

# Routes of Drug Delivery

Parenteral  
(IV)



Inhaled



Oral



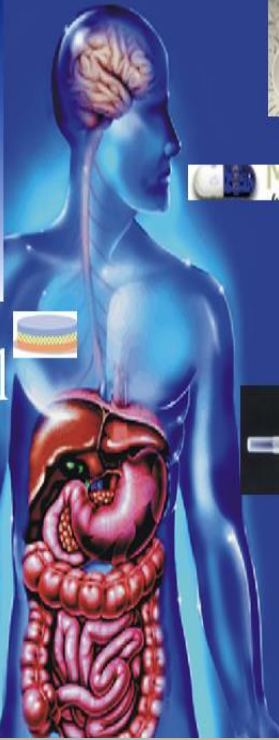
Transdermal



Topical



Parenteral  
(SC, IM)

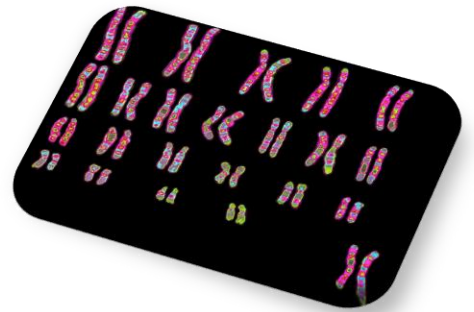


## STUDY GUIDE

THIRD YEAR MBBS

8<sup>TH</sup> FEB- 17<sup>TH</sup> APRIL 2021

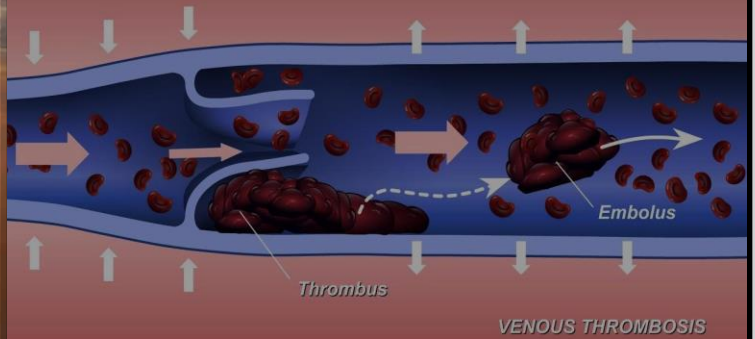
DURATION: 10 WEEKS



# FOUNDATION II MODULE



What is venous thromboembolism (VTE)?



**LIAQUAT NATIONAL HOSPITAL AND MEDICAL COLLEGE**  
INSTITUTE FOR POSTGRADUATE MEDICAL STUDIES & HEALTH SCIENCE



**STUDY GUIDE FOR FOUNDATION-II MODULE**

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Module name: Foundation-II

Year: Three

Duration: 10 weeks (Feb - April 2021)

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

<b>MODULE COORDINATOR:</b>	<ul style="list-style-type: none"> <li>• Dr. Saima Zainab ( <i>Community Medicine</i> )</li> </ul>
<b>CO-COORDINATORS:</b>	<ul style="list-style-type: none"> <li>• Dr. Afifa Tabassum (DHPE)</li> <li>• Dr. Sadia A. Qayyum ( <i>Forensic Medicine</i> )</li> </ul>

### DEPARTMENTS' & RESOURCE PERSONS' FACILITATING LEARNING

<b>BASIC HEALTH SCIENCES</b>		
<b>BIOCHEMISTRY</b>		
<ul style="list-style-type: none"> <li>• Professor Muhammad Kashif Nisar</li> </ul>		
<b>COMMUNITY MEDICINE</b>		
<ul style="list-style-type: none"> <li>• Dr. Saima Zainab</li> </ul>		
<b>FORENSIC MEDICINE</b>		
<ul style="list-style-type: none"> <li>• Professor Murad Zafar Marri</li> </ul>		
<b>PATHOLOGY</b>		
<ul style="list-style-type: none"> <li>• Professor Naveen Faridi</li> </ul>		
<b>MICROBIOLOGY</b>		
<ul style="list-style-type: none"> <li>• Professor Shaheen Sharafat</li> </ul>		
<b>PHARMACOLOGY</b>		
<ul style="list-style-type: none"> <li>• Professor Nazir Ahmad Solangi</li> <li>• Professor Tabassum Zehra</li> </ul>		
<b>DEPARTMENT OF HEALTH PROFESSION EDUCATION</b>		
<ul style="list-style-type: none"> <li>• Professor Nighat Huda</li> <li>• Dr. M. Suleman Sadiq</li> </ul>	<ul style="list-style-type: none"> <li>• Professor Sobia Ali</li> </ul>	<ul style="list-style-type: none"> <li>• Dr. Afifa Tabassum</li> </ul>
<b>LNH&amp;MC MANAGEMENT</b>		
<ul style="list-style-type: none"> <li>• Professor Karimullah Makki, Principal, LNH&amp;MC</li> <li>• Dr. Shaheena Akbani, Director A.A &amp; R.T LNH&amp;MC</li> </ul>		
<b>STUDY GUIDE COMPILED BY: Department of Health Professions Education</b>		

## **INTRODUCTION**

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

It is an aid to:

- Inform students how student learning program of the module has been organized
- Help students organize and manage their studies throughout the module
- Guide students on assessment methods, rules and regulations

### **THE STUDY GUIDE:**

- Communicates information on organization and management of the module.  
This will help the student to contact the right person in case of any difficulty.
- Defines the objectives which are expected to be achieved at the end of the module.
- Identifies the learning strategies such as lectures, small group teachings, clinical skills, demonstration, tutorial and case based learning that will be implemented to achieve the module objectives.
- Provides a list of learning resources such as books, computer assisted learning programs, web- links, journals, for students to consult in order to maximize their learning.
- Highlights information on the contribution of continuous on the student's overall performance.
- Includes information on the assessment methods that will be held to determine every student's achievement of objectives.
- Focuses on information pertaining to examination policy, rules and regulations.

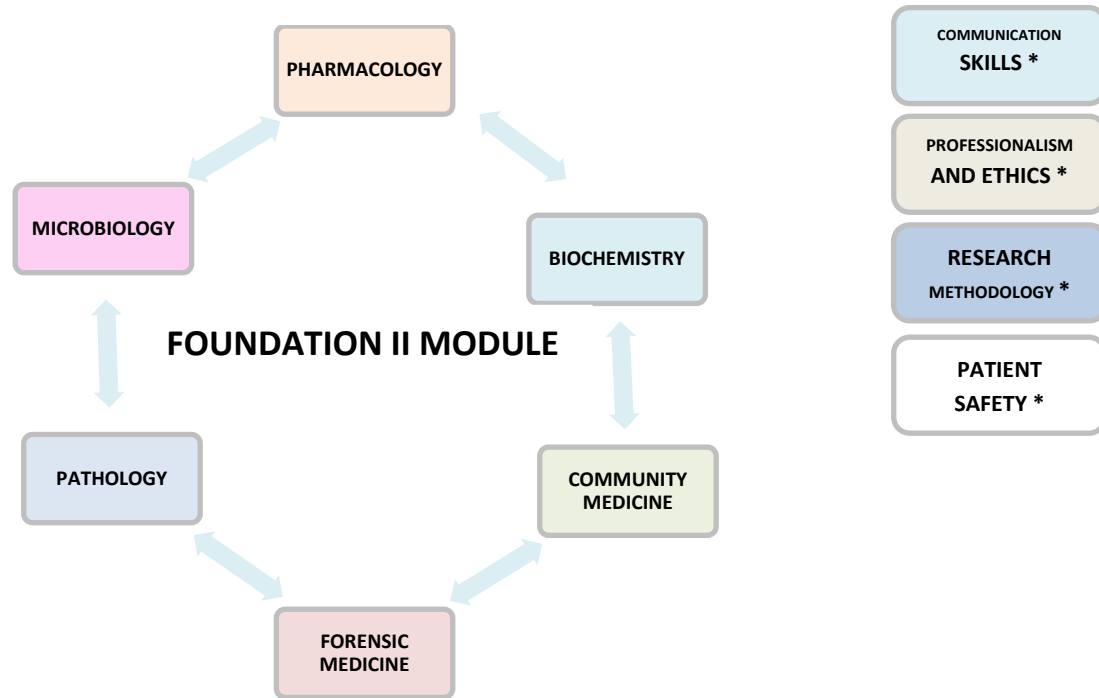
### **CURRICULUM FRAMEWORK**

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

**INTEGRATED CURRICULUM** comprises of system-based modules such as Blood II, Locomotor II, GIT & Liver II, Respiratory System II and Cardiovascular system II which links basic science knowledge to clinical problems. Integrated teaching means that subjects are presented as a meaningful whole. Students will be able to have better understanding of basic sciences when they repeatedly learn in relation to clinical examples.

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

## INTEGRATING DISCIPLINES OF FOUNDATION MODULE-II



**Note:** \*Communication Skills, Patient Safety, Professionalism and Ethics & Research Methodology Will run as a longitudinal theme

## LEARNING METHODOLOGIES

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

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

**INTERACTIVE LECTURES:** In large group, the lecturer introduces a topic or common clinical conditions and explains the underlying phenomena through questions, pictures, videos of patients' interviews, exercises, etc. Students are actively involved in the learning process.

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

**CASE- BASED INTEGRATED LEARNING (CBIL):** A small group discussion format where learning is focused around a series of questions based on a clinical scenario. Students' discuss and answer the questions applying relevant knowledge gained previously in clinical and basic health sciences during the module and construct new knowledge. The CBIL will be provided by the concern department.

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

- **CLINICAL ROTATIONS:** In small groups, students rotate in different wards like Medicine, Pediatrics, Surgery, Obs & Gyne, ENT, Eye, Family Medicine clinics, outreach centers & Community Medicine experiences. Here students observe patients, take histories and perform supervised clinical examinations in outpatient and inpatient settings. They also get an opportunity to observe medical personnel working as a team. These rotations help students relate basic medical and clinical knowledge in diverse clinical areas.
- **EXPERIENCE IN LNH OUTREACH CENTERS:** Learning at outreach centers of LNH have been organized and incorporated as part of training of third year medicinal students. The objective is to provide clinical training experiences for students in primary care settings.

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

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

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

**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**

<b>TOPICS &amp; OBJECTIVES</b>	<b>LEARNING STRATEGY</b>
<b>1. Basic concepts of genetics</b>	Lecture
Discuss the basic concepts of genetics including DNA and RNA structure, Mendel's Laws of inheritance and Pedigree Chart	
<b>2. DNA Replication and repair</b>	Lecture
Describe the process of DNA Replication and repair	
<b>3. Transcription and Post Transcriptional Modification</b>	Lecture/ Tutorial
Explain the mechanism of Transcription and Post Transcriptional Modification	
<b>4. Translation and Post Translational Modification</b>	Lecture/ Tutorial
Discuss the process of Translation and Post Translational Modification	

**COMMUNITY MEDICINE**

<b>TOPICS &amp; OBJECTIVES</b>	<b>LEARNING STRATEGY</b>
<b>1. Introduction to public health</b>	Tutorial
<ul style="list-style-type: none"> <li>Define common terminologies used in Community Medicine including C.O.M.E (Community Oriented Medical Education) &amp; Comprehensive Health Care</li> </ul>	
<ul style="list-style-type: none"> <li>Briefly describe historical development of Public Health</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss development of public health in Indo- Pakistan</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss Health Plans and Social Action Program</li> </ul>	
<b>2. Concept of disease causation:</b>	Lecture
<ul style="list-style-type: none"> <li>Discuss the concept of disease causation</li> </ul>	
<ul style="list-style-type: none"> <li>List determinants of disease</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the dynamics of disease</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss direct and indirect transmission</li> </ul>	
<b>3. Natural history of disease &amp; Levels of prevention:</b>	Lecture
<ul style="list-style-type: none"> <li>List factors facilitating occurrence of disease</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the phenomenon of natural history of disease &amp; different levels of prevention</li> </ul>	
<b>4. International health agencies- WHO, UNICEF etc.</b>	Tutorial
<ul style="list-style-type: none"> <li>Discuss iceberg phenomenon</li> </ul>	
<ul style="list-style-type: none"> <li>List Regional Offices of WHO</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss functions of WHO &amp; of UNICEF</li> </ul>	Tutorial



• Discuss UNICEF's GOBI-FFF program	
• Describe International Health Regulations	
<b>5. Health Care System (health system of Pakistan included):</b>	
• Define District Health System and Health District.	Lecture
• Explain Health Systems Development	
• Discuss the Situation Analysis by studying Health Indicators and Health Needs.	
• list the following:	
i. Health System Problems,	
ii. Public Health Engineering,	
iii. Financial and Organizational problems	
iv. Problems of Health Planning, Evaluation and Research	
v. Primary aims of Integrated Health	
• Identify Services and Resources, Health Facilities and Health Manpower.	
• Describe major problems of Rural and Urban Health Areas of Pakistan.	
• Explain Multi-sectoral Interaction and Partnership	
• Describe the role of District Management Team.	
<b>6. Primary Health Care:</b>	
• Discuss the concept of Primary Health Care and its essential components	Tutorial
• Describe guidelines in PHC Planning.	
<b>7. Introduction to environmental health (climate change &amp; global warming included)</b>	
• Define environmental health	Practical / Tutorial
• Discuss epidemiological triangle linking with environmental health	
• List types of pollution and its sources	
<b>8. Nuclear medicine:</b>	
• Describe the basic concepts involved in radiation process	Lecture
• Explain the role of nuclear medicine in medical diagnosis	
• State the standard permeable dose of radiation	
• Describe the method of protection from radiation	
• Describe safe management of radioactive waste.	
<b>9. Genomics:</b>	
• Define genomics	Lecture
• Differentiate between genetics and genomics	
• Discuss Genotype and Phenotype	
• Discuss Public Health or Community Genetics	
• Describe the role of Public Health practitioners in Genomics	
<b>10. Introduction to demography (demographic transition included):</b>	
• Define demography	Lecture
• List the tools of demography	
• Explain the Four Patterns of population change	
• Discuss the stages of demographic transition	

<b>11. Vital Statistics:</b>	
<ul style="list-style-type: none"> <li>Discuss the role of vital statistics in health status of country.</li> </ul>	Practical / Tutorial
<ul style="list-style-type: none"> <li>Describe Vital statistics registration in developing countries.</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the situation of vital statistics in Pakistan.</li> </ul>	
<b>12. Morbidity &amp; mortality determinants:</b>	
<ul style="list-style-type: none"> <li>Calculate and interpret different mortality and morbidity indicators</li> </ul>	Practical
<ul style="list-style-type: none"> <li>Describe Special Indicators – Infant and maternal mortality rates</li> </ul>	
<b>13. Population pyramid &amp; interpretation:</b>	
<ul style="list-style-type: none"> <li>Describe Age-Sex Composition by Population Pyramid &amp; its Importance</li> </ul>	Lecture
<ul style="list-style-type: none"> <li>Define the concept of Population pyramid</li> </ul>	
<ul style="list-style-type: none"> <li>Compare the advantages and disadvantages of population pyramid</li> </ul>	
<b>14. Introduction to infections &amp; control of infections:</b>	
<ul style="list-style-type: none"> <li>Define the following terms: infection, infestation, infection agent, control, elimination and eradication, agent, host and environment</li> </ul>	Practical / Tutorial
<ul style="list-style-type: none"> <li>Discuss the role of incubation period, serial time period in control of infection.</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the epidemiological triangle</li> </ul>	
<ul style="list-style-type: none"> <li>Differentiate between infectious and communicable diseases.</li> </ul>	
<ul style="list-style-type: none"> <li>Differentiate between disinfection and sterilization.</li> </ul>	
<ul style="list-style-type: none"> <li>Describe control measures for infectious &amp; communicable diseases.</li> </ul>	
<b>15. Emerging &amp; Re-emerging diseases:</b>	
<ul style="list-style-type: none"> <li>Name the different emerging diseases</li> </ul>	Tutorial
<ul style="list-style-type: none"> <li>Describe the etiology, epidemiology, risk factors, control and prevention of emerging and re-emerging diseases</li> </ul>	
<b>16. Disease Surveillance &amp; Common screening tests:</b>	
<ul style="list-style-type: none"> <li>Define Disease Surveillance</li> </ul>	Lecture
<ul style="list-style-type: none"> <li>Discuss the Key concepts of Disease surveillance</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the uses and methods of disease surveillance</li> </ul>	
<b>17. Health Information, Education and Communication (IEC):</b>	
<ul style="list-style-type: none"> <li>Define Health Management Information System &amp; Health Education</li> </ul>	Lecture
<ul style="list-style-type: none"> <li>Identify the components of Health Management Information System</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the need of Health Management Information System in Primary Care Programs</li> </ul>	
<ul style="list-style-type: none"> <li>Explain the important features of Health Management Information System</li> </ul>	
<ul style="list-style-type: none"> <li>Explain the principles and stages of health education</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss health education in Pakistan</li> </ul>	
<b>18. Waste Disposal I:</b>	
<ul style="list-style-type: none"> <li>Differentiate between various terminologies like refuse, sewage and sullage</li> </ul>	Practical / Tutorial
<ul style="list-style-type: none"> <li>Differentiate between sludge and sullage</li> </ul>	Practical / Tutorial
<b>19. Waste Disposal II:</b>	

<ul style="list-style-type: none"> <li>Describe the various ways to collect and dispose human excreta and advise best method in given situation</li> </ul>	Lecture
<ul style="list-style-type: none"> <li>Explain the water carriage system</li> </ul>	
<ul style="list-style-type: none"> <li>State the advantages of different types of Sewage Treatment Plants</li> </ul>	

### **FORENSIC MEDICINE**

<b>TOPICS &amp; OBJECTIVES</b>	<b>LEARNING STRATEGY</b>	
<b>1. Introductory lecture</b>		
<ul style="list-style-type: none"> <li>Describe basics terms related to Forensic Medicine and Toxicology.</li> </ul>	Lecture	
<ul style="list-style-type: none"> <li>Enumerate the branches of Forensic Sciences</li> </ul>		
<ul style="list-style-type: none"> <li>Explain the importance and utility of Forensic Medicine and its branches, in medical, legal and ethical issues</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the structure of Legal system and the powers of different courts in Pakistan</li> </ul>		
<b>2. Legal Procedures - I</b>		
<ul style="list-style-type: none"> <li>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</li> </ul>		
<ul style="list-style-type: none"> <li>Explain medical evidence and its types (oral, documentary, hearsay, circumstantial)</li> </ul>		
<ul style="list-style-type: none"> <li>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)</li> </ul>		
<ul style="list-style-type: none"> <li>Differentiate Dying declaration and Dying deposition</li> </ul>		
<b>3. Legal Procedures – II</b>		
<ul style="list-style-type: none"> <li>Enumerate the types of witnesses</li> </ul>		
<ul style="list-style-type: none"> <li>Explain the procedure of examination in the court</li> </ul>		
<ul style="list-style-type: none"> <li>List the protocols for the conduct of Doctor in the witness box, during court attendance &amp; recording evidence and volunteering of a statement by the doctor in court of law</li> </ul>		
<ul style="list-style-type: none"> <li>Describe Professional secrecy and Privileged communication</li> </ul>		
<b>4. Legal Procedures – III</b>		
<ul style="list-style-type: none"> <li>Explain the hierarchy of Criminal courts in Pakistan</li> </ul>		
<ul style="list-style-type: none"> <li>Define Pakistan Penal Code and Criminal Procedure Code; its execution and delivery</li> </ul>		
<ul style="list-style-type: none"> <li>List the general presumptions of law and general exemptions of law</li> </ul>		
<b>5. Thanatology - I</b>		
<ul style="list-style-type: none"> <li>Explain the scientific concepts regarding death</li> </ul>		
<ul style="list-style-type: none"> <li>Highlight the significance of Medico-legal aspects of brain death</li> </ul>		
<ul style="list-style-type: none"> <li>Enumerate Howard’s criteria of death</li> </ul>		
<ul style="list-style-type: none"> <li>Define the terms cause, manner, mode and mechanism of death</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the medico-legal aspects of sudden &amp; unexpected deaths</li> </ul>		

<b>6. Thanatology - II</b>	Lecture
• 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), physio-chemical changes in various body tissues and organs under various environmental conditions, such as changes in muscular system after death	
<b>7. Thanatology - III</b>	
• Describe Postmortem Lividity (Livor mortis, Hypostasis or Suggilation) and its significance	
• Enumerate the postmortem changes in the blood, CSF, Vitreous humor and Bone marrow	
<b>8. Thanatology - IV</b>	
i. Late signs of death i.e. Putrefaction, its mechanism, changes and gases of decomposition	
ii. Adipocere formation	
iii. Mummification	
<b>9. Thanatology - V</b>	
i. Describe presumption of death	
ii. Describe presumption of survivor-ship	
iii. Describe certification of death according to WHO	
<b>10. Thanatology - VI</b>	
• Describe forensic entomology	
• Describe estimate of time since death	
<b>11. Autopsy - I</b>	
• Define autopsy and its types	
• List its aims and objectives	
• Differentiate between Medico legal and Pathological autopsy	
• Explain Autopsy protocols	
<b>12. Autopsy - II</b>	
i. Describe External examination	
ii. Describe Types of incisions	
iii. Describe Techniques of autopsy	
iv. Describe Negative and Obscure autopsy	
v. Describe Internal examination of head	
<b>13. Autopsy - III</b>	Lecture
i. Describe Internal examination of thoracic and abdominal cavities	
ii. Dissection of respiratory tract, heart, abdominal viscera, pelvic organs, and Spinal cord	
<b>14. Autopsy - IV</b>	
• Describe method of preservation of viscera for chemical and histo-pathological examination	
• List the preservatives used in mortuary	
<b>15. Autopsy - V</b>	

<ul style="list-style-type: none"> <li>Define Exhumation and Postmortem artifacts</li> </ul>	Lecture
<b>16. Traumatology - I</b>	
<ul style="list-style-type: none"> <li>Define Injury, Hurt, Wound, Assault and Battery</li> </ul>	
<ul style="list-style-type: none"> <li>Classify Injuries</li> </ul>	
<ul style="list-style-type: none"> <li>Describe blunt weapon injuries; Abrasions and Bruises</li> </ul>	
<b>17. Traumatology – II</b>	
<ul style="list-style-type: none"> <li>i. Lacerated wounds, types, mechanism of production and medico legal significance</li> </ul>	
<ul style="list-style-type: none"> <li>ii. Sharp weapon injuries- Incised wounds, stab wounds with medico legal significance</li> </ul>	
<b>18. Traumatology – III</b>	
<ul style="list-style-type: none"> <li>Summarize Qisas and Diyat Act with interpretation of injuries accordingly</li> </ul>	
<b>19. Custodial deaths and torture</b>	
<ul style="list-style-type: none"> <li>Enumerate deaths in custody</li> </ul>	
<ul style="list-style-type: none"> <li>Define Torture according to World Medical Association (Declaration of Tokyo)</li> </ul>	
<ul style="list-style-type: none"> <li>Explain various torture techniques</li> </ul>	
<ul style="list-style-type: none"> <li>List the sequelae of torture</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the role of Medical practitioner and the ethical issues with relation to torture</li> </ul>	
<b>20. Infanticide (Pediatric Forensic Medicine- I)</b>	
<ul style="list-style-type: none"> <li>Define infanticide, feticide, still born baby and dead born baby</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss Maceration</li> </ul>	
<ul style="list-style-type: none"> <li>List the methods of foetal age estimation</li> </ul>	
<ul style="list-style-type: none"> <li>Summarize the signs of live birth</li> </ul>	
<ul style="list-style-type: none"> <li>Define Precipitate labor/Unconscious delivery</li> </ul>	
<ul style="list-style-type: none"> <li>List the criminal causes of death of new born babies i.e. Acts of commission and omission</li> </ul>	
<ul style="list-style-type: none"> <li>Explain autopsy on bodies of new born babies</li> </ul>	
<b>21. Battered Baby (Pediatric Forensic Medicine-II)</b>	
<ul style="list-style-type: none"> <li>Explain Battered Baby Syndrome, its etiology and clinical features</li> </ul>	
<ul style="list-style-type: none"> <li>Enumerate the Injuries related to Shaken Baby Syndrome with mechanism</li> </ul>	
<ul style="list-style-type: none"> <li>Define COT death (Sudden Infant Death Syndrome) and various possibilities of death with postmortem findings, Medico legal importance of SIDS</li> </ul>	
<b>22. Animal Poisons- Toxicology (Snakes And Scorpions )</b>	Lecture
<ul style="list-style-type: none"> <li>Classify snakes</li> </ul>	
<ul style="list-style-type: none"> <li>Differentiate between poisonous and non-poisonous snakes</li> </ul>	
<ul style="list-style-type: none"> <li>Differentiate between Colubridae and Viperidea</li> </ul>	
<ul style="list-style-type: none"> <li>Summarize the signs and symptoms of bites by cobra and viper</li> </ul>	
<ul style="list-style-type: none"> <li>Explain the principles of treatment of snake bite and Anti-venom therapy</li> </ul>	
<ul style="list-style-type: none"> <li>List the medico legal aspects of snakebite</li> </ul>	

<ul style="list-style-type: none"> <li>Discuss the signs, symptoms and treatment of Scorpion bite</li> </ul>	Lecture
<b>23. Thermal Injuries (Burns, scalds)</b>	
<ul style="list-style-type: none"> <li>Classify thermal injuries and burns</li> </ul>	
<ul style="list-style-type: none"> <li>Differentiate the types of burns.</li> </ul>	
<ul style="list-style-type: none"> <li>Calculate the surface area of burns in adults and children.</li> </ul>	
<ul style="list-style-type: none"> <li>List the causes of death due to burns.</li> </ul>	
<ul style="list-style-type: none"> <li>List the postmortem findings and artifacts due to burns.</li> </ul>	
<ul style="list-style-type: none"> <li>Differentiate ante-mortem and postmortem burning</li> </ul>	
<ul style="list-style-type: none"> <li>Differentiate burns due to dry heat, moist heat and chemicals for medico legal purposes.</li> </ul>	
<b>24. Environmental (Cold/heat) trauma</b>	
<ul style="list-style-type: none"> <li>Describe the causes, clinical features and treatment of injuries due to local exposure to cold; Frostbite, trench foot, chilblain</li> </ul>	
<ul style="list-style-type: none"> <li>Explain Hypothermia; its causes, clinical features and treatment</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the injuries due to general exposure to heat viz. Heatstroke, exhaustion, cramps; their causes, clinical features and treatment</li> </ul>	
<b>25. Forensic Electrocutation &amp; Lightning</b>	
<ul style="list-style-type: none"> <li>Explain the features of injuries due to various types of electrical current.</li> </ul>	
<ul style="list-style-type: none"> <li>List the causes of death due to electrocution.</li> </ul>	
<ul style="list-style-type: none"> <li>Enumerate lightning injuries and lightning deaths.</li> </ul>	
<b>26. Starvation and neglect</b>	
<ul style="list-style-type: none"> <li>Describe the types, signs and symptoms and postmortem findings of starvation</li> </ul>	
<b>27. General Toxicology-I</b>	Practical / Tutorial
<ul style="list-style-type: none"> <li>Define Toxicology</li> </ul>	
<ul style="list-style-type: none"> <li>Classify poisons based on: chief symptoms and medico legal criteria</li> </ul>	
<ul style="list-style-type: none"> <li>Explain the International toxicity rating of poisons</li> </ul>	
<b>28. General Toxicology-II</b>	Practical / Tutorial
<ul style="list-style-type: none"> <li>Define a poison.</li> </ul>	
<ul style="list-style-type: none"> <li>Differentiate between poison and a medicine.</li> </ul>	
<ul style="list-style-type: none"> <li>Explain routes of administration and excretion of poisons.</li> </ul>	
<ul style="list-style-type: none"> <li>List the factors that modify action of poisons.</li> </ul>	Practical / Tutorial
<ul style="list-style-type: none"> <li>Explain the diagnosis of poisoning in living &amp; dead</li> </ul>	
<b>29. General Toxicology-III</b>	
<ul style="list-style-type: none"> <li>Duties of a doctor in a case of suspected poisoning</li> </ul>	
<ul style="list-style-type: none"> <li>Describe general principles of treatment of poisoning viz. Gastric lavage, Antidote therapy</li> </ul>	
<b>30. General Toxicology-IV</b>	
<ul style="list-style-type: none"> <li>Discuss the role of poisoning Information Centre in treatment of cases of poisoning</li> </ul>	
<b>31. Postmortem report writing/ Autopsy Protocols</b>	
<ul style="list-style-type: none"> <li>Write a Postmortem Report.</li> </ul>	
<b>32. Autopsy hazards</b>	Practical / Tutorial
<ul style="list-style-type: none"> <li>Discuss the hazards related to autopsy, and the methods to prevent these hazards.</li> </ul>	

<b>33. Traumatology</b>	
<ul style="list-style-type: none"> <li>Write medico legal report of an injured person.</li> </ul>	
<b>34. Crime scene investigation</b>	
<ul style="list-style-type: none"> <li>Discuss the important aspects of           <ol style="list-style-type: none"> <li>Crime scene investigation.</li> <li>Trace evidence</li> <li>Locard's principle of exchange &amp; its medico legal importance</li> </ol> </li> </ul>	

## ***PATHOLOGY***

<b><i>TOPICS &amp; OBJECTIVES</i></b>	<b><i>LEARNING STRATEGY</i></b>
<b>GENERAL PATHOLOGY</b>	
<b>CELLULAR RESPONSES TO STRESS AND TOXIC INSULTS: ADAPTATION, INJURY, AND DEATH</b>	
<b>1. Introduction to Pathology Overview: Cellular Responses to Stress and Noxious Stimuli</b>	
<ul style="list-style-type: none"> <li>Define Pathology and Pathogenesis.</li> <li>Briefly discuss cellular responses to the injury and stages of the cellular response to stress and injurious stimuli.</li> </ul>	Lecture
<b>2. Adaptation of Cellular Growth and Differentiation</b>	
<ul style="list-style-type: none"> <li>Define adaptation, hypertrophy, hyperplasia, atrophy, and metaplasia</li> <li>Describe the causes and mechanism of hypertrophy, hyperplasia, atrophy, and metaplasia.</li> </ul>	
<b>3. Overview of Cell Injury and Cell Death</b>	
<ul style="list-style-type: none"> <li>List causes of cell injury</li> <li>Discuss morphological alterations in cell injury including both reversible and irreversible injury</li> </ul>	Lecture/ Practical
<b>4. Mechanism of Cell Injury and Examples</b>	
<ul style="list-style-type: none"> <li>Describe Mechanisms of Cell Injury including Depletion of ATP, Mitochondrial damage, Influx of Calcium, Accumulation of Oxygen derived free radicals, Defects in membrane permeability, Damage to DNA and Proteins</li> <li>Discuss properties of the Principal Free Radicals Involved in Cell Injury.</li> <li>Describe the process of Autophagy</li> </ul>	
<b>5. Apoptosis and Necrosis</b>	
<ul style="list-style-type: none"> <li>Discuss causes, morphological and biochemical changes, clinic-pathologic correlations in Apoptosis.</li> <li>Summarize the pathways of apoptosis</li> <li>Discuss morphologically distinct patterns of necrosis including coagulative necrosis, liquefactive necrosis, gangrenous necrosis, caseous necrosis, Fat necrosis, and fibrinoid necrosis</li> <li>Briefly discuss Necroptosis</li> </ul>	
<b>6. Intracellular Accumulations</b>	
<ul style="list-style-type: none"> <li>Summarize the pathways of abnormal accumulation.</li> <li>Discuss types of pigments (exogenous and endogenous)</li> </ul>	



<ul style="list-style-type: none"> <li>Describe hyaline changes, lipid, protein, and glycogen accumulation</li> </ul>		
<b>INFLAMMATION AND REPAIR</b>		
<b>7. Introduction to Inflammation &amp; Acute inflammation</b>		
<ul style="list-style-type: none"> <li>Define inflammation</li> </ul>	Lecture/ tutorial	
<ul style="list-style-type: none"> <li>Classify inflammation</li> </ul>		
<ul style="list-style-type: none"> <li>List the causes of inflammation</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the sequence of events in acute inflammatory process</li> </ul>		
<b>8. Mediators of acute inflammation</b>		
<ul style="list-style-type: none"> <li>Name the main inflammatory mediators</li> </ul>		
<ul style="list-style-type: none"> <li>Describe their role in the inflammatory process</li> </ul>		
<b>9. Morphological pattern &amp; outcomes of acute inflammation</b>		
<ul style="list-style-type: none"> <li>Explain different morphological pattern of acute inflammation</li> </ul>		
<ul style="list-style-type: none"> <li>List the outcomes of acute inflammation</li> </ul>		
<b>10. Chronic Inflammation</b>		
<ul style="list-style-type: none"> <li>Define chronic inflammation</li> </ul>		
<ul style="list-style-type: none"> <li>List the causes and morphological features of chronic inflammation</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the cells and mediators &amp; their role in chronic inflammation</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the systemic effects of chronic inflammation</li> </ul>		
<b>11. Granulomatous Inflammation</b>		
<ul style="list-style-type: none"> <li>Define granulomatous inflammation</li> </ul>		
<ul style="list-style-type: none"> <li>List the types of granulomatous inflammation</li> </ul>		
<ul style="list-style-type: none"> <li>List the diseases with granulomatous inflammation</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss morphology of granulomatous inflammation</li> </ul>		
<b>12. Tissue repair</b>		
<ul style="list-style-type: none"> <li>Define tissue repair</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the mechanism involved in tissue regeneration and scar formation</li> </ul>		
<ul style="list-style-type: none"> <li>List the factors that influence tissue repair</li> </ul>		
<b>13. Healing by First &amp; Second Intention</b>		
<ul style="list-style-type: none"> <li>Contrast repair by primary and secondary intention</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the complications in tissue repair</li> </ul>		
<b>HEMODYNAMICS AND SHOCK</b>		
<b>14. Edema, Effusion, Hyperemia and Congestion</b>		
<ul style="list-style-type: none"> <li>Define edema, effusion, exudate, transudate, hyperemia and congestion</li> </ul>	Lecture	
<ul style="list-style-type: none"> <li>Define various terminologies according to morphology of edema &amp; effusion</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the pathophysiologic categories of edema</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the mechanism &amp; clinical significance of edema at different sites</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the morphological changes in chronic passive congestion of the lungs &amp; liver</li> </ul>		
<b>15. Hemostasis</b>		
<ul style="list-style-type: none"> <li>Define hemostasis</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the sequence of events involved in primary &amp; secondary hemostasis including the role of platelets, endothelium &amp; coagulation cascade</li> </ul>		

<ul style="list-style-type: none"> <li>Describe the defects of primary &amp; secondary hemostasis</li> </ul>	Lecture
<b>16. Thrombosis &amp; Embolism</b>	
<ul style="list-style-type: none"> <li>Define embolus, infarction</li> <li>Describe the factors that predispose to thrombosis</li> <li>Describe the morphologic features of thrombi</li> <li>List the possible fate of thrombus</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the clinical features of venous, arterial &amp; cardiac thrombosis</li> </ul>	CBIL
<ul style="list-style-type: none"> <li>Define Disseminated Intravascular Coagulation (DIC)</li> <li>Describe the pathogenesis of DIC</li> <li>List the types of embolism</li> <li>Describe the clinical manifestations &amp; consequences of pulmonary &amp; systemic thromboembolism</li> <li>Discuss the clinical conditions that give rise to fat &amp; marrow embolism, air embolism &amp; amniotic fluid embolism</li> <li>Classify infarction</li> <li>Describe the morphologic features of red &amp; white infarct</li> <li>List the factors that influence development of infarct</li> <li>Explain the differences between ante-partum &amp; post-mortem clots</li> </ul>	
<b>17. Shock</b>	
<ul style="list-style-type: none"> <li>Define shock</li> <li>List the three major types of shock</li> <li>Describe the mechanism of three major types of shock</li> <li>Discuss the factors involved in the pathophysiology of septic shock</li> <li>Describe the three stages of shock</li> <li>List the clinical features of shock</li> </ul>	
<b>GENETICS</b>	
<b>18. Introduction to Mendelian Disorders</b>	Lecture
<ul style="list-style-type: none"> <li>Discuss the transmission pattern of single gene disorder</li> <li>Discuss the pathogenesis of important autosomal recessive, autosomal dominant, and X-linked disorders</li> <li>List the examples of Autosomal Dominant Disorders, Autosomal Recessive Disorders.</li> </ul>	
<b>19. Mutation</b>	
<ul style="list-style-type: none"> <li>Define mutation</li> <li>Briefly discuss principles relating to the effects of gene mutation</li> <li>Distinguish between types of mutations in the coding and non-coding regions of genes</li> </ul>	
<b>20. Single Gene Disorders</b>	
<ul style="list-style-type: none"> <li>Define single-gene disorders</li> <li>List types of single-gene disorders on the molecular and biochemical basis</li> <li>Discuss disorders associated with defects in structural proteins (Marfans &amp; Ehlers -Danlos syndrome)</li> <li>Discuss disorders associated with defects in receptor proteins (Familial Hypercholesterolemia)</li> </ul>	Lecture

<ul style="list-style-type: none"> <li>Name types of lysosomal &amp; glycogen storage diseases with their deficient enzymes</li> </ul>	
<b>21. Chromosomal Disorders</b>	
<ul style="list-style-type: none"> <li>Define normal karyotype and common cytogenetic terminology</li> <li>Discuss structural chromosomal abnormalities</li> <li>Discuss Cytogenetic Disorders Involving Autosomes including Trisomy 21: Down Syndrome, Trisomy 18: Edwards Syndrome, Trisomy 13: Patau Syndrome</li> <li>Name diseases with deletion of genes at chromosomal locus 22q11.2 (DiGeorge syndrome, Velocardiofacial syndrome)</li> <li>Discuss Cytogenetic Disorders Involving Sex Chromosomes including Klinefelter syndrome, Turner syndrome</li> </ul>	
<b>22. Molecular Genetic Disorders and Diagnosis</b>	
<ul style="list-style-type: none"> <li>List the indications for analysis of Inherited Genetic Alterations</li> <li>Summarise the basic principles of recombinant genetic techniques (PCR, FISH, RFLP, BLOTTING) and their applications in the detection of genetic diseases</li> </ul>	
<b>IMMUNOLOGY</b>	
<b>23. Introduction &amp; Innate immunity</b>	
<ul style="list-style-type: none"> <li>Define immunity and its types</li> <li>Classify types of immunity according to their function especially innate immunity</li> <li>List the components of immune system</li> <li>Discuss the functions of immune system</li> <li>Discuss the role of T cells, B cells, natural killer cells, macrophages in immunity</li> <li>Discuss the specificity of the immune response and properties, component and pattern of recognition receptors</li> <li>Define Innate immunity</li> <li>Discuss properties, components &amp; pattern recognition receptors.</li> </ul>	
<b>24. Adaptive immunity (I)</b>	
<ul style="list-style-type: none"> <li>Define adaptive immunity</li> <li>Classify T cells according to its types.</li> <li>Discuss the functions of CD4 and CD8 T cells with respect to activation, co-stimulation and memory formation</li> <li>Discuss the effect of superantigens on T cells</li> </ul>	
<b>25. Adaptive immunity (II)</b>	
<ul style="list-style-type: none"> <li>Define adaptive immunity</li> <li>Discuss the mode of activation of B cells</li> <li>Discuss effector functions of B cells</li> <li>Define antibody</li> <li>Discuss the structure of antibody</li> <li>Classify antibodies according to types</li> <li>Define primary response and secondary response of antibodies</li> <li>Discuss the functions of antibodies</li> </ul>	Lecture
<b>26. MHC &amp; transplantation</b>	
<ul style="list-style-type: none"> <li>Define Major Histocompatibility Complex (MHC)</li> </ul>	

<ul style="list-style-type: none"> <li>Classify MHC proteins according to its classes</li> </ul>	Lecture
<ul style="list-style-type: none"> <li>Define transplantation</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the importance of MHC in transplantation</li> </ul>	
<ul style="list-style-type: none"> <li>Classify types of transplant rejections</li> </ul>	
<ul style="list-style-type: none"> <li>Define allograft rejection</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss HLA typing in the lab in association with transplantation</li> </ul>	
<b>27. Complement System</b>	
<ul style="list-style-type: none"> <li>Define complement system</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss complement system with respect to activation and regulation</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the role of complement in immunity</li> </ul>	
<ul style="list-style-type: none"> <li>Explain the clinical aspects of complement system</li> </ul>	
<b>28. Hypersensitivity I &amp; II</b>	Lecture
<ul style="list-style-type: none"> <li>Define Hypersensitivity reaction, desensitization, atopy, drug hypersensitivity</li> </ul>	
<ul style="list-style-type: none"> <li>Classify hypersensitivity according to its types</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the pathogenesis of types I &amp; II hypersensitivity</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss various clinical presentations of type I &amp; II hypersensitivity reactions</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the treatment and prevention of types I &amp; II hypersensitivity</li> </ul>	
<b>29. Hypersensitivity III &amp; IV</b>	
<ul style="list-style-type: none"> <li>Define Arthus reaction, Serum Sickness, Immune Complex Disease</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the pathogenesis of type III &amp; IV hypersensitivity</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss various clinical presentations of type III &amp; IV hypersensitivity reactions</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the treatment and prevention of type III &amp; IV hypersensitivity</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss diagnostic immunology</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss briefly Agglutination &amp; precipitations reactions, ELISA</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss ABO blood groups, transfusion reactions &amp; Rh- incompatibility</li> </ul>	
<b>30. Tolerance and Autoimmune Disease</b>	
<ul style="list-style-type: none"> <li>Define T &amp; B cell tolerance, autoimmunity</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the pathogenesis of autoimmune disease</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss various clinical presentations of autoimmune diseases</li> </ul>	
<b>31. Immunodeficiencies</b>	
<ul style="list-style-type: none"> <li>Define immunodeficiency</li> </ul>	
<ul style="list-style-type: none"> <li>Classify immunodeficiency according to its types</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss various clinical presentations of immunodeficiency diseases</li> </ul>	
<b>NEOPLASIA</b>	
<b>32. Introduction to Neoplasia</b>	
<ul style="list-style-type: none"> <li>Define neoplasia</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss Nomenclature of benign and malignant tumors with respect to tissue of origin</li> </ul>	
<ul style="list-style-type: none"> <li>Describe characteristic features of benign &amp; malignant tumors</li> </ul>	
<b>33. Gross &amp; Microscopy of Benign &amp; Malignant tumors</b>	
<ul style="list-style-type: none"> <li>Define Anaplasia, Metaplasia, Dysplasia, Metastasis</li> </ul>	

<ul style="list-style-type: none"> <li>Define cell Differentiation and de-differentiation</li> </ul>	Lecture
<ul style="list-style-type: none"> <li>Discuss all the components and morphological features of anaplasia</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss Local Invasion of tumors</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss Pathways of Spread of malignant tumors</li> </ul>	
<ul style="list-style-type: none"> <li>Compare features of Benign and Malignant Tumors</li> </ul>	
<b>34. Epidemiology of Cancer</b>	
<ul style="list-style-type: none"> <li>Discuss the global Impact of cancer</li> </ul>	
<ul style="list-style-type: none"> <li>List the Environmental Factors involved in the pathogenesis of malignancy</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss different types of occupational cancers</li> </ul>	
<ul style="list-style-type: none"> <li>Define Acquired Predisposing Conditions leading to cancer development.</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss association between Chronic Inflammatory States and Cancer</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the role of genetic predisposition and Interactions between Environmental and Inherited factors in cancer development</li> </ul>	
<b>35. Molecular Basis of cancer I</b>	
<ul style="list-style-type: none"> <li>List Four classes of normal regulatory genes with respect to neoplasia</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss Stepwise Accumulation of driver and passenger mutations</li> </ul>	
<ul style="list-style-type: none"> <li>Describe Cellular and Molecular Hallmarks of Cancer</li> </ul>	
<ul style="list-style-type: none"> <li>Define oncogenes</li> </ul>	
<ul style="list-style-type: none"> <li>Define Proto-oncogenes, and Oncoproteins</li> </ul>	
<ul style="list-style-type: none"> <li>Classify oncogenes according to their mode of action and associated tumors</li> </ul>	
<b>36. Molecular Basis of cancer II</b>	
<ul style="list-style-type: none"> <li>Define Tumor Suppressor Genes</li> </ul>	
<ul style="list-style-type: none"> <li>Classify tumor suppressor genes according to their mode of action and associated tumors</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss RB gene with respect to its role in tumor development</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss p53 gene with respect to its role in tumor development</li> </ul>	
<b>37. Molecular Basis of cancer III</b>	
<ul style="list-style-type: none"> <li>Define the Warburg Effect and angiogenesis</li> </ul>	
<ul style="list-style-type: none"> <li>Define Evasion of Programmed Cell Death (Apoptosis)</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the Stem Cell–Like Properties of Cancer Cells</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the effect of angiogenesis on tumor progression</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss local Invasion and distant metastasis in neoplastic lesions</li> </ul>	
<ul style="list-style-type: none"> <li>Explain the molecular basis of Multistep-Carcinogenesis</li> </ul>	
<b>38. Grading, staging &amp; clinical effects of Neoplasia</b>	
<ul style="list-style-type: none"> <li>Define Grading and Staging of Tumors</li> </ul>	
<ul style="list-style-type: none"> <li>Define Cancer Cachexia</li> </ul>	
<ul style="list-style-type: none"> <li>Classify Paraneoplastic Syndromes according to their clinical effects and association with various tumors</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss different types of Laboratory investigations used for Diagnosis of Cancer</li> </ul>	
<b>39. Tumor markers &amp; carcinogenic agents</b>	
<ul style="list-style-type: none"> <li>Define Chemical Carcinogenesis, Radiation Carcinogenesis, Microbial Carcinogenesis</li> </ul>	
<ul style="list-style-type: none"> <li>Classify chemical and radiation carcinogens according to their types and modes of action</li> </ul>	

<ul style="list-style-type: none"> <li>Classify microbial carcinogenesis according to the Viral and Bacterial involvement</li> <li>Classify Tumor Markers according to types and mode of action</li> </ul>		
<b>40. Cell Adaptations</b>		
<ul style="list-style-type: none"> <li>Differentiate among hypertrophy, hyperplasia, atrophy, metaplasia based on slides shown</li> </ul>	Practical	
<b>41. Apoptosis and Necrosis</b>		
<ul style="list-style-type: none"> <li>Differentiate between necrosis and apoptosis based on the slides shown</li> <li>Identify morphologic changes in cell injury culminating in necrosis and apoptosis</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss morphologically distinct patterns of necrosis including coagulative necrosis, liquefactive necrosis, gangrenous necrosis, caseous necrosis, Fat necrosis, and fibrinoid necrosis</li> </ul>		

## MICROBIOLOGY

<i>TOPICS &amp; OBJECTIVES</i>	<i>LEARNING STRATEGY</i>	
<b>GENERAL MICROBIOLOGY</b>		
<b>1. Introduction to Microbiology</b>		
<ul style="list-style-type: none"> <li>Define microbiology</li> <li>Differentiate between prokaryotes and eukaryotes</li> <li>Discuss the types of microorganisms</li> </ul>	Lecture	
<b>2. Bacterial structure I</b>		
<ul style="list-style-type: none"> <li>Discuss the difference between gram-positive and gram-negative bacteria</li> <li>Discuss the essential components of bacterial structure ( cell wall, plasma membrane , cytoplasm, plasmid, transposons , nucleoid, mesosomes, periplasm)</li> </ul>		
<b>3. Bacterial structure II</b>		
<ul style="list-style-type: none"> <li>Describe the non-essential components of the bacterial structure ( capsule, spore, pili, plasmid, flagellum, granules, glycocalyx)</li> <li>Explain the growth cycle</li> <li>Differentiate between aerobic and anaerobic growth</li> <li>Describe Obligate intracellular growth, Fermentation of sugars, Iron metabolism</li> </ul>		
<b>4. Bacterial genetics</b>		
<ul style="list-style-type: none"> <li>Discuss Mutations</li> <li>Describe the process of transfer of DNA within and between bacterial cells</li> <li>Discuss the importance of recombination</li> </ul>		
<b>5. Classification of Bacteria and Normal Human Microbiome</b>		
<ul style="list-style-type: none"> <li>Discuss the principles of classification</li> <li>Classify Bacteria</li> <li>Discuss the concepts in normal microbiota of various areas of the body</li> </ul>		
<b>6. Pathogenesis I</b>		
<ul style="list-style-type: none"> <li>Describe the Principles of pathogenesis</li> <li>List the types of bacterial infection</li> </ul>		

<ul style="list-style-type: none"> <li>• Explain the stages of bacterial pathogenesis</li> </ul>	
<ul style="list-style-type: none"> <li>• Discuss the determinants of bacterial pathogenesis (Transmission, adherence, invasion)</li> </ul>	
<b>7. Pathogenesis II</b>	
<ul style="list-style-type: none"> <li>• Discuss the determinants of bacterial pathogenesis, (Toxin production eg. exotoxin, endotoxin),</li> </ul>	
<ul style="list-style-type: none"> <li>• Discuss bacterial infection associated with cancer,</li> </ul>	
<ul style="list-style-type: none"> <li>• Describe the stages of infectious disease,</li> </ul>	
<ul style="list-style-type: none"> <li>• Describe the importance of Koch's postulates</li> </ul>	
<b>8. Host defence</b>	
<ul style="list-style-type: none"> <li>• Discuss the Principles of host defence, innate immunity(skin and mucous membrane)</li> </ul>	
<ul style="list-style-type: none"> <li>• Describe the processes of Inflammatory response, phagocytosis and adaptive specific immunity</li> </ul>	
<b>9. Sterilization and Disinfection</b>	
<ul style="list-style-type: none"> <li>• Discuss the principles of sterilization and disinfection</li> </ul>	
<ul style="list-style-type: none"> <li>• Describe the Chemical agents of disinfection</li> </ul>	
<ul style="list-style-type: none"> <li>• Describe the physical agents of disinfection and autoclaving</li> </ul>	
<b>10. Vaccines (Bacterial)</b>	
<ul style="list-style-type: none"> <li>• Explain the principles of bacterial vaccines</li> </ul>	
<ul style="list-style-type: none"> <li>• Differentiate between active immunity and passive immunity</li> </ul>	
<b>VIROLOGY</b>	
<b>11. Basic Virology &amp; Classification</b>	
<ul style="list-style-type: none"> <li>• Compare viruses and cells</li> </ul>	
<ul style="list-style-type: none"> <li>• Classify viruses</li> </ul>	
<ul style="list-style-type: none"> <li>• Discuss size and shape of viruses</li> </ul>	
<b>12. Replication</b>	
<ul style="list-style-type: none"> <li>• Describe viral growth curve</li> </ul>	
<ul style="list-style-type: none"> <li>• Describe specific events during the growth cycle and lysogeny</li> </ul>	
<b>13. Viral Pathogenesis &amp; host defence</b>	
<ul style="list-style-type: none"> <li>• Describe Transmission and portal of entry of virus</li> </ul>	
<ul style="list-style-type: none"> <li>• Differentiate Pathogenesis and immunopathogenesis</li> </ul>	
<ul style="list-style-type: none"> <li>• Differentiate Nonspecific defences and specific defences</li> </ul>	
<b>MYCOLOGY</b>	
<b>14. Basic Mycology</b>	
<ul style="list-style-type: none"> <li>• Describe the structure and growth of fungi</li> </ul>	
<ul style="list-style-type: none"> <li>• Explain the pathogenesis</li> </ul>	
<ul style="list-style-type: none"> <li>• Describe fungal toxins and allergies</li> </ul>	
<ul style="list-style-type: none"> <li>• Explain Laboratory diagnoses and treatment of fungal infections</li> </ul>	
<b>15. Cutaneous and Subcutaneous Mycoses</b>	
<ul style="list-style-type: none"> <li>• Describe Dermatophytosis causing agents</li> </ul>	
<ul style="list-style-type: none"> <li>• Discuss the following: Tinea versicolor, Tinea nigra, Sporotrichosis, Chromomycosis and Mycetone</li> </ul>	



<b>16. Systemic Mycoses (Coccidioides, Histoplasma, Blastomyces, Paracoccidioides)</b>	Lecture
<ul style="list-style-type: none"> <li>Describe the properties of fungi causing systemic fungal diseases</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the process of transmission, pathogenesis and clinical findings of these fungal infections</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the epidemiology of these fungal infections</li> <li>Discuss Laboratory Diagnoses and treatment of systemic mycoses</li> </ul>	
<b>17. Use of microscope for the identification of bacteria</b>	Tutorial
<ul style="list-style-type: none"> <li>Identify different parts of microscope</li> <li>Use identification of histopathological specimens and micro-organisms</li> </ul>	
<b>18. Simple staining</b>	
<ul style="list-style-type: none"> <li>Name different kinds of stains and staining techniques</li> <li>Perform simple staining</li> </ul>	
<b>19. Gram Staining</b>	
<ul style="list-style-type: none"> <li>Discuss the rationale and uses of performing gram staining</li> <li>Perform gram staining</li> </ul>	
<b>20. Spore staining &amp; Capsule staining</b>	lecture/CBL /Tutorial
<ul style="list-style-type: none"> <li>Perform Spore &amp; Capsule staining</li> <li>Spore formation</li> </ul>	
<b>21. Motility test, Specialized structures &amp; extensions outside cell wall</b>	Tutorial
<ul style="list-style-type: none"> <li>Perform motility test</li> <li>Name the specialized structures &amp; extensions outside cell wall</li> </ul>	
<b>22. Sterilization &amp; Disinfection</b>	Tutorial
<ul style="list-style-type: none"> <li>Identify the apparatus for Sterilization &amp; Disinfection</li> <li>Discuss the uses of various disinfectants</li> </ul>	
<b>23. Catalase and Coagulase tests</b>	
<ul style="list-style-type: none"> <li>Perform Catalase and coagulase tests</li> <li>Discuss the importance and relevance of these tests</li> </ul>	
<b>24. Culture Media</b>	
<ul style="list-style-type: none"> <li>Name the various culture media required for bacterial identification</li> <li>Discuss the properties, characteristics and relevance of various culture media</li> </ul>	
<b>25. How to culture and perform Antibiotic Susceptibility Test (AST)</b>	
<ul style="list-style-type: none"> <li>Discuss the process of how to culture and perform Antibiotic susceptibility test</li> <li>Describe the importance and relevance of AST</li> </ul>	
<b>26. Types of hemolysis on Blood Agar</b>	
<ul style="list-style-type: none"> <li>Describe the types of hemolysis on blood agar for identification of micro-organism</li> <li>Describe the importance and relevance of hemolysis on blood agar</li> </ul>	
<b>27. Examination of Pus, Ulcer material and skin specimens</b>	SGD
<ul style="list-style-type: none"> <li>Discuss the process of examination of Pus, ulcer material and skin specimens</li> <li>Types of Microscopes and their usage</li> <li>Discuss basic structures of bacterial cell and their functions</li> <li>Discussion on Tests for identification of bacteria</li> <li>Various methods of DNA transfer Mutations Impact on human life Importance of mutations on epidemics</li> <li>Role of disinfectants and sanitizers in infection control</li> </ul>	

## PHARMACOLOGY

<b>TOPICS &amp; OBJECTIVES</b>	<b>LEARNING STRATEGY</b>
<b>1 Introduction to Pharmacology</b>	Lecture
<ul style="list-style-type: none"> <li>• Discuss the branches of Pharmacology and Therapeutics with their application</li> <li>• Define terminology of Pharmacokinetics and Dynamics</li> </ul>	
<b>2 Routes of drugs administration</b>	
<ul style="list-style-type: none"> <li>• Classify routes of drug administrations</li> <li>• Explain advantages and disadvantages of different routes of administration</li> </ul>	
<b>3 Source of drugs active principle</b>	
<ul style="list-style-type: none"> <li>• Discuss sources of drug synthesis and explain their active principles</li> <li>• Explain different types of drug doses and their effects</li> </ul>	
<b>4 Drug Absorption &amp; Bioavailability &amp; Factors</b>	Lecture/CBL
<ul style="list-style-type: none"> <li>• Discuss different processes of drug permeation through biological membranes</li> <li>• Explain drug absorption and bioavailability, and factors affecting on these both</li> </ul>	
<b>5 Drugs Distribution, volume of Distribution &amp; PPB</b>	
<ul style="list-style-type: none"> <li>• Define drug distribution and Vd</li> <li>• Discuss factors affecting it</li> <li>• Explain plasma protein binding and its influence on drug distribution</li> </ul>	
<b>6. Biotransformation of drugs</b>	
<ul style="list-style-type: none"> <li>• Describe principles of drug biotransformation, metabolic reactions, phase-I &amp; phase-II and their catalyzing enzymes</li> </ul>	
<b>7. Biotransformation &amp; factors affecting</b>	
<ul style="list-style-type: none"> <li>• Explain different factors which affect the process of drug biotransformation</li> </ul>	
<b>8. Pharmacology of drugs excretion &amp; factor affecting the excretion</b>	
<ul style="list-style-type: none"> <li>• Define kinetics of drug excretion, routes of drug excretion</li> <li>• Discuss factors affecting drug excretion</li> </ul>	
<b>9. Steady State Concentration and Kinetics of Drug Elimination</b>	CBL
<ul style="list-style-type: none"> <li>• Define drug clearance, drug elimination and half-life</li> </ul>	
<ul style="list-style-type: none"> <li>• Explain kinetics of drug clearance and drug elimination.</li> </ul>	
<ul style="list-style-type: none"> <li>• Explain C<sub>ss</sub> and its achievement.</li> </ul>	
<ul style="list-style-type: none"> <li>• Calculate half-life</li> <li>• Discuss the of half-life and relation with drug dosing</li> </ul>	
<b>10. Drug Receptors</b>	Lecture
<ul style="list-style-type: none"> <li>• Explain types of drug receptors, their properties</li> <li>• Discuss different mechanisms by which we obtain the therapeutic effect of the drugs</li> </ul>	

<b>11. Mechanism of drug actions</b>	
<ul style="list-style-type: none"> <li>Explain modes of action of different drugs at the molecular level</li> <li>Discuss its classification</li> </ul>	
<b>12. Dose response relationship and factors</b>	
<ul style="list-style-type: none"> <li>Discuss the drug dose relationships to the drug effect and their graphic presentations</li> <li>Describe the following terms: potency, efficacy, TI.</li> </ul>	CBL
<b>13. Adverse Drug Reactions</b>	
<ul style="list-style-type: none"> <li>Discuss drug side effects, toxic effects and their types with examples</li> </ul>	
<b>14. Drug-Drug Interaction</b>	
<ul style="list-style-type: none"> <li>Explain types of drug interactions</li> <li>Discuss the Pharmacokinetics and Pharmacodynamics interactions; summation, potentiation, synergism, additive effects and antagonism with examples</li> </ul>	
<b>AUTONOMIC NERVOUS SYSTEM</b>	
<b>15. Introduction to Autonomic Pharmacology</b>	Lecture
<ul style="list-style-type: none"> <li>Summarise the organization of the Autonomic Nervous System, its innervations, and functions, neurotransmitters and their locations.</li> <li>List receptor types</li> <li>Discuss the effects caused by the activation of different receptors</li> </ul>	
<b>16. Parasympathomimetic Drugs</b>	
<ul style="list-style-type: none"> <li>Summarise cholinergic nerves, their characteristics and subtypes of cholinceptors</li> <li>Describe the Classification, mode of action, clinical uses and side effects of Cholinoceptors stimulants</li> </ul>	
<b>17. Parasympatholytic Drugs-I</b>	
<ul style="list-style-type: none"> <li>Classify Anticholinergic drugs,</li> <li>Explain their pharmacokinetics &amp; pharmacodynamics.</li> <li>Describe organ system effects, clinical uses, side effects and contra-indications of anticholinergic drugs</li> </ul>	Lecture/ Tutorial
<b>18. Parasympatholytic Drugs-II</b>	
<ul style="list-style-type: none"> <li>Explain the basic &amp; clinical pharmacology of Skeletal muscle relaxants</li> </ul>	
<b>19. Sympathomimetic Drugs</b>	
<ul style="list-style-type: none"> <li>Summarise Adrenoreceptor types &amp; subtypes</li> <li>Classify the sympathomimetic drugs. clinical uses, side effects and contra-indications of those drugs</li> </ul>	
<b>20. Sympatholytic Drugs-I(<math>\alpha</math>-adrenergic antagonists)</b>	
<ul style="list-style-type: none"> <li>Classify <math>\alpha</math>-adrenoceptor antagonists</li> <li>Explain the pharmacokinetics and pharmacodynamics, clinical uses, side effects of <math>\alpha</math>-adrenergic antagonists</li> </ul>	
<b>21. Sympatholytic Drugs II ( <math>\beta</math>-adrenoceptor Antagonists)</b>	
<ul style="list-style-type: none"> <li>Classify <math>\beta</math>-adrenoceptor Antagonists</li> </ul>	

<ul style="list-style-type: none"> <li>Explain the pharmacokinetics and dynamics, clinical uses, side effects of <math>\beta</math>-adrenergic antagonists</li> </ul>	Lecture/ Tutorial
<b>22. Terms &amp; Abbreviations used in Pharmacology</b>	
<ul style="list-style-type: none"> <li>Explain use of metric and apothecary systems of measurement in the drug preparation</li> <li>Discuss terms &amp; abbreviations used in prescriptions</li> </ul>	Tutorial
<b>23. Dosage formed Drugs</b>	
<ul style="list-style-type: none"> <li>Discuss the clinical usage, classification and properties of different drug dosage forms</li> </ul>	
<b>24. Standard format of prescription writing</b>	
<ul style="list-style-type: none"> <li>Discuss the importance and method of standard format of prescription writing</li> </ul>	
<b>25. Drug-dosage calculation</b>	Practical
<ul style="list-style-type: none"> <li>Explain the different formulas used to calculate the drug dosage</li> <li>Calculate the doses of drugs for patients of different ages and weight</li> </ul>	
<b>26. Preparation of Physiological Salt Solutions (Tyrode, Ringer, Kerb`s and De-Jalon`s solution)</b>	
<ul style="list-style-type: none"> <li>Demonstrate different types of Physiological Salt Solutions used in clinical practice and their composition for viability of living tissue.</li> <li>Explain the method to calculate the doses of different solutes to prepare those solutions used clinically</li> </ul>	
<b>27. Preparation of ORS and 5% dextrose solution</b>	
<ul style="list-style-type: none"> <li>Demonstrate different types of solutions used in clinical practice and their composition.</li> <li>Explain the method to calculate the doses of different solutes to prepare those solutions used clinically.</li> </ul>	Practical
<b>28. Introduction to Power Lab System</b>	
<ul style="list-style-type: none"> <li>Demonstrate various parts of the Power Lab System</li> <li>Describe their functions to perform relevant experiments using Power Lab System</li> </ul>	
<b>29. Effect of drugs on Rabbit`s eye</b>	Practical
<ul style="list-style-type: none"> <li>Demonstrate the effect of given drugs (atropine, adrenaline, ephedrine and pilocarpine) on rabbit`s eye</li> </ul>	

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



**LEARNING RESOURCES**

<b>SUBJECT</b>	<b>RESOURCES</b>
<b>COMMUNITY MEDICINE</b>	<p><b><u>TEXT BOOKS</u></b></p> <ol style="list-style-type: none"> <li>1. Community Medicine by Parikh</li> <li>2. Community Medicine by M Illyas</li> <li>3. Basic <i>Statistics</i> for the Health Sciences by Jan W Kuzma</li> </ol>
<b>FORENSIC MEDICINE</b>	<p><b><u>TEXT BOOKS</u></b></p> <ol style="list-style-type: none"> <li>1. Nasib R. Awan. Principles and practice of Forensic Medicine 1st ed. 2002.</li> <li>2. Parikh, C.K. Parikh's Textbook of Medical Jurisprudence, Forensic Medicine and Toxicology. 7th ed.2005.</li> </ol> <p><b><u>REFERENCE BOOKS</u></b></p> <ol style="list-style-type: none"> <li>3. Knight B. Simpson's Forensic Medicine. 11th ed.1993.</li> <li>4. Knight and Pekka. Principles of forensic medicine. 3rd ed. 2004</li> <li>5. Krishan VIJ. Text book of forensic medicine and toxicology (principles and practice). 4th ed. 2007</li> <li>6. Dikshit P.C. Text book of forensic medicine and toxicology. 1st ed. 2010</li> <li>7. Polson. Polson's Essential of Forensic Medicine. 4th edition. 2010.</li> <li>8. Rao. Atlas of Forensic Medicine (latest edition).</li> <li>9. Rao. Practical Forensic Medicine 3rd ed ,2007.</li> <li>10. Knight: Jimpson's Forensic Medicine 10th 1991,11th ed.1993</li> <li>11. Taylor's Principles and Practice of Medical Jurisprudence. 15th ed.1999</li> </ol> <p><b><u>CDs:</u></b></p> <ol style="list-style-type: none"> <li>1. Lectures on Forensic Medicine.</li> <li>2. Atlas of Forensic Medicine.</li> </ol> <p><b><u>WEBSITES:</u></b></p> <p><a href="http://www.forensicmedicine.co.uk">www.forensicmedicine.co.uk</a></p>
<b>PATHOLOGY/MICROBIOLOGY</b>	<p><b><u>TEXT BOOKS</u></b></p> <ol style="list-style-type: none"> <li>1. Robbins &amp; Cotran, Pathologic Basis of Disease, 9th edition.</li> <li>2. Rapid Review Pathology, 4th edition by Edward F. Goljan MD</li> </ol> <p><b><u>WEBSITES:</u></b></p> <ol style="list-style-type: none"> <li>1. <a href="http://library.med.utah.edu/WebPath/webpath.html">http://library.med.utah.edu/WebPath/webpath.html</a></li> <li>2. <a href="http://www.pathologyatlas.ro/">http://www.pathologyatlas.ro/</a></li> </ol>
<b>PHARMACOLOGY</b>	<p><b>A. <u>TEXT BOOKS</u></b></p> <ol style="list-style-type: none"> <li>1. Lippincot Illustrated Pharmacology</li> <li>2. Basic and Clinical Pharmacology by Katzung</li> </ol>

**ASSESSMENT METHODS:**

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

**BCQs:**

- A BCQ has a statement or clinical scenario of four options (likely answers).
- **Correct answer carries one mark, and incorrect 'zero mark'. There is NO negative marking.**
- Students mark their responses on specified computer-based sheet designed for LNHMC.

**OSCE:**

- All students rotate through the same series of stations in the same allocated time.
- At each station, a brief written statement includes the task. Student completes the given task at one given station in a specified time.
- Stations are observed, unobserved, interactive or rest stations.
- In unobserved stations, flowcharts, models, slide identification, lab reports, case scenarios may be used to cover knowledge component of the content.
- Observed station: Performance of skills /procedures is observed by assessor
- Interactive: Examiner/s ask questions related to the task within the time allocated.
- In Rest station, students in the given time not given any specific task but wait to move to the following station.

**Internal Evaluation**

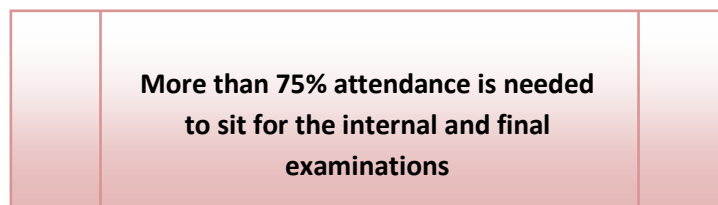
- Students will be assessed comprehensively through multiple methods.
- 20% marks of internal evaluation will be added to JSMU final exam. That 20% may include class tests, assignment, practicals and the internal exam which will all have specific marks allocation.

**Formative Assessment**

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

The marks obtained are not included in the internal evaluation

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



**LNH&MC EXAMINATION RULES & REGULATIONS**

- Student must report to examination hall/venue, 30 minutes before the exam.
- **Exam will begin sharp at the given time.**
- No student will be allowed to enter the examination hall after 15 minutes of scheduled examination time.
- Students must sit according to their roll numbers mentioned on the seats.
- **Cell phones are strictly not allowed in examination hall.**
- If any student is found with cell phone in any mode (silent, switched off or on) he/she will be not be allowed to continue their exam.
- No students will be allowed to sit in exam without University Admit Card, LNMC College ID Card and Lab Coat
- Student must bring the following stationary items for the exam: Pen, Pencil, Eraser, and Sharpener.
- Indiscipline in the exam hall/venue is not acceptable. Students must not possess any written material or communicate with their fellow students.



**SCHEDULE:**

WEEKS	3 <sup>RD</sup> YEAR	MONTH
WEEK 1-10	FOUNDATION II MODULE	8 <sup>th</sup> February 2021
		17 <sup>th</sup> April 2021
WEEK 1-4	BLOOD II MODULE	April 2021*
		May 2021*
WEEK 1-4	LOCOMOTOR II MODULE	
WEEK 1-4	RESPIRATORY II MODULE	
WEEK 1-4	CVS II MODULE	
WEEK 1-6	GIT II MODULE	

\*Final dates will be announced later