# FACULTY OF MEDICAL SCIENCES
## UNIVERSITY OF DELHI
## दिल्ली विश्वविद्यालय



**FMDS/330/10(2)/Minutes/2022**

## MINUTES

An emergent meeting of the Faculty of Medical Sciences, University of Delhi was held on Friday, the 28th January, 2022 at 12:00 Noon in the Committee Room, Ist Floor, University College of Medical Sciences, Delhi - 110095.

The following members were present:

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| **1.** | Prof. Anil Kr. Jain | Dean (Medical)- Chairperson |
| **2.** | Dr. Renu Chauhan | HOD (Anatomy), DU |
| **3.** | Prof., Archana Singhal | HOD (Dermatology), DU |
| **4.** | Prof. Neelam Vaney | Prof. (Physiology) UCMS |
| **5.** | Prof. S.K. Bhasin | HOD (Community Medicine), DU |
| **6.** | Prof. Anju Jain | HOD (Bio- Chemistry) DU |
| **7.** | Prof., N.P. Singh | HOD (Medical Microbiology), DU |
| **8.** | Prof. Sonal Sharma | HOD (Pathology), DU |
| **9.** | Prof. V.P. Varshney | HOD (Physiology) DU |
| **10.** | Prof. Jolly Rohtagi | HOD (Ophthalmology), DU |
| **11.** | Prof. Tulika Tripathi | HOD (Dental Sciences) MAIDS |
| **12.** | Prof. Vivek Aggarwal | HOD (Surgery), UCMS |
| **13.** | Prof. Ramachandra | Director, LHMC |
| **14.** | Prof. Anju Aggarwal | Prof. (Pediatrics) LHMC |
| **15.** | Prof. K Rajeshwari | Prof. (Pediatrics) MAMC |
| **16.** | Prof. Anuradha Chowdhary | Prof. (Medicine) MAMC |
| **17.** | Prof., Shukla Das | Prof (Microbiology) UCMS |
| **18.** | Prof. Ram Anand | Prof. (Radiology) LHMC |
| **19.** | Prof. Sonal Saxena | Prof. (Microbiology) MAMC |
| **20.** | Prof. Dinesh Puri | Prof. (Biochemistry) UCMS |
| **21.** | Prof. Vandana Roy | Prof. (Pharmacology) MAMC |
| **22.** | Prof.Namita Kalra | Prof. (Dental Sciences) UCMS |

Members from Serial no. **05 to 22** attended the meeting through virtual mode.

The following member regretted their inability to attend the meeting due to prior commitments.

1. **Prof. Amita Suneja, HOD (Obstt & Gynae.), UCMS**

Shri Deepak Vats, Joint Registrar, Faculty of Medical Sciences was present in the meeting.

Sh. Ashwani Kumar, Assistant Registrar assisted the Faculty in its deliberations.

**Contd. From Pre-page:**

The Faculty considered the recommendations of the Committee of Courses and Studies (CCS) of the following departments regarding course curriculum prepared on competency based UG curriculum for MBBS Course- IInd Professional (New Scheme) in the light of Regulations on Graduate Medical Education (Amendment), 2019, published in the Gazette of India dated 06.11.2019:

1. Microbiology
2. Pharmacology
3. Pathology

The Faculty after a detailed discussion approved the Course Curriculum of MBBS IInd Professional (New Scheme) applicable to the Batch of MBBS students admitted in the Academic Session 2019-2020 and onwards and recommended it to the Academic Council for consideration.

The meeting ended with a vote of thanks to the Chair.

20/1/22

**Deepak Vats**
**Joint Registrar (Medical)**

**Prof. Anil Kr. Jain**
**Dean, Faculty of Medical Sciences**
**(Chairperson)**

## MINUTES

A meeting of the Committee of Courses & Studies in the Department of **Microbiology** was held on Wednesday the 29th December, 2021 at 2.00 p.m. in the Committee Room, 7th Floor, VPCI Building, University of Delhi.

The following members were present:-

1. **Dr. N.P. Singh**, Head, Deptt. of Microbiology, University of Delhi C/O UCMS
2. **Dr. Sonal Saxena**, Head, Department of Microbiology, MAMC
3. **Dr. Malini Shariff**, Head Department of Microbiology, V.P.C.I.
4. **Dr. V S Randhawa**, Senior Most Teacher, Department of Microbiology, LHMC
5. **Dr. Shukla Das**, Senior Most Teacher, Department of Microbiology, UCMS
6. **Dr Deepti Rawat,** Sr. Assoc. Professor, Department of Microbiology, LHMC
7. **Dr Rohit Chawla,** Sr. Assoc. Professor, Department of Microbiology, MAMC
8. **Dr. Manisha Jain,** Associate Prof., G.B. Pant Hospital
9. **Dr. Bineeta Kashyap,** Prof., UCMS

1. The Committee recommended the new MBBS 2nd Prof. Microbiology curriculum to be implemented from the current academic year.

2. An approved curriculum document for MBBS CBME Phase-II for Microbiology Department of MAMC, LHMC & UCMS is annexed as **Annexure-I**.

3. An approved assessment Blue Print for MBBS CBME Phase-II for Microbiology Department of MAMC, LHMC & UCMS is annexed as **Annexure-II**.

The meeting ended with a vote of thanks to the chair.

N P Singh

**Dr. N.P. Singh**
**(Chairperson)**

# University of Delhi
# Curriculum document for
# MBBS CBME Phase II Batch for Microbiology

## *(Maulana Azad Medical College, University College Of Medical Sciences & Lady Hardinge Medical College New Delhi)*

## 1. VISION

To provide state of the art, reliable diagnostic services and quality medical education that integrates recent advances and research to foster the development of a highly knowledgeable, skilled and competent undergraduate and postgraduate student in the subject of clinical microbiology.

**MISSION**

- To develop state of art facility, in terms of quality infrastructure and trained manpower so as to enable the students of medical microbiology to appreciate the aetiology, pathogenesis and laboratory diagnosis of infectious diseases.
- To deliver timely and quality diagnostic services to patients.
- To create an environment for need based quality research among faculty and students.

## 2. OVERALL LEARNING OBJECTIVES FOR UNDERGRADUATE MEDICAL EDUCATION

The objectives are developed to foster the development of an 'Indian Medical Graduate' possessing requisite knowledge, skills and values with regard to infectious diseases as outlined in Competency Based Medical Education curriculum of National Medical Commission.

**The undergraduate learner should be able to demonstrate:**

1. An understanding of role of microbial agents in health and disease.
2. An understanding of the immunological mechanisms in health and disease.
3. Ability to correlate the natural history, mechanisms and clinical manifestations of infectious diseases as they relate to the properties of microbial agents.
4. Knowledge of the principles and application of infection control measures.
5. An understanding of the basis of choice of laboratory diagnostic tests and their interpretation, antimicrobial therapy, control and prevention of infectious diseases.

**3. Competencies**: Table 1 and Annexure I

**4. Course** (Topics, theory practical, laboratory clinical): As per CBME curriculum laid down by NMC for Indian medical Graduate: Table 1

**5. Teaching learning methods**: Table 1

**The curriculum is based on NMC Document UG curriculum Part-I (available at https://www.nmc.org.in/wp-content/uploads/2020/01/UG-Curriculum-Vol-I.pdf). The Teaching learning methods, assessment tools, horizontal and vertical integration will be based on the document form NMC.**

## Subtopics to be taught in Microbiology for fulfillment of competencies

| Topics | Topics |
|---|---|
| **Gen Microbiology** | **Immunology** |
| Introduction, history, biosafety, universal precautions | Introduction |
| Bacteria in health and disease | Structure & Functions of Immune System |
| Bacterial Morphology & Physiology | Antigen & antibody |
| Bacterial Genetics | Antigen-Antibody Reaction |
| Isolation & Identification of Bacteria including Culture Media & Culture Methods | Complement System |
| Antimicrobial Resistance | Humoral and cellular Immune Response |
| Bacterial Pathogenicity | Hypersensitivity |
| Sterilization & Disinfection | Autoimmunity |
| Gen properties Virus and lab diagnosis | Transplantation & Immunodeficiency |
| Gen properties of fungi | Tumour Immunology, Immunohematology, Immunoprophylaxis |
| Gen properties of parasites | **GIT & Hepatobiliary** |
| **CVS & Blood** | Diarrhoea & dysentery, Cholera, |
| Rheumatic fever & Infective endocarditis | Enteric fever |
| Infections causing anaemia | Food poisoning |
| Kala Azar & Toxoplasma | Intestinal Protozoal, nematodes &Trematodes infections |
| Malaria & Filariasis | Helicobacter/APD |
| Brucella, Borrelia, Listeria, S minor | Viral GI infections including hepatitis |
| Viral Haemorrhagic fevers | **Respiratory Infections** |
| HIV | Bacterial URTI |
| **Musculoskeletal system skin and soft tissues infections** | Viral pneumonia |
| Anaerobic infections | Bacterial LRTI |
| Bone & Joint Infections | **Genitourinary & STD infections** |
| Skin & soft tissue infections | UTI, E Coli, Proteus, Klebsiella |
| **CNS infections** | STD: Syphilis & gonorrhoea |
| Bacterial meningitis | Gonorrhoea |

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| Viral Meningitis | |
| Encephalitis | |
| **Zoonotic diseases and miscellaneous** | |
| Zoonotic infections | Emerging and re-emerging infections |
| Oncogenic virus | Opportunistic infections |
| Infection control, PPE, BMW & HAI | Environmental microbiology |

## Table 1: Specific learning objective and topic as per CBME

| Session | SLOs |
|---|---|
| **General Microbiology & Immunology** | |
| **MI1.1Describe the different causative agents of Infectious diseases, the methods used in their detection, and discuss the role of microbes in health and disease** | |
| **MI1.1a**<br>Introduction - Microbiology & History, Biosafety & standard precautions | 1. Describe the scope of clinical Microbiology<br>2. Describe the different branches of Microbiology with suitable examples<br>3. Describe Whittaker classification<br>4. Enumerate important milestones of Medical Microbiology<br>5. Describe contribution of Louis Pasteur & Robert Koch in details<br>6. Describe the development of Chemotherapy and contributions of Ehrlich and Fleming<br>7. Describe standard precautions, Biosafety<br>8. Describe various components, & their use of standard precautions. |
| **MI 1.1b**<br>Introduction of Bacteria in health and disease | 1.Describe Normal flora and its benefits<br>2. Differentiate between pathogen, commensals, and saprophyte.<br>3. Describe opportunistic pathogen<br>3. Describe the pathogen<br>4. Define: Health, Disease, infectious agents, commensalism, parasite, pathogen and opportunistic pathogen.<br>5. Explain the pathogenesis of bacterial infection.<br>6 Discuss the various microbial factors contributing to disease.<br>7. Enumerate the Global burden of common infectious diseases<br>8. Describe common infectious diseases in India |
| **MI 1.1c**<br>Bacterial Morphology | 1. Describe salient feature of eukaryotic and prokaryotic cell<br>2. Describe morphology cell structure,different shapes and arrangement of bacterial cells<br>3. Describe the structure and function of Cell organelles |
| **MI 1.1d**<br>Physiology & Metabolism | 1. Describe Physiology and metabolism of bacteria.<br>2. Describe the growth curve of bacteria<br>3. Describe anaerobiosis |
| **MI 1.1e**<br>General principle of identification of Bacteria | 1. Microscopy and culture of bacteria<br>2. Enumerate common culture media and biochemical reactions and its use<br>2. Describe the use of automation in identification of bacteria<br>3. Enumerate molecular techniques for identification |
| **MI1.1f**<br>Bacterial genetics | 1. Discuss Replication, mechanism of gene transfer, mutation and gene rearrangement in bacteria.<br>2. Describe Principals of genetic engineering. |

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| **MI1.1g**<br>General Properties and Classification of Viruses (IncludingBacteriophages ) | 1. Describe the general features of virus<br>2. Describe the structure and symmetry of viruses<br>3. Describe viral replication<br>4. Classify viruses<br>5. Describe bacteriophages, its replication cycles and use |
| **MI1.1h**<br>Laboratory Diagnosis of Viral infection | 1. Enumerate the technique used in viral lab diagnosis<br>2. Describe the use of Microscopy and inclusion bodies<br>3. Describe tissue culture and detection of viral growth in it<br>4. Describe serological methods for Lab Diagnosis<br>5. Describe the molecular methods for laboratory diagnosis of viral diseases |
| **MI1.1i**<br>General Properties and Classification of Fungi | 1. Describe the general features of Fungi<br>2. Classify fungi on morphological and taxonomical bases<br>3. Enumerate different mycoses with suitable example<br>4. Describe lab diagnosis of fungal infections |
| **MI1.1j**<br>General Properties and Classification of Parasites | 1.Classify parasites giving suitable examples<br>2.Enumerate common parasitic pathogen<br>3.Classify protozoa and helminths giving suitable examples<br>4. Describe various modes of transmission of different parasites.<br>5. Enumerate different methods used for laboratory diagnosis of parasitic diseases |
| **MI 1.3Describe the epidemiological basis of common infectious diseases** | |
| **MI 1.3**<br>Describe the epidemiological basis of common infectious diseases | 1. Describe host parasite relationship<br>2. Discuss the various sources and reservoirs of infections.<br>3. Describe different routes of transmission with suitable examples<br>4. Enumerate common strategies to prevent infectious disease.<br>5.Describe the various epidemiological patterns of infectious disease. |
| **MI 1.4 Classify and describe the different methods of sterilization and disinfection. Discuss the application of the different methods in the laboratory, in clinical and surgical practice** | |
| **MI 1.4**<br>Sterilization & Disinfection | 1.Define: Sterilization, disinfection, asepsis, antiseptics, and decontamination.<br>2. List different methods of sterilisation and disinfection<br>3. Describe various methods of sterilization (principle, method, use).<br>4. Classify disinfectants and describe various methods of disinfection.<br>5. Explain various monitoring methods applied for individual methods of sterilisation procedures and disinfectants<br>6. Enumerate new methods of sterilization |
| **MI 1.5Choose the most appropriate method of sterilization and disinfection to be used in specific situations in the laboratory, in clinical and surgical practice** | |
| **MI 1.5**<br>Sterilization & Disinfection | 1.Diffrentiate between sterilization and disinfection.<br>2. Describe Spaulding Classification of medical devices.<br>3. Describe the practical use of disinfectants according to clinical condition.<br>4. Recommend various methods of sterilization/disinfection for medical devices.<br>5. Describe the process and functioning of CSSD. |
| **MI1.6 Describe the mechanisms of drug resistance, and the methods of antimicrobial susceptibility testing and monitoring of antimicrobial therapy** | |

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| **MI 1.6**<br>Antimicrobial agents, mechanisms of antimicrobial resistance and antimicrobial susceptibility testing | 1. Classify antimicrobial agents and their mechanism of resistance.<br>2. Define and classify antimicrobial resistance.<br>3. List and describe mechanism of action of antimicrobial agents.<br>4. Describe acquired and intrinsic resistance.<br>5. Describe various methods of antimicrobial susceptibility testing.<br>6. Describe disc diffusion methods, E test and MIC methods in detail.<br>7. Define: Bacteriostatic, bactericidal, pharmacodynamics, pharmacokinetics, MIC, MBC, , agar dilution.<br>8. Describe relevance of AST.<br>9. Describe antibiotic stewardship program, its utility and principles. |
| **MI1.7 Describe the immunological mechanisms in health** | |
| **MI1.7a**<br>Introduction to immunity | 1. Define and classify immunity<br>2. Define and contrast innate and acquired immunity<br>3. Describe mechanisms of innate immunity<br>4. Define and describe the salient features of active, passive and acquired immunity<br>5. Define local immunity, herd immunity and adoptive immunity |
| **MI 1.7b**<br>Structure and function of immune system | 1. Describe the structure and function of Central and peripheral lymphoid organs<br>2. Describe the development of T and B lymphocytes<br>3. Describe the types of T and B lymphocytes<br>4. Compare and Contrast T cells and B cells<br>5. Describe morphology and function of macrophage<br>6. Describe the structure and functions of human MHC gene complex<br>7. Outline the other cells of Immune System<br>8. Describe class, properties and functions of important cytokines |
| **MI 1.7c**<br>Antigens | 1. Define antigen and antigenicity<br>2. Define and classify epitope &haptens<br>3. Describe alloantigens, isoantigen, heteroantigen, autoantigen and heterophile antigen.<br>4. Define immunogenicity and describe the factors affecting it.<br>5. Describe various determinants of antigenicity<br>6. Define adjuvant with examples<br>7. Describe mechanisms of adjuvant<br>8. Describe T cell dependent/independent antigens and superantigens |
| **MI1.7d**<br>Antibody | 1. Define antibody<br>2. Describe the structure and function of antibody<br>3. Classify immunoglobulins<br>4. Describe the structure and functions of IgG, IgM, IgA, IgE and IgD<br>5. Describe antigenic determinants of immunoglobulins<br>6. Describe abnormal Immunoglobulins<br>7. Define the monoclonal antibody<br>8. Describe the hybridoma technique for production of monoclonal antibody<br>9. Enumerate various applications of monoclonal antibody |

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| MI 1.7e Antigen Antibody reactions | 1. Describe general properties of antigen antibody reactions.<br>2. Describe lattice hypothesis<br>3. Classify antigen antibody reactions.<br>4. Describe the principle, method, types and uses of precipitation, agglutination and neutralization reaction.<br>5. Describe the principle, method, types and uses of complement fixation test, ELISA, immunofluorescence assay, CLIA. Radioimmuno assay, western blot and rapid tests. |
| MI 1.7f Complement | 1. Define complement and enumerate complement activation pathways.<br>2. Describe the classical and alternate pathway of complement<br>3. Compare and contrast Classical and Alternative complement pathways<br>4. Describe the biological effects of complement<br>5. Enumerate common complement deficiency and associated diseases |
| **MI 1.8 Describe the mechanisms of immunity and response of the host immune system to infections** | |
| Immune response | 1. Define cell mediated and humoral immune response<br>2. Describe the process of antigen presentation<br>3. Describe the cell mediated immune response<br>4. Describe humoral immune response<br>5. Describe the activation and differentiation of B cells<br>6. Describe, compare and contrast the events of primary and secondary immune response |
| **MI1.9 Discuss the immunological basis of vaccines and describe the Universal Immunisation schedule** | |
| **MI 1.9** Immunoprophylaxis | 1. Define immunoprophylaxis<br>2. Describe the types and explain the scientific basis of vaccines [live attenuated, killed,toxoid, subunit]<br>3. Enumerate commonly used vaccines<br>4. Describe Universal immunisation program and National Immunisation Schedule<br>5. Describe the 'Cold Chain System" and the steps involved in vaccine development<br>6. Describe the newer approaches for vaccine development |
| **MI1.10 Describe the immunological mechanisms in immunological disorder (hypersensitivity, autoimmune disorders and immunodeficiency states) and discuss the laboratory methods used in detection.** | |
| **MI 1.10a** Hypersensitivity | 1. Define hypersensitivity.<br>2. Classify hypersensitivity and describe their features.<br>3. Describe the mechanism and clinical presentation of Type I,II,III & IV hypersensitivity |
| **MI 1.10b** Autoimmune | 1. Define Autoimmunity<br>2. Describe mechanisms of immune (central and peripheral) tolerance<br>3. Describe mechanisms of autoimmunity<br>4. Describe the pathogenesis of common autoimmune diseases<br>5. Describe laboratory tests of autoimmune diseases<br>6. Describe the role of Immunofluorescent test in diagnosis of autoimmune diseases.<br>7. Describe newer approaches for treatment of autoimmune diseases |
| **MI1.10c**Immunodeficiency | 1. Define and enumerate Immunodeficiency<br>2. Classify immunodeficiency diseases |

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| | 3. Describe common immunodeficiency diseases |
| **MI 1.11 Describe the immunological mechanisms of transplantation and tumor immunity** | |
| Transplant & tumour immunity | 1. Describe the role of Histocompatibility antigens in transplant immunology<br>2. Describe the types of graft rejection<br>3. Describe mechanism and factors affecting graft rejection<br>4. Desribe graft versus host reaction<br>5. Desribe approaches for prevention of graft rejection<br>6. Describe Tumor antigens (TSTA and TATA)<br>7. Describe mechanism of immune response against tumour cells<br>8. Describe immune surveillance theory<br>9. Explain the role of vaccine, monoclonal antibodies and cytokines in cancer immunotherapy. |

| **CVS and Blood** | |
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| MI2.1 Describe the etiologic agents in rheumatic fever and their diagnosis | |
| **MI2.1**<br>Rheumatic fever | 1. Define Rheumatic fever and name it's causative agent<br>2. Classify Streptococcus species<br>3. Describe the morphology, pathogenesis, toxins, virulence factors, antigenic structures, clinical features, epidemiology of streptococcus pyogenes<br>5. Describe the infections caused by S pyogenes and list the suppurative and non-suppurative sequelae of Streptococcus pyogenes<br>6. Describe the pathogenesis, clinical features and complications of Rheumatic fever<br>7. Describe the laboratory diagnosis of rheumatic fever and of other infection caused by beta haemolytic Streptococci. |
| **MI2.2Describe the classification etio-pathogenesis, clinical features and discuss the diagnostic modalities of Infective endocarditis** | |
| **MI 2.2**<br>Infective endocarditis (S. viridans, CONS, HACEK Enterococcus) | 1. Classify IE and enumerate the causative organisms<br>2. Describe the morphology, pathogenesis, virulence factors, antigenic structures, clinical features, epidemiology of S. viridans, CONS, HACEK organisms, Enterococcus<br>2. Describe the pathogenesis and clinical features of infective endocarditis.<br>3. Describe the Laboratory diagnosis of IE.<br>5. Briefly discuss the antimicrobial treatment of IE |
| **MI2.4 List the common microbial agents causing anemia. Describe the morphology, mode of infection and discuss the pathogenesis, clinical course, diagnosis and prevention and treatment of the common microbial agents causing Anemia** | |

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| **MI 2.4**<br>Infections causinganemia: [Trematodes (Schistosoma), Nematodes (Ancylostoma, N. americanus, Trichuris trichuria) , Cestodes (D latum)]. | 1. Enumerate the microbial agents causing Anaemia<br>2. Describe morphology, modes of transmission, pathogenicity, life cycle of parasites causing anaemia ( [Trematodes (Schistosoma), Nematodes (Ancylostoma, N. americanus, Trichuris trichuria) , Cestodes (D latum)]<br>3. Discuss clinical course of Anaemia caused by each microbial agent<br>4. Describe laboratory diagnosis of each microbial agent causing Anaemia.<br>5. Describe treatment, prevention and control of each microbial agent |
| **MI2.5 Describe the etio-pathogenesis and discuss the clinical evolution and the laboratory diagnosis of kalaazar, malaria, filariasis and other common parasites prevalent in India** | |
| **MI2.5a**<br>Kala Azar (Leishmania )& sleeping sickness (Trypanosoma) | 1. Classify the common Leishmania species causing human disease and the clinical syndromes caused by them<br>2. Describe the morphology, modes of transmission, pathogenicity, life cycle of Leishmania donovanii and Trypanosoma<br>3. Discuss the clinical presentation, complications and laboratory diagnosis of kala azar and trypanosomiasis.<br>4. Describe PKDL<br>5. Describe treatment, prevention and control of kala azar and trypanosomiasis.<br>6. Classify the Trypanosomes infecting man and the diseases caused by them |
| **MI2.5b**<br>Toxoplasmosis | 1. Describe the the morphology, modes of transmission, pathogenicity, life cycle of Toxoplasma gondii.<br>2. Describe the clinical presentation, complications and laboratory diagnosis of Toxoplasmosis.<br>3. Discuss the treatment, prevention and control of Toxoplasmosis. |
| **MI 2.5c**<br>Malaria and Babesia. | 1. Enumerate the causative Plasmodium species of human malaria<br>2. Describe the the morphology, modes of transmission, pathogenicity, life cycle of Plasmodium species.<br>3. Describe the clinical presentation, complications immunity and laboratory diagnosis of malaria.<br>4. Discuss the treatment, prevention and control of malaria.<br>5. Describe the the morphology, modes of transmission, pathogenicity, life cycle of Babesia.<br>6. Describe the clinical presentation and laboratory diagnosis of Babesiosis |

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| **MI 2.5d**<br>Filariasis | 1. Enumerate the filarial nematodes causing lymphatic filariasis<br>2. Describe the the morphology, modes of transmission, pathogenicity, life cycle of loaloa, oncocercavololus, Wuchereriabancrofti and Brugiamalayi.<br>3. Describe the clinical presentation, complications immunity and laboratory diagnosis of filariasis.<br>4. Discuss the treatment, prevention and control of filariasis.<br>5. Differentiate between the microfilaria of loaloa, oncocercavololus, Wuchereriabancrofti and Brugiamalayi. |
| **MI2.5e**<br>Miscellaneous Infections of blood:Brucella. | 1. Describe the epidemiology of Brucella<br>2. Describe the classification, morphology, and virulence factors of Brucella<br>3. Describe the epidemiology pathogenesis, mode of transmission, clinical features and laboratory diagnosis of Brucellosis<br>4. Describe the complications, treatment, prevention and control of Brucellosis. |
| **MI2.5e**<br>Miscellaneous Infections of blood:Borrelia, Listeria, Spirillum minor, Parvovirus & EBV. | 1. Describe the epidemiology, morphology, virulence factors and pathogenicity of Borrelia, Listeria, Parvovirus and Epstein Barr Virus and spirillum minor.<br>2. Describe the pathogenesis, clinical features and diagnostic modalities of infections caused by these agents.<br>3. Describe the complications, treatment, prevention and control of listeriosis, rat bite fever, relapsing fever and Lyme disease. |
| **MI2.5f**<br>Viral haemmorhagic fevers: Arboviruses, Filovirus, robovirus | 1. Enumerate and classify the viruses causing haemorrahagic fevers.<br>2. Decribe the morphology,, mode of transmission pathogenesis and virulence factors of viral agents causing VHF.<br>3. Describe the clinical features, complications and laboratory diagnosis of VHF.<br>4. Describe treatment prevention and control of VHF. |
| **MI2.7Describe the epidemiology, the etio- pathogenesis, evolution complications, opportunistic infections, diagnosis, prevention and the principles of management of HIV** | |
| **MI 2.7**<br>HIV | 1. Describe morphology, antigenic structure, pathogenesis, serotypes, replication of HIV.<br>2. Describe clinical features including WHO clinical staging of HIV/AIDS for adults<br>3. Describe global and Indian epidemiology of AIDS.<br>4. Enumerate opportunistic infections occurs in HIV infected people<br>5. Describe laboratory daignosis of HIV/AIDS<br>6. Describe NACO strategy for HIV diagnosis<br>7. Describe treatment strategies in brief.<br>8. Describe PEP as per NACP guidelines.<br>9. List HIV vaccine strategies |

| GIT Infections | |
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| MI3.1 Enumerate the microbial agents causing diarrhea and dysentery. Describe the epidemiology, morphology, pathogenesis, clinical features and diagnostic modalities of these agents | |
| **MI3.1a**<br>Gastro intestinal tract infections: general, Diarrhoea, Dysentery, Introduction to Enterobacteriaceae, E coli, Shigella, Campylobacter, other Enterobacteriaceae members. | 1. Define diarrhoea and dysentery.<br>2. Describe the epidemiology of diarrhoea and dysentery<br>3. Enumerate the microbial agents causing diarrhoea and dysentery<br>4. Describe the pathogenesis, clinical features and complications of diarrhoea&dysentery.<br>5. Differentiate the clinical features of diarrhoea and dysentery.<br>6. Describe laboratory diagnosis of diarrhoea and dysentery.<br>7. Describe the epidemiology, morphology, cultural characteristics, virulence markers, identification strategies of diarrheagenic E. coli, Shigella & other Enterobacteriaceae causing diarrhoea and dysentery. |
| **MI3.1b**<br>Cholera: Vibrio, Plesiomonasand Aeromonas | 1. Define cholera.<br>2. Describe the epidemiology of cholera<br>3. Describe the pathogenesis, clinical features and complications of cholera.<br>4. Describe various methods of clinical and laboratory diagnosis of cholera.<br>6. Describe the epidemiology, morphology, cultural characteristics, virulence markers, identification strategies of Vibrio cholera, Aeromonas, Plesiomonas<br>7. Describe the treatment, prevention and control of cholera. |
| **MI3.1c**<br>Parasitic Gastro intestinal tract infections: Entamoeba and Giardia | 1. Describe the epidemiology, morphology, life cycle, pathogenesis, clinical features and diagnosis of Entamoeba histolytica, Balantidium coli and Giardia<br>2. Describe the epidemiology, morphology, life cycle, pathogenesis, clinical features and diagnosis of coccidian parasites.<br>3. Describe the treatment, prevention and control of infections caused by Entamoeba histolytica, Balantidium coli, Giardia and coccidian parasites |
| **MI3.1d**<br>Viral GI infections | 1. Describe the epidemiology, morphology, pathogenesis, clinical features and diagnostic modalities of viral gastroenteritis .<br>2. Describe the epidemiology, morphology, pathogenesis, immunity, clinical features, diagnosis, prevention and control of |

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| | gastroenteritis caused by rotavirus, adenovirus,Norwalk agent and norovirus |
| **MI 3.1e**<br>Parasitic GI Infections-I &II: Intestinal nematodes (Ascaris, EnterobiusTrichinellaStrongyloidiasis)<br>Trematodes (Liver fluke etc. ) | 1. Describe the epidemiology, morphology, life cycle and pathogenesis, of cestodes (Taenia saginata, T. solium, H. nana, Echinococcusgranuloses)<br>2. Describe the epidemiology, morphology, life cycle, pathogenesis, clinical features and diagnosis of trematodes (Fasciola hepatica & F. buski)<br>3. Describe the epidemiology, morphology, life cycle, pathogenesis, clinical features and diagnosis of intestinal nematodes.<br>4. Describe the laboratory diagnosis, treatment, control and prevention of diseases caused by these organisms. |
| **MI 3.3 Describe the enteric fever pathogens and discuss the evolution of the clinical course and the laboratory diagnosis of the diseases caused by them** | |
| **MI 3.3**<br>GI Infections: Enteric fever | 1.List the various pathogens causing enteric fever.<br>2.Describe the pathogenesis of Typhoid & paratyphoid fever.<br>3. Describe the morphology, virulence factors, cultural characteristics and identification strategies for Salmonella Typhi, S. Paratyphi A and B.<br>4. Describe the laboratory diagnosis of typhoid and paratyphoid fever.<br>5. Describe clinical course, epidemiology, treatment and complications of enteric fever.<br>6. Describe multidrug resistant Salmonella<br>7. Discuss treatment, prevention and control of enteric fever. |
| **MI3.5 Enumerate the causative agents of food poisoning and discuss the pathogenesis, clinical course and laboratory diagnosis** | |
| **MI 3.5**<br>Food Poisoning {Staphylococcus aureus<br>Bacillus cereus<br>Clostridium perfringens<br>Bacillus cereus<br>Vibrio cholerae<br>Vibrio parahaemolyticus<br>Enterotoxigenic Escherichia coli<br>Enterohemorrhagic Escherichia coli | 1. Define and classify various types of Food Poisoning.<br>2. Enumerate and classify the causative agents of food poisoning and commonly incriminated food items<br>3. Describe the pathogenesis, clinical course with relation to the etiological agent.<br>4. Describe the laboratory diagnostic of food poisoning. |

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| Non typhoidal Salmonella<br>Shigella spp.} | |
| **MI3.6 Describe the etio-pathogenesis of Acid peptic disease (APD) and the clinical course. Discuss the diagnosis and management of the causative agent of APD** | |
| **MI 3.6**<br>APD:Helicobacter pylori | 1. Describe Acid peptic disease.<br>2. Describe clinical course of APD.<br>3. Describe the pathogenesis of APD due to H. pylori<br>4. Describe the morphology, cultural characteristics, and identification strategies of Helicobacter pylori.<br>5. Describe diagnosis, treatment, control and prevention of acid peptic disease. |
| **MI3.7 Describe the epidemiology, the etio-pathogenesis and discuss the viral markers in the evolution of Viral hepatitis. Discuss the modalities in the diagnosis and prevention of viral hepatitis** | |
| **MI 3.8a**<br>Viral Hepatitis | 1. Define and describe viral hepatitis<br>2. Enumerate and describe the viruses causing hepatitis<br>3. Describe the epidemiology, pathogenesis and clinical features of hepatitis A, B, C, D, E and G viruses.<br>4. Discuss the viral markers in the evolution of acute and chronic Viral hepatitis.<br>5. Describe the modalities in the diagnosis, treatment and prophylaxis of hepatitis A, B, C, D, E and G viruses. |
| **MI3.8 Choose the appropriate laboratory test in the diagnosis of viral hepatitis with emphasis on viral markers** | |
| **MI 3.8b**<br>Viral Hepatitis | 1. Enumerate and describe the viral markers daignostic of viral hepatitis<br>2. Describe the evolution, rise and fall of various markers.<br>3. Discuss the viral markers in the evolution of Viral hepatitis (A, B, C, D, E and G).<br>5. Describe the utility of each marker with respect to clinical stage of hepatitis. |

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| **Skin and soft tissue infections** |
| **MI 4.1 Enumerate the microbial agents causing anaerobic infections. Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of anaerobic infections** |

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| **MI 4.1a** Anaerobes and anaerobic infections including anaerobic culture methods | 1. Define anaerobes<br>2. Describe features of anaerobic infections<br>3. Enumerate and classify pathogenic anaerobic bacteria<br>4. Describe the pathogenesis, clinical course, laboratory diagnosis and complications of common anaerobic infection.<br>5. Describe different methods of anaerobiosis |
| **MI4.1b**<br>Tetanus and gas gangrene | 1. Define gas gangrene<br>2. Enumerate the causative agents of gas gangrene<br>3. Describe the morphology, virulence factors, cultural characteristics of *Clostridium perfringens.*<br>4. Describe the pathogenesis, clinical course and laboratory diagnosis of gas gangrene.<br>5. Describe the treatment, prevention and control of gas gangrene.<br><br>1.Define tetanus and name the causative agent<br>2.Describe the Morphology, virulence factors, cultural characteristics of *Clostridium tetani*<br>3. Describe the pathogenesis, clinical course and laboratory diagnosis of tetanus<br>4. Describe the treatment, prevention and control of tetanus |
| **MI4.1c**<br>Botulinum and Miscellaneous anaerobes} | 1. Define botulism and its types<br>2. Describe the morphology, virulence markers, cultural characteristics of *Clostridium botulinum.*<br>3. Describe the epidemiology, pathogenesis, clinical manifestations, complications & laboratory diagnosis of botulism<br>4. Describe role of anaerobic organisms as normal gut flora<br>5. Describe antibiotic associated colitis and its aetiology<br>6. Describe the pathogenesis, clinical features and management of antibiotic associated colitis<br>7. Enumerate non sporing anaerobes<br>8.Enumerate the diseases caused by common non sporing anaerobes<br>9. Describe the pathogenesis and clinical features of various infections caused by non sporing anaerobes<br>10. Discuss laboratory diagnosis for infections caused by nonsporing anaerobes |
| **MI4.2Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of bone & joint infections** | |
| **MI4.2**<br>Joint and bone infections: Osteomylitis& arthritis (Staph aureus, CONS) Parvovirus | 1. Enumerate common bacterial and viral agents causing osteomyelitis, septic arthritis, diabetic foot infections<br>2. Describe the pathogenesis, clinical features and laboratory diagnosis of osteomyelitis and arthritis.<br>3. Differentiate between gonococcal ad non gonococcal arthritis<br><br>1. Define osteomyelitis<br>2. Enumerate causative agents of osteomyelitis<br>3. Describe the pathogenesis, clinical features, laboratory |

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| | diagnosis and management of Osteomyelitis. |
| **MI4.3 Describe the etio-pathogenesis of infections of skin and soft tissue and discuss the clinical course and the laboratory diagnosis** | |
| **MI 4.3 a**<br>Skin and soft tissue infections: Classification,etiology and general considerations , Parasitic Skin manifestations (Ectoparasites, Larva migrans, PKDL) | 1. Enumerate the organisms of normal skin flora<br>2. Discuss the role of normal flora of skin<br>3. Define and classify SSTIs<br>4. Describe the varied clinical presentations with eiological agents of SSTIs<br>5. Describe the etiopathogenesis, clinical presentation and management of superficial and deep skin infections<br>6. Describe lab diagnosis of various types of SSTI<br>7. Enumerate the parasites involved in skin and soft tissue infections.<br>8. Describe etiology, types, clinical presentation and management of larva migrans.<br>9. Describe etiology, clinical presentation and management of PKDL |
| **MI 4.3b**:<br>Leprosy and NTM | 1.Define and classify leprosy<br>2.Describe morphology and cultural characters of *M.leprae*<br>3. Describe the pathogenesis and clinical presentations in leprosy<br>4. Describe the role of immunity in leprosy<br>5. Describe lepra reactions<br>6. Describe lab diagnosis, treatment and control of leprosy<br>7. Describe and classify Non tuberculus Mycobacteria (NTM).<br>8. Describe the etiopathogenesis, clinical presentation and management of infections caused by NTM. |
| **MI 4.3 c:**<br>Viral exanthemas | 1.Enumerate the causes of viral exanthematous infections<br>2. Describe the etiopathogenesis of viral exanthematous infections<br>3. Describe the morphology, virulence factors, epidemiology and immunity of Measles virus, Chicken pox virus, small pox virus and Rubella virus.<br>4. Describe the clinical features, complication and diagnosis of measles, small pox, chicken pox and Rubella.<br>5. Describe the treatment, prevention and control for viral exanthematous infections. |

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| **MI 4.3d**<br>Superficial fungal infections | 1. Enumerate various surface infections of the skin and its appendages caused by fungal agents, along with their etiology<br>2. Describe the microscopic and cultural characteristics of fungal agents (Candida, Pityriasis versiclor, Tinea nigra, Piedra, onychomycosis, dermatophytes etc.) causing infections of skin<br>3. Enumerate various clinical types of dermatophytosis with their causative agents<br>4. Describe the morphological and cultural characters of dermatophytes.<br>5. Describe the laboratory diagnosis of superficial fungal infections<br>6. Describe the management of superficial fungal infections |
| **MI 4.3e**<br>Subcutaneous mycosis, mycetoma | 1. Define mycetoma<br>2..Enumerate the microbial agents (Bacteria & Fungi) causing mycetoma and subcutaneous mycosis<br>3. Describe the pathogenesis, clinical presentation laboratory diagnosis and treatment of subcutaneous mycosis and mycetoma. |

| **CNS Infections**<br>**MI5.1 Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of meningitis** | |
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| **MI 5.1a**<br>Infections of CNS: Introduction & Pyogenic meningitis | 1.Enumerate various infective syndromes of CNS<br>2.Define and classify Meningitis .<br>3.Differentiate between Acute & Chronic meningitis<br>4. Enumerate the bacterial, viral and parasitic causes of acute/pyogenic meningitis according to age.<br>5. Describe the morphology, antigenic structure and virulence factors of various etiological agents of pyogenic meningitis. (Neisseria meningitidis, Streptococcus pneumoniae, Haemophilus influenzae). |
| **MI5.1 b**<br>Aseptic meningitis | 1. Enumerate the bacterial, viral, fungal and parasitic etiological agents of aseptic meningitis.<br>2. Describe the morphology, antigenic structure and virulence factors of various etiological agents of aseptic meningitis. (Leptospira, Free living amoebae, Enterovirusess (poliovirus, echovirus, Coxsackie), Cryptococcus neoformans).<br>3. Describe the pathogenesis, clinical presentation, diagnosis, treatment, control and prevention of aseptic meningitis (Leptospira, Free living amoebae,Enterovirusess (poliovirus, echovirus, Coxsackie), Cryptococcus neoformans)<br>4. Differentiate the clinical findings of pyogenic meningitis and aseptic meningitis. |

| MI 5.2 Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of encephalitis | |
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| **MI 5.2a** Encephalitis | 1. Enumerate common etiological agents causing encephalitis with special reference to India.<br>2. Describe the morphology, virulence factors, antigenic structure and pathogenesis of causative agents of encepahlitis. (Rabies, Tick borne encephalitis viruses, HSV-2 &Nipah)<br>3. Describe the epidemiology, clinical features, diagnosis, treatment, control and prevention of Rabies.<br>4. Describe the epidemiology, clinical features, diagnosis, treatment, control and prevention of tick borne encephalitis.<br>5. Describe the epidemiology, clinical features, diagnosis, treatment, control and prevention of parasitic encephalitis |
| **MI 5.2b** Miscellaneous infections of CNS | 1.Define prions and slow virus infections<br>2. Describe the morphology, virulence factors, antigenic structure and pathogenesis of slow viruses and prions<br>3. Describe the epidemiology, clinical features, diagnosis, treatment, control and prevention of prion disease. |

| Respiratory Tract Infections<br>MI6.1 Describe the etio-pathogenesis, laboratory diagnosis and prevention of Infections of upper and lower respiratory tract | |
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| **MI 6.1a** Respiratory tract infections: Introduction | 1. Describe the normal defence mechanism of respiratory tract<br>2. Enumerate various clinical types of respiratory infections with examples.<br>3. Describe the mode of transmission of upper and lower respiratory tract infections<br>4. Enumerate the causative agent of various type of respiratory infections.<br>4. Outline the laboratory diagnosis of patient with respiratory infection. |
| **MI 6.1b** Viral URTI including common cold & croup | 1. Enumerate the causative viral agents of common cold, pharyngitis, croup, sinusitis, otitis media.<br>2.Describe classification, morphology, antigenic structure, virulence factor of causative agent (Adeno, Rhino, Mumps, Echo, Par echo, Coxsackie A, RSV, Corona, Influenza & Parainfluenza viruses).<br>3. Discuss the pathogenesis, epidemiology and immunityof causative agent .<br>4. Discuss the laboratory diagnosis, treatment and control of common cold, croup, mumps and pharyngitis. |
| **MI 6.1c** Tuberculosis | 1. Define and classify tuberculosis<br>2. Classify mycobacteria causing tuberculosis<br>3. Describe morphology, pathogenesis, virulence factors and cultural characteristics of Mycobacterium tuberculosis.<br>4. Describe the epidemiology, clinical manifestations, complications and laboratory diagnosis of pulmonary tuberculosis.<br>5. Discuss the treatment, control and prevention of tuberculosis.<br>6. Describe the strategies and case management as per RNTCP |

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| **MI6.1d** Bacterial URTI-I<br>**MI6.1e** Bacterial URTI-II | 1. Enumerate the causative bacterial agents of pharyngitis, diphtheria, whooping cough (croup), sinusitis, otitis media.<br>2. Describe the clinical features, pathogenesis and immunity of diphtheria and whooping cough.<br>4. Describe the morphology, virulence factors and cultural characteristics of bacterial agents causing pharyngitis.<br>9. Describe clinical features, pathogenesis, complications and laboratory diagnosis of pharyngitis, diphtheria and whooping cough.<br>10. Describe the treatment, prevention and control measures for diphtheria, whooping cough and pharyngitis. |
| **MI 6.1f** Bacterial pneumonia other than Mycobacteria-I<br>**MI 6.1g** Bacterial pneumonia other than Mycobacteria-II | 1.Define the clinical types of Pneumonia [CAP, HAP/VAP & AP]<br>2. Enumerate the causative bacterial agents of pneumonia (other than Mycobacteria)<br>3. Describe the morphology, antigenic structure, virulence markers, cultural characteristics of various bacterial agent (S. pneumoniae, Staph. aureus, H. influenzae, Mycoplasma, Chlamydia, Klebsiella, Pseudomonas, Acinetobacter, Legionella ).<br>4. Describe the clinical features, pathogenesis, clinical features, complications and lab diagnosis of bacterial pneumonia.<br>5. Describe the treatment, prevention and control measures for pneumonia.<br>6. Describe the clinical features, pathogenesis, clinical course of Atypical pneumonia & legionella pneumonia.<br>7. Discuss the laboratory diagnosis, treatment, prevention and control of atypical pneumonia. |
| **MI 6.1h** Fungal pneumonia | 1. Enumerate the various fungal agents of pneumonia<br>2. Describe the morphology, epidemiology, virulence and cultural characteristics of agent (Candida, Cryptococcus, Dimorphic fungi {Histoplasma, coccidoidies, paarcoccidoidesC.immitis, P.brazilliansis} Aspergilus, P.Jeroveci, Penicillium, {Oral thrush, ABPA })<br>3. Discuss the predisposing factors and pathogenesis of fungal pneumonia.<br>4. Describe the clinical features, complications, laboratory diagnosis, treatment, control and preventive methods of fungal pneumonia. |
| **MI 6.1i** Viral LRTI-I | 1. Enumerate the causative viral agents of pneumonia, ARDS, ILI, SARI.<br>2. Describe epidemiology, classification, morphology, virulence factors, antigenic structure, immunity of the agent (paramyxovirus, orthomyxovirus, Corona, MERS COV, SARS, SARS-CoV2).<br>3. Describe the pathogenesis and immunity of viral pneumonia.<br>4. Define and Classify influenza viruses.<br>5. Discuss its pathogenesis [antigenic structure and variations]<br>6. Describe epidemiology including antigenic shift and drift of influenza virus.<br>7. Describe the clinical features, complications, laboratory diagnosis, treatment, control and preventive methods of viral pneumonia. |

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| **MI 6.1j** Miscellaneous disorders of lung (Bronchitis, Bronchiectasis, Lung abscess, empyema, pleural effusion | 1. Enumerate the causative agents of Bronchitis, Bronchiectasis, Lung abscess, empyema, pleural effusion<br>2. Enumerate the parasitic agents causing lung infection<br>3.Describe the pathogenesis & clinical manifestations of Bronchitis, Bronchiectasis, Lung abscess, empyema, pleural effusion<br>4.Discuss the treatment, prevention & control of Bronchitis, Bronchiectasis, Lung abscess, empyema, pleural effusion<br>5. Describe the pulmonary manifestations of various parasites causing lung disorder (E.histolytica, E.granulosus)<br>6. Describe the epidemiology, morphology, life cycle, of P.westermani<br>7. Describe the pathogenesis, clinical features, complications, treatment and control of paragonimiasis<br>8. Discuss the laboratory diagnosis of varied lung infections. |

| **Genitourinary system and urinary tract infections** | |
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| **MI 7.1 Describe the etio-pathogenesis and discuss the laboratory diagnosis of infections of genitourinary system** | |
| **MI 7.1** Genitourinary system infections | 1. Enumerate the microorganisms found as part of normal flora of Genitourinary system.<br>2. Discuss the role of normal flora in health of genitourinary tract.<br>3. Define and Classify Genitourinary Tract infections, Reproductive Tract infections and SexuallyTransmitted Infections<br>4. Describe the etio-pathogenesis of Genitourinary Tract infections, Reproductive Tract infections and SexuallyTransmitted Infections<br>5. List the clinical syndromes associated with the RTIs<br>6. Name the etiological agents of the various clinical syndromes<br>7. Classify Urinary Tract Infections<br>8. Describe etiopathogenesis of Urinary Tract infections<br>9. Describe the laboratory diagnosis of Genitourinary infections |
| **MI 7.2 Describe the etio-pathogenesis and discuss the laboratory diagnosis of sexually transmitted infections. Recommend preventive measures** | |
| **MI 7.2 a** **Painless** Genital ulcers: Syphilis | 1. Name the causative agent of Syphilis<br>2. Classify Treponemes<br>3. Describe the pathogenesis and clinical manifestations of various stages of Syphilis<br>4. Describe the morphology, virulence factors and cultural characteristics of Treponema pallidum<br>5.Describe the laboratory diagnosis of syphilis including congenital syphilis<br>6. Describe treatment, control and prevention of syphilis |

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| **MI 7.2b**<br>STD-II Genital ulcers and warts | 1. Enumerate the causative agents of genital warts, painful genital ulcer.<br>2. Classify Herpesviruses<br>3. Describe the pathogenesis, clinical features and laboratory diagnosis of genital herpes, chancroid, Donovanosis.<br>4. Describe the epidemiology, morphology & cultural characteristics of Haemophilus ducreyi, HSV, Klebsiella granulomatis<br>7. Discuss Anogenital Warts and Human Papilloma Virus associated lesions. |
| **MI 7.2c**<br>Vaginal/Urethral Discharge -I Urethritis gonococcal and NGU (Gonorrhoea, Chlamydia, Trichomonas, Bacterial vaginosis, ureaplasma, Candida | 1. Enumerate the organisms causing vaginal/urethral discharge<br>2. Describe the morphology, cultural characteristics, methods for identification and antimicrobial susceptibility testing of Neisseria gonorrhoeae<br>3.Describe the pathogenesis, clinical features, laboratory diagnosis and treatment of gonorrhea<br>4. Define Non-gonococcal urethritis and cervicitis<br>5. List the causative agents of NGU, LGV<br>6. Classify family Chlamydiaceae<br>7. Describe the morphology, cultivation, typing and life cycle of Chlamydia trachomatis<br>8. Discuss the pathogenesis, complications and clinical features of genital Chlamydia trachomatis infections<br>9. Discuss the laboratory diagnosis of genital C. trachomatis infections |
| **MI 7.2d**<br>Vaginal/UrethraDischarge -II (Gonorrhoea, Chlamydia, Trichomonas, Bacterial vaginosis, Candida | 1. Describe the morphology, cultural characteristics, methods for identification of Mycoplasma and ureaplasma.<br>2. Describe the morphology, pathogenesis, life cycle and laboratory diagnosis of Trichomonas vaginalis.<br>3. Discuss the laboratory diagnosis of NGU and non-gonococcal endocervicitis<br>4. Enumerate the organisms associated with Bacterial Vaginosis<br>5. Describe the morphology, pathogenesis, life cycle and laboratory diagnosis of organisms involved in bacterial vaginosis. |
| **MI 7.2e**<br>Miscellaneous STI | 1. Enumerate the non-sexually transmitted microbial causes of infections of genitourinary system<br>2. Describe the pathogenesis of these infections (PID, Genital warts (HPV), Molluscum contagiosum, pubic lice, scabies)<br>3. Describe the clinical features of these infections<br>4. Discuss the laboratory diagnosis of these infections |
| **MI7.2f**<br>Lab diagnosis and syndromic management of STI | 1. Describe Syndromic management of STDs and Reproductive Tract Infections<br>2. Describe treatment, prevention and control of STDs |
| **MI 7.3** Describe the etio-pathogenesis, clinical features, the appropriate method for specimen collection, and discuss the laboratory diagnosis of Urinary tract infections | |

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| **MI 7.3**<br>UTI | 1. Enumerate the etiological agents causing Urinary Tract Infections<br>2. Describe the predisposing factors, pathogenesis and clinical features of UTI<br>3. Describe the laboratory diagnosis of UTI. ,<br>4. Define significant bacteriuria and interpret patients test reports<br>5. Describe the methods used to differentiate between upper and lower UTI<br>6. Describe the morphology, cultural characteristics, methods for identification and antimicrobial susceptibility testing of Proteus, Morganella and Providencia |

| **Zoonotic and Miscellaneous Infections** | |
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| **MI8.1** Enumerate the microbial agents and their vectors causing Zoonotic diseases. Describe the morphology, mode of transmission, pathogenesis and discuss the clinical course, laboratory diagnosis and prevention | |
| **MI8.1a** Zoonotic disease: Introduction, epidemiology and prevention.<br>**MI 8.1b** Entomology and vectors in disease<br>MI 8.1cRickettsia, Bartonella, Coxiella<br>**MI 8.1d** Miscellaneous Zoonosis: Yersinia, Bacillus anthracis, Pasteurella, Franscicella | 1. Define: Zoonoses<br>2. Enumerate the microbial agents and their vectors causing Zoonotic diseases.<br>3. Describe the morphology, mode of transmission, pathogenesis, clinical course, laboratory diagnosis and prevention of Zoonotic diseases:<br>4. Describe the morphology, cultural characteristics, methods for identification of Bacillus anthracis, Brucella species, Yersinia pestis, Leptospira, Ricketssia species, Rhabdovirus.<br>5. Describe the pathogenesis, clinical features, laboratory diagnosis and treatment of Anthrax, Brucellosis, Plague, Leptospirosis, Rickettsia, Rabies, |
| **MI8.2** Describe the etio-pathogenesis of opportunistic infections (OI) and discuss the factors contributing to the occurrence of OI, and the laboratory diagnosis | |
| **MI 8.2a** Opportunistic infections: General Bacterial, Parasitic and Virus | 1. Define Opportunistic infections<br>2. Classify and enumerate opportunistic infections.<br>3. Describe the etiopathogenesis of Opportunistic infections and discuss the factors contributing to opportunistic infections.<br>4. Describe diagnosis of opportunistic infections |
| **MI 8.2b** Opportunistic infections: Mycosis | 1. Enumerate fungi causing OI<br>2. Describe laboratory diagnosis of opportunistic infections |
| MI8.3 Describe the role of oncogenic viruses in the evolution of virus associated malignancy | |
| Oncogenic virus | 1. Describe oncogenesis<br>2. Describe the properties of cells transformed by viruses.<br>3. Enumerate oncogenic DNA and RNA viruses<br>3. Define and describe Oncogenes/ Proto-oncogenes<br>4. Describe the mechanism of viral oncogenesis. |

| MI8.4 Describe the etiologic agents of emerging Infectious diseases. Discuss the clinical course and diagnosis | |
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| Emerging and reemerging Infections | 1. Define: Emerging infectious agents.<br>2. Enumerate emerging infectious agents in world and in India.<br>3. Describe the factors that contribute to emerging and reemerging infections.<br>4. Discuss epidemiology of emerging infections with special reference to Indian context.<br>5. Discuss their clinical course and diagnosis. |
| MI8.5 Define Healthcare Associated Infections (HAI) and enumerate the types. Discuss the factors that contribute to the development of HAI and the methods for prevention | |
| HAI | 1. Define Healthcare Associated Infections (HAI)<br>2. Enumerate and describe common types of HAI<br>3. Enumerate microbial agents responsible for various types of HAI<br>4. Discuss the factors that contribute to the development of HAI, including sources, mode of transmission and epidemiology of infectious agents<br>5. Discuss the methods of prevention of HAI |
| MI 8.6 Describe the basics of Infection control | |
| **MI 8.6**<br>Infection control | 1. Define and describe the concept of Hospital/ Healthcare Infection Control<br>2. Enumerate and describe the concepts and methods of Infection control.<br>3. Define Standard precautions, transmission based precautions, and contact precautions.<br>4. Describe the components of Standard precautions, transmission based precautions, and contact precautions.<br>5. Describe Respiratory etiquettes, sharps safety, safe injection practices, sterilization, disinfection, good housekeeping, PPE donning/doffing, hand hygiene, post-exposure prophylaxis, etc.)<br>6. Describe the constitution and functions of Hospital Infection Control Committee.<br>7. Define and classify Biomedical waste.<br>8. Discuss management of Biomedical Waste as per latest Biomedical Waste Management Rules. |
| MI 8.8 Describe the methods used and significance of assessing the microbial contamination of food, water and air | |
| **MI 8.8**<br>Milk, food and air Microbiology | 1. Enumerate the bacteria that can be found in food, water and air.<br>2. Describe the methods used and significance of assessing the microbial contamination of water air, food, and milk. |
| MI 8.13Choose the appropriate laboratory test in the diagnosis of the infectious disease | |

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| **MI 8.13a**<br>PUO | 1. Define PUO<br>2. Enumerate the causative agents of PUO<br>3. Enumerate the samples and describe sample collection techniques and transport<br>4. Describe blood collection technique<br>5. Describe the sample processing, identification and confirmation |
| **MI 8.13b**<br>Congenital infections | 1. Enumerate various congenital infections.<br>2. Enumerate various test to screen for congenital infections<br>3. Describe the pathogenesis, complications and screening for congenital infections. |
| **MI 8.13c**<br>URTI | 1. Enumerate various clinical types of upper respiratory infections with examples.<br>2. Describe the mode of transmission of upper and lower respiratory tract infections<br>3. Enumerate the causative agent of various type of respiratory infections.<br>4. Enumerate the samples and describe sample collection techniques and transport<br>5. Describe the sample processing, identification and confirmation |
| **MI 8.13d**<br>LRTI | 1. Enumerate various clinical types of lower respiratory infections with examples.<br>2. Describe the mode of transmission of upper and lower respiratory tract infections<br>3. Enumerate the causative agent of various type of respiratory infections.<br>4. Enumerate the samples and describe sample collection techniques and transport<br>5. Describe the sample processing, identification and confirmation |
| **MI 8.13e**<br>Wound infection | 1. Enumerate various clinical types of wound infections.<br>2. Enumerate the causative agent of various type of wound infections.<br>3. Enumerate the samples and describe sample collection techniques and transport<br>4. Describe the sample processing, identification and confirmation |
| **MI 8.13f**<br>Meningitis | 1. Enumerate various clinical types of meningitis.<br>2. Enumerate the causative agent of various type of meningitis.<br>3. Enumerate the samples and describe sample collection techniques and transport<br>4. Describe the sample processing, identification and confirmation |
| **MI 8.13g**<br>Eye/ENT infections | 1. Enumerate various clinical types of eye and ENTinfections.<br>2. Enumerate the causative agent of various type of Eye and ENT infections.<br>3. Enumerate the samples and describe sample collection techniques and transport<br>4. Describe the sample processing, identification and |

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| | confirmation |
| **MI8.15 Choose and Interpret the results of the laboratory tests used in diagnosis of the infectious disease** | |
| **MI 8.15**<br>Lab diagnosis of PUO, URTI,LRTI,Meningitis , wound infections, Eye, ENT infections | 1. Enumerate various clinical types of infections with examples.<br>2. Describe the mode of transmission of infections<br>3. Enumerate the causative agent of various type of infections.<br>4. Enumerate the samples and describe sample collection techniques and transport<br>5. Describe the sample processing, identification and confirmation |
| **MI 8.16 Describe the National Health Programs in the prevention of common infectious disease** | |
| **MI 8.16** | 1. Enumerate various National programs for prevention of infectious diseases.<br>2. Enumerate the components and strategies of control program.<br>3. Describe the implementation of National Program at various levels.<br>4. Describe the evaluation of National Program. |

## 6. Assessment

Student will maintain a log book as given in Annexure II. Practical record book will also be maintained by students to record practical findings for day to day work and assessments. Both theory and practical to be assessed.

### (a) Formative

- **First Term**

  Assessments (2): General Microbiology, Immunology & CVS

  End term Exam- January last week to February 1st week.

- **Second Term**

  Assessment (3): Respiratory, GIT 7 Hepatobiliary

  End Term Exam: April last week to May 1st week.

- **Third Term**

  Assessment (2): SDL & Zoonotic, CVS, GUT, Miscellaneous

  Sent Up Examination: August last week to September 1st week.

**Section 3: Schedule of Internal assessment (IA) in Microbiology**

| IA | 1st IA (Jan-Feb) | 2nd IA (April-May) | Sent up examination | Final Examination |
|---|---|---|---|---|
| **Theory** | 50 | 50 | Paper 1-100 | Paper 1-100 |

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| | | | Paper 2-100 | Paper 2-100 |
| **Practical (including 10 marks log book & practical file)** | 50 | 50 | 100 | 100 |
| **Total** | 100 | 100 | 300 | 300 |

**b) Internal Assessment**

Maintained in card format for all teachers. Feedback given after end of each assessment. Internal assessment is divided in two components. Day t day assessments based on performance in tutorials, seminars, Practical class and skill session will be given weightage of 20%, while term exam assessments, end competency assessments will be included in term assessments given weightage of 80 %. IA sheet will be maintained for each student mentioning the suggested and taken remedial measures.

| **Theory** | **T1** | **T2** | **T3** | **Total %** |
|---|---|---|---|---|
| Interest in subject (5) | | | | |
| Active participation (5) | | | | |
| Scientific attitude (5) | | | | |
| Any other academic input (SDL, Quiz, Poster, Paper presentation, social service) (5) | | | | |
| **Exams assessment** (80) | | | | |
| **Total Theory** | | | | |
| **Practical** | | | | |
| Interest in subject (5) | | | | |
| Attitude (5) | | | | |
| Bench Work culture (5) | | | | |
| Behaviour (5) | | | | |
| **Term exams Assessment (60)** | | | | |
| **Log Book (10)** | | | | |
| **Practical record Book (10)** | | | | |
| **Total Practical (100)** | | | | |
| **Total IA (Theory + Practical)** | | | | |

| | | | | |
|---|---|---|---|---|
| **Remarks/ Remedial measures suggested** | | | | |
| **Signature Student** | | | | |
| **Signature Teacher In charge** | | | | |
| **Signature Batch In charge** | | | | |
| **Signature HOD** | | | | |

**IA Sheet for monitoring of student's performance**

| **Roll No.** | | **Name:** | | | | **Contact no:** | |
|---|---|---|---|---|---|---|---|
| | | **Attendance (%)** | | **Marks (%)** | | **Signature** | **Total Marks 100 (%)** |
| **S. no.** | **Date** | **Theory** | **Practical** | **Theory** | **Practical** | | |
| **1st Term** | | | | | | | |
| **1.** | | | | | | | |
| **2.** | | | | | | | |
| **End term** | | | | | | | |
| **2nd Term** | | | | | | | |
| **3.** | | | | | | | |
| **4.** | | | | | | | |
| **5** | | | | | | | |
| **End term** | | | | | | | |
| **Total** | | | | | | | |
| **3rd term** | | | | | | | |
| **6. SDL** | | | | | | | |
| **Sent up Exam** | | | | | | | |
| **Log Book** | | | | | | | |
| **Remarks/ Remedial measures** | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **suggested** | | | | | | | |

**Table 2: Theory distribution layout**

| **Paper Layout** | | | |
|---|---|---|---|
| **Types of questions** | **Marks per question** | **No of questions in each paper** | **Total** |
| MCQ | 1 | 20 | 20 |
| Short answer | 3 | 10 | 30 |
| Short Note | 5 | 6 | 30 |
| Long Question | 10 | 2 | 20 |
| Total | | | 100 |

**Table 3: Theory paper distribution**

| **PAPER I** | **Gen Microbiology** | | **Immunology** | **CVS & Blood** | **GIT & Hepatobiliary** | **Total no of questions** |
|---|---|---|---|---|---|---|
| Total Marks (100) | 25 | | 30 | 22 | 23 | 38 |
| **PAPER II** | **Musculoskeletal system skin and soft tissues infections** | **Central Nervous System infections** | **Respiratory Infections** | **Genitourinary &Sexually transmitted infections** | **Zoonotic diseases and miscellaneous** | **Total no of questions** |
| Total Marks (100) | 20 | 20 | 20 | 20 | 20 | 38 |

**Table 4: Term wise assessment pattern for Practical**

| | **Spots** | **Gram stain & hanging drop with clinical problem** | **PS for mp/mf with clinical problem** | **Log book/Practical file** | **Viva related to practical exercises** | **Total** |
|---|---|---|---|---|---|---|
| **1st Term** | 10 | 10 | 10 | 10 | 10 | 50 |
| **2nd Term** | Spots | ZN stain | Stool examination for ova/cyst | Log book/Practical file | Viva related to practical exercises | Total |
| | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 10 | 10 | 10 | 10 | 10 | 50 |

**Table 5: Complete distribution of Practical examination for final summative exam**

| Pattern | Exercise | Marks |
|---|---|---|
| **Microscopic skills*** | Gram staining, hanging drop & clinical problem | 10 (3+2+2+3) {Identify+Focus+Report+Record observation} |
| | ZN staining with clinical problem | 10 (3+2+2+3) {Identify+Focus+Report+Record observation} |
| | Stool Examination with clinical vignette | 10 (2 findings) (3+2X2) {Identify+Record observations} |
| **Clinical problem** | Clinical Problem solving for sample, container and precautions | 10 |
| **Spots or OSPE with Clinical Problem** | Clinical vignette with Peripheral blood smear for MP/MF | 5(3+2) |
| **Skill based exercise** | Exercise with infection control, PPE & hand hygiene | 05 |
| **AETCOM Excercise** | Clinical Problem with AETCOM competency | 05 |
| **Spot/OSPE** | Culture Medium, biochemicals/AST | 3(2+1){Identify +Question} |
| **Spot/OSPE** | Instrument, sterilization, disinfection, Biomedical waste | 3(2+1{Identify +Question} |
| **Spot/OSPE** | Fungal | 3(2+1) {Identify +Question} |
| **Spot/OSPE** | Serology/Immunology | 3(2+1) {Identify +Question} |
| **Spot/OSPE** | Virus, Parasite | 3(2+1) {Identify +Question} |
| **Viva based on practical exercises** | | 30 |
| **Total** | | **100** |

**Note: The students will submit practical file and log book during the Examination.**
*Numerical scoring: The steps of the staining procedure and interpretation are scored as follows

| Steps Done | Marks allotted |
|---|---|
| Performing the stain following all the steps (1 mark each)<br>-Primary stain<br>-Decolourisation<br>-Secondary stain | 3 |
| Focusing the stained slide with appropriate adjustments of the Microscope | 2 |
| Identifying the structures under the Microscope/Observation and inference | 3 |
| Diagram and writing the report | 2 |
| Total | 10 |

**7) ASSESSMENT OF INDIVIDUAL COMPETENCIES: (To be done similarly for each competency)**

1) Competency identified: MI 1.2 (a)

2) Name of the activity: Perform and identify the different causative agents of Infectious diseases by Gram Stain

3) Components of the activity:
   a) Practical session to demonstrate the procedure for stain.
   b) Performing the procedure by the student and focussing the slide.
   c) Recording the observation and the inference with a neat labelled diagram
   d) Feedback given on the session.

4) Criteria for successful completion: The student has to perform the activity 5 times and score more than 5/10 in each attempt

| **Attempt Number** | **Date of performing the activity** | **Marks scored out of 10** | **Rating BelowExpectations(B); Meets Expectations(M); Exceeds Expectations(E)** | **Signature of faculty** | **Signature of student** |
|---|---|---|---|---|---|
| **1** | | | | | |
| **2** | | | | | |
| **3** | | | | | |
| **4** | | | | | |
| **5** | | | | | |

Documentation of activity (diagram and observation and inference) – to be written in the Record book.

Recommended action when unsuccessful : Repeat after discussion

**Note:**
**Keeping the basic structure of internal assessment intact, minor adjustments in unit I and II can be done based on the course covered.**
**For detailed assessment instructions refer to Assessment Blueprint document for CBME batch 2021**

**Internal assessment will be calculated for theory (40) marks and practical (20) marks Student will require to get 50 % combined in theory & practical (not less than40 % in each) for eligibility to appear for university exam.**

# MINUTES

A meeting of the Committee of Courses & Studies in the Department of **Pharmacology** was held on Thursday the 13th January, 2022 at 02:00 P.M. through online mode due to pandemic Covid-19.

The following members were present:

1. Prof. H.S. Rehan, HOD, Pharmacology, D.U. C/o LHMC - Chairperson
2. Dr. Vandana Roy, Head, Department of Pharmacology, MAMC.
3. Dr. Rachna Gupta, Head, Department of Pharmacology, UCMS.
4. Dr. Anita kotwani, Sr. Associate Prof., Department of Pharmacology, VPCI.
5. Dr. Lalit Kumar Gupta, Sr. Professor, Department of Pharmacology, LHMC.
6. Dr. Shalini Chawla, Sr. Professor, Department of Pharmacology, MAMC
7. Dr. Kavita Gulati, Sr. Professor, Department of Pharmacology, VPCI
8. Dr. Seema Jain, Sr. Professor, Department of Pharmacology, UCMS
9. Dr. Krishna, Sr. Associate Professor, Deptt. of Pharmacology, LHMC
10. Dr. Vandana Tayal, Sr. Associate Professor, Deptt. of Pharmacology, MAMC
11. Dr. Sumita Halder, Sr. Associate Professor, Deptt. of Pharmacology, UCMS

1. The Committee recommended the names of Examiners for Pharmacology (PG) (Annual/Supplementary) to be held during the year 2022 (Batch-2019) (List not enclosed being confidential).

2. The Committee recommended the names of examiners to evaluate thesis submitted by the students admitted during the year 2020 in Pharmacology (PG) (List not enclosed being confidential).

3. The Committee recommended the names of 15 teachers from different medical colleges other than Delhi University for Panel of Experts.

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The meeting ended with a vote of thanks to the chair.

**(Prof. H.S. Rehan)**
**(Chairperson)**

No.F. IV/3/2021/MC/Pharma/406 Date:- 23/7/21

The Dean
University of Delhi
Faculty of Medical Sciences
6th Floor, V.P.C.I. Building
Delhi-110007

**Subject:- Revised CBME Curriculum in Pharmacology**

Reference No. MDS/086/MBBS-BDS/2021/497 Dated 08/07/2021
No. FMDS/247/PG/2019/1149-12,Dated 25.10.2019

Dear Professor Jain

Please find enclosed revised curriculum in Pharmacology ( CBME) as prepared by the Courses Committee of Studies ( Pharmacology) through on line discussions.
Both the soft and hard copy are being sent.

Thanking You

Yours Sincerely

Vandana Roy

Dr. Vandana Roy
Head
Department of Pharmacology
Faculty of Medical Sciences
University of Delhi
Delhi

Encl: Copy of Revised curriculum in Pharmacology ( CBME)

Email acknowledgment & approval of new curriculum

# Revised Pharmacology Curriculum(CBME)
# 2020 Onwards

**Department of Pharmacology**
**Faculty of Medical Sciences**
**University of Delhi**

## CURRICULUM OF PHARMACOLOGY FOR MEDICAL STUDENTS

**Preamble**

Pharmacology is the science of medicines. The knowledge of the molecular basis of drug action, its therapeutic applications, the adverse effects caused by the medications, their prevention and treatment and the effects of administering two or more drugs to a patient will be learnt in the context of its clinical application and not just as facts. The use of medicines for treating patients with the required medications, at the right dose, in the right way, for the right duration and at a appropriate cost, with consideration for all social, environmental and economic factors that may impact the therapy. The emphasis will be on clinical relevance of pharmacology knowledge.

### 1. VISION / GOAL

The broad goal of teaching pharmacology to under graduate students is to inculcate rational and scientific basis of therapeutics. To provide knowledge of pharmacology based on evidence and to foster the development of a highly knowledgeable, skilled and competent Indian Medical Graduates imbued with the concept of rational Pharmaco-therapeutics. Simultaneously focus is to impart requisite skills, attitudes, values and responsiveness, so that the students are able to function appropriately and effectively as doctors at the community level while being globally relevant.

### 2. LEARNING OBJECTIVES (overall)

i. To equip the Indian Medical Graduate (IMG) with the knowledge of scientific basis of therapeutics and the skills of rational prescribing.
ii. The student should acquire knowledge of the principles and application of Pharmacotherapy.
iii. The student should be able to demonstrate appropriate use of medicines in disease with consideration to its efficacy, safety, suitability and cost for the individual and mass therapy.
iv. The student should have an understanding of general considerations of antimicrobial resistance and antibiotic stewardship program

Access knowledge about medicines through reliable resources to enable the students to fulfill their roles of an Indian Medical Graduate as a clinician, leader, communicator, lifelong learner and professional

### 3. COMPETENCIES

The student during the training program should acquire the following competencies:

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**(a) Knowledge /Cognitive Domain**

At the end of the course the learner shall be able to:

1. Understand the general principles of drug action and handling of drugs by the body in all the individuals including children, elderly, lactating and pregnant women and those having a renal and/or hepatic disease and genetic variations.
2. Prescribe drugs rationally by:

a. Understanding the importance of both the non pharmacological(non drug) and pharmacological (drug) treatment

b. Selection of drugs based on suitability, tolerability, efficacy and cost.

3. Apply pharmacokinetic principles in clinical practice pertaining to the drugs used in commonly encountered conditions, National Health Programmes and emergency medical conditions.
4. Foresee, prevent and manage adverse drug events and drug drug/food/traditional medicine interactions.
5. Use antimicrobials judiciously for therapy and prophylaxis, understanding the rapid development of Antimicrobial resistance(AMR).
6. Understand and implement the concepts of essential medicines, pharmacoeconomics and evidence-based medicine for improving the community health care.
7. Describe the clinical presentation and management of common poisoning including bites and stings.
8. Understand the basic concepts of new drug development with emphasis on design and conduct of clinical trials and interpretation of their results.

**(b) Skills/ Psychomotor Domain**

At the end of the course the learner shall be able to perform and interpret following skills

1. Write a correct, complete and legible prescription for common ailments including those in the National health Programmes and emergency medical conditions. And should be able to modify the prescription in case of drug interactions.
2. Calculate the drug dosage using appropriate formulae for an individual patient.
3. Administer the required dose of different drug formulations using appropriate devices and techniques (.e.g injections, inhalers, transdermal patches etc.).
4. Advice and interpret the therapeutic monitoring reports of important drugs.
5. Identify, analyze and report adverse drug reactions to appropriate authorities.
6. Retrieve drug information from appropriate sources including the electronic resources.
7. Analyse critically drug promotional literature in terms of pharmacological actions of the ingredients, rational/irrational nature of the preparation, economics of the use and claims by the pharmaceutical companies.

**(c) Communication affective attitude Domain**

1. Effectively explain to patients, the effects and side effects of drugs, including the need for medication adherence.
2. Communicate effectively with pharmacological reasoning with health care team on rational use of drugs and improving spontaneous reporting of adverse events.
3. Motivate patients with chronic diseases to adhere to the line of management as outlined by the health care provider.
4. Demonstrate respect in interactions with peers, and other healthcare professionals.
5. Demonstrate ethical behavior and integrity in one's work.

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6. Demonstrate ability to generate awareness about the use of generic drugs in patients.
7. Understand the legal and ethical aspects of prescribing drugs.
8. Acquire skills for self-directed learning to keep up with developments in the field and to continuously build to improve on skills, expertise and perpetual professional development.

## 4. COURSE

Course content for detailed competencies given below in Appendix 1

| PH | Competency |
|---|---|
| 1.1 | Define and describe the principles of pharmacology and pharmacotherapeutics |
| 1.2 | Describe the basis of Evidence based medicine and Therapeutic drug monitoring |
| 1.3 | Enumerate and identify drug formulations and drug delivery systems |
| 1.4 | Describe absorption, distribution, metabolism & excretion of drug |
| 1.5 | Describe general principles of mechanism of drug action |
| 1.6 | Describe principles of Pharmacovigilance & ADR reporting systems |
| 1.7 | Define, identify and describe the management of adverse drug reactions (ADR) |
| 1.8 | Identify and describe the management of drug interactions |
| 1.9 | Describe nomenclature of drugs i.e. generic, branded drug |
| 1.10 | Describe parts of a correct, complete and legible generic prescription. Identify errors in prescription and correct appropriately |
| 1.11 | Describe various routes of drug administration, eg. oral, SC, IV, IM, SL |
| 1.12 | Calculate the dosage of drugs using appropriate formulae for an individual patient, including children, elderly and patient with renal dysfunction |
| 1.13 | Describe mechanism of action, types, doses, side effects, indications and contraindications of adrenergic and anti-adrenergic drugs |
| 1.14 | Describe mechanism of action, types, doses, side effects, indications and contraindications of cholinergic and anticholinergic drugs |
| 1.15 | Describe mechanism/s of action, types, doses, side effects, indications and contraindications of skeletal muscle relaxants |
| 1.16 | Describe mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act by modulating autacoids, including: anti-histaminic, 5-HT modulating drugs, NSAIDs, drugs for gout, anti-rheumatic drugs, drugs for migraine |
| 1.17 | Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of local anesthetics |
| 1.18 | Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of general anesthetics, and preanesthetic medications |
| 1.19 | Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act on CNS, (including anxiolytics, sedatives & hypnotics, anti-psychotic, antidepressant drugs, anti-maniacs, opioid agonists and antagonists, drugs used for neurodegenerative disorders, anti-epileptics drugs) |
| 1.20 | Describe the effects of acute and chronic ethanol intake |

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| | |
|---|---|
| 1.21 | Describe the symptoms and management of methanol and ethanol poisonings |
| 1.22 | Describe drugs of abuse (dependence, addiction, stimulants, depressants, psychedelics, drugs used for criminal offences) |
| 1.23 | Describe the process and mechanism of drug deaddiction |
| 1.24 | Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs affecting renal systems including diuretics, antidiuretics- vasopressin and analogues |
| 1.25 | Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs acting on blood, like anticoagulants, antiplatelets, fibrinolytics, plasma expanders |
| 1.26 | Describe mechanisms of action, types, doses, side effects, indications and contraindications of the drugs modulating the renin-angiotensin and aldosterone system |
| 1.27 | Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antihypertensive drugs and drugs used in shock |
| 1.28 | Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in ischemic heart disease (stable, unstable angina and myocardial infarction), peripheral vascular disease |
| 1.29 | Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in congestive heart failure |
| 1.30 | Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the antiarrhythmics |
| 1.31 | Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in the management of dyslipidemias |
| 1.32 | Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in bronchial asthma and COPD |
| 1.33 | Describe the mechanism of action, types, doses, side effects, indications and contraindications of the drugs used in cough (antitussives, expectorants/ mucolytics) |
| 1.34 | Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs used as below: 1. Acid-peptic disease and GERD<br>2. Antiemetics and prokinetics<br>3. Antidiarrhoeals<br>4 .Laxatives<br>5. Inflammatory Bowel Disease 6. Irritable Bowel Disorders, biliary and pancreatic diseases |
| 1.35 | Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in hematological disorders like:<br>1.Drugs used in anemias<br>2.Colony Stimulating factors |
| 1.36 | Describe the mechanism of action, types, doses, side effects, indications and contraindications of drugs used in endocrine disorders (diabetes mellitus, thyroid disorders and osteoporosis) |
| 1.37 | Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used as sex hormones, their analogues and anterior Pituitary hormones |

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|---|---|
| 1.38 | Describe the mechanism of action, types, doses, side effects, indications and contraindications of corticosteroids |
| 1.39 | Describe mechanism of action, types, doses, side effects, indications and contraindications the drugs used for contraception |
| 1.40 | Describe mechanism of action, types, doses, side effects, indications and contraindications of 1. Drugs used in the treatment of infertility, and 2. Drugs used in erectile dysfunction |
| 1.41 | Describe the mechanisms of action, types, doses, side effects, indications and contraindications of uterine relaxants and stimulants |
| 1.42 | Describe general principles of chemotherapy |
| 1.43 | Describe and discuss the causes, extent and burden of Antimicrobial Resistance(AMR). Rational use of antimicrobials including antibiotic stewardship program |
| 1.44 | Describe the first line antitubercular dugs, their mechanisms of action, side effects and doses. |
| 1.45 | Describe the drugs used in MDR and XDR Tuberculosis |
| 1.46 | Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antileprotic drugs |
| 1.47 | Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in malaria, KALA-AZAR, amebiasis and intestinal helminthiasis |
| 1.48 | Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in UTI/ STD and viral diseases including HIV |
| 1.49 | Describe mechanism of action, classes, side effects, indications and contraindications of anticancer drugs |
| 1.50 | Describe mechanisms of action, types, doses, side effects, indications and contraindications of immunomodulators and management of organ transplant rejection |
| 1.51 | Describe occupational and environmental pesticides, food adulterants, pollutants and insect repellents |
| 1.52 | Describe management of common poisoning, insecticides, common sting and bites |
| 1.53 | Describe heavy metal poisoning and chelating agents |
| 1.54 | Describe vaccines and their uses |
| 1.55 | Describe and discuss the following National Health Programmes including Immunisation, Tuberculosis, Leprosy, Malaria, HIV, Filaria, Kala Azar, Diarrhoeal diseases, Anaemia & nutritional disorders, Blindness, Non-communicable diseases, cancer and Iodine deficiency |
| 1.56 | Describe basic aspects of Geriatric and Pediatric pharmacology |
| 1.57 | Describe drugs used in skin disorders |
| 1.58 | Describe drugs used in Ocular disorders |
| 1.59 | Describe and discuss the following: Essential medicines, Fixed dose combinations, Over the counter drugs, Herbal medicines |
| 1.60 | Describe and discuss Pharmacogenomics and Pharmacoeconomics |
| 1.61 | Describe and discuss dietary supplements and nutraceuticals |
| 1.62 | Describe and discuss antiseptics and disinfectant |
| 1.63 | Describe Drug Regulations, acts and other legal aspect |
| 1.64 | Describe overview of drug development, Phases of clinical trials and |

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| | |
|---|---|
| | Good Clinical Practice |
| | **CLINICAL PHARMACY** |
| 2.1 | Demonstrate understanding of the use of various dosage forms (oral/local/parenteral; solid/liquid) |
| 2.2 | Prepare oral rehydration solution from ORS packet and explain its use |
| 2.3 | Demonstrate the appropriate setting up of an intravenous drip in a simulated environment |
| 2.4 | Demonstrate the correct method of calculation of drug dosage in patients including those used in special situations |
| | **CLINICAL PHARMACOLOGY** |
| 3.1 | Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient |
| 3.2 | Perform and interpret a critical appraisal (audit) of a given prescription |
| 3.3 | Perform a critical evaluation of the drug promotional literature |
| 3.4 | To recognise and report an adverse drug reaction |
| 3.5 | To prepare and explain a list of P-drugs for a given case/condition |
| 3.6 | Demonstrate how to optimize interaction with pharmaceutical representative to get authentic information on drug |
| 3.7 | Prepare a list of essential medicines for a healthcare facility |
| 3.8 | Communicate effectively with a patient on the proper use of prescribed medication |
| | **EXPERIMENTAL PHARMACOLOGY** |
| 4.1 | Administer drugs through various routes in a simulated environment using mannequins |
| 4.2 | Demonstrate the effects of drugs on blood pressure (vasopressor and vaso-depressors with appropriate blockers) using computer aided learning |
| | **COMMUNICATION** |
| 5.1 | Communicate with the patient with empathy and ethics on all aspects of drug use |
| 5.2 | Communicate with the patient regarding optimal use of a) drug therapy, b) devices and c) storage of medicines |
| 5.3 | Motivate patients with chronic diseases to adhere to the prescribed management by the health care provider |
| 5.4 | Explain to the patient the relationship between cost of treatment and patient compliance |
| 5.5 | Demonstrate an understanding of the caution in prescribing drugs likely to produce dependence and recommend the line of management |
| 5.6 | Demonstrate ability to educate public & patients about various aspects of drug use including antimicrobials as prescription drugs, drug dependence and OTC drugs |
| 5.7 | Demonstrate an understanding of the legal and ethical aspects of prescribing drugs |

**RECOMMENDED HOURS of Pharmacology Teaching**

**Total - 230 hours**
**Lectures - 80 hours**
**Practicals - 138 hours**
**Self Directed Learning - 12 hours**

## 5. TEACHING LEARNING METHODS

Teaching Learning methods used would include both for large group teaching and small group teaching. Approximately one third of time will be for didactic lectures.

**Large group** -Any instructional large group method including traditional lecture and interactive lecture.

**Small Group** – Any instructional method involving small groups of students in an appropriate learning context. These topics included are those where more intensive and interactive learning sessions are required.

Will be as follows

**-Demonstration-Observation-Assistance-Performance(DOAP)-Sessions**:A practical session that allows the student to observe a demonstration, assist the performer, perform in a simulated environment, perform under supervision or perform independently.
Demonstration of different routes of drug administration i.e Intravenous, Intramuscular, subcutaneous, Inhalation, Drug formulation exercises (Clinical Pharmacy)

**- Problem based learning for Small Group Discussions** - Drug nomenclature, Home remedies and house hold measures, Fixed dose drug combinations, Prescription writing, Rational Use of Medicines, Drug Advertisement, Drug dose calculation, Drug interaction, Drug food interactions and interaction of drugs of modern & traditional medicines,Antimicrobial Stewardship Program & Rational Use of antimicrobials, Essential Medicine concept, P Medicine exercises for treatment of common disease conditions, Monitoring drug therapy, Ethics in Human Volunteer Experiment, Adverse Drug Reaction(ADR) form filling exercise

- **Computer Assisted Learning-** Experiments showing effects of drugs on physiological systems. For example Effect of drugs on Rabbit Eye, Effect of drugs on Dog Blood Pressure, Effect of drugs on Frog Rectus abdominis muscle.

**- Student Presentations** - Evolution of Medicine and Pharmacology, Sources of Medicines, Drug formulations, Pharmacological basis of House hold remedies, Indian Systems of Medicines , Systemic Pharmacology etc

**-Preparation of Charts and Models** - Evolution of Medicine and Pharmacology, House hold remedies, Drug dosage forms

**- Clinical Exposure** - Clinical case discussions on common disease conditions, ADR monitoring and reporting

**- Self Directed Learning** -A process in which individuals take the initiative, with or without the help of others in diagnosing their learning needs, formulating learning goals, identifying human and material sources for learning, choosing and implementing appropriate learning methods.

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Preparation for seminars, projects, student presentations on areas of interest and relevant to learning of Pharmacology

**6. ASSESSMENT**

**a) Formative Assessment**: Formative assessment shall be done periodically throughout the course.

**b) Internal Assessment:**

**i)** No less than three internal assessment exams shall be conducted during the course.

**Ii) Certifiable competencies:**Achievement of certifiable competencies would also be recorded in logbooks. The student must have completed the required certifiable competencies and completed the log book to be eligible for appearing at the final university examination. (Appendix 2: List of Certifiable competencies)

**Iii) Log Book**: Log book is to be maintained to record all activities like Drug formulations, Computer Assisted Learning exercises, Experimental Pharmacology, Clinical Pharmacology and other academic activities. It has to be submitted to the department regularly and would be assessed regularly ( Appendix 3) .
Internal assessment will be calculated for Theory (40) marks & Practical (20) marks.
50% combined in theory and practical (not less than 40% in each) for eligibility for appearing for University Examinations.

**c)Summative theory practical and Viva voice pattern with distribution of marks :**
At the end of the course a final examination will be conducted by the University.
**University (Professional) examination**: There will be a Theory and Practical + Viva examination .

**i) THEORY PAPERS**
There shall be two theory papers. .
Each paper shall be of 03 hours duration and of 100 marks.

**THEORY PAPER - PHARMACOLOGY**
**Theory (200 marks)** (Paper I – 100, Paper II – 100)

**PAPER – I (100 Marks)**
**Topics:** General Pharmacology, Drugs acting on Autonomic nervous system, Drugs acting on Central nervous system, Drugs acting on Peripheral nervous system, Drugs acting on Cardio vascular system, Drugs acting on Kidney, Drugs acting on Respiratory system

**PAPER – II (100 Marks)**
**Topics:** Chemotherapy of infective, parasitic disorders and malignancy, Drugs acting on Reproductive system, Drugs related to Endocrinal system, Drugs acting on Gastrointestinal system, skin and mucous membrane, Autacoids, Drugs affecting Blood and blood formation, Vitamins, Antiseptics and disinfectant, Diagnostic agents, Chelating agents, Vaccines and sera, Environmental pollutants

**THEORY QUESTION PAPER FORMAT**
Each paper will have three Parts. Part 1 of 20 marks, & Part II of 40 marks each.

Each part will have two questions

**Each paper 100 marks**

**Part I** **20 marks**
Objective type questions

Q1. Multiple type questions of inferential, reasoning type (5 x 2 marks=10)
Q2. State True or False / Fill in the blanks, Match the following (5 x 2 marks =10 )
Mechanism of action/Therapeutic uses/ adverse effects of drugs,
Drug of choice type of questions

**Part II** **40 marks**
Q 3. Explain why (rationale of) giving suitable examples (5 x 4 marks= 20marks)

Q 4. a)Long structured question based on a Case scenario ( 10 marks)
b)Short notes (2 x 5=10 marks)

**Part III** **40** marks
Q5. Discuss the therapeutic status of a medicine ( 4 x 5marks =20 marks)
Q6. Discuss giving the therapeutic goals the drug treatment of a medical condition ( 2 x 10 marks=20 marks)

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**ii) PRACTICALS & VIVA**
**Total marks -100marks**
**Practical -70 marks**
**Viva-voce 30 marks**

**Practical ( 70 marks)**

| | |
|---|---|
| 1. Clinical Pharmacy | 20 marks |
| 2. Clinical Pharmacology | 30 marks |
| 3. Attitude, Ethics ,Communication | 10 marks |
| 4. Experimental Pharmacology | 10 marks |

**7. RECOMMENDED READING**
**(A) TEXT**
1. Essentials of Medical Pharmacology by K.D. Tripathi latest ed. Jaypee brothers, Medical Publishers, India.
2. Sharma and Sharma's Principles of Pharmacology latest ed by H. L. Sharma and K. K. Sharma Publishers: Paras Medical Publishers, New Delhi
3. Basic & Clinical Pharmacology Bertram G. Katzung, Susan B. Masters, Anthony J. Trevor, latest ed McGraw-Hill Companies

**(B) REFERENCE BOOKS**
1. Lippincott's Illustrated Reviews : Pharmacology : by Mary J Mycek , Richard A Harvey , Pamela C Champe latest ed Lippincott Williams & Wilkins

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2. Goodman & Gilman's the Pharmacological Basis of Therapeutics by Joel Griffith Hardman, Alfred Goodman Gilman, Lee Limbird, Theodore W. Rall latest ed, McGraw-Hill Professional.

**(C) AETCOM module**

1. Johnson AR, Siegler M, Winslade WJ. Clinical Ethics: A Practical Approach to Ethical Decisions in Clinical Medicine. New York: Mc Graw Hill Inc, 2015 ( latest edition)

2. Timms O. Biomedical Ethics. Elsievier India, 2019( latest edition)

## 8. ELECTIVES

May be offered to students in the subject. A student has a choice of four weeks of elective posting after 3rd MBBS part I Professional examination. The departments can offer options for a student to do the same in Pharmacology.

## REFERENCES


1. Syllabus Of Pharmacology For Undergraduate Medical Students. https://www.fmsc.ac.in/curriculum/Curriculum%20for%20UG%20Pharmacology.pdf
2. Assessment Module for Undergraduate Medical Education 2019. https://www.nmc.org.in/wp-content/uploads/2020/01/Module_Competence_based_02.09.2019.pdf
3. Competency Based Undergraduate Curriculum For The Indian Medical Graduate 2018. https://www.nmc.org.in/wp-content/uploads/2020/01/UG-Curriculum-Vol-II.pdf


## Appendix 1

### (I) Concepts of General and Clinical Pharmacology

1. Introduction: definition, historical perspective, branches and scope of the subject of pharmacology and its relation with other medical disciplines
2. Nature and sources of Drugs, Drug nomenclature and dosage forms
3. Routes of drugs' administration; advantages and disadvantages of different routes
4. Pharmacokinetic considerations: drug absorption, distribution, biotransformations and excretion
5. Pharmacokinetic concepts of bioavailability, apparent volume of distribution (aVd), half life (t½), and clearance (CL) that are used to decide the doses and rational dosing during the drug treatment.
6. Pharmacodynamics; site and mechanism of drug action, drug receptors and receptor regulation, concepts of agonists, antagonists, partial agonist and inverse agonist drugs
7. Quantitative aspect of drug action: analysis of dose response curve and therapeutic index (safety index)
8. Factors affecting drug action and doses, how to prolong or shorten the drug action and effects
9. Drug interactions and concept of pharmacogenomics/-genetics in drug action, effects and ADRs
10. Adverse drug reactions (ADRs) and role of pharmacovigilance activity in ADR monitoring
11. Concept of evidence-based medicine, essential medicines, pharmacoeconomics,

Pdrugs and rational prescribing
12. Development of new drugs : pre-clinical and clinical phases of drug evaluation
13.Scope and relevance of Clinical Pharmacology
14. Essential medicine, rationality of fixed dose combinations
15. Drug regulation acts and other legal aspects

**(b) Systemic Pharmacology – Drug oriented teaching**
(Here a core information about drugs is to be given that should include pharmacological actions, mechanism of action, indications, contraindications, side effects, drug interactions,
precautions etc.)

**(II) Drugs Affecting Autonomic Nervous System (ANS)**
16. Introduction to Pharmacology of ANS
17. Cholinergic drugs: cholinoceptor agonist and cholinesterase inhibiting drugs
18. Anticholingergic drugs: cholinoceptor blocking agents
19. Adrenergic drugs: adrenoceptor agonist and sympathomimetic drugs
20 Anti-adrenergic drugs: adrenoceptor antagonists and
sympatholytic agents

**(III) Drugs Affecting Peripheral Nervous System (PNS)**
21 Local anaesthetics
22. Skeletal muscle relaxants

**(IV) Drugs Affecting Cardiovascular System (CVS)**
23. Drugs affecting vascular tone and volume of circulation, renin angiotensin system and other mechanisms affecting this system
24. Antihypertensive drugs
25. Anti-anginal drugs, management of Myocardial Infarction
26. Drugs for heart failure
27. Anti-arrythmic agents
28. Anti-dyslipidemic agents, drugs used in peripheral vascular disease
29. Nitric oxide donors and inhibitors and basic concepts of treatment of shock

**(V) Drugs Affecting Autacoids, Inflammation and Gout**
30. Histamine, serotonin & their antagonists, treatment of migraine
31. Prostaglandins, Leukotrienes, Platelet activating factor
32. Non Steroidal Anti inflammatory Drugs
34. Drug treatment of gout, rheumatoid arthritis & other autoimmune diseases

**(VI) Drugs Affecting Kidney Function**
35. Diuretics
36. Antidiuretics

**(VII) Drugs Affecting Respiratory System**
37. Antitussives, expectorants, mucolytics
38. Drug treatment of bronchial asthma, Chronic Obstructive Pulmonary disease

**(VIII) Drugs Affecting Gastro-intestinal System**
39. Drugs for gastric acidity, peptic ulcer & Gastro esophageal reflux disease

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40. Antiemetic and prokinetic agents
41. Drugs for constipation and Inflammatory Bowel Disease
42. Antidiarrhoeal agents

**(IX) Drugs Acting on Blood**

43. Agents used to treat anemias and haematopoietic growth factors
44. Coagulants and anticoagulants
45. Antiplatelet drugs
46. Fibrinolytic, antifibrinolytic, plasma expanders

**(X) Drugs Affecting Central Nervous system**

47. Introduction and basic concepts of drugs affecting CNS activity: Neurotransmitters and their pathways and important sites of Central Nervous System effect of drugs
48. Sedative hypnotic drugs
49. General anaesthetics with preanaesthetic medications
50. Antiepileptic drugs
51. Antipsychotic drugs
52 Antianxiety drugs
53. Antidepressant and antimaniac drugs
54. Opioid analgesic and antagonists
55. Antiparkinsonian drugs and drugs for other neurodegenerative and movement disorders
56. Pharmacology of ethyl alcohol and other alcohols
57. Pharmacology of CNS stimulants, psychomimetic drugs, drug dependence and substance abuse

**(XI) Drugs Affecting Endocrine System and its Diseases**

58. Pharmacology of pituitary and hypothalamic hormones
59. Thyroid hormones and antithyroid drugs
60. Estrogen, progesterone and inhibitors
61. Oral contraceptives & Hormone replacement therapy
62. Androgen
63.Drugs for diabetes mellitus: Insulin and oral antidiabetic agents
65. Corticosteroids
66. Parathyroid hormones and drugs affecting calcium balance
67. Drugs acting on uterus
68. Drug treatment for infertility and erectile dysfunctions

**(XII) Pharmacology of Chemotherapeutic Agents**

69. Introduction and basic principles of chemotherapy of infection, infestation and neoplastic diseases and concepts of resistance to chemotherapeutic agents
70.Sulfonamides
71. Quinolones
72. Beta lactam antibiotics
73. Aminoglycosides
74. Macrolides and ketolides
75. Tetracycline and chloramphenicol
76. Oxazolidinones, streptogramin and other antibiotics
77. Antimycobacterial drugs, antitubercular drugs; treatment of MDR and XDR

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tuberculosis
78. Antileprosy drugs
79 Antifungal drugs
80. Antimalarial drugs
81. Antiamoebic and other antiprotozoal drugs
82. Drugs used in filariasis and kalaazar
83. Anthelmintic agents
84. Antiviral, anti-AIDS drugs
85. Chemotherapy of Urinary tract infection & Sexually transmitted diseases
86. Basic principles of cancer chemotherapy

**(XIII) Immunopharmacology**

87. Vaccines, immunomodulators and treatment of transplant rejection disorders

**(XIV) Miscellaneous Topics**

88. Drugs acting on skin and mucous membrane
89. Vitamins, nutraceuticals and probiotics
90. Pharmacology of Diagnostic agents
91. Paediatric pharmacology
92. Geriatric pharmacology
93. Pharmacology of chelating agents
94. Indian Systems of Medicines

## Appendix 2. Certifiable Competencies

| | Certifiable competencies | Number required to certify |
|---|---|---|
| 3.1 | Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient | 5 |
| 3.2 | Perform and interpret a critical appraisal (audit) of a given prescription | 3 |
| 3.3 | Perform a critical evaluation of the drug promotional literature | 3 |
| 3.5 | To prepare and explain a list of P-drugs for a given case/condition | 3 |

## Appendix 3

## M.B.B.S. STUDENT'S LOG BOOK (PHARMACOLOGY)

## GENERAL INSTRUCTIONS

1. This logbook is a record of the academic/co-curricular activities in Pharmacology of the designated student.

2. The student is responsible for getting the entries in the logbook verified by the faculty in-charge in the next class.

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3. Entries in the Logbook will reflect the activities undertaken in the department of Pharmacology during your course.

4. The student has to get this logbook verified by the mentor and the Head of the department before submitting the application of the University examination.

The log book must have

1) Details of Students
   Name
   Roll Number
2) Details of attendance
3) Details of all skill based exercises done
4) Details of Certifiable skills
5) Details of group discussions/ presentations
6) Details of any project work done
7) Any other Cocurricular activity related to the subject

A format for **Certifiable skill**

**Skill: PH 3.1 Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient**

Domain: Skills
Level of competency: Perform
Core: Yes

The student has to perform this activity- Present **five** prescription for common diseases for certification.

| Exercise name | Date | Completed | | Rating | | |
|---|---|---|---|---|---|---|
| | | Yes | No | Below expectations | Meet expectations | Exceed expectations |
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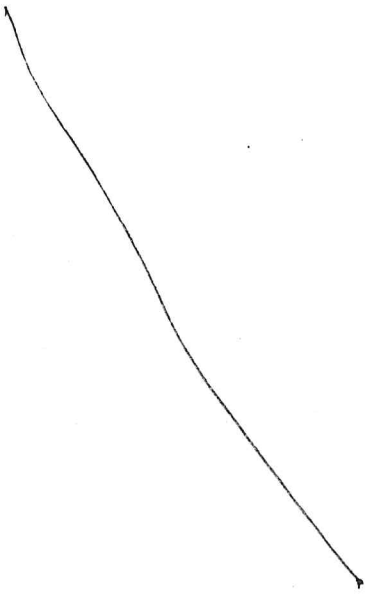
## LOG BOOK CERTIFICATE

This is to certify that the candidate Ms _____ Reg No. _____, admitted in the year _____in the _____Medical college, New Delhi, has satisfactorily completed / has not completed all assignments /requirements mentioned in this logbook for Second year MBBS course in the subject of Pharmacology during the period from _____ to _____. She/ is/is not eligible to appear for the summative (University) assessment as on the date given below.

_____

Signature of Faculty Name and Designation

Countersigned by Head of the Department



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## MINUTES

A meeting of the Committee of Courses & Studies in the Department of **Pathology** was held on Monday the 27th December, 2021 at 2.00 p.m. in the Committee Room, Faculty of Medical Sciences, 7th Floor, VPCI Building, University of Delhi, Delhi – 110007.

The following members were present:-

1. **Prof. Sonal Sharma,** Head, Deptt of Pathology, DU C/o UCMS
2. **Dr. Sunita Sharma, Head, Dept of Pathology, LHMC**
3. **Dr. Nita Khurana, Head, Deptt of Pathology, MAMC**
4. **Dr. Vinod Kumar Arora, Head, Deptt of Pathology, UCMS**
5. **Dr. Sarika Singh, Senior Professor, Dept of Pahology, MAMC**
6. **Dr. Reena Tomar, Sr. Associate Professor, Deptt of Pathology, MAMC**
7. **Dr. Preeti Diwakar, Sr. Associate Professor, Deptt of Pathology, UCMS**
8. **Dr. Shailaja Shukla, Lady Hardinge Medical College,**
9. **Col. (Dr.) Venkatesam S, AHRR**
10. **Dr. P. Lalita Jyotsna, LHMC**

1. The Committee recommended the new MBBS 2nd Prof. Pathology curriculum to be implemented from the current academic year.

2. An approved curriculum document for MBBS CBME Phase-II for Pathology Department of MAMC, LHMC & UCMS is annexed as **Annexure-I**.

3. An approved assessment Blue Print for MBBS CBME Phase-II for Pathology Department of MAMC, LHMC & UCMS is annexed as **Annexure-II**.

The meeting ended with a vote of thanks to the chair.

**Prof. Sonal Sharma**
**(Chairperson)**

## VISION

The broad goal of pathology curriculum is to make undergraduates aware of pathological basis of disease, have comprehensive scientific knowledge of the gross and microscopic features of various organs affected in different pathological lesions and their correlation with clinical presentation.

**Learning objectives (overall)**

At the end of curriculum, student should be able to

**a) KNOWLEDGE**

1. Explain pathological basis of disease.
2. Identify gross and microscopic features of common pathological lesions
3. Know the etiopathogenesis of common clinical conditions
4. Know genetic basis of diseases with knowledge of genetic tools for diagnosis of diseases

**b) SKILL**

At the end of course, student should be able to

1. Make good peripheral smear AND describe the peripheral blood picture
2. Analyze lab reports and its correlation with clinical diagnosis
3. Describe the correct technique to perform blood grouping & cross matching,
4. Identify the etiology of meningitis based on given CSF parameters
5. Interpret liver function and viral hepatitis serology panel and able to differentiate various types of jaundice

**C) ATTITUDE AND COMMUNICATIONS**

At the end of course, student should be able to

1.Show due respect in handling of specimens, slides and microscope
2. work efficiently in a team
3.Communicate efficiently with teachers and peer groups
4. Develop professional attributes in terms of discipline, punctuality, accountability and respect to teachers

**Competencies**

Detailed competencies are shown in annexure 1

Learning objective for each competencies are added in annexure 2

# Annexure 1

**Syllabus copy for approval**

| s.no | Topic | Competency | Theory/practical/ laboratory/clinical |
|---|---|---|---|
| 1) | Introduction to Pathology | PA1.1: Describe the role of a pathologist in diagnosis and management of disease<br>PA1 2:Enumerate common definitions and terms used in Pathology<br>PA1.3:Describe the history and evolution of Pathology | Theory/practical |
| 2) | Cell Injury and Adaptation | PA2.1:Demonstrate knowledge of the causes, mechanisms, typesand effects of cell injury and their clinical significance<br>PA2.2:Describe the etiology of cell injury. Distinguish between reversible-irreversible injury: mechanisms; morphology of cell injury<br>PA2.3:Intracellular accumulation of fats, proteins, carbohydrates,pigments<br>PA2.4:Describe and discuss Cell death-types, mechanisms, necrosis, apoptosis (basic as contrasted with necrosis), autolysis<br>PA2.5:Describe and discuss pathologic calcifications, gangrene<br>PA2.6:Describe and discuss cellular adaptations: atrophy,hypertrophy, hyperplasia, metaplasia, dysplasia<br>PA2.7:Describe and discuss the mechanisms of cellular aging and Apoptosis<br>PA2.8:Identify and describe various forms of cell injuries, theirmanifestations and consequences in gross and microscopic specimens | Theory/practical/ laboratory/clinical |
| 3) | Amyloidosis | PA3.1Describe the pathogenesis and pathology of amyloidosis<br>PA3.2:Identify and describe amyloidosis in a pathology specimen | Theory/practical/ laboratory/clinical |
| 4) | Inflammation | PA4.1 Define and describe the general features of acute and chronic inflammation including stimuli, vascular and cellular events<br>PA4.2Enumerate and describe the | Theory/practical/ laboratory/clinical |

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| | | mediators of acute inflammation<br>PA4.3: Define and describe chronic inflammation including causes,typesnon-specific and granulomatous; and examples of each<br>PA4.4: Identify and describe acute and chronic inflammation in gross and microscopic specimens | |
| 5) | Healing and repair | PA5.1:Define and describe the process of repair and regenerationincluding wound healing and its types | Theory/practical/ laboratory/clinical |
| 6) | Hemodynamic disorders | PA6.1 Define and describe edema,its types, pathogenesis and clinical correlation<br>PA6.2Define and describe hyperemia, congestion, hemorrhage<br>PA6.3 :Define and describe shock, its pathogenesis and its stages<br>PA6.4:Define and describe normal haemostasis and theetiopathogenesis and consequences of thrombosis<br>PA6.5: Define and describe embolism and its causes and common types<br>PA6.6:Define and describe Ischaemia/infarction its types, etiology,morphologic changes and clinical effects<br>PA6.7: Identify and describe the gross and microscopic features of infarction in a pathologic specimen | Theory/practical/ laboratory/clinical |
| 7) | Neoplastic disorders | PA7.1:Define and classify neoplasia. Describe the characteristics of neoplasia including gross, microscopy, biologic, behaviour and spread. Differentiate between benign from maignantneoplasm<br>PA7.2:Describe the molecular basis of cancer<br>PA7.3:Enumerate carcinogens and describe the process of Carcinogenesis<br>PA7.4:Describe the effects of tumor on the host includingparaneoplastic syndrome<br>PA7.5: Describe immunology and the immune response to cancer | Theory/practical/ laboratory/clinical |
| 8) | Basic diagnostic cytology | PA8.1Describe the diagnostic role of cytology and its application in clinical care<br>PA8.2Describe the basis of exfoliative cytology including the technique & stains used | Theory/practical/ laboratory/clinical |

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| | | PA8.3Observe a diagnostic cytology and its staining and interpret the specimen DOAP | |
| 9) | Immunopathology and AIDS | PA9.1Describe the principles and mechanisms involved in immunity<br>PA9.2Describe the mechanism of hypersensitivity reactions<br>PA9.3 DESCRIBE HLA SYSTEM and immune systems Involved in transplant and mechanism of transplant rejection<br>PA9.4 Define autoimmunity. Enumerate autoimmune disorders<br>PA9.5 Define and describe the pathogenesis of systemic Lupus Erythematosus<br>PA9.6Define and describe the pathogenesis and pathology of HIV and AIDS<br>PA9.7Define and describe the pathogenesis of other common autoimmune diseases | Theory/practical/ laboratory/clinical |
| 10) | Infections and Infestations | PA10.1:Define and describe the pathogenesis and pathology of malaria<br>PA10.2:Define and describe the pathogenesis and pathology of Cysticercosis<br>PA10.3:Define and describe the pathogenesis and pathology of leprosy<br>PA10.4:Define and describe the pathogenesis and pathology of common bacterial, viral, protozoal and helminthic diseases | Theory/practical/ laboratory/clinical |
| 11) . | Genetic and paediatric diseases | PA11.1:Describe the pathogenesis and features of commoncytogenetic abnormalities and mutations in childhood<br>PA11.2:Describe the pathogenesis and pathology of tumor and tumourlike conditions in infancy and childhood<br>PA11.3:Describe the pathogenesis of common storage disorders in infancy and childhood | Theory/practical/ laboratory/clinical |
| 12) | Environmental and nutritional diseases | PA12.1:Enumerate and describe the pathogenesis of disorders caused by air pollution, tobacco and alcohol<br>PA12.2:Describe the pathogenesis of disorders caused by protein calorie malnutrition and starvation<br>PA12.3:Describe the pathogenesis of obesity and its consequences | Theory/practical/ laboratory/clinical |
| 13) | Introduction to haematology | PA13.1:Describe hematopoiesis and extramedullary hematopoiesis<br>PA13.2:Describe the role of anticoagulants in hematology<br>PA13.3:Define and classify anemia<br>PA13.4:Enumerate and describe the | Theory/practical/ laboratory/clinical |

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| | | investigation of anemia<br>PA13.5:Perform, Identify and describe the peripheral blood picture in anemia | |
| 14) | Microcytic anemia | PA14.1:Describe iron metabolism<br>PA14.2:Describe the etiology, investigations and differential diagnosis of microcytic hypochromic anemia<br>PA14.3:Identify and describe the peripheral smear in microcytic anemia | Theory/practical/ laboratory/clinical |
| 15) | Macrocytic anemia | PA15.1:Describe the metabolism of Vitamin B12 and the etiology and pathogenesis of B12 deficiency<br>PA15.2:Describe laboratory investigations of macrocytic anemia<br>PA15.3:Identify and describe the peripheral blood picture of macrocytic Anemia<br>PA15 4:Enumerate the differences and describe thedistinguishing features of megaloblastic and non-megaloblastic macrocytic anemia | Theory/practical/ laboratory/clinical |
| 16) | Hemolyticanemia | PA16.1Define and classify hemolytic anemia<br>PA16.2Describe the pathogenesis and clinical features and hematologic indices of hemolytic anemiaPA16.3Describe the pathogenesis, features, hematologic indices and peripheral blood picture of sickle cell anemia and thalassemia<br>PA16.4Describe the etiology pathogenesis, hematologic indices and peripheral blood picture of Acquired hemolytic anemia<br>PA16.5 Describe the peripheral blood picture in different hemolyticanemia<br>PA16.6:Prepare a peripheral blood smear and identify hemolytic anaemia from it<br>PA16.7:Discribe the correct technique to perform a cross match | Theory/practical/ laboratory/clinical |
| 17) | Aplastic anemia | PA17.1Enumerate the etiology, pathogenesis and findings in aplastic anemia<br>PA17.2Enumerate the indications and describe the findings in bone marrow aspiration and biopsy | Theory/practical/ laboratory/clinical |
| 18) | Leucocytic disorders | PA18.1Enumerate and describe the causes of leucocytosis leucopenia lymphocytosis and leukemoid reactions .<br>PA`18.2:Describe the etiology, genetics, pathogenesis classification, features, hematologic features of acute | Theory/practical/ laboratory/clinical |

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| | | and chronic leukemia | |
| 19) | Lymph node and spleen | PA19.1Enumerate the causes and describe the differentiating features of lymphadenopathy<br><br>PA19.2Describe the pathogenesis and pathology of tuberculous lymphadenitis<br><br>PA19.3Identify and describe the features of tuberculous lymphadenitis in a gross and microscopic specimen<br><br>PA19.4 :Describe and discuss the pathogenesis, pathology and the differentiating features of Hodgkin's and non-Hodgkin'slymphoma<br><br>PA19.5: Identify and describe the features of Hodgkin's lymphoma in a gross and microscopic specimen<br><br>PA19.6 Enumerate and differentiate the causes of splenomegaly<br><br>PA19.7:Identify and describe the gross specimen of an enlarged spleen | Theory/practical/ laboratory/clinical |
| 20) | Plasma cell disorders | PA20.1 :Describe the features of plasma cell myeloma | Theory/practical/ laboratory/clinical |
| 21) | Hemorrhagic disorders | PA21.1Describe normal hemostasis<br>PA21.2Classify and describe the etiology, pathogenesis and pathology of vascular and platelet disorders including ITP and haemophilia<br><br>PA21.3Differentiate platelet from clotting disorders based on the clinical and hematologic features<br><br>PA21.4Define and describe disseminated intravascular coagulation, its laboratory findings and diagnosis of disseminated intravascular coagulation<br><br>PA21.5Define and describe disseminated intravascular coagulation AND VIT K DEFICIENCY | Theory/practical/ laboratory/clinical |
| 22) | Blood banking and transfusion | PA22.1:Classify and describe blood group systems (ABO and RH)<br>PA22.2:Enumerate the indications, describe the principles, enumerate and demonstrate the steps of compatibility testing | Theory/practical/ laboratory/clinical |

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| | | PA22.4:Enumerate blood components and describe their clinical uses<br>PA22.5:Enumerate and describe infections transmitted by blood<br>Transfusion<br>PA22.6Describe transfusion reactions and enumerate the steps in the investigation of a transfusion reaction<br>PA22.7:Enumerate the indications and describe the principles and procedure of autologous transfusion | |
| 23) | Clinical Pathology | PA23.1:Describe abnormal urinary findings in disease states and identify and describe common urinary abnormalities in a clinical specimen<br>PA23.2:Describe abnormal findings in body fluids in various disease States<br>PA23.3:Describe and interpret the abnormalities in a panel containing semen analysis, thyroid function tests, renal function tests or liver function tests | Theory/practical/ laboratory/clinical |
| 24) | Gastrointestinal tract | PA24.1:Describe the etiology, pathogenesis, pathology and clinical features of oral cancers<br>PA24.2:Describe the etiology, pathogenesis, pathology, microbiology, clinical and microscopic features of peptic ulcer disease<br>PA24.3:Describe and identify the microscopic features of peptic ulcer<br>PA24.4:Describe and etiology and pathogenesis and pathologic features of carcinoma of the stomach<br>PA24.5;Describe and etiology and pathogenesis and pathologic features of Tuberculosis of the intestine<br>PA24.6:Describe and etiology and pathogenesis and pathologic and distinguishing features of Inflammatory bowel disease<br>PA24.7:Describe the etiology, pathogenesis, pathology and distinguishing features of carcinoma of the colon | Theory/practical/ laboratory/clinical |
| 25) | Hepatobiliary system | PA25.1:Describe bilirubin metabolism, enumerate the etiology and pathogenesis of jaundice, distinguish between direct and indirect hyperbilirubinemia<br>PA25.2:Describe the pathophysiology and pathologic changes seen in hepatic failure and their clincial manifestations, complications | Theory/practical/ laboratory/clinical |

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| | | and consequences<br>25.3:Describe the etiology and pathogenesis of viral and toxic hepatitis: distinguish the causes of hepatitis based on the clinical and laboratory features. Describe the pathology, complications and consequences of hepatitis<br>25.4:Describe the pathophysiology, pathology and progression of alcoholic liver disease including cirrhosis<br>25.5:Describe the etiology, pathogenesis and complications of portal hypertension<br>SDL PA25.6 :Interpret liver function and viral hepatitis serology panel. Distinguish obstructive from non-obstructive jaundice based on clinical features and liver function tests | |
| 26) | Respiratory system | 26.1:Define and describe the etiology, types, pathogenesis, stages, morphology and complications of pneumonia<br>26.2:Describe the etiology, gross and microscopic appearance and complications of lung abscess<br>PA26.3:describe the etiology, types, pathogenesis, stages, morphology and complications and evaluation of Obstructive airway disease (OAD) and bronchiectasis<br>PA26.4;Define and describe the etiology, types, pathogenesis, stages, morphology microscopic appearance and complications of tuberculosis<br>PA26.5:Define and describe the etiology, types, exposure, environmental influence, pathogenesis, stages, morphology, microscopic appearance and complications of Occupational lung disease<br>PA26.6: Define and describe the etiology, types, exposure, genetics environmental influence, pathogenesis, stages, morphology, microscopic appearance,metastases and complications of tumors of the lung and pleura<br>PA26.7:Define and describe the etiology, types, exposure, genetics environmental influence, pathogenesis, morphology, microscopic appearance and complications | Theory/practical/ laboratory/clinical |

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| | | of mesothelioma | |
| 27) | Cardiovascular system | PA27.1:Distinguish arteriosclerosis from atherosclerosis. Describe the pathogenesis and pathology of various causes and types of arteriosclerosis<br>PA27.2:Describe the etiology, dynamics, pathology types and complications of aneurysms including aortic aneurysms<br>PA27.3:Describe the etiology, types, stages pathophysiology, pathology and complications of heart failure<br>PA27.4:Describe the etiology, pathophysiology, pathology, gross and microscopic features, criteria and complications of rheumatic fever<br>PA27.5:Describe the epidemiology, risk factors, etiology,pathophysiology, pathology, presentations, gross and microscopic features,diagnostic tests and complications ofischemic heart disease<br>PA27.6:Describe the etiology, pathophysiology, pathology, gross and microscopic features, diagnosis and complications of infective endocarditis<br>PA27.7:Describe the etiology, pathophysiology, pathology, gross and microscopic features, diagnosis and complications of pericarditis and pericardial effusion<br>PA27.8:Interpret abnormalities in cardiac function testing in acute coronary syndromes<br>PA27.9:Classify and describe the etiology, types, pathophysiology, pathology, gross and microscopic features, diagnosis and complications of cardiomyopathies<br>PA27.10:Describe the etiology, pathophysiology, pathology features and complications of syphilis on the cardiovascular system | Theory/practical/ laboratory/clinical |
| 28) | Urinary Tract | PA28.1:Describe the normal histology of the kidney<br>PA28.2:Define, classify and distinguish the clinical syndromes and describe the etiology, pathogenesis, pathology, morphology, clinical and laboratory and urinary findings, complications of renal failure<br>PA28.3:Define and describe the etiology, precipitating factors, | Theory/practical/ laboratory/clinical |

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| | | pathogenesis, pathology, laboratory urinary findings,<br>progression and complications of acute renal failure<br>PA28.4:Define and describe the etiology, precipitating factors,<br>pathogenesis, pathology, laboratory urinary findings<br>progression and complications of chronic renal failure<br>PA28.5:<br>Define and classify glomerular diseases. Enumerate and<br>describe the etiology, pathogenesis, mechanisms of glomerular<br>injury, pathology, distinguishing features and clinical<br>manifestations of glomerulonephritis<br>PA28.6:Define and describe the etiology, pathogenesis, pathology,<br>laboratory, urinary findings, progression and complications of<br>IgA nephropathy<br><br>PA28.7:Enumerate and describe the findings in glomerular<br>manifestations of systemic disease<br><br>PA28.8Enumerate and classify diseases affecting the tubular<br>Interstitium<br><br>PA28.9Define and describe the etiology, pathogenesis, pathology,<br>laboratory, urinary findings, progression and complications of<br>acute tubular necrosis<br><br>PA28 10 describe the itiology ,pathophysiology ,lab findings and distinguishing features progression and complications<br>of acute and chronic pyelonephritis and reflux nephropathy<br><br>PA28.11:Define classify and describe the etiology, pathogenesis<br>pathology, laboratory, urinary findings, distinguishing features<br>progression and complications of vascular disease of the<br>kidney<br><br>PA28.12Define classify and describe the genetics, inheritance, etiology,<br>pathogenesis, pathology, laboratory, | |

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| | | urinary findings,<br>distinguishing features, progression and complications of cystic<br>disease of the kidney<br><br>PA28.13Define classify and describe the etiology, pathogenesis,<br>pathology, laboratory, urinary findings, distinguishing features<br>progression and complications of renal stone disease and<br>obstructive uropathy<br><br>PA28.14Classify and describe the etiology, genetics, pathogenesis,<br>pathology, presenting features,<br>progression and spread of renal<br>tumors<br><br>PA28.15Classify and describe the etiology, genetics, pathogenesis,<br>pathology, presenting features,<br>progression and spread of renal<br>tumors<br><br>PA28.16Describe the etiology, genetics, pathogenesis, pathology,<br>presenting features and progression of urothelial tumors | |
| 29) | Male Genital Tract | PA29.1:Classify testicular tumors and describe the pathogenesis,<br>pathology, presenting and distinguishing features, diagnostic<br>tests, progression and spread of testicular tumors<br>PA 29.2:Describe the pathogenesis, pathology, presenting and<br>distinguishing features, pathogenesis and spread of carcinoma of the penis<br>PA29.3:Describe the pathogenesis, pathology, hormonal dependency<br>presenting and distinguishing features, urologic findings &<br>diagnostic tests of benign prostatic hyperplasia<br><br>PA29.4:Describe the pathogenesis, pathology, hormonal dependency<br>presenting and distinguishing features, diagnostic tests,<br>progression and spread of carcinoma of the prostate<br>PA 29.5: Describe the etiology, pathogenesis, pathology and progression of prostatitis<br>GROSS | Theory/practical/ laboratory/clinical |

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| 30) | Female Genital Tract | PA30.1 DESCRIBE screening, diagnosis and progression of carcinoma of the cervix<br>PA30.2: Describe the pathogenesis, etiology, pathology, diagnosis and progression and spread of carcinoma of the endometrium<br>PA30.3 :Describe the pathogenesis, etiology, pathology, diagnosis and progression and spread of carcinoma of the leiomyomas and leiomyosarcomas<br>PA30.4:Classify and describe the etiology, pathogenesis, pathology, morphology, clinical course, spread and complications of ovarian tumors<br>PA30.5 : Describe the etiology, pathogenesis, pathology, morphology, clinical course, spread and complications of gestational trophoblastic neoplasms<br>PA 30.6 Describe the etiology and morphologic features of cervicitis(Non core)<br>PA30.7Describe the etiology, hormonal dependence, features and morphology of endometriosis<br>PA30.8 :Describe the etiology and morphologic features of adenomyosis<br>PA30.9Describe the etiology, hormonal dependence and morphology of endometrial hyperplasia | Theory/practical/ laboratory/clinical |
| 31) | **Breast** | PA31.1:classify and describe the types, etiology, pathogenesis,OF benign breast disease<br>PA31.2:Classify and describe the epidemiology, pathogenesis, classification, morphology, prognostic factors, hormonal dependency, staging and spread of carcinoma of the breast<br>PA31.3 Describe and identify the morphologic and microscopic features of carcinoma of the breast (P)<br>PA31.4 Enumerate and describe the etiology, hormonal dependency and pathogenesis of gynecomastia (NON CORE) | Theory/practical/ laboratory/clinical |
| 32) | Endocrine system | PA32.1Enumerate, classify and describe the etiology, pathogenesis, pathology and iodine dependency of thyroid swellings<br><br>PA32.2:Describe the etiology, cause, | Theory/practical/ laboratory/clinical |

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| | | iodine dependency,<br>pathogenesis, manifestations, laboratory and imaging features<br>and course of thyrotoxicosis<br><br>PA32.3:Describe the etiology, pathogenesis, manifestations, laboratory and imaging features and course of thyrotoxicosis/<br>hypothyroidism AND THYROID TUMORS<br><br>PA 32.4: Classify and describe the epidemiology, etiology, pathogenesis, pathology, clinical laboratory features, complications and<br>progression of diabetes mellitus<br><br>PA32.5:Describe the etiology, genetics, pathogenesis, manifestations,<br>laboratory and morphologic features of hyperparathyroidism<br><br>PA32.6:describe the itiology , laboratory, morphologic features, complications and metastases of pancreatic cancer<br><br>PA32.7:Describe the etiology, pathogenesis, manifestations, laboratory, morphologic features, complications of adrenal<br>insufficiency<br><br>PA32.8:Describe the etiology, pathogenesis, manifestations, laboratory, morphologic features, complications of Cushing's syndrome<br><br>PA32.9:Describe the etiology, pathogenesis, manifestations, laboratory and morphologic features of adrenal neoplasms | |
| 33) | Bone and soft tissue | PA33.1: Classify and describe the etiology, pathogenesis,<br>manifestations, radiologic and complications of osteomyelitis<br>PA 33.2 : Classify and describe the etiology, pathogenesis,<br>manifestations, radiologic and morphologic features and complications and metastases of bone tumors<br>PA 33.3:Classify and describe the etiology, pathogenesis,<br>manifestations, radiologic and morphologic features and<br>complications and metastases of soft | Theory/practical/ laboratory/clinical |

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| | | tissue tumors<br><br>PA 33.4:Classify and describe the etiology, pathogenesis,<br>manifestations, radiologic and morphologic features and<br>complications of Paget's disease of the bone<br>PA 33.5:Classify and describe the etiology, immunology, pathogenesis,<br>manifestations, radiologic and laboratory features, diagnostic<br>criteria and complications of rheumatoid arthritis | |
| 34) | Skin | PA34.1Describe the risk factors pathogenesis, pathology and natural history of squamous cell carcinoma of the skin<br>PA34.2Describe the risk factors pathogenesis, pathology and natural history of basal cell carcinoma of the skin<br>PA34.3: Describe the distinguishing features between a nevus and melanoma. Describe the etiology, pathogenesis, risk factors morphology clinical features and metastases of melanoma<br>PA34.4: Identify, distinguish and describe common tumors of the skin | Theory/practical/ laboratory/clinical |
| 35) | Central Nervous System | PA 35.1Describe the etiology, types and pathogenesis, differentiating<br>factors, CSF findings in meningitis<br>PA35.2:Classify and describe the etiology, genetics, pathogenesis,<br>pathology, presentation sequelae and complications of CNS<br>tumors<br>PA35.3:Identify the etiology of meningitis based on given CSF<br>parameters (P) | Theory/practical/ laboratory/clinical |
| 36) | Eye | PA36.1: Describe the etiology, genetics, pathogenesis, pathology, presentation, sequelae and complications of retinoblastoma | Theory/practical/ laboratory/clinical |

**Holidays and exams :**

| Term | Exam | Vacations/preparatory leaves |
|---|---|---|
| 1 | 05/1-10/1 | 17/12-31/12 |
| 2 | 20/4-26/4 theory<br>7 days practical till 08/5 | 16/6-30/6 |
| 3 | 9/8-15/8 theory<br>16/8-23/8 practicals | |
| University exams | 5/9 onwards | |

**Teaching learning methods**

1. Didactic lectures
2. Small group teaching
3. Self directed learning by arranging seminars and symposium
4. Problem card based learning
5. Practical –
    - Performing hematological exercises –TLC,DLC , Peripheral smear making and staining
    - Performing urine examination and interpreting various lesions
    - Analyse lab reports and its correlation with clinical diagnosis
    - Perform the correct technique of blood grouping and cross matching
6. Identifying gross pathology of various organs
7. Study of histopathology slides of various diseases
8. AETCOM

## Annexure2

## Learning objectives are attached as pdf document

**Paper I: General principles of Pathology, Clinical Pathology and Hematology**

| S.no | Topic | Approximate weight-age |
|---|---|---|
| 1 | Cell injury and adaptation | 10 |
| 2 | Inflammation and repair | 10 |
| 3 | Hemostasis/ Circulatory disturbances | 8 |
| 4 | Immunopathology | 6 |
| 5 | Infectious pathology | 8 |
| 6 | Genetic and Environmental diseases | 4 |
| 7 | Neoplasia | 10 |
| 8 | Childhood diseases | 4 |
| 9 | RBC Disorders | 10 |
| 10 | WBC disorders | 10 |
| 11 | Lymphoreticular system | 4 |
| 12 | Diseases of Coagulation & Bleeding | 8 |
| 13 | Blood Banking | 4 |
| 14 | Clinical pathology incl cytopathology | 4 |
| | | 100 |

Guidelines for assessment: 20% MCQ 80% SAQ

30% of Questions should be on etiopathogenesis

30% on morphology preferably with clinical correlation

40% Problem based / lab diagnosis / reasoning

Variations in the scheme as per the consensus of examiners and moderator

Part I

1. Structured essay Question 8 marks
2. Differentiate between 4 questions x 4 = 16 marks

Part II

3. Structured essay Question 8 marks
4. Short notes; 4 questions x 5 = 20 marks

Part III

5. Structured essay Question 8 marks
6. Short notes 4 questions x 5 = 20 marks

## Paper II Systemic Pathology

| S.no | Topic | Approximate weight age |
|---|---|---|
| 1 | Cardiovascular | 10 |
| 2 | Respiratory | 10 |
| 3 | Gastrointestinal Tract | 15 |
| 4 | Hepatic and Biliary Tract, exocrine pancreas | 15 |
| 5 | Endocrine system | 8 |
| 6 | Urinary tract | 10 |
| 7 | Male genital tract | 6 |
| 8 | Female genital tract | 8 |
| 9 | Breast | 6 |
| 10 | CNS | 4 |
| 11 | Skin and soft tissue | 4 |
| 12 | Bone & Joints | 4 |
| | | 100 |

Guidelines for assessment: 20% MCQ 80% SAQ

30% of Questions should be on etiopathogenesis

30% on morphology preferably with clinical correlation

40% Problem based/lab diagnosis / reasoning

Variation in the scheme as per the consensus of examiners/ moderator

Part I

1 Structured essay Question 8 marks

2.Differentiate between 4 questions x 4 = 16 marks

Part II

3. Structured essay Question 8 marks
4. Short notes ; 4 questions x 5 = 20 marks

Part III

5. Structured essay Question 8 marks

6 Short notes 4 questions x5 = 20 marks

**Eligibility** for appearing in examination and pass criteria as per NMC guidelines

PATHOLOGY PRACTICAL EXAMINATION

Pattern & Marks Distribution MAX MARKS : 100

Observation and reasoning

| S No | Activity | Marks |
|---|---|---|
| 1 | Examine Three histopathology slides, identify the parent tissue, write microscopic features, give diagnosis and make a labelled diagram | 3x5= 15 |
| 2 | Examine the stained peripheral smear provided, do DLC, give the report and three causes of the findings | 1 x 5 = 5 |
| 3 | Study the case history provided. Examine the given peripheral smear/ bone marrow smear, write your observations and give your diagnosis. | 1 x 5 = 5 |
| 4 | Test for Hemoglobin by Sahli's hemoglobinometer orTLC by Neubauer's chamber. Write observation, inference. Performance of this test will be observed by 1 examiner | 1 x 5 = 5 |
| 5 | With the given blood sample, prepare and stain the peripheral smear and focus the smear. Performance of this test will be observed by 1 examiner for smear making and staining. | 5+ 5 = 10 |
| 6 | Urine Chemical Test: (Test for Protein/sugar/ketone bodies): perform urine chemical test by conventional method. Student has to write the result, inference and give answer to additional questions asked. Performance of this test will be observed by 1 examiner | 15 |
| 7 | OSPE:<br>• Three gross - specimens<br>• Two Instrument identification & related Questions<br>• One observation and interpretation of test: Blood group identification by Slide method<br>• One urine sediment/ PAP stain<br>• One parasite<br>• Two clinical case histories and lab findings for diagnosis | 10 |
| 8 | Viva voce : Analytical skill-Case based discussion / Interpretation to assess clinical application; based on case histories discussion on approach to diagnosis, reasoning based on test findings/ specimens /images /instruments / charts/ lab data | 30 |
| 9 | AETCOM | 5 |
| | Total | 100 |

**Internal assessment (IA)**

Chapter end assessment, approx 10 : 10x10 = 100 ( Total 50 for Theory & 50 for OSPE/ Spotting - to be added in term examinations theory & practical respectively)

Should include short essay questions, objective questions, ospe , practicals and practical logbook

| Exam | Theory | | Practical | |
|---|---|---|---|---|
| | Academic knowledge | Other* academic activities | Academic knowledge | Other** academic activities |
| Chapter end assessment (10x10=100) | 40 | 10 | 40 | 10 |
| Term I | 40 | 10 | 40 | 10 |
| Term II | 80 | 20 | 80 | 20 |
| Term III | 200 | | 100 | |
| Total | 400 | | 300 | |

Term I Theory: 50 = (40 + 10 MCQ) Practical : 50

Term II Theory: 100 = (80 + 20 MCQ) Practicals : 100

Term III : same format as university exam

As per CBME recommendations, upto 20% marks of IA should be from log book assessment.

It has been recommended that 80% of both theory and practical IA should be from Academic knowledge and rest 20% from other academic activities

*Other academic activities for Theory include: Interst in subject, Active participation, Scientific attitude, other acadmic activity participation (e.g.quiz, poster making, etc) and Logbook.

**Other academic activities for Practical include: Assignment completion (Practical notebook etc), Attitude, Ethical work habits, Communication and Logbook.

IA taken during the whole tenure will be added

Internal assessment: all above ( Theory 400; Practicals : 300) added and IA calculated for Theory (40) and Practical (20)

- Eligibility as per NMC guidelines: Learners must secure at least 50% marks of the total marks (Combined theory and Practical marks; not less than 40% marks in theory and practical seperately) assigned for internal assessment.

Eligibility for appearing in examination and pass criteria as per NMC guidelines

DEPARTMENT OF PATHOLOGY

UNIVERSITY OF DELHI

DELHI

# LOGBOOK FOR PHASE SECOND MBBS STUDENTS

## AS PER COMPETENCY BASED CURRICULUM

Name of the student: .....

Date of admission to MBBS course: .....

Date of beginning of second Phase: .....

College Roll No:.....

Permanent Address .....

.....

Email : .....

Mobile number : .....

# Department of Pathology

## Certificate

This is to certify that, Mr/Ms _____

Roll No _____ admitted in Phase II in Pathology has satisfactorily attended/completed all assignments mentioned in this logbook as per the guidelines prescribed by Medical Council of India, for Phase II MBBS Competency Based Curriculum in the subject of Pathology. She/He is eligible to appear in the University examination in subject of Pathology.

Date: _____

_____

Undergraduate Teaching Incharge

Department of Pathology

_____

Head of Department, Pathology

# Instructions

1. This logbook is a record of the activities of the designated student who will be responsible for maintain the practical activity book and logbook.

2. The practical activity book is a record of the overall participation in the session, attendance , timely completion and acquisition of the competencies as per CBME

3. All the activities in the logbook should be written in detail in the practical activity book which the student should get verified regularly by the respective faculty incharge

4. Students are instructed to keep their logbook entries up to date and get them verified by the faculty incharges regularly

5. The assessment of the practical activity record book and log book will be as per NMC guidelines

# FORMATIVE ASSESSMENT

| S.no | Competency # addressed | Name of Activity* | Date completed: dd- mmyyyy | Attempt at activity First or Only (F) Repeat (R) Remedial (Re) | Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score | Decision of faculty Completed (C) Repeat (R) Remedial (Re) | Initial of faculty and date | Feedback Received Initial of learner |
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# FORMATIVE ASSESSMENT

| S.no | Competency # addressed | Name of Activity* | Date completed: dd- mmyyyy | Attempt at activity First or Only (F) Repeat (R) Remedial (Re) | Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score | Decision of faculty Completed (C) Repeat (R) Remedial (Re) | Initial of faculty and date | Feedback Received Initial of learner |
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# FORMATIVE ASSESSMENT

| S.no | Competency # addressed | Name of Activity* | Date completed: dd- mmyyyy | Attempt at activity First or Only (F) Repeat (R) Remedial (Re) | Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations OR Numerical Score | Decision of faculty Completed (C) Repeat (R) Remedial (Re) | Initial of faculty and date | Feedback Received Initial of learner |
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## Assessment of Logbook

| Sl No | Description | Maximum Marks | Marks Obtained | Signature of teacher |
|---|---|---|---|---|
| 1 | Completion of Activity book Term I | 5 | | |
| 2 | Completion of Activity book Term II | 5 | | |
| 3 | Performance in Case based learning(SGD) | 5 | | |
| 4 | Participation in SDL | 5 | | |
| | Total | 20 | | |

**The following skills have been performed by the student and are certified by the teacher as follows:**

| | | Date | Teacher's Signature |
|---|---|---|---|
| 1 | Preparation of peripheral smear | | |
| 2 | Interpretation of liver function tests and viral serology panel | | |
| 3 | Interpretation of CSF in meningitis | | |

**Signature of Teacher-in-charge**

# Attendance Record of the Student

| Sl.No | Terms | Theory % | Practical % | Signature of Student | Signature of Teacher |
|---|---|---|---|---|---|
| A | I Term | | | | |
| B | II Term | | | | |
| C | Overall Attendance | | | | |

**Note: Above information is for the benefit of students and parents. In case of any discrepancy departmental record will be treated as final.**

## Details of attending extra classes [For poor attendance (if any)]

| Sl. No. | Date | Period | Total hrs | Signature of Student | Signature of Teacher |
|---|---|---|---|---|---|
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**Total hours**

**Note: Above information is for the benefit of students and parents. In case of any discrepancy departmental record will be treated**

## Records of Internal Assessment Examinations

| Sl. No | Exam | Theory | Practical including Viva and logbook | Signature of Student | Signature of Teacher |
|---|---|---|---|---|---|
| 1 | I Internal Assessment | /50 | /50 | | |
| 2 | II Internal Assessment | /100 | /100 | | |
| 3 | III Internal Assessment | /200 | /100 | | |
| 4 | Internal Assessment Marks / End Chapter Assessment | /50 | /50 | | |
| 5 | Remedial exam | /200 | /100 | | |
| 6 | Internal Assessment marks after conversion | ~~/100~~ /40 | ~~/100~~ /20 | | |