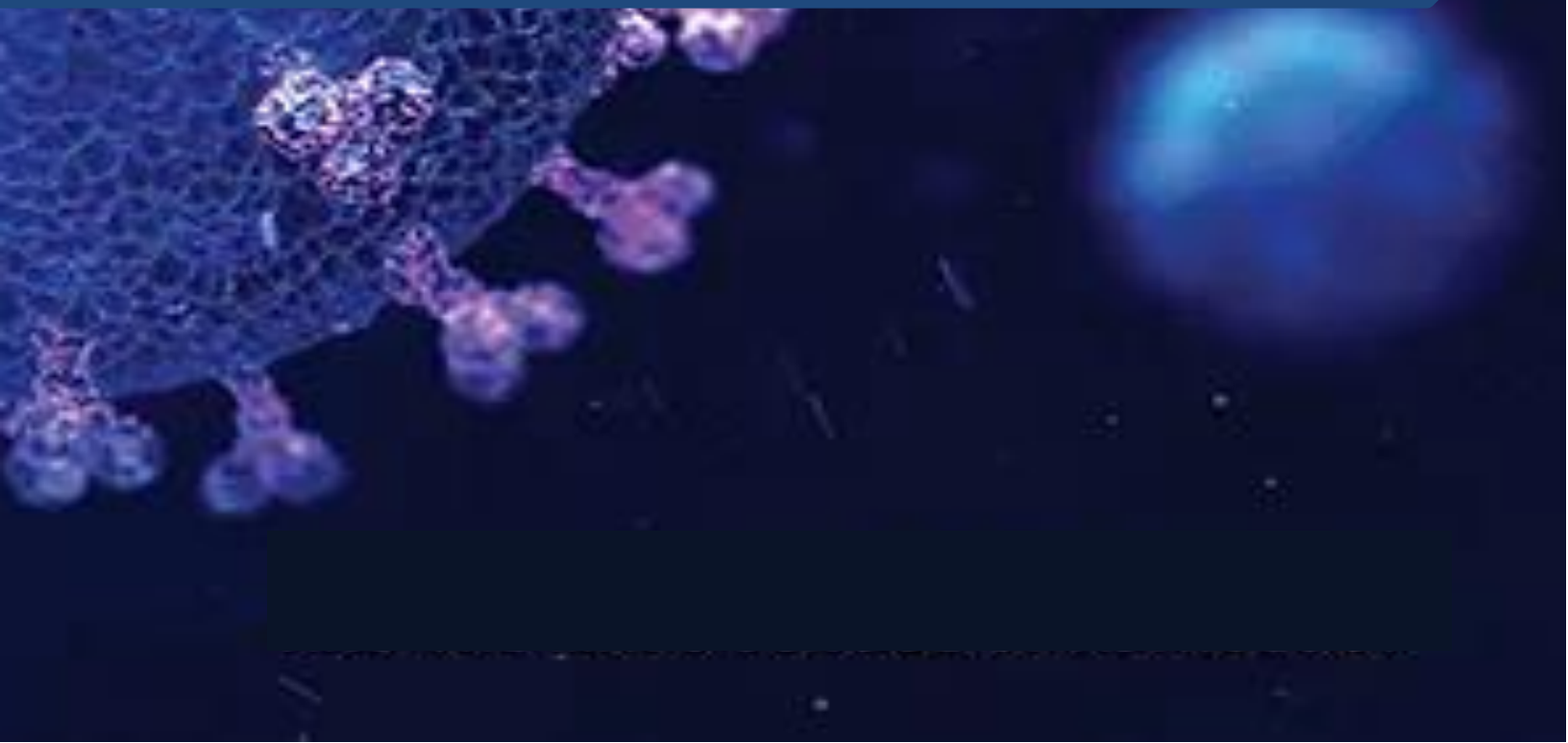
Study Guide - Third Year MBBS

- 7th March – 19th May 2022
- Duration 11 Weeks

FOUNDATION II MODULE



STUDY GUIDE FOR FOUNDATION-II MODULE

Module name: **Foundation-II** *Year:* ***Three*** *Duration:* ***11 weeks (March - May 2022)***

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

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CO-COORDINATORS:	• Dr. Sadia A. Qayyum (Forensic Medicine) • Dr. Afifa Tabassum (DHPE)

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STUDY GUIDE COMPILED BY: Department of Health Professions Education

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.

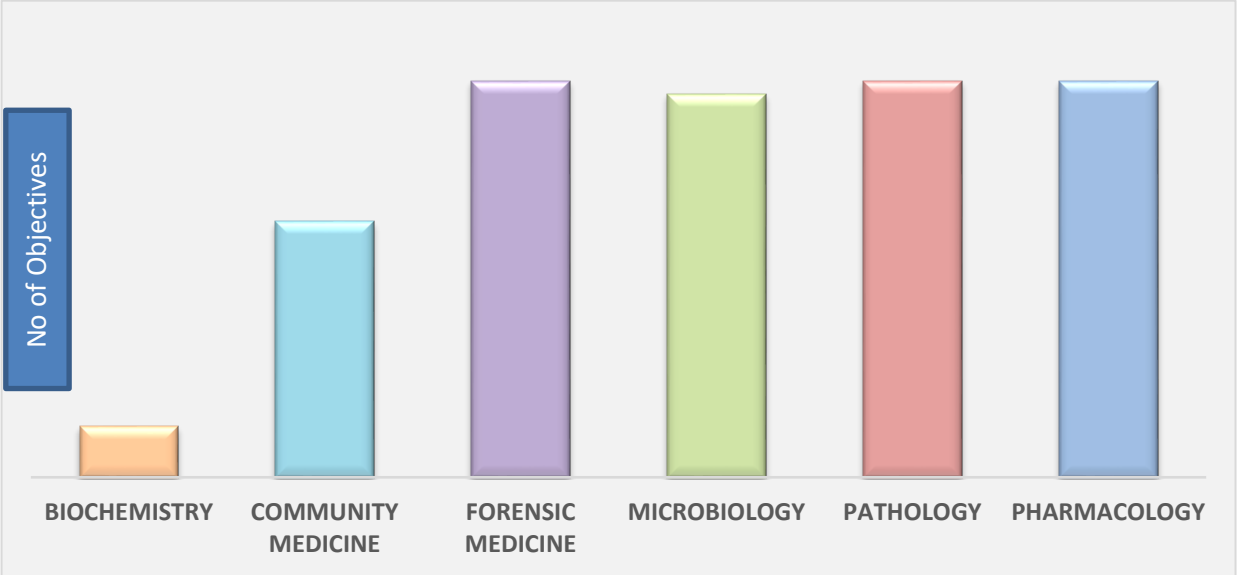
CURRICULUM FRAMEWORK

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



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
- 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.

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.

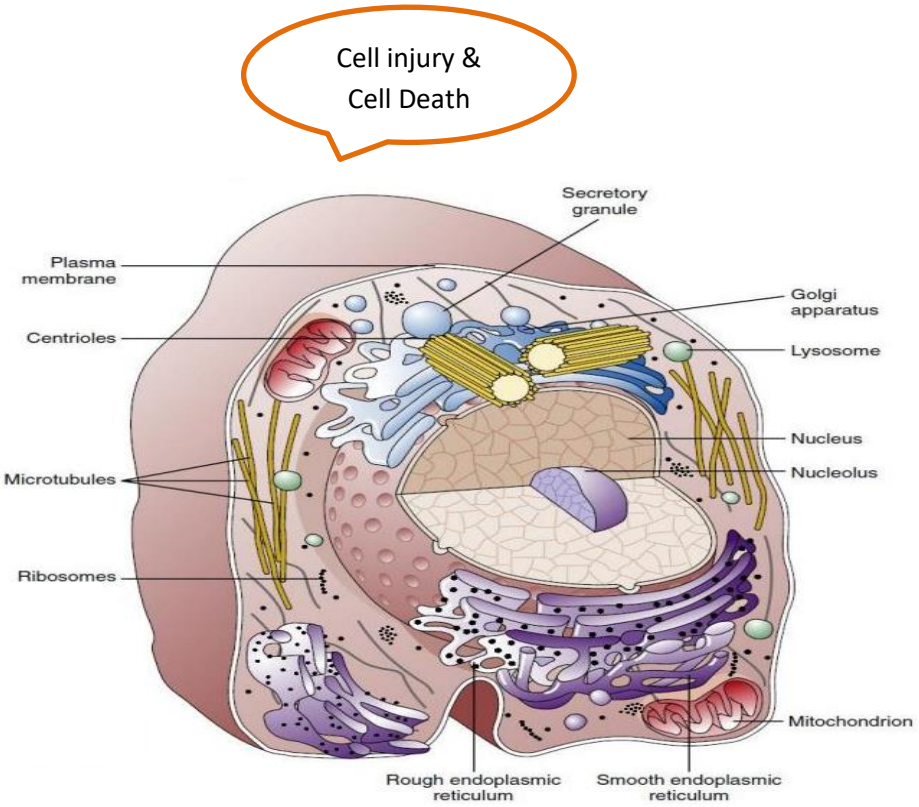
MODULE 1 : FOUNDATION-II

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

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

COMMUNITY MEDICINE

TOPICS & OBJECTIVES	LEARNING STRATEGIES
1. Introduction to public health	Tutorial
• Define common terminologies used in Community Medicine	
• Discuss Comprehensive Health Care	
• Briefly describe historical development of Public Health	
• Discuss development of public health in Pakistan	
• Explain Social Action Program	
• Discuss major health problems in Pakistan	
2. Determinants of Disease & iceberg	Interactive Lecture
• Explain determinants of disease	
• Explain determinants of Health	
• Discuss Millennium. Development Goals (MDGs) & Sustainable Development Goals (SDGs)	
• Discuss iceberg phenomenon	

3. Natural history of disease & Levels of prevention	Tutorial/ Self directed learning
• Discuss the phenomenon of natural history of disease	
• Explain different levels of prevention	
4. Introduction to Epidemiology & Biostatistics	Interactive Lecture
• Describe Epidemiology and Biostatistics	
• Explain theories of disease causation	
5. International organizations	
• List regional offices of World Health Organization (WHO)	
• Discuss functions of WHO & of UNICEF	
• Discuss UNICEF's GOBI-FFF program	
6. Health Care System	Interactive Lecture/ Tutorial
• Describe health system	
• Define district health system	
• Describe the role of district management team	
• Explain health systems development	
• Discuss the situation analysis by studying health indicators and health needs.	
• Discuss 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	
• Enumerate the health services and resources	
• Describe major health problems of rural and urban areas of Pakistan.	
• Explain Multi-Sectoral interaction and partnership	
7. Primary Health Care (PHC)	Tutorial
• Describe Primary Health Care	
• Explain essential components of Primary Health Care	
• Describe guidelines in PHC Planning	
8. Introduction to environmental health	Interactive Lecture
• Describe environmental health	
• List common environmental problems	
• Explain role of international agencies in environmental safety	
9. Nuclear medicine	
• Describe the basic concepts involved in radiation process	
• State the standard permeable dose of radiation	
• Describe the method of protection from radiation	
• Describe safe management of radioactive waste	
10. Genomics	
• Differentiate between genetics and genomics	
• List the chromosomal abnormalities	
• Describe the steps in genetic counseling	
• Explain genetic surveillance	

11. Introduction to demography	Interactive Lecture/ Tutorial/ Self directed learning
• Describe demography	
• Explain sources of demographic data	
• Explain the importance of demographic data	
• Discuss the stages of demographic transition	
12. Vital Statistics	Interactive Lecture
• Describe vital statistics.	
• Describe Vital statistics registration in developing countries.	
• Discuss the situation of vital statistics in Pakistan	
13. Morbidity & mortality determinants	Tutorial
• Explain morbidity measures	
• Describe mortality measures	
14. Population pyramid & interpretation	
• Define Population pyramid	
• Compare the advantages and disadvantages of population pyramid	
15. Introduction to infections & control of infections	
• Define different terms related to infection	
• Discuss the incubation period, serial time period in control of infection	
• Differentiate between infectious and communicable diseases	
• Describe control measures for infectious & communicable diseases	
• Explain the role of immune-prophylaxis & screening in the control of infection	
16. Emerging & Re-emerging diseases	Interactive Lecture
• Describe emerging & re-emerging diseases	
• Enumerate factors contributing to emergence	
• Explain preventive measures for the emergence	
17. Disease screening & Surveillance	Tutorial
• Describe Screening and its role in natural history of disease	
• Classify the types of screening	
• List criteria of a good screening test	
• Discuss the characteristics of a good screening test	
• Calculate screening measures	
• Describe surveillance	
• Differentiate between surveillance and monitoring	
• Describe the factors affecting the value of data	
18. Health Education	Interactive Lecture
• Describe Health Education	
• Explain the principles and stages of health education	
• Discuss health education in Pakistan	
• Discuss Health Information, Education and Communication (IEC)	
19. Waste Disposal	Tutorial
• Differentiate between various terminologies of waste disposal	
• Describe the various ways to collect and dispose human excreta	
• Explain the water carriage system	

• Differentiate between sludge and sullage	
• Discuss advantages of different types of Sewage Treatment Plants	
20. Biomedical Waste	Interactive Lecture
• Describe Biomedical Waste	
• Explain various types of Biomedical Waste	
• Describe color coding scheme for various types of waste.	
• Discuss the waste management plan	

FORENSIC MEDICINE

TOPICS & OBJECTIVES	LEARNING STRATEGIES
1. Introductory lecture	Interactive Lecture
• Describe basics terms related to Forensic Medicine and Toxicology.	
• 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	
• List the reference books for developing a thorough understanding of the subject	
2. Legal Procedures - I	
• Define important legal terms such as Summons, warrant, perjury, deposition, exhibit, offence, cognizable offence, non-cognizable offence, oath, conduct money, summons case, warrant case, bail, FIR	
• Explain medical evidence and its types (oral, documentary, hearsay, circumstantial)	
• List the documents prepared by a medical man (Postmortem Reports, Medico Legal Reports, Certificates such as birth certificates, death certificates, sickness certificates, certificates of unsoundness of mind)	
• Differentiate Dying declaration and Dying deposition	
3. Legal Procedures – II	
• Enumerate the types of witnesses	
• Explain the procedure of examination in the court	
• List the protocols for the conduct of Doctor in the witness box, during court attendance & recording evidence and volunteering of a statement by the doctor in court of law	
• Describe Professional secrecy and Privileged communication	
4. Legal Procedures – III	
• Explain the hierarchy of Criminal courts in Pakistan	
• Define Pakistan Penal Code and Criminal Procedure Code; its execution and delivery	
• List the general presumptions of law and general exemptions of law	
5. Thanatology - I	
• 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	
6. 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), physio-chemical changes in various body tissues and organs under various environmental conditions, such as changes in muscular system after death	
7. Thanatology - III	
• Describe Postmortem Lividity (Livor mortis, Hypostasis or Suggilation) and its significance	
• Enumerate the postmortem changes in the blood, CSF, Vitreous humor and Bone marrow	
8. Thanatology - IV	
• Explain late signs of death i.e. Putrefaction, its mechanism, changes and gases of decomposition, forensic entomology, adipocere formation and mummification	
9. Thanatology - V	
• Define presumption of death and presumption of survivor-ship	
• Explain the method of writing certificate of death according to WHO	
• Summarize the parameters of estimation of time since death	
10. Autopsy - I	
• Define autopsy and its types	
• List its aims and objectives	
• Differentiate between Medico legal and pathological autopsy	
• Explain Autopsy protocols	
11. Autopsy - II	
• Describe external examination, types of incisions, techniques of autopsy	
• Explain negative and obscure autopsy	
• Summarize internal examination of head	
12. Autopsy - III	
• Describe internal examination of thoracic and abdominal cavities	Interactive Lecture
• Explain dissection of respiratory tract, heart, abdominal viscera, pelvic organs, and Spinal cord	
13. Autopsy - IV	
• Describe method of preservation of viscera for chemical and histo-pathological examination	
• List the preservatives used in mortuary	
• Define Exhumation and Postmortem artifacts	
14. Traumatology - I	
• Define Injury, Hurt, Wound, Assault and Battery	
• Classify Injuries	
• Describe blunt weapon injuries; Abrasions and Bruises	
15. Traumatology – II	
• Explain the types, mechanism of production and medico legal significance of Lacerated wounds	
• Describe Sharp weapon injuries- Incised wounds, stab wounds with medico legal significance	

16. Traumatology – III
• Summarize Qisas and Diyat Act with interpretation of injuries accordingly
17. Custodial deaths and torture
• Enumerate deaths in custody
• 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
18. Infanticide (Pediatric Forensic Medicine- I)
• Define infanticide, feticide, still born baby and dead born baby
• Discuss Maceration
• List the methods of foetal age estimation
• Summarize the signs of live birth
• Define Precipitate labor/Unconscious delivery
• List the criminal causes of death of new born babies i.e. Acts of commission and omission
• Explain autopsy on bodies of new born babies
19. Battered Baby (Pediatric Forensic Medicine-II)
• Explain Battered Baby Syndrome, its etiology and clinical features
• 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
20. Animal Poisons- Toxicology (Snakes and Scorpions)
• Classify snakes
• 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
21. Thermal Injuries (Burns, scalds)
• Classify thermal injuries and burns
• 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
22. Environmental (Cold/heat) trauma
• Describe the causes, clinical features and treatment of injuries due to local exposure to cold; Frostbite, trench foot, and chilblain
• Explain Hypothermia; its causes, clinical features and treatment
• Discuss the injuries due to general exposure to heat viz. Heatstroke, exhaustion, cramps; their causes, clinical features and treatment

23. Forensic Electrocution & Starvation	
• Explain the features of injuries due to various 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	
24. General Toxicology	Tutorial
• Define Toxicology	
• Classify poisons based on chief symptoms and medico legal criteria	
• Explain the International toxicity rating of poisons	
25. General Toxicology	
• Define a poison	
• Differentiate between poison and a medicine	
• Explain routes of administration and excretion of poisons	
• List the factors that modify action of poisons	
• Explain the diagnosis of poisoning in living & dead	
26. General Toxicology	
• Discuss the duties of a doctor in a case of suspected poisoning	
• List the general principles of treatment of poisoning viz. Gastric lavage, Antidote therapy	
27. General Toxicology	
• Discuss the role of poisoning Information Centre in treatment of cases of poisoning	
28. Postmortem report writing/ Autopsy Protocols	
• Write a Postmortem Report according to WHO guidelines	
29. Autopsy hazards	
• Discuss the hazards related to autopsy, and the methods to prevent these hazards	
30. Traumatology	
• Write medico legal report of an injured person	
31. Crime scene investigation	
• Discuss the important aspects of crime scene investigation, Trace evidence and Locard's principle of exchange	

MICROBIOLOGY

TOPICS & OBJECTIVES	LEARNING STRATEGIES
1. Introduction to Microbiology	Interactive Lecture
• Define microbiology	
• Differentiate between prokaryotes and eukaryotes	
• Discuss the types of microorganisms according to shapes and staining	
2. 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	

3. 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	
4. Bacterial genetics	
• Discuss mutations	
• Describe the process of transfer of DNA within and between bacterial cells	
• Discuss the importance of recombination	
5. Classification of Bacteria and Normal Human Microbiome	
• Discuss the principles of classification of bacteria and normal human microbiome	
• Classify Bacteria	
• Discuss the normal microbiota of various areas of the body	
6. Pathogenesis I	
• Describe the principles of pathogenesis	
• List the types of bacterial infection	
• Explain the stages of bacterial pathogenesis	
• Discuss the determinants of bacterial pathogenesis (transmission, adherence, invasion)	
7. 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	
8. Host defence	
• Discuss the principles of host defence, innate immunity (skin and mucous membrane)	
• Describe the processes of inflammatory response, phagocytosis and adaptive specific immunity	
9. Sterilization and Disinfection	Interactive Lecture/ Practical
• Discuss the principles of sterilization and disinfection	
• Describe the chemical agents of disinfection	
• Describe the physical agents of disinfection and autoclaving	
• Discuss the role of sanitizers and disinfectants	
• Identify the apparatus for sterilization & disinfection	
• Discuss the uses of various disinfectants	
10. Vaccines (Bacterial)	Interactive Lecture
• Explain the principles of bacterial vaccines	
• Differentiate between active and passive immunity	
11. Antimicrobial drugs	
• Discuss the principles of antimicrobial drugs stewardship stewardship	
• Briefly discuss the mechanism of action of various antibiotics and clinical indication of antibiotics against common bacterial infections	
• Discuss the concept of chemoprophylaxis and probiotics	

12. Antimicrobial drugs Resistance	
• Discuss the principles of antibiotic resistance	
• Discuss genetic and non-genetic basis of resistance	
• Discuss specific mechanisms of resistance	
VIROLOGY	
13. Basic Virology & Classification	
• Compare viruses and cells	
• Classify viruses	
• Discuss symmetry, capsid and envelope of viruses	
• Discuss viruses causing epidemic and pandemic	
• Discuss atypical virus like agents	
14. Replication	
• Describe viral growth curve	
• Describe specific events during the growth cycle	
• Discuss lysogeny and its relationship in bacteria to latency in human cells	
15. Viral Pathogenesis & host defence	
• Describe transmission and portal of entry of virus	
• Differentiate pathogenesis and immunopathogenesis	
• Differentiate nonspecific defences and specific defences	
16. Genetics, gene therapy and viral vaccines (Especially COVID-19 vaccine)	
• Discuss the role of mutations in viral vaccines	
• Describe the four different phenomena of interaction between viruses during cell infection	
• Discuss the role of Gene therapy and recombinant vaccines in disease	
• List the important viral vaccines and their types including COVID-19 vaccines	
MYCOLOGY	
17. Basic Mycology	
• Describe the structure and growth of fungi	
• Explain the mechanism of pathogenesis in fungal infections	
• Describe fungal toxins and allergies	
• Explain laboratory diagnoses and treatment of fungal infections	
IMMUNOLOGY	
18. Introduction & Innate immunity	Interactive Lecture
• Define immunity and its types	
• 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	
• Define Innate immunity	
• Discuss properties, components & pattern recognition receptors.	
19. Adaptive immunity (I)	
• Define adaptive immunity	

• Classify T cells according to its types.	
• Discuss the functions of CD4 and CD8 T cells with respect to activation, co-stimulation and memory formation	
• Discuss the effect of superantigens on T cells	
20. Adaptive immunity (II)	
• Define adaptive immunity	
• Discuss the mode of activation of B cells	
• Discuss effector functions of B cells	
• Define antibody	
• Discuss the structure of antibody	
• Classify antibodies according to types	
• Define primary response and secondary response of antibodies	
• Discuss the functions of antibodies	
21. Major Histocompatibility Complex (MHC) & transplantation	
• Define Major Histocompatibility Complex (MHC)	
• Classify MHC proteins according to its classes	
• Define transplantation	
• Discuss the importance of MHC in transplantation	
• Classify types of transplant rejections	
• Define allograft rejection	
• Discuss HLA typing in the lab in association with transplantation	
22. Complement System	
• Define complement system	
• Discuss complement system with respect to activation and regulation	
• Discuss the role of complement in immunity	
• Explain the clinical aspects of complement system	
23. Hypersensitivity I & II	
• Define Hypersensitivity reaction, desensitization, atopy, drug hypersensitivity	
• 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	
24. Hypersensitivity III & IV	Interactive Lecture/ Self directed learning
• Define Arthus reaction, Serum Sickness, Immune Complex Disease	
• Discuss the pathogenesis of type III & IV hypersensitivity	
• Discuss various clinical presentations of type III & IV hypersensitivity reactions	
• Discuss 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	
25. Tolerance and Autoimmune Disease	Interactive Lecture
• Define T & B cell tolerance, and autoimmunity	
• Discuss the pathogenesis of autoimmune disease	

• Discuss various clinical presentations of autoimmune diseases	
26. Immunodeficiency	
• Define immunodeficiency	
• Classify immunodeficiency according to its types	
• Discuss various clinical presentations of immunodeficiency diseases	
27. Use of microscope for the identification of bacteria	Practical
• Identify different parts of microscope	
• Identify histopathological specimens and micro-organisms	
28. Staining techniques	
• Enumerate different kinds of stains and staining techniques	
• Describe simple and gram staining and their procedure	
• Discuss the rationale and uses of performing gram staining	
• Perform gram staining	
• Briefly discuss spore and capsule staining	
29. Culture Media	
• List the various culture media required for bacterial identification	
• Discuss the properties, characteristics and relevance of various culture media	
30. Antibiotic Susceptibility Test (AST)	
• Perform Antibiotic susceptibility test	
• Describe the process, importance and relevance of AST	

PATHOLOGY

TOPICS & OBJECTIVES	LEARNING STRATEGIES
CELLULAR RESPONSES TO STRESS AND TOXIC INSULTS ADAPTATION, INJURY, AND DEATH	
1. Introduction to Pathology Overview: Cellular Responses to Stress and Noxious Stimuli	Interactive Lecture
• Define Pathology and Pathogenesis	
• Briefly discuss cellular responses to the injury and stages of the cellular response to stress and injurious stimuli	
2. Adaptation of Cellular Growth and Differentiation	Interactive Lecture/ Practical
• Define adaptation, hypertrophy, hyperplasia, atrophy, and metaplasia	
• Describe the causes and mechanism of hypertrophy, hyperplasia, atrophy, and metaplasia	
• Differentiate among hypertrophy, hyperplasia, atrophy, metaplasia based on slides shown	
3. Overview of Cell Injury and Cell Death	Tutorial/ Self directed learning
• List causes of cell injury	
• Discuss morphological alterations in cell injury including both reversible and irreversible injury	
4. Mechanism of Cell Injury	Interactive Lecture
• Describe mechanisms of cell injury (with examples) including depletion of ATP, mitochondrial damage, influx of calcium, accumulation of oxygen derived free radicals, defects in membrane permeability, damage to DNA and proteins	
• Discuss properties of the principal free radicals involved in cell injury.	
• Describe the process of Autophagy	

5. Apoptosis and Necrosis	Interactive Lecture/ Practical
• Discuss causes, morphological and biochemical changes, clinic-pathologic correlations in Apoptosis	
• Summarize the pathways of apoptosis	
• Discuss morphologically distinct patterns of necrosis including coagulative, liquefactive, gangrenous, caseous, Fat, and fibrinoid necroses	
• Briefly discuss Necroptosis	
• Differentiate between necrosis and apoptosis based on the slides shown	
• Identify morphologic changes in cell injury culminating in necrosis and apoptosis	
• Discuss morphologically distinct patterns of necrosis including coagulative necrosis, liquefactive necrosis, gangrenous necrosis, caseous necrosis, Fat necrosis, and fibrinoid necrosis	
6. Intracellular Accumulations	Interactive Lecture
• Summarize the pathways of abnormal accumulation	
• Discuss types of pigments (exogenous and endogenous)	
• Describe hyaline changes, lipid, protein, and glycogen accumulation	
• Discuss briefly pathological classification of intracellular accumulations	
INFLAMMATION AND REPAIR	
7. Introduction to Inflammation & Acute inflammation	Interactive Lecture
• Define inflammation	
• Classify inflammation	
• List the causes of inflammation	
• Discuss the sequence of events in acute inflammatory process	
8. Mediators of acute inflammation	
• Name the main inflammatory mediators	
• Describe their role in the inflammatory process	
9. Morphological pattern & outcomes of acute inflammation	Tutorial
• Explain different morphological pattern of acute inflammation	
• List the outcomes of acute inflammation	
10. Chronic Inflammation	Interactive Lecture
• 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	Tutorial
• Define granulomatous inflammation	
• List the types of granulomatous inflammation	
• List the diseases with granulomatous inflammation	
• Discuss morphology of granulomatous inflammation	
12. Tissue repair	Interactive Lecture
• Define tissue repair	
• Describe the mechanism involved in tissue regeneration and scar formation	
• List the factors that influence tissue repair	

13. Healing by First & Second Intention	Interactive Lecture/ Tutorial
• Contrast repair by primary and secondary intention	
• Describe the complications in tissue repair	
HEMODYNAMICS AND SHOCK	
14. Edema, Effusion, Hyperaemia and Congestion	Interactive Lecture
• Define edema, effusion, exudate, transudate, hyperemia and congestion	
• Define various terminologies according to morphology of edema & effusion	
• Discuss the pathophysiologic categories of edema	
• Describe the mechanism & clinical significance of edema at different sites	
• Describe the morphological changes in chronic passive congestion of the lungs & liver	
15. Hemostasis	
• Define hemostasis	
• Describe the sequence of events involved in primary & secondary hemostasis including the role of platelets, endothelium &coagulation cascade	
• Describe the defects of primary & secondary hemostasis	
16. Thrombosis & Embolism	
• Define embolus and infarction	
• 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 Disseminated Intravascular Coagulation (DIC)	
• Describe the pathogenesis of DIC	
• List the types of embolism	
• Describe the clinical manifestations & consequences of pulmonary & systemic thromboembolism	
• Discuss the clinical conditions that give rise to fat & marrow embolism, air embolism & amniotic fluid embolism	
• Classify infarction	
• Describe the morphologic features of red & white infarct	
• List the factors that influence development of infarct	
• Explain the differences between ante-mortem & post-mortem clots	
17. Shock	
• Define shock	
• List the three major types of shock	
• Describe the mechanism of three major types of shock	
• Discuss the factors involved in the pathophysiology of septic shock	
• Describe the three stages of shock	
• List the clinical features of shock	
GENETICS	
18. Introduction to Mendelian Disorders	Interactive Lecture
• Discuss the transmission pattern of single gene disorder	
• Discuss the pathogenesis of important autosomal recessive, autosomal dominant, and X-linked disorders	
• List the examples of Autosomal Dominant Disorders, Autosomal Recessive Disorders	

19. Mutation	
• Define mutation	
• Briefly discuss principles relating to the effects of gene mutation	
• Distinguish between types of mutations in the coding and non-coding regions of genes	
20. Single Gene Disorders	
• Define single-gene disorders	
• List types of single-gene disorders on the molecular and biochemical basis	
• Discuss disorders associated with defects in structural proteins (Marfans & Ehlers -Danlos syndrome)	
• Discuss disorders associated with defects in receptor proteins (Familial Hypercholesterolemia)	
• Enumerate the types of lysosomal & glycogen storage diseases with their deficient enzymes	
21. Chromosomal Disorders	
• Define normal karyotype and common cytogenetic terminology	
• Discuss structural chromosomal abnormalities	
• Discuss cytogenetic disorders involving autosomes including Trisomy 21: Down Syndrome, Trisomy 18: Edwards Syndrome, Trisomy 13: Patau Syndrome	
• Name diseases with deletion of genes at chromosomal locus 22q11.2 (Di George syndrome, Velocardiofacial syndrome)	
• Discuss cytogenetic disorders involving sex chromosomes including Klinefelter syndrome, Turner syndrome	
22. Molecular Genetic Disorders and Diagnosis	
• List the indications for analysis of Inherited Genetic Alterations	
• Summarise the basic principles of recombinant genetic techniques (PCR, FISH, RFLP, BLOTTING) and their applications in the detection of genetic diseases	
23. Antibiotic resistance and antibiotic Stewardship program	Tutorial
• Define antibiotic stewardship program	
• Briefly discuss mechanism of resistance for antibiotics	
• Discuss core elements of antibiotic stewardship program and importance of antibiotic stewardship program	
NEOPLASIA	
24. Introduction to Neoplasia	Interactive Lecture/Small Group discussion
• Define neoplasia	
• 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	Interactive Lecture
• Discuss the global impact of cancer	

• List the environmental factors involved in the pathogenesis of malignancy	
• Discuss different types of occupational cancers	
• Define acquired predisposing conditions leading to cancer development.	
• 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	
• 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 oncogenes	
• 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	
• Define 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	
• Define 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	Tutorial
• Define chemical carcinogenesis, radiation carcinogenesis, microbial carcinogenesis	
• 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	

PHARMACOLOGY

TOPICS & OBJECTIVES	LEARNING STRATEGIES
1. Introduction to Pharmacology	Interactive Lecture
• Discuss various branches of pharmacology and therapeutics and their applications	
• Discuss 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	Case-Based Learning
• Discuss various sources of drugs and explain their active principles	
• Explain different types of drug dosage forms	
• List various sources of drug information	
4. Drug Absorption and Bioavailability	Interactive Lecture
• Discuss various processes of drug permeation through biological membranes	
• Explain drug absorption and bioavailability and factors affecting them	
• Define loading dose and maintenance dose	
• 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	
• 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	
• 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	
• Define half-life, its calculation and its relationship with drug dosing	
8. Drug Receptors and mechanisms of drug actions	
• Explain types of drug receptors, their properties	
• Discuss various molecular mechanisms by which therapeutic effect of the drugs are obtained	
9. Dose Response relationship and factors modify it. l	
• 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	
11. Drug-Drug Interactions	
• Explain types of drug interactions and factors affecting drug interactions	
• Discuss the pharmacokinetic and pharmacodynamic drug interactions	
• Describe potentiation, synergism, summation, additive effects and drug antagonism with examples	
12. Introduction to Autonomic Pharmacology	
• Give a brief overview of organization of Autonomic Nervous System, its innervations, functions, biosynthesis of neurotransmitters and their anatomic locations	
• Describe autonomic receptor types and their effects caused either by activation or inhibition	

13. Parasympathomimetic Drugs	Interactive Lecture/Small Group discussion
• Give a brief review of cholinergic nerves, characteristics and subtypes of cholinoceptors	
• 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 & pharmacodynamicsorgan system effects, clinical uses, adverse effects and contraindications	
15. Parasympatholytic Drugs-II (Skeletal Muscle Relaxants/ Ganglion-Blocking Drugs)	Interactive Lecture
• 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	
• Classify sympathomimetic drugs	
• Discuss their clinical uses, adverse effects and contraindications	
17. Sympatholytic Drugs- I & II	
• Classify alpha (a) and beta (ß)-adrenoceptor antagonists	
• Explain pharmacokinetics and pharmacodynamics, clinical uses, adverse effects and contraindications of adrenergic antagonists	
18. Terms & abbreviations used in pharmacology	Tutorial/Small Group discussion
• Explain the use of metric and apothecary systems of measurement in drug preparation	
• Discuss various terms & abbreviations and their uses in rationale prescription writing.	
19. Dosage forms of drugs	
• Discuss the classification, clinical usage and properties of different drug dosage forms.	
20. Routes of drug administration, sources and active principles of drugs	
• Explain various routes of drug administration, sources of drugs and active principles of drugs.	
21. Standard format of prescription writing	Case-Based Learning
• Discuss the importance and standard format of prescription writing	
22. Drug absorption, bioavailability, drug distribution and drug biotransformation	Tutorial/Small Group discussion/ Practical
• Explain the process of drug absorption, bioavailability, drug distribution and biotransformation and factors that could modify them	
23. Drug dosage calculations	
• Explain the various formulae used to calculate the drug dosages	
• Calculate the drug dosage for patients having varying ages and body weights	
24. Drug receptors and mode of action of drugs	
• Explain drug receptors and mechanisms of action of drugs	
25. Concepts of Autonomic Nervous System (ANS) & autonomic receptors	
• Explain the general concept of ANS and autonomic receptors.	
26. Parasympathomimetic and Parasympatholytic drugs	
• Discuss the classification, pharmacokinetics & pharmacodynamics of parasympathomimetic and parasympatholytic drugs	

27. Sympathomimetic and sympatholytic drugs
• Discuss the classification, pharmacokinetics and pharmacodynamics of sympathomimetic and sympatholytic drug
28. Preparation of Physiological Salt Solutions (Tyrode, Ringer, Kerb`s and De-Jalon`s solution)
• Demonstrate the preparation of various physiological salt solutions listed above
• Describe their composition and experimental uses
• Explain the methods of calculation for preparation of strengths of doses of different solutions used experimentally
29. Preparation of ORS and 5% dextrose solution
• Prepare ORS and 5% dextrose solutions along with their composition
• Discuss their uses in clinical practice
• Explain the method of preparation of various solutions used clinically
• Calculate the deficit and replacement of fluids & electrolytes
30. Introduction to Power Lab System
• Identify various parts of Power Lab System
• Describe their functions in detail to perform relevant experiments
31. Effect of drugs on Rabbit's eye
• Demonstrate the effects of atropine, adrenaline, ephedrine and pilocarpine on rabbit's eye
32. 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
• Explain the effects of Acetylcholine, Carbachol, Methacholine acting as skeletal muscle relaxants

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

LEARNING RESOURCES

SUBJECT	*RESOURCES*
COMMUNITY MEDICINE	**TEXT BOOKS** 1. Community Medicine by Parikh 2. Community Medicine by M Illyas 3. Basic *Statistics* for the Health Sciences by Jan W Kuzma
FORENSIC MEDICINE	**TEXT BOOKS** 1. Nasib R. Awan. Principles and practice of Forensic Medicine 1st ed. 2002. 2. Parikh, C.K. Parikh's Textbook of Medical Jurisprudence, Forensic Medicine and Toxicology. 7th ed.2005. **REFERENCE BOOKS** 3. Knight B. Simpson's Forensic Medicine. 11th ed.1993. 4. Knight and Pekka. Principles of forensic medicine. 3rd ed. 2004 5. Krishan VIJ. Text book of forensic medicine and toxicology (principles and practice). 4th ed. 2007 6. Dikshit P.C. Text book of forensic medicine and toxicology. 1st ed. 2010 7. Polson. Polson's Essential of Forensic Medicine. 4th edition. 2010. 8. Rao. Atlas of Forensic Medicine (latest edition). 9. Rao.Practical Forensic Medicine 3rd ed ,2007. 10. Knight: Jimpson's Forensic Medicine 10th 1991,11th ed.1993 11. Taylor's Principles and Practice of Medical Jurisprudence. 15th ed.1999 **CDs:** 1. Lectures on Forensic Medicine. 2. Atlas of Forensic Medicine. **WEBSITES:** www.forensicmedicine.co.uk
PATHOLOGY/MICROBIOLOGY	**TEXT BOOKS** 1. Robbins & Cotran, Pathologic Basis of Disease, 9th edition. 2. Rapid Review Pathology, 4th edition by Edward F. Goljan MD
	WEBSITES: 1. http://library.med.utah.edu/WebPath/webpath.html 2. http://www.pathologyatlas.ro/
PHARMACOLOGY	**A. TEXT BOOKS** 1. Lippincot Illustrated Pharmacology 2. Basic and Clinical Pharmacology by Katzung

ASSESSMENT METHODS:

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

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!

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

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	3RD YEAR	MONTH
11 WEEKS	FOUNDATION II MODULE	7th March 2022
		19th May 2022
5 WEEKS	BLOOD II MODULE	23rd May 2022
		18th June 2022*
Mid Term Examination 23rd to 25th June 2022*		

*Final dates will be announced later