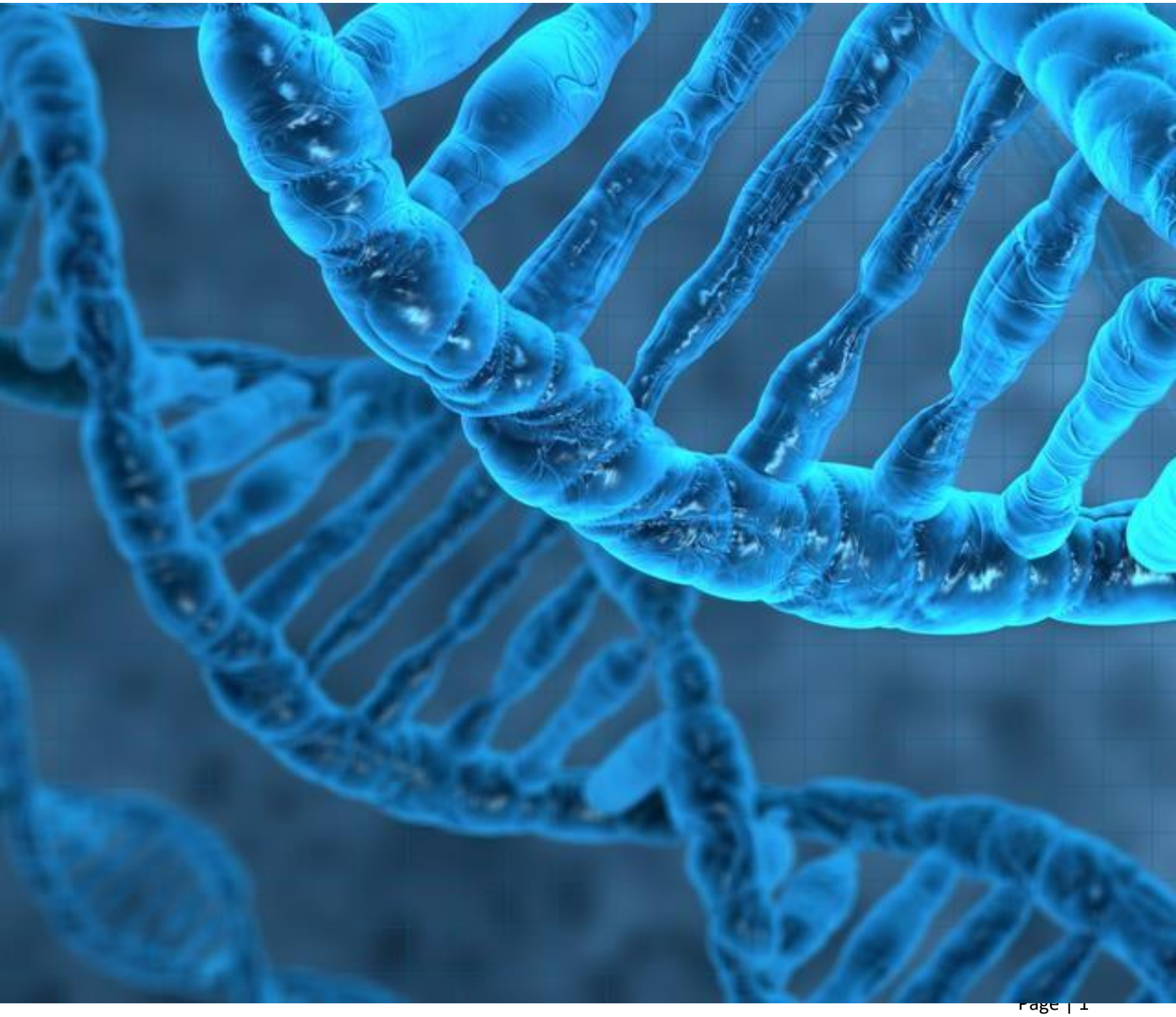
LIAQUAT NATIONAL HOSPITAL AND MEDICAL COLLEGE

Institute for Undergraduate and Postgraduate Medical Studies & Health Science

FOUNDATION MODULE II

9th February 2026 to 25th April 2026



Module name: **Foundation-II** *Year:* ***Three*** *Duration:* ***10 weeks (Feb – April 2026)***

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. Fizzah Ali (Pharmacology)**
CO-COORDINATOR:	• **Dr. Yusra Nasir (DHPE)**

DEPARTMENTS' & RESOURCE PERSONS' FACILITATING LEARNING

BASIC HEALTH SCIENCES
COMMUNITY MEDICINE • Dr. Saima Zainab
FORENSIC MEDICINE • Professor Syed Mukkaram Ali
PATHOLOGY • Professor Naveen Faridi
MICROBIOLOGY • Professor Shaheen Sharafat
PHARMACOLOGY • Professor Tabassum Zehra
BIOCHEMISTRY • Professor. Faiza Waseem
FAMILY MEDICINE • *Dr Rabeeya Saeed*
Longitudinal Curriculum leads Research : Dr. Saima Zainab Patient Safety : Dr. Sana Anwar Communication : Dr. Afifa Tabassum Bioethics : Prof. Sobia Ali
DEPARTMENT OF HEALTH PROFESSION EDUCATION ● Prof. Sobia Ali ● Dr. Nighat Huda ● Dr. Afifa Tabassum ●Dr. Yusra Nasir ● Dr. Asra Zia ● Dr. Maryam Fatima
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

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 b y 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.

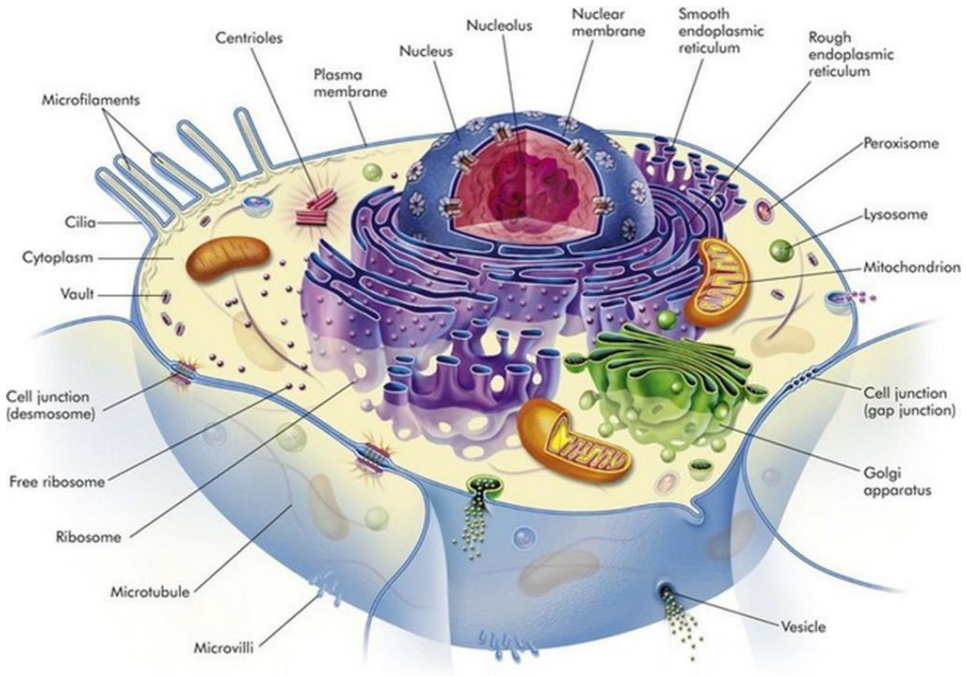
MODULE 1: FOUNDATION-II

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:

COMMUNITY MEDICINE

TOPICS & OBJECTIVES	LEARNING STRATEGIES
1. Introduction to public health	
• Define: health, disease, illness and well-being	**Interactive Lectures**
• Define: Preventive medicine, community medicine, public health, social medicine and	
• List the functions of public health system	
2. Determinants of Disease & iceberg	
• Describe determinants of Health	**Interactive Lectures**
• Explain health determinants model	
• Discuss iceberg phenomenon	
3. Natural history of disease & Levels of prevention	
• Discuss the phenomenon of natural history of disease	**Interactive Lectures**
• Explain different levels of prevention	
• Discuss Population pyramid	
4. Introduction to Epidemiology	
• Define Epidemiology	**Interactive Lectures**
• List the uses of epidemiology	
• Explain theories of disease causation	
• Describe prevalence and incidence and their relationship	
5. International organizations	
• List regional offices of World Health Organization (WHO)	**Interactive Lectures**
• Discuss functions of WHO & UNICEF	
• Discuss UNICEF's GOBI-FFF program	
• Describe the health related non-governmental organizations in Pakistan	
6. Health Care System-1	
• Describe health system	**Interactive Lecture**
• Define district health system	
• Describe the role of district management team	
• Explain health systems development	
• Discuss the health indicators of Pakistan.	
• Discuss the situation analysis by studying health indicators and health needs.	
7. Health Care System-2	
• Discuss the following	
i. Health system problems of Pakistan	
ii. Public health engineering	

iii. Financial and organizational problems	**Interactive Lectures**
iv. Problems of health planning, evaluation and research	
v. Primary aims of Integrated Health	
• Enumerate the health services and resources	
• Describe major health problems of rural and urban areas of Pakistan.	
• Explain Multi-Sectorial interaction and partnership	
8. Primary Health Care (PHC)	
• Define Primary Health Care	**Interactive Lectures**
• 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	
9. Health Management Information System	
• Define HMIS	
• State the essential elements of HMIS	**Interactive Lectures**
• List the components of HMIS	
• Describe the important features of HMIS	
• Define disease early warning system (DEWS)	
10. 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	
11. Genomics	
• Differentiate between genetics and genomics	**Interactive Lectures**
• Describe the public health genetics	
• Describe the steps in genetic counseling	
• Explain genetic surveillance	
• Briefly describe the cloning	
12. Demography & Vital Statistics	
• Define demography	**Interactive Lectures**
• Explain sources of demographic data	
• Describe the types of census	
• Discuss the stages of demographic transition	
• Describe vital statistics.	
• Discuss Population pyramid	
13. Morbidity & mortality determinants	
• Define rate , ratio, proportion	**Tutorial**
• Explain morbidity measures	
• Describe mortality measures	
14. Disease Surveillance	

• Define surveillance	**Interactive Lectures**
• Classify the types of surveillance	
• Differentiate between surveillance vs monitoring	
• List of objectives of public health surveillance	
• Describe the sources of data disease surveillance	
• Explain the steps of an epidemic investigation	
15. Define health promotion	
a. Describe Ottawa Charter for Health Promotion	**Tutorial**
b. Describe Sustainable Development Goals (SDGs) specifically related to health	
16. Control of infections	
• Differentiate between infectious and communicable diseases	**Tutorial**
• Describe control measures for infectious & communicable diseases	
• Explain the role of immune-prophylaxis & screening in the control of infection	
17. Emerging & Re-emerging diseases	
• Describe emerging & re-emerging diseases	**Tutorial**
• Enumerate factors contributing to emergence	
• Explain preventive measures for the emergence	
18. Screening for disease	
• 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	
19. Health Education	
• Differentiate between Health Education and health promotion	**Interactive Lectures**
• Explain the stages of health education	
• Discuss strategies for health education	
• Describe key principles of health education	
• Define Health Information, Education and Communication (IEC)	
• Differentiate between Health Education and health promotion	
20. 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	
21. Vital statistics	
• Describe vital statistics.	**Tutorial**
• Describe Vital statistics registration in developing countries.	
• Discuss the situation of vital statistics in Pakistan	
22. Infectious disease epidemiology	

▪ Define the following terms: infection, infestation, contamination, host, infectious disease, contagious disease, communicable disease, epidemic, endemic, pandemic, sporadic, nosocomial infection, opportunistic infection, eradication, elimination	**Tutorial**
▪ Explain the chain of infection	
▪ Describe the modes of transmission	

FORENSIC MEDICINE

TOPICS & OBJECTIVES	LEARNING STRATEGIE
1. INTRODUCTION TO LEGAL PROCEDURE	
• List the reference books for developing a thorough understanding of the subject	
• 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	
• 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	
• 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	
• Differentiate Dying declaration and Dying deposition	
2.LEGAL AND ETHICAL RESPONSIBILITIES OF MEDICAL WITNESS	
• Enumerate the types of witnesses	**Interactive Lecture**
• 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	
3.INTRODUCTION TO SCIENTIFIC & MEDICOLEGAL ASPECT TO DEATH	
• Explain the scientific concepts regarding death	**Interactive Lecture**
• Highlight the significance of Medico-legal aspects of brain death	
• Enumerate Howard's criteria of death	
• Define the terms cause, manner, mode and mechanism of death	
• Explain the scientific concepts regarding death	
4.IMMEDIATE SIGN OF DEATH	
• Explain immediate signs of death with special stress on somatic or clinical death	**Interactive Lecture**
• Define Suspended animation	
• Summarize postmortem changes in the eyes	
• Describe early changes after death such as Algor Mortis (Cooling of the body)	

5.EARLY SIGN OF DEATH	
Explain the Physio-chemical changes in various body tissues and organs under various environmental conditions, such as changes in muscular system after death	**Interactive Lecture**
Describe Postmortem Lividity (Livor mortis, Hypostasis or Suggilation) and its significance	
• Enumerate the postmortem changes in the blood, CSF, Vitreous humor and Bone marrow	
6.LATE SIGN & CERTIFICATION OF DEATH	
• Explain late signs of death i.e. Putrefaction, its mechanism, changes and gases of decomposition, forensic entomology, adiopocere formation and mummification	
• Discuss presumption of death presumption of survivor-ship	
7.INTRODUCTION TO AUTOPSY	**Interactive Lecture**
• Discuss autopsy & its types along with aims and objectives	
• Differentiate between Medico legal and pathological autopsy	
• Explain Autopsy protocols	
	Interactive Lecture
8.EXTERNAL & INTERNAL BODY EXAMINATION	
• Describe the external body examination criteria • Discuss the types of incisions along with techniques of autopsy	
• Summarize Negative and obscure autopsy	
• Describe the internal examination of different regions and dissection of various organs during autopsy.	
9.INTRODUCTION TO TRAUMATOLOGY	**Interactive Lecture**
• Define Injury, Hurt, Wound, Assault and Battery	
• Classify Injuries	
• Describe blunt weapon injuries; Abrasions, Bruises & laceration mechanism of production and medico legal significance	
10.BLUNT & SHARP INJURIES	
• Sharp weapon injuries- Incised wounds, stab wounds with medico legal significance • Summarize Qisas and Diyat Act with interpretation of injuries accordingly	**Interactive Lecture**
11.CUSTODIAL DEATHS AND TORTURE	
• Enumerate deaths in custody	**Interactive Lecture**
• Define Torture according to World Medical Association (Declaration of Tokyo)	
• Explain various torture techniques	
• List the sequelae of torture	
• Describe the role of Medical practitioner and the ethical issues with relation to torture	
12.INFANTICIDE (PEDIATRIC FORENSIC MEDICINE- I)	
• Define infanticide, feticide, still born baby and dead born baby	**Interactive Lecture**
• Discuss Maceration	
• List the methods of foetal age estimation	
• Summarize the signs of live birth	
13.BATTERED BABY (PEDIATRIC FORENSIC MEDICINE-II)	
• Define precipitate labor/ unconscious delivery • List the criminal causes of death of new born babies i.e. acts of commission and omission	**Interactive Lecture**
• Enumerate the Injuries related to Shaken Baby Syndrome with mechanism	

• Define COT deaths (Sudden Infant Death Syndrome) and various possibilities of death with • postmortem findings, Medico legal importance of SIDS	
14.ANIMAL POISONS- TOXICOLOGY (SNAKES AND SCORPIONS)	
• Classify snakes	**Interactive Lecture**
• 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	
• List the medico legal aspects of snakebite	
• Discuss the signs, symptoms and treatment of Scorpion bite	
15.THERMAL INJURIES (BURNS, SCALDS)	
• Classify thermal injuries and burns	**Interactive Lecture**
• Differentiate the types of burns	
• Calculate the surface area of burns in adults and children	
• List the causes of death, postmortem findings and artifacts due to burns	
• Differentiate ante-mortem and postmortem burning	
• Differentiate burns due to dry heat, moist heat and chemicals for medico legal purposes	
16.GENERAL TOXICOLOGY	
• Explain and Classify poisons based on chief symptoms and medico legal criteria	**Tutorial/ Practical**
• Discuss the International toxicity rating of poisons	
• Classify and Differentiate between poison and a medicine	
17.DIAGNOSIS OF POISONING	
• Explain routes of administration and excretion of poisons	**Tutorial/ Practical**
• Explain the diagnosis of poisoning in living & dead	
• List the factors that modify action of poison	
18.MANAGEMENT OF POISONING	
• Duties of a doctor in a case of suspected poisoning	**Tutorial/ Practical**
• General principles of treatment of poisoning viz. Gastric lavage, Antidote therapy	
19.VISIT to LNH DRUG AND POISON INFORMATION CENTER	
• The role of poisoning Information Centre in treatment of cases of poisoning	**Tutorial/ Practical**
20.AUTOPSY PRESERVATIVES & HAZARDS	
• Describe method of preservation of viscera for chemical and histo-pathological examination • List the preservatives used in mortuary • Preservatives of dead bodies • Explain Exhumation and Postmortem artifacts • Discuss the hazards related to autopsy, and the methods to prevent these hazards	**Tutorial/ Practical**

21.Visit to LNH ER	
• Observe different mechanical injury cases and how to evaluate injured person. • Explain the process of Writing medico legal report of an injured person • Crime scene investigation • Trace evidence • Locard's principle of exchange & its medico legal importance	**Tutorial/ Practical**
22.FORENSIC ELECTROCUTION & LIGHTNING, STARVATION AND NEGLECT	
• Explain the features of features due to various of types of electrical current • List the causes of death due to electrocution • Enumerate lightning injuries and lightning deaths • Describe the types, signs and symptoms and postmortem findings of starvation	**Tutorial/ Practical**
23.ENVIRONMENTAL (COLD/HEAT)TRAUMA	
• Describe the causes, clinical features and treatment of injuries due to local exposure to cold, frostbite, trench foot, chilblain • Explain hypothermia; its causes, clinical exposure to heat viz. heatstroke, exhaustion, cramps; their causes, clinical features and treatment	**Tutorial/ Practical**
24. THANATOLOGY - I	
• Explain the scientific concepts regarding death • Highlight the significance of Medico-legal aspects of brain death • Enumerate Howard's criteria of death • Define the terms cause, manner, mode and mechanism of death • Describe the medico-legal aspects of sudden &unexpected deaths	
25. THANATOLOGY - II	
• Explain immediate signs of death with special stress on somatic or clinical death • Define Suspended animation • Summarize postmortem changes in the eyes • Describe early changes after death such as Algor Mortis (Cooling of the body), physico-chemical changes in various body tissues and organs under various environmental conditions, such as changes in muscular system after death	
26. 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	
27. THANATOLOGY - IV	
• Explain late signs of death i.e. Putrefaction, its mechanism, changes and gases of decomposition, forensic entomology, adipocere formation and mummification	
28. 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	

GENERAL PATHOLOGY

TOPICS & OBJECTIVES	LEARNING STRATEGIES
TOPIC 1: CELLULAR RESPONSES TO STRESS AND TOXIC INSULTS ADAPTATION,INJURY,AND	
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	**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**
• Describe the mechanism involved in tissue regeneration and scar formation	**Lecture**
• 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	**Interactive Lecture**
• Describe the sequence of events involved in primary & secondary hemostasis including the role of platelets, endothelium &coagulation	
• Describe the defects of primary & secondary hemostasis	
• Briefly discuss haemorrhagic disorders	
16. Thrombosis & Embolism	
• Define embolus, infarction, thrombosis and Disseminated Intravascular Coagulation	

• 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	
• Describe the pathogenesis of DIC	
17 Embolism & Infarction	
• Define embolism & infarction	
• Classify infarction	
• List the types of embolism & the factors that influence development of	
• Describe the clinical manifestations & consequences of pulmonary & systemic thromboembolism	
• Discuss the clinical conditions that give rise to fat & marrow embolism, air embolism	
• Describe the morphologic features of red & white infarct	
18 Shock	
• Define shock	**Case- Based**
• List the three major types of shock & the clinical features of shock	**Integrated Learning (CBIL)**
• 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	**Interactive Lecture**
• Discuss the transmission pattern of single gene disorder	
• Discuss the pathogenesis of important autosomal recessive, autosomal dominant, and	
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	
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	
22. Single Gene Disorders II	
• Discuss disorders associated with defects in structural proteins (Ehlers -Danlos syndrome)	
• Discuss disorders associated with defects in receptor proteins (Familial	
• 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	
• 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	**Interactive Lecture/ practical**
• 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	
• 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.	**Interactive Lecture**
• Classify Bacteria	
• Discuss the normal microbiota of various areas of the body	
37.Sterilization and Disinfection	
• Discuss the principles of sterilization and disinfection	
• Describe the Chemical agents of disinfection	
• Describe the physical agents of disinfection and autoclaving	
38 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)	
39 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	
40 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	
41 Bacterial Vaccines	
• Explain the principles of bacterial vaccines	**Interactive Lecture**
• Discuss bacterial vaccines use for active and passive immunity	
42 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	
43 Vaccines (Bacterial)	
• Explain the principles of bacterial vaccines	
• Differentiate between active immunity and passive immunity	
44 Antimicrobial drugs	
• Discuss the principles of antimicrobial drugs stewardship stewardship	
• Briefly discuss the mechanism of action of various antibiotics and clinical indication of	
• 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	
45 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	
46 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	
47	**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	
48	**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	
49	**Viral Pathogenesis & host defence**	
•	Describe transmission and portal of entry of virus	
•	Differentiate pathogenesis and immunopathogenesis	
•	Differentiate nonspecific defences and specific defences	
	TOPIC: MYCOLOGY	
50	**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	

51	**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.	

52	**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-	
•	Discuss the effect of superantigens on T cells	
53	**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	
54	**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	
55	**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	
56	**Hypersensitivity I & II**	
•	Define Hypersensitivity reaction, desensitization, atopy, drug hypersensitivity	**Interactive Lecture**
•	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	
57	**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	
58 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	
59 Immunodeficiency	
• 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 Lecture**
• Discuss various molecular mechanisms by which therapeutic effect of the drugs are obtained	
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	**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	**Interactive Lecture**
• Classify alpha (α) and beta (β)-adrenoceptor antagonists	
• Explain pharmacokinetics and pharmacodynamics, clinical uses, adverse effects and contraindications of adrenergic antagonists	
17. Terms & abbreviations used in pharmacology	
• Explain the use of metric and apothecary systems of measurement in drug preparation	**Tutorial**
• Discuss various terms & abbreviations and their uses in rationale prescription	
18. Dosage forms of drugs and Drug dosage calculations	
• Discuss the classification, clinical usage and properties of different drug dosage forms	**Tutorial**
• Explain the various formulae used to calculate the drug dosages	
• Calculate the drug dosage for patients having varying ages and body weights	
19. Standard format of prescription writing	
• Discuss the importance and standard format of prescription writing	**Tutorial**
20. Absorption, Bioavailability, Distribution and Biotransformation of Drug	
• Explain the process of drug absorption, bioavailability, drug distribution and biotransformation and factors that could modify them	**Tutorial**
21. Parasympathomimetic and Parasympatholytic drugs	
• Discuss the classification, pharmacokinetics & pharmacodynamics of parasympathomimetic and parasympatholytic drugs	**Tutorial**
22. Sympathomimetic and sympatholytic drugs	
• Discuss the classification, pharmacokinetics and pharmacodynamics of sympathomimetic and sympatholytic drugs	**Tutorial**
23. Preparation of Physiological Salt Solutions (Tyrode, Ringer, Kerb`s and De-Jalon`s solution) and Preparation of ORS and 5% dextrose solution	
• Demonstrate the preparation of various physiological salt solutions listed above	
• Describe their composition and experimental uses	**Practical**

• Explain the methods of calculation for solutions preparation of different strengths used experimentally	
• Prepare ORS and 5% dextrose solutions along with their composition	**Practical**
• Discuss their uses in clinical practice	
• Explain the methods of calculation for solution preparation of different strengths used clinically	
• Calculate the deficit and replacement of fluids & electrolytes	
24. Introduction to Power Lab System	
• Identify various parts of Power Lab System	**Practical**
• Describe their functions in detail to perform relevant experiments	
25. Effect of drugs on Rabbit's eye	
• Demonstrate the effects of atropine, adrenaline, ephedrine and pilocarpine on rabbit's eye	**Practical**
26. Effects of Drugs on the Frog's Rectus Abdominis Muscle	
• Demonstrate effects of drugs on isolated skeletal muscle (Rectus Abdominis muscle of frog) by using Power Lab System	**Practical**
• Explain the effects of Acetylcholine, Carbachol, Methacholine acting as skeletal muscle relaxants	

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	

FAMILY MEDICINE

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

RSDC

TOPICS AND OBJECTIVES	LEARNING STRATAGIES
1. Clinical posting	
• Bleeding and soft tissue injuries	**Skills Lab**
• Body injuries	

LONGITUDINAL CURRICULUM

TOPICS AND OBJECTIVES	LEARNING STRATEGIES
1. Research	
Data Collection: Meeting with research supervisors	**Demonstration in digital lab followed by Small groups Discussion**
• Discuss various methods of data collection along with their advantages and disadvantages	
• Collect data by using the data collection instrument within the given timeline	
Types of data	
• Discuss types of variables and data	
• Identify the main variables and the data types in their research projects	
Data Entry: Meeting with research supervisors	
Measures of Central Tendency & dispersion	
• Calculate relevant measures of central tendency and dispersion by using SPSS	
Summarization and display of data	
2. Patient Safety	
Foundation of Clinical practice : Professionalism & Patient Safety	**Small groups Discussion**
• Discuss the importance of patient safety and clinical environment	
• Discuss the importance of ethical practices and their relevance to patient safety	
• List the factors affecting safety in ambulatory case settings	
Introduction to Patient Safety	
• Discuss the importance of patient safety in clinical environment	**Interactive Lecture**
Prescription Writing Essentials for Enhanced Patient Safety	**Small group Discussion**
• Write Prescription according to prescribed protocols	
Team work and Patient Safety	**Role play**
• Discuss the importance of teamwork in health care delivery	
Death Reporting guideline	**Small groups Discussion**
• Write complete death report according to standardized guideline	
3. Bioethics	
• Introduction to Professionalism and Bioethics (Large group)	
4. Communication skills	
• Take history using patient centered interviewing techniques	**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

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!

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

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

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
Mid Term Examination*	

**Final dates will be announced later*