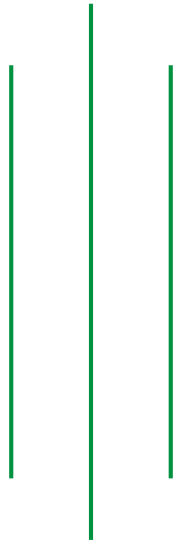
Syllabus for Licensing Examination of M.Sc. MLT/Medical/Clinical Microbiology 2021



Nepal Health Professional Council

Bansbari, Kathmandu

Table of content

1. Microbiology theory

General Microbiology

- Microscopy: Principle, Mechanism, Handling and application of Simple microscope,
- Compound microscope, Dark ground microscope, Phase contrast microscope, Interference microscope, Fluorescent microscope and Electron microscope.
- Safety measures and infection prevention:
- Sterilization and disinfection: Introduction, types, mode of action and application of
- sterilization by physical and chemical method, Testing for potency of disinfectants
- Disposal of biomedical waste: Principle, procedure and Precautions.
- Collection, transportation, preservation, storage and processing of clinical specimens for
- aerobic and anaerobic culture.
- Methods of anaerobiasis:
- Quality assurance and quality control in microbiology:
- Role of antimicrobials and their mechanism of actions:
- Drug resistance: Types, mechanism and their detection methods.
- Host-parasite relationship: Types of microbial flora, Dis/advantages of microbial flora,
- Pathogenesis of infection, Microbial virulence factors, Infecting dose, Routes of infection,
- Types of infectious diseases and their epidemiology.
- Stains: Principle, procedure, result, reporting, interpretation, clinical significance,
- modification(if there) and reagent preparation of the following
  - Gram's stain
  - Ziehl-Neelsen stain
  - Albert stain
  - Capsule stain
  - Flagella stain
  - Spore stain
- Laboratory animals and ethics: care, handling, bleeding, methods of inoculation and uses of the mice, rats, guinea pigs, rabbits, hamsters, monkeys and sheep.
- Advanced and automated culture technique,
- Overview, Characteristics of causative agents, epidemiology, laboratory diagnosis,
- prevention and control: Water Borne Infections, Air Borne Infections, Food Borne Diseases, Zoonotic Diseases, Entomology, Vector Borne Diseases, Sexually Transmitted Infections (STIs), Hospital Acquired Infection and Antimicrobial Resistance, Emerging Infectious Diseases, Bioterrorism and biosecurity

Bacteriology

- Anatomy and Physiology of Bacteria and staining properties
- Culture media and culture techniques
- Morphology, Cultural characteristics, Biochemical reactions, Resistance, Antigenic structure, Pathogenesis, Epidemiology, Laboratory diagnosis, Prophylaxis and Treatment of the following: Staphylococcus, Micrococci, Stomatococcus, Streptococcus, Enterococcus, Neisseria, Moraxella, Bacillus, Corynebacterium, Clostridium species,Peptococcus, Peptostreptococcus, Veillonella, Lactobacillus, Bifidobacterium,Propionibacterium, Actinomyces, Mobiluncus, Bacteriodes, Fusobacterium, Enterobacteriaceae, Vibrio, Aeromonas and Pleisomonas, Pseudomonas, Stenotrophomonas, Burkholderia, Yersinia, Pasteurella, Franscisella, Haemophilus, Bordetella, Brucella,Mycobacterium tuberculosis complex, Non-Tuberculous Mycobacteria, M.leprae, Spirochetes, Mycoplasma, Actinomycetes, Rickettsiaceae, Chlamydia etc

Immunology

- Structure, functions and cells involved in immune system, Antigens, Immunoglobulins, Antigen-Antibody reactions, Complement system, Immune responses, Hypersensitive reactions, Auto immunity, autoimmune disorders, immunodeficiency diseases, Tissue transplantation and graft rejection.

Research methodology and Biostatistics

- Literature Review, Variables and Techniques in Sampling Methods, Research Methods and Design, Data Collection Methods, tools, management and analysis, Ethics, Proposal design and Report writing, Plagiarism
- Fundamentals statistical measures, Probability and Probability distribution, Sample size calculation, Tests of statistical significance, Correlation and regression

Parasitology

- Introduction and classification of Parasites, Parasitism, Host Parasite Relations
- Morphology, Life Cycle, epidemiology, Pathogenesis, Laboratory Diagnosis, Treatment and Preventive measures of Entamoeba histolytica, Giardia lamblia, Trichomonas vaginalis, Balantidium coli, Isospora belli, Cryptosporidium parvum, Cyclospora, Fasciolopsisbuski, Fasciola hepatica, Schistosoma hematobium, S. mansoni, S.japonicum, Paragonimus westermanii, Taeniasolium, T. saginata, Echinococcusgranulosus, Hymenolepis nana, Diphylobothrium Latum,, Ascarislumbricoides, Trichuristrichiura, Ancyclostomaduodenale, Necatoramericanus, Strongyloidesstercoralis, Enterobius vermicularis, Dracunculus Medinensis, Wuchereria bancrofti, Brugia spp, Trichinella spiralis, Plasmodium spp., Babesia spp., Trypanosoma, Leishmania spp., Toxoplasma gondii, Acanthamoeba spp., Naegleria fowleri

Mycology

- Introduction and classification of medically important Fungi, Mycosis Pityriasisvesicolor, White piedra, Black piedra, Tinea nigra, Trichosporonbeigelii, Dermatophytes, Mycetoma, Sporotrichosis, Chromoblastomycosis, Rhinosporidiosis, Lobomycosis, Histoplasmosis, Blastomycosis, Coccidioidomycosis, Cryptococcosis, paracocci-diodomycosis, Candidiasis, Aspergillosis, Zygomycosis, Penicillosis Otomycosis: Fungal infections in eye, Mycotoxins, Allergic Fungal diseases: Mycetismus, Antifungal agents, Drug resistance in fungi.

Virology

- Introduction, Classification, Structure, Physiology, Pathogenesis, Laboratory Diagnosis, and Prevention and control of medically important Viruses: Poxviridae: Variola, Vaccina, MolluscumContagiosus, Herpesviridae: HSV 1 and 2, Varicella-zoster virus, Cytomegalovirus, Epstein-Barr virus, Orthomyxoviridae: Influenzavirus A, B, C, Parainfluenza viruses, Mumps, Measles, Respiratory syncytial Virus, Enterovirus, Polio, Rhinovirus, Echoviruses, Coxsackie, Chikungunya virus, Encephalitis viruses, Hepatitis virus, Japanese encephalitis, Yellow fever, Reo viruses, Retro viruses, Arena viruses, Marburg/Ebola Virus, Norwalk Virus, Corona Virus, Rota virus, Dengue virus, Adeno virus, Rhabdoviridae, Zika, Nipah virus, Oncogenic Viruses, Rubella virus, Papova Virus
- Types of viral vaccines
- Antiviral drugs

Molecular Microbiology

- DNA, RNA extraction techniques, Electrophoresis, Plasmids & mobile genetic elements, Methods of genetic transfer, Mutation, Nucleic acid Probing and Amplification techniques, Sequencing Techniques

2.Diagnostic Microbiology

Bacteriology

- Bacterial identification methods and strategies for: Skin, soft tissue and wound infections, Blood stream infections, Infections of lower respiratory tract, Upper respiratory tract infections and other infections of the oral cavity and neck, Meningitis and other infections of Central Nervous System, Infections of eyes, ears and sinuses, Infections of urinary tract, Gastrointestinal tract infections, Normally sterile body fluids, bone and bone marrow and spinal tissues, Anaerobic bacterial culture techniques

Mycobacteriology:

- Laboratory diagnosis of Mycobacterial infections, Antibiotic susceptibility testing, Fluorescent microscopy, GeneXpert, PCR

Virology:

- Overview of the methods and strategies in virology, Virus culture, Serological tests for diagnosis of viral infections (Rapid and molecular methods)

Mycology:

- Overview of fungal identification methods and strategies, Staining methods and microscopic study of fungi, Fungal culture techniques, Antifungal susceptibility testing

Parasitology:

- Overview of the methods and strategies in parasitology, Staining methods and microscopic study of parasites, Identification of intestinal parasites, Identification of blood parasites, Identification of tissue parasites, Culture techniques used in parasitology