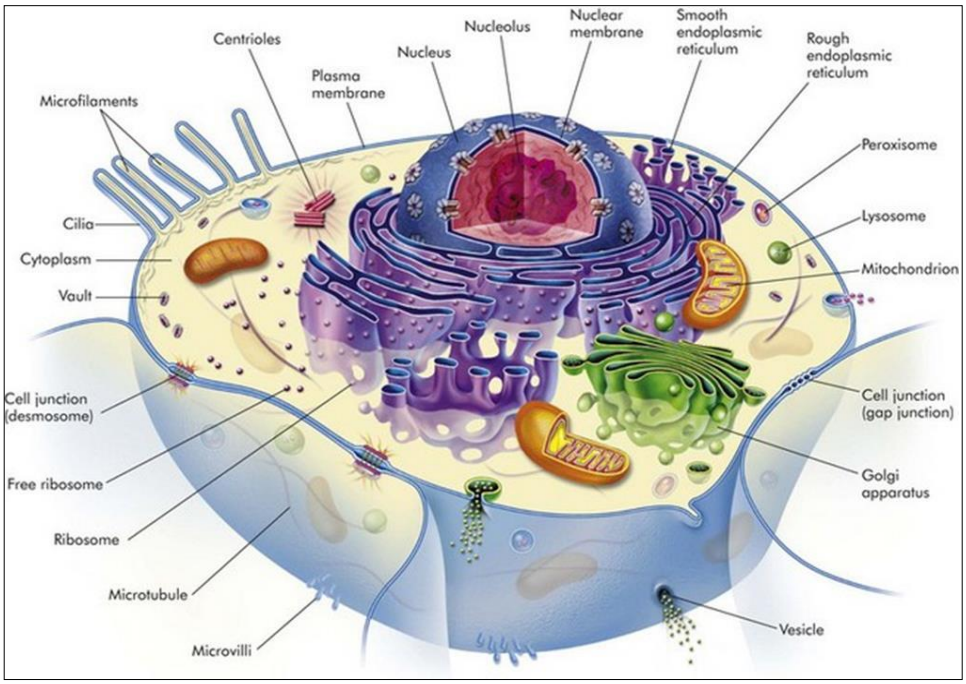
MODULE 1 : FOUNDATION-II

INTRODUCTION

This module marks the beginning of transition to more focus on clinical learning. This module will introduce students to key concepts essential for understanding diseases process, their prevention and treatment. Students will be able to apply these key concepts in future, system-based modules to understand the diseases processes and their management.

The course covers the molecular level of cell biology including genetics and its role in microbiology and pathology. In community medicine, health issues and policies on disease control, health systems will be discussed. This module will also include basics of pharmacology and forensic medicine.

Concepts dealt with in this module will be revisited in other modules in the future.



COURSE OBJECTIVES AND STRATEGIES

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

BIOCHEMISTRY

TOPICS & OBJECTIVES	LEARNING STRATEGIES
1.Regulation of gene expression	
• Define the term gene expression	**Interactive Lecture**
• Explain the mechanism of gene expression in prokaryotes and eukaryotes	
• Justify the need for gene expression	
2. DNA isolation	
• Define DNA Isolation	**Tutorial**
• Describe the different methods of isolation of DNA	
• Explain the uses of DNA isolation	
3. Recombinant DNA technology	
• Define the term Recombinant DNA technology	**Interactive Lecture**
• Describe the different types of Recombinant technologies and their uses	
• Explain the significance of Recombinant technology	
4. Hybridization and blotting techniques	
• Define the terms related to Hybridization and blotting techniques	**Interactive Lecture**
• Explain the types of hybridization and blotting techniques and their methods (Flow chart)	
• Describe the uses and significance of each method	

COMMUNITY MEDICINE

TOPICS & OBJECTIVES	LEARNING STRATEGIES
1. **Introduction to public health**	
• Define common terminologies used in Community Medicine	**Tutorial**
• Discuss Comprehensive Health Care	
• Briefly describe historical development of Public Health	
• Discuss development of public health in Pakistan	
• Explain Social Action Program	
• Discuss major health problems in Pakistan	
2. **Determinants of Disease & iceberg**	
• Explain determinants of disease	

• Explain determinants of Health	**Tutorial**
• Discuss Millennium. Development Goals (MDGs) & Sustainable Development Goals (SDGs)	
• Discuss iceberg phenomenon	
3. **Natural history of disease & Levels of prevention**	
• Discuss the phenomenon of natural history of disease	**Tutorial**
• Explain different levels of prevention	
4. Introduction to Epidemiology	
• Describe Epidemiology	**Interactive Lectures**
• Explain theories of disease causation	
• Describe Epidemiological Study Designs	
5. International organizations	
• List regional offices of World Health Organization (WHO)	**Interactive Lectures**
• Discuss functions of WHO & UNICEF	
• Discuss UNICEF's GOBI-FFF program	
6. Health Care System	
• Describe health system	**Interactive Lecture/ Tutorial**
• Define district health system	
• Describe the role of district management team	
• Discuss the health indicators of Pakistan.	
• Discuss the Health system problems of Pakistan	
7. Primary Health Care (PHC)	
• Describe Primary Health Care	**Tutorial**
• Explain essential components of Primary Health Care	
• Describe key concepts in PHC planning	
• Describe the steps in PHC planning	
• Differentiate between selective vs comprehensive PHC	
8. Health Management Information System	
• • Define HMIS	**Interactive Lectures**
• • State the essential elements of HMIS	
• • List the components of HMIS	
• Describe the important features of HMIS	
• Define disease early warning system (DEWS)	

9. Leadership in Public Health	
• Define leadership	**Interactive Lectures**
• Describe four styles of leadership	
• Discuss the role of health professionals in community development	
• Explain the basic principles of leadership for community development	
10. Genomics	
• Differentiate between genetics and genomics	**Interactive Lectures**
• List the chromosomal abnormalities	
• Describe the steps in genetic counseling	
• Explain genetic surveillance	
11. Introduction to demography	
• Describe demography	**Interactive Lectures/ Tutorial**
• Explain sources of demographic data	
• Explain the importance of demographic data	
• Discuss the stages of demographic transition	
12. Vital Statistics	
• Describe vital statistics.	**Interactive Lectures**
• Describe Vital statistics registration in developing countries.	
• Discuss the situation of vital statistics in Pakistan	
13. Morbidity & mortality determinants	
• Explain morbidity measures	**Interactive Lectures**
• Describe mortality measures	
14. Population pyramid & interpretation	
• Define Population pyramid	**Interactive Lectures/ Tutorial**
• Compare the advantages and disadvantages of population pyramid	
15. Introduction to infections & control of infections	
• Define different terms related to infection	**Tutorial**
• Discuss the incubation period, serial time period in control of infection	
• Differentiate between infectious and communicable diseases	
• Describe control measures for infectious & communicable diseases	
• Explain the role of immune-prophylaxis & screening in the control of infection	
16. Emerging & Re-emerging diseases	
• Describe emerging & re-emerging diseases	**Interactive Lectures**
• Enumerate factors contributing to emergence	
• Explain preventive measures for the emergence	

17.	**Disease screening & Surveillance**	
•	Describe Screening and its role in natural history of disease	**Tutorial**
•	Classify the types of screening	
•	List criteria of a good screening test	
•	Discuss the characteristics of a good screening test	
•	Calculate screening measures	
•	Describe surveillance	
•	Differentiate between surveillance and monitoring	
•	Describe the factors affecting the value of data	
18.	**Health Education**	
•	Describe Health Education	**Interactive Lectures**
•	Explain the principles and stages of health education	
•	Discuss health education in Pakistan	
•	Discuss Health Information, Education and Communication (IEC)	
19.	**Hospital administration**	
•	Define hospital	**Interactive Lectures**
•	Explain the classification of hospitals	
•	Describe the indices related to hospitals and population at risk	
•	Describe the factors influencing hospital utilization	

FORENSIC MEDICINE

TOPICS & OBJECTIVES		LEARNING STRATEGIES
1.	**Introductory lecture**	
•	Describe basics terms related to Forensic Medicine and Toxicology.	**Interactive Lecture**
•	Enumerate the branches of Forensic Sciences	
•	Explain the importance and utility of Forensic Medicine and its branches, in medical, legal and ethical issues	
•	Discuss the structure of Legal system and the powers of different courts in Pakistan	
•	Outline the schedule of teaching and examinations, and code of conduct in the department of Forensic Medicine and Toxicology, JSMU	
•	List the reference books for developing a thorough understanding of the subject	

2. Legal Procedures - I	
• Define important legal terms such as Summons, warrant, perjury, deposition, exhibit, offence, cognizable offence, non-cognizable offence, oath, conduct money, summons case, warrant case, bail, FIR	**Interactive Lecture**
• Explain medical evidence and its types (oral, documentary, hearsay, circumstantial)	
• List the documents prepared by a medical man (Postmortem Reports, Medico Legal Reports, Certificates such as birth certificates, death certificates, sickness certificates, certificates of unsoundness of mind)	
• Differentiate between Dying declaration and Dying deposition	
3. Legal Procedures – II	
• Enumerate the types of witnesses	
• Explain the procedure of examination in the court	
• List the protocols for the conduct of Doctor in the witness box, during court attendance & recording evidence and volunteering of a statement by the doctor in court of law	
• Describe Professional secrecy and Privileged communication	
4. Legal Procedures – III	
• Explain the hierarchy of Criminal courts in Pakistan	
• Define Pakistan Penal Code and Criminal Procedure Code; its execution and delivery	
• List the general presumptions of law and general exemptions of law	
5. Thanatology - I	
• Define the terms cause, manner, mode and mechanism of death	**Interactive Lecture**
• Explain the scientific concepts regarding death	
• Highlight the significance of Medico-legal aspects of brain death	
• Enumerate Howard's criteria of death	
• Describe the medico-legal aspects of sudden & unexpected deaths	
6. Thanatology - II	
• Define Suspended animation	
• Explain immediate signs of death with special stress on somatic or clinical death	
• Summarize postmortem changes in the eyes	
• Describe early changes after death such as Algor Mortis (Cooling of the body), physio-chemical changes in various body tissues and organs under various environmental conditions, such as changes in muscular system after death	
7. Thanatology - III	
• Describe Postmortem Lividity (Livor mortis, Hypostasis or Suggilation and its significance	
• Enumerate the postmortem changes in the blood, CSF, Vitreous humor and Bone marrow	

8. Thanatology - IV	
• Explain late signs of death i.e. Putrefaction, its mechanism, changes and gases of decomposition, forensic entomology, adipocere formation and mummification	
9. Thanatology - V	
• Define presumption of death and presumption of survivor-ship	
• Explain the method of writing certificate of death according to WHO	
• Summarize the parameters of estimation of time since death	
10. Autopsy - I	
• Define autopsy and its types	**Interactive Lecture**
• List its aims and objectives	
• Differentiate between Medico legal and pathological autopsy	
• Explain Autopsy protocols	
11. Autopsy - II	
• Describe external examination, types of incisions, techniques of autopsy,	
• Explain negative and obscure autopsy	
• Summarize internal examination of head	
12. Autopsy - III	
• Describe internal examination of thoracic and abdominal cavities	
• Explain dissection of respiratory tract, heart, abdominal viscera, pelvic organs, and Spinal cord	
13. Autopsy - IV	
• Define Exhumation and Postmortem artifacts	
• Describe method of preservation of viscera for chemical and histo-pathological examination	
• List the preservatives used in mortuary	
14. Traumatology - I	
• Define Injury, Hurt, Wound, Assault and Battery	
• Classify Injuries	
• Describe blunt weapon injuries; Abrasions and Bruises	
15. Traumatology – II	
• Explain the types, mechanism of production and medico legal significance of Lacerated wounds	
• Describe Sharp weapon injuries- Incised wounds, stab wounds with medico legal significance	

16.	**Traumatology – III**	
•	Summarize Qisas and Diyat Act with interpretation of injuries accordingly	
17.	**Custodial deaths and torture**	
•	Define Torture according to World Medical Association (Declaration of Tokyo)	**Interactive Lecture**
•	Enumerate deaths in custody	
•	Explain various torture techniques	
•	List the sequelae of torture	
•	Describe the role of Medical practitioner and the ethical issues with relation to torture	
18.	**Infanticide (Pediatric Forensic Medicine- I)**	
•	Define infanticide, feticide, still born baby and dead born baby, Precipitate labor/Unconscious delivery	
•	List the criminal causes of death of new born babies i.e. Acts of commission and omission and methods of foetal age estimation	
•	Discuss Maceration	
•	Summarize the signs of live birth	
•	Explain autopsy on bodies of new born babies	
19.	**Battered Baby (Pediatric Forensic Medicine-II)**	
•	Define Cot deaths (Sudden Infant Death Syndrome) and various possibilities of death with postmortem findings, Medico legal importance of SIDS	
•	Explain Battered Baby Syndrome, its etiology and clinical features	
•	Enumerate the Injuries related to Shaken Baby Syndrome with mechanism	
20.	**Animal Poisons- Toxicology (Snakes and Scorpions)**	
•	Classify snakes	**Interactive Lecture**
•	List the medico legal aspects of snakebite	
•	Differentiate between poisonous and non-poisonous snakes	
•	Differentiate between Colubridae and Viperidae	
•	Summarize the signs and symptoms of bites by cobra and viper	
•	Explain the principles of treatment of snake bite and Anti-venom therapy	
•	Discuss the signs, symptoms and treatment of Scorpion bite	
21.	**Thermal Injuries (Burns, scalds)**	
•	Classify thermal injuries and burns	
•	List the causes of death, postmortem findings and artifacts due to burns	
•	Differentiate the types of burns	
•	Calculate the surface area of burns in adults and children	
•	Differentiate ante-mortem and postmortem burning	
•	Differentiate burns due to dry heat, moist heat and chemicals for medico legal purposes	

22. Environmental (Cold/heat) trauma	
• Describe the causes, clinical features and treatment of injuries due to local exposure to cold; Frostbite, trench foot, and chilblain	**Interactive Lecture**
• Explain Hypothermia; its causes, clinical features and treatment	
• Discuss the injuries due to general exposure to heat viz. Heatstroke, exhaustion, cramps; their causes, clinical features and treatment	
23. Forensic Electrocution & Starvation	
• List the causes of death due to electrocution	**Interactive Lecture**
• Explain the features of injuries due to various types of electrical current	
• Enumerate lightning injuries and lightning deaths	
• Describe the types, signs and symptoms and postmortem findings of starvation	

GENERAL PATHOLOGY

TOPICS & OBJECTIVES	LEARNING STRATEGIES
TOPIC 1: CELLULAR RESPONSES TO STRESS AND TOXIC INSULTS ADAPTATION,INJURY,AND DEATH	
1. **Introduction to Pathology Overview: Cellular Responses to Stress and Adaptation of cellular growth**	
• Define Pathology and Pathogenesis	**Interactive Lecture**
• Briefly discuss cellular responses to the injury and stages of the cellular response to stress and injurious stimuli	
• Define adaptation, hypertrophy, hyperplasia, atrophy, and metaplasia	
• Describe the causes and mechanism of hypertrophy, hyperplasia, atrophy, and metaplasia	
2. Overview of Cell Injury and Cell Death	
• List causes of cell injury	**Interactive Lecture/ Tutorial**
• Briefly discuss various types of cell injury	
• Discuss morphological alterations in cell injury including both reversible and irreversible injury	
3. Necrosis	
• Define necrosis	**Interactive Lecture**
• Discuss the pathological and morphological types of necrosis	
4. Mechanism of Cell Injury I	
• Describe mechanisms of cell injury (with examples) including depletion of ATP, mitochondrial damage, influx of calcium, accumulation of oxygen derived free radicals, defects in membrane permeability, damage to DNA and proteins	**Interactive Lecture**
• Discuss properties of the principal free radicals involved in cell injury.	
5. Mechanism of Cell Injury and examples (II)	
• Discuss ischemia and reperfusion injury	
• Discuss chemical and toxic injury	
6. Apoptosis	
• Discuss causes, morphological and biochemical changes, clinic-pathologic correlations in Apoptosis.	**Interactive Lecture**
• Briefly describe the mitochondrial and extrinsic the pathways of apoptosis	
• Briefly discuss Necroptosis	

7.	**Intracellular Accumulations**	
•	Summarize the pathways of abnormal accumulation	**Interactive Lecture**
•	Discuss types of pigments (exogenous and endogenous)	
•	Describe hyaline changes, lipid, protein, and glycogen accumulation	
•	Discuss briefly pathological classification of intracellular accumulations	
	TOPIC-2: INFLAMMATION AND REPAIR	
8.	**Introduction to Inflammation & Acute inflammation**	
•	Define inflammation	**Interactive Lecture**
•	Classify inflammation	
•	List the causes of inflammation	
•	Discuss the sequence of events in acute inflammatory process	
9.	**Mediators of acute inflammation**	
•	Name the main inflammatory mediators	
•	Describe their role in the inflammatory process	
10.	**Morphological pattern & outcomes of acute inflammation& Chronic Inflammation**	
•	Explain different morphological pattern of acute inflammation	
•	List the outcomes of acute inflammation	
•	Define chronic inflammation	
•	List the causes and morphological features of chronic inflammation	
•	Describe the cells and mediators & their role in chronic inflammation	
•	Describe the systemic effects of acute and chronic inflammation	
11.	**Granulomatous Inflammation**	
•	Define granulomatous inflammation	**Interactive Lecture**
•	Discuss the pathogenesis of granulomatous inflammation	
•	List the diseases with granulomatous inflammation	
•	Discuss morphology of granulomatous inflammation	
12.	**Tissue repair**	
•	Define tissue repair	**Interactive Lecture**
•	Describe the mechanism involved in tissue regeneration and scar formation	
•	List the factors that influence tissue repair	
13.	**Healing by First & Second Intention**	
•	Contrast repair by primary and secondary intention	**Interactive Lecture**
•	Describe the complications in tissue repair	

TOPIC 3: HEMODYNAMICS AND SHOCK	
14. Edema, Effusion, Hyperaemia and Congestion	
• Define edema, effusion, exudate, transudate, hyperemia and congestion	**Interactive Lecture**
• Define various terminologies according to morphology of edema & effusion	
• Discuss the pathophysiologic categories of edema	
• Describe the mechanism & clinical significance of edema at different sites	
• Describe the morphological changes in chronic passive congestion of the lungs & liver	
15. Hemostasis	
• Define hemostasis	
• Describe the sequence of events involved in primary & secondary hemostasis including the role of platelets, endothelium &coagulation cascade	
• Describe the defects of primary & secondary hemostasis	
• Briefly discuss haemorrhagic disorders	
16. Thrombosis & Embolism	
• Define embolus, infarction, thrombosis and Disseminated Intravascular Coagulation (DIC)	
• Discuss various types of thrombi according to their morphology	
• Describe the factors that predispose to thrombosis	
• Describe the morphologic features of thrombi	
• List the possible fate of thrombus	
• Describe the clinical features of venous, arterial & cardiac thrombosis	
• Define	**Interactive Lecture/ Tutorial**
• Describe the pathogenesis of DIC	
17 Embolism & Infarction	
• Define embolism & infarction	
• Classify infarction	
• List the types of embolism & the factors that influence development of infarct	
• Describe the clinical manifestations & consequences of pulmonary & systemic thromboembolism	
• Discuss the clinical conditions that give rise to fat & marrow embolism, air embolism & amniotic fluid embolism	
• Describe the morphologic features of red & white infarct	
18 Shock	
• Define shock	**Case- Based Integrated Learning (CBIL)**
• List the three major types of shock & the clinical features of shock	
• Describe the mechanism of three major types of shock	
• Discuss the factors involved in the pathophysiology of septic shock	
• Describe the three stages of shock	

TOPIC 4: GENETIC DISORDERS	
19 Introduction to Mendelian Disorders	
• List the examples of Autosomal Dominant Disorders, Autosomal Recessive Disorders	**Interactive Lecture**
• Discuss the transmission pattern of single gene disorder	
• Discuss the pathogenesis of important autosomal recessive, autosomal dominant, and X-linked disorders	
20 Mutation	
• Define mutation	
• Briefly discuss principles relating to the effects of gene mutation	
• Distinguish between types of mutations in the coding and non-coding regions of genes	
21 Single Gene Disorders I	
• Define single-gene disorders	
• Classify single-gene disorders on the molecular and biochemical basis	
• Discuss disorders associated with defects in structural proteins (Marfans syndrome)	
21. Single Gene Disorders II	
• Discuss disorders associated with defects in structural proteins (Ehlers -Danlos syndrome)	
• Discuss disorders associated with defects in receptor proteins (Familial Hypercholesterolemia)	
• Enumerate the types of lysosomal & glycogen storage diseases with their deficient enzymes	
23. Chromosomal Disorders	
• Define normal karyotype and common cytogenetic terminology	**Interactive Lecture**
• Discuss structural chromosomal abnormalities	
• Discuss cytogenetic disorders involving autosomes including Trisomy 21: Down Syndrome, Trisomy 18: Edwards Syndrome, Trisomy 13: Patau Syndrome	
• Name diseases with deletion of genes at chromosomal locus 22q11.2 (Di George syndrome, Velocardiofacial syndrome)	
• Discuss cytogenetic disorders involving sex chromosomes including Klinefelter syndrome, Turner syndrome	
TOPIC 5: NEOPLASIA	
24 Introduction to Neoplasia	
• Define neoplasia	**Interactive Lecture**
• Discuss the nomenclature of benign and malignant tumors with respect to tissues of origin	
• Describe characteristic features of benign & malignant tumors	
25 Gross & Microscopy of Benign & Malignant tumors	
• Define Anaplasia, Metaplasia, Dysplasia, Metastasis	

• Define cell differentiation and de-differentiation	
• Discuss all the components and morphological features of anaplasia	
• Discuss local invasion of tumors	
• Discuss pathways of spread of malignant tumors	
• Compare features of benign and malignant tumors	
26 Epidemiology of Cancer	
• Define acquired predisposing conditions leading to cancer development	
• List the environmental factors involved in the pathogenesis of malignancy	
• Discuss the global impact of cancer	
• Discuss different types of occupational cancers	
• Discuss association between chronic inflammatory states and cancer	
• Discuss the role of genetic predisposition and interactions between environmental and inherited factors in cancer development	
27 Molecular Basis of cancer I	
• Define oncogenes	
• List four classes of normal regulatory genes with respect to neoplasia	
• Discuss stepwise accumulation of driver and passenger mutations	
• Describe cellular and molecular hallmarks of cancer	
• Define Proto-oncogenes, and Oncoproteins	
• Classify oncogenes according to their mode of action and associated tumors	
28 Molecular Basis of cancer II	
• Define Tumor Suppressor Genes	
• Classify tumor suppressor genes according to their mode of action and associated tumors	
• Discuss RB gene with respect to its role in tumor development	
• Discuss p53 gene with respect to its role in tumor development	
29 Molecular Basis of cancer III	
• Define the Warburg Effect and angiogenesis & evasion of programmed cell death (Apoptosis)	
• Discuss the stem cell–like properties of cancer cells	
• Discuss the effect of angiogenesis on tumor progression	
• Discuss local Invasion and distant metastasis in neoplastic lesions	
• Explain the molecular basis of multistep-carcinogenesis	
30 Grading, staging & clinical effects of Neoplasia	
• Define grading and staging of tumors & cancer cachexia	
• Classify paraneoplastic syndromes according to their clinical effects and association with various tumors	
• Discuss different types of laboratory investigations used for diagnosis of cancer	

31	**Tumor markers & carcinogenic agents**	
•	Define chemical carcinogenesis, radiation carcinogenesis, microbial carcinogenesis	**Tutorial**
•	Classify chemical and radiation carcinogens according to their types and modes of action	
•	Classify microbial carcinogenesis according to the viral and bacterial involvement	
•	Classify Tumor Markers according to types and mode of action	

GENERAL MICROBIOLOGY

	TOPICS AND OBJECTIVES	LEARNING STRATEGIES
32	**Introduction to Microbiology**	
•	Define microbiology	
•	Differentiate between prokaryotes and eukaryotes	
•	Discuss the types of microorganisms according to shapes and staining	
33	**Bacterial structure I**	
•	Discuss the difference between gram-positive and gram-negative bacteria	**Interactive Lecture/ practical**
•	Discuss the essential components of bacterial structure (cell wall, plasma membrane, cytoplasm, plasmid, transposons, nucleoid, mesosomes, periplasm)	
•	Describe the different shapes & staining procedure for bacteria	

34 Bacterial structure II and growth cycle	
• Describe the non-essential components of the bacterial structure (capsule, spore, pili, plasmid, flagellum, granules, glycocalyx)	
• Explain the growth cycle	
• Differentiate between aerobic and anaerobic growth	
• Describe obligate intracellular growth, fermentation of sugars, iron metabolism	
35 Bacterial genetics	
• Discuss mutations	
• Describe the process of transfer of DNA within and between bacterial cells	
• Discuss the importance of recombination	
36 Classification of Bacteria and Normal Human Microbiome	
• Discuss the principles of classification of bacteria and normal human microbiome	**Interactive Lecture**
• Classify Bacteria	
• Discuss the normal microbiota of various areas of the body	
37 Pathogenesis I	
• Describe the principles of pathogenesis	**Interactive Lecture/ Practical**
• List the types of bacterial infection	
• Explain the stages of bacterial pathogenesis	
• Discuss the determinants of bacterial pathogenesis (transmission, adherence, invasion)	
38 Pathogenesis II	
• Discuss the determinants of bacterial pathogenesis, (toxin production eg. exotoxin, endotoxin)	
• Discuss bacterial infection associated with cancer	
• Describe the stages of infectious disease,	
• Describe the importance of Koch's postulates	
39 Host defence	
• Discuss the principles of host defence, innate immunity (skin and mucous membrane)	**Interactive Lecture**
• Describe the processes of inflammatory response, phagocytosis and adaptive specific immunity	
40 Bacterial Vaccines	
• Explain the principles of bacterial vaccines	**Interactive Lecture**
• Discuss bacterial vaccines use for active and passive immunity	
41 Antimicrobial drugs and Resistance	
• Discuss the principles of antimicrobial drugs stewardship stewardship	**Interactive Lecture**
• Briefly discuss the mechanism of action of various antibiotics and clinical indication of	

antibiotics against common bacterial infections	
• Discuss the concept of chemoprophylaxis and probiotics	
• Discuss the principles of antibiotic resistance	
• Discuss genetic and non-genetic basis of resistance	
• Discuss specific mechanisms of resistance	
Gram positive cocci I	
• Discuss the diseases and important properties of Staphylococci	**Interactive Lecture**
• Describe the transmission, pathogenesis and clinical findings of Staphylococci	
• Briefly discuss the treatment and prevention of Staphylococci	
Gram positive cocci II	
• Discuss the diseases and important properties of Streptococci	
• Describe the transmission, pathogenesis and clinical findings of Streptococci	
• Briefly discuss the treatment and prevention of Streptococci	
TOPIC: VIROLOGY	
42 Basic Virology & Classification	
• Compare viruses and cells	**Interactive Lecture**
• Classify viruses	
• Discuss symmetry, capsid and envelope of viruses	
• Discuss atypical virus like agents	
• Discuss viral vaccines and their types related to active, passive and herd immunity	
43 Replication	
• Describe viral growth curve	**Interactive Lecture**
• Describe specific events during the growth cycle	
• Discuss lysogeny and its relationship in bacteria to latency in human cells	
44 Viral Pathogenesis & host defence	
• Describe transmission and portal of entry of virus	
• Differentiate pathogenesis and immunopathogenesis	
• Differentiate nonspecific defences and specific defences	
TOPIC: MYCOLOGY	
45 Basic Mycology	
• Describe the structure and growth of fungi	**Practical**
• Explain the mechanism of pathogenesis in fungal infections	
• Describe fungal toxins and allergies	
• Explain laboratory diagnoses and treatment of fungal infections	
TOPIC : IMMUNOLOGY	
46 Introduction & Innate immunity	
• Define immunity and its types	**Interactive Lecture**
• Define Innate immunity	
• Classify types of immunity according to their function especially innate immunity	

•	List the components of immune system	
•	Discuss the functions of immune system	
•	Discuss the role of T cells, B cells, natural killer cells, macrophages in immunity	
•	Discuss the specificity of the immune response and properties, component and pattern of recognition receptors	
•	Discuss properties, components & pattern recognition receptors.	
47	**Adaptive immunity (I)**	
•	Define adaptive immunity	**Interactive Lecture**
•	Classify T cells according to its types.	
•	Discuss the functions of CD4 and CD8 T cells with respect to activation, co-stimulation and memory formation	
•	Discuss the effect of superantigens on T cells	
48	**Adaptive immunity (II)**	
•	Define adaptive immunity & antibody, primary response and secondary response of antibodies	
•	Discuss the mode of activation of B cells	
•	Discuss effector functions of B cells	
•	Explain the structure of antibody	
•	Classify antibodies according to types	
•	Discuss the functions of antibodies	
49	**Major Histocompatibility Complex (MHC) & transplantation**	
•	Define Major Histocompatibility Complex (MHC), transplantation & allograft rejection	**Interactive Lecture**
•	Classify MHC proteins according to its classes	
•	Classify types of transplant rejections	
•	Discuss the importance of MHC in transplantation	
•	Discuss HLA typing in the lab in association with transplantation	
50	**Complement System**	
•	Define complement system	**Interactive Lecture**
•	Discuss complement system with respect to activation and regulation	
•	Discuss the role of complement in immunity	
•	Explain the clinical aspects of complement system	
51	**Hypersensitivity I & II**	
•	Define Hypersensitivity reaction, desensitization, atopy, drug hypersensitivity	**Interactive Lecture/ Practical**
•	Classify hypersensitivity according to its types	
•	Discuss the pathogenesis of types I & II hypersensitivity reactions	
•	Discuss various clinical presentations of type I & II hypersensitivity reactions	
•	Discuss the treatment and prevention of types I & II hypersensitivity	

52	**Hypersensitivity III & IV**	
•	Define Arthus reaction, Serum Sickness, Immune Complex Disease	
•	Discuss the pathogenesis of type III & IV hypersensitivity	
•	Explain various clinical presentations of type III & IV hypersensitivity reactions	
•	Describe the treatment and prevention of type III & IV hypersensitivity	
•	Discuss diagnostic immunology	
•	Discuss briefly agglutination & precipitations reactions, and ELISA	
•	Discuss ABO blood groups, transfusion reactions & Rh- incompatibility	
53	**Tolerance and Autoimmune Disease**	
•	Define T & B cell tolerance, and autoimmunity	**Interactive Lecture**
•	Discuss the pathogenesis of autoimmune disease	
•	Discuss various clinical presentations of autoimmune diseases	
54	**Immunodeficiencyy**	
•	Define immunodeficiency	**Interactive Lecture**
•	Classify immunodeficiency according to its types	
•	Discuss various clinical presentations of immunodeficiency diseases	

PHARMACOLOGY

TOPICS AND OBJECTIVES	LEARNING STRATAGIES
1. Introduction to Pharmacology	
• Discuss various branches of pharmacology and therapeutics and their applications	**Interactive Lecture**
• Describe the various terminologies used in pharmacology and pharmacokinetics and dynamics	
2. Routes of drugs administration	
• Classify various routes of drug administration	
• Explain the advantages and disadvantages of different routes of drug administration	
3. Sources of drugs and their active principles	
• Discuss various sources of drugs and explain their active principles	**Interactive Lecture**
• Explain different types of drug doses and their effects	
4. Drug Absorption and Bioavailability	
• Discuss various processes of drug permeation through biological membranes	**Interactive Lecture**
• Explain drug absorption and bioavailability and factors affecting them	
5. Drug Distribution, Volume of Distribution (Vd) and Drug Clearance	
• Describe drug distribution and Vd and discuss factors affecting it	
• Discuss plasma protein binding of drugs and its influence on drug distribution	
6. Biotransformation of drugs I and II	
• Describe principles of drug biotransformation & metabolic reactions (Phase-I and Phase-II)	
• Describe microsomal mixed function oxidase system and concept of enzyme induction and inhibition	
• Explain various factors which could affect the process of drug biotransformation	
7. Excretion of drugs, Steady State Concentration (Css) and Kinetics of Drug Elimination	
• Define half-life, its calculation and its relationship with drug dosing	**Interactive Lecture**
• Describe drug excretion	
• List various routes of drug excretion and factors affecting it	
• Discuss drug clearance and elimination and explain their kinetics	
• Explain Css and its clinical application	
8. Drug Receptors and mechanisms of drug actions (I & II)	
• Explain types of drug receptors, their properties	**Interactive**

• Discuss various molecular mechanisms by which therapeutic effect of the drugs are obtained	**Lecture**
9. **Dose Response relationship and factors modify it.**	
• Discuss the relationship between drug dosage and its clinical response with the help of graphical representation	
• Describe drug potency, efficacy, therapeutic index and quantal dose-effect curve	
10. Adverse Drug Reactions	
• Discuss drug side effects, toxic effects and their types with examples	**Case-Based Integrated Learning (CBIL)**
11. Drug-Drug Interactions	
• Explain types of drug interactions	
• Discuss the pharmacokinetic and pharmacodynamics drug interactions	
• Describe potentiation, synergism, summation, additive effects and drug antagonism with examples	
12. Introduction to Autonomic Pharmacology	
• Give a brief overview of organization of Autonomic Nervous System, its innervations, functions, biosynthesis of neurotransmitters and their anatomic locations	**Interactive Lecture**
• Describe autonomic receptor types and their effects caused either by activation or inhibition	
13. Parasympathomimetic Drugs	
• Give a brief review of cholinergic nerves, characteristics and subtypes of cholinoceptors	**Small Group Discussion (SGD)/ Interactive Lecture**
• Classify cholinoceptor stimulants	
• Describe the mode of action, clinical uses and adverse effects of cholinoceptor stimulants	
14. Parasympatholytic Drugs-I	
• Classify anticholinergic drugs	
• Describe their pharmacokinetics & pharmacodynamics, clinical uses, adverse effects and contraindications	
15. Parasympatholytic Drugs-II (Skeletal Muscle Relaxants/ Ganglion-Blocking Drugs)	
• Explain the basic & clinical pharmacology of skeletal muscle relaxants and ganglion-blocking drugs	
16. Sympathomimetic Drugs	
• Give a brief review of adrenoreceptor types and their subtypes	**Interactive Lecture**
• Classify sympathomimetic drugs	
• Discuss their clinical uses, adverse effects and contraindications	

17. Sympatholytic Drugs- I & II	
• Classify alpha (α) and beta (β)-adrenoceptor antagonists	
• Explain pharmacokinetics and pharmacodynamics, clinical uses, adverse effects and contraindications of adrenergic antagonists	

FAMILY MEDICINE

TOPICS AND OBJECTIVES	LEARNING STRATAGIES
1. Clinical posting	
• Explain orientation steps	**Small groups Discussion**
• Explain the procedure of history taking and recording	

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. Community Medicine by Parikh 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
PATHOLOGY/MICROBIOLOGY	**TEXT BOOKS** 1. Robbins & Cotran, Pathologic Basis of Disease, 9th edition. 2. Rapid Review Pathology, 4th edition by Edward F. Goljan MD 3. Medical Microbiology Immunology by Warren Levinson 17th edition **WEBSITES:** 1. http://library.med.utah.edu/WebPath/webpath.html 2. http://www.pathologyatlas.ro/
PHARMACOLOGY	**TEXT BOOKS** 1. Lippincot Illustrated Pharmacology 2. Basic and Clinical Pharmacology by Katzung

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

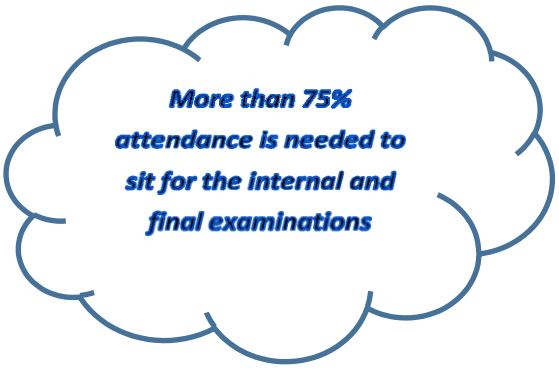
Internal Evaluation

- 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 JSMU website!



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:

3RD YEAR	Weeks
FOUNDATION II MODULE	10 Weeks
BLOOD II MODULE	7 Weeks
Mid Term Examination*	

**Final dates will be announced later*