

## Thematic plan of lectures and practical classes

### for Faculty of Medicine and Stomatology

#### Microbiology I

Days N	Lectures Content
1.	The essence of Microbiology. Principles of microbial classification.
2.	Structure of bacterial cell; morphology of spirochetes, rickettsia, chlamydia, mycoplasma, ureaplasma, actinomyces;
3.	Mechanisms of bacterial nutrition; nutrition types, growth factors, enzymes, plastic and energy metabolism, pigments, luminescent and aroma-producing bacteria; growth and multiplication.
4.	General Virology. Viral morphology and interaction to host cells. Bacteriophages. Microbial genetics (genetic organization of bacteria, their genotypes and phenotypes, non-chromosomal hereditary factors, modification, mutation, reparation, genetic recombination);
5.	Distribution of microbes in the environment. Microflora of the human body. Dysbiosis. Influence of environmental (physical, chemical, biological) factors on microorganisms. Basics of sanitary microbiology;
6.	Chemotherapeutic agents, their classification and mechanism of action. Antibiotic resistance of bacteria. Infectious process and infectious disease; bacterial toxins; peculiarities of viral infections, epidemiological peculiarities of infections;
7.	Microbial antigens, antigen-antibody reactions; immunoprophylaxis and immunotherapy.
8.	Pathogenic cocci – aerobic gram-positive cocci
9.	Pathogenic cocci – anaerobic gram-positive and gram-negative cocci.
10.	Gram-negative facultative anaerobic rods – <i>Enterobacteriaceae</i> ,
11.	<i>Vibrio, Pasteurella, Eikenella</i>
12.	Gram-negative aerobic rods – <i>Bordetella, Brucella, Francisella, Legionella, Bartonella</i> ; non-fermenting, aerobic gram-negative rods – <i>Pseudomonas, Burkholderia, Kingella, Moraxella, Branhamella, Acinetobacter</i> .
13.	Gram-negative anaerobic rods; gram-positive spore-forming rods ( <i>Bacillus, Clostridia</i> ).
14.	Gram-positive straight rods – <i>Lactobaccillaceae, Listeriaceae</i> ; gram-positive non-straight, branched rods – <i>Corynebacteria, Mycobacteria, Actynomyces, Nocardia, Bifidobacteria</i> .

#### Content of Practical Classes and Seminars

1.	Working rules in microbiology laboratory. Microscopical methods: a) microscope and its types (light, phase-contrast, dark field, luminescent); b) techniques of smear preparation; negative (Burry) and simple method of staining, introduction of bacterial shapes.
2.	Microscopic methods for detecting bacterial structural components – a) Gram method, b) Neisser method, c) Ziehl–Neelsen staining, d) Ojeshko's method, e) Burry-Hines staining, f) vital staining.
3.	Cultivation Methods. Introducing of nutrient media; cultivation in aerobic and anaerobic conditions; microbial growth characteristics in solid and liquid media; growth signs of microorganisms; study of biochemical activities for bacterial identification.
4.	Cultivation and identification of viruses; Bacteriophages, detection of phage titer activity.
5.	Sterilization, disinfection, aseptic, antiseptic procedures. Microbiological assessment of water, soil and air. Detection of bacterial susceptibility/resistance to antibiotics. Pathogenicity factors of bacteria. Measurement of virulence. Biological methods.
6.	<b>I colloquium - MCQ testing.</b>
7.	Antigen-antibody reactions (agglutination, precipitation, complement fixation, neutralization); immunoserologic methods, skin tests.
8.	Laboratory diagnosis of staphylococcal, streptococcal and gonococcal infections.
9.	Laboratory diagnosis of escherichiosis, salmonellosis, shigellosis.
10.	<b>II colloquium - MCQ testing.</b>
11.	Laboratory diagnosis of respiratory infections (pertussis, legionellosis). Laboratory diagnosis infections caused by <i>Haemophyllus</i> spp. (influenza, chancroid).
12.	Laboratory diagnosis of wound suppurative infections.
13.	Laboratory diagnosis of zoonotic infections; Laboratory diagnosis of anaerobic (clostridial) infections.
14.	Laboratory diagnosis of diphtheria; Laboratory diagnosis of tuberculosis.
15.	<b>III colloquium - MCQ testing.</b>

## Microbiology II

Days N	Lectures Content
1.	Pathogenesis of diseases caused by pathogenic spirochetes, <i>Campylobacter</i> and <i>Helicobacter</i> (syphilis, Lyme disease, recurrent typhoid fever, leptospirosis, mycoplasmosis)
2.	Pathogenesis of diseases caused by Rickettsia, Chlamydia (Rocky Mountain spotted fever, rickettsial tick-bite infections, Orientia, Anaplasma, Q-fever, trachoma, conjunctivitis, urogenital chlamidiosis, pneumonia)

3.	RNA viruses. Picornaviruses (enteroviruses, polioviruses, Coxsackie A and B viruses, ECHO-viruses, rhinoviruses, foot and mouth disease virus, hepatitis A virus). Reoviruses (orthoviruses, orbiviruses, coltivirus, rotaviruses).
4.	Buniaviruses (California encephalitis virus, Rift-valley fever virus, Nairovirus - Crimean-Congo haemorrhagic fever. Hantavirus pulmonary syndrome)
5.	Togaviruses (Sindbis virus, Semliki forest virus, chikungunya virus, o'nyong'nyong virus, horses encephalitis virus, rubella virus).
6.	Flaviviruses (Omsk haemorrhagic fever, Kyasanur forest disease, Japanese encephalitis, yellow fever, West Nile, dengue, yellow fever, <a href="#">tick-borne encephalitis</a> viruses)
7.	Ortho- and paramyxoviruses (influenza virus, parainfluenza virus, mumps virus, measles virus and subacute sclerosing panencephalitis (SSPE), respiratory syncytial virus).
8.	Rabdoiruses (rabies, vesicular stomatitis viruses). Filoviruses (Marburg and Ebola viruses). Coronaviruses.
9.	Retroviridae (human immunodeficiency virus), Arenaviridae (lymphocytic choriomeningitis virus, Lassa virus, <a href="#">Junin virus</a> <a href="#">Machupo virus</a> and others), Caliciviridae. Hepeviridae (hepatitis E virus).
10.	DNA-viruses. (papilloma-, poliomyeloviridae, adenoviridae, Herpesviridae (herpes simplex, varicella-zoster, Epstein-Barr, cytomegalovirus, types of human herpesviruses 6,7,8 types). Poxviridae (smallpox and other viruses).
11.	Slow infections. Prion diseases. Acute respiratory and intestinal infections, blood borne hepatitis B, D, C, G viruses. Oncogenic viruses.
12.	Mycology – agents of superficial (keratomycosis, cutaneous, subcutaneous), systemic and opportunistic mycosis.
13.	Protozoa (agents of amebiasis, leishmaniasis, toxoplasmosis, malaria, cryptosporidiosis, balantidiosis, microsporidiosis, blastocytosis, trichomonosis).
14.	Basics of clinical microbiology. Nosocomial infections.

### Content of Practical Classes and Seminars

1.	Microbiology diagnostic methods of syphilis, Lyme disease, recurrent typhoid fever, leptospirosis, mycoplasmosis, campylobacteriosis and helicobacteriosis;
2.	Microbiology diagnostic methods of diseases caused by Rickettsia. (cultivation characteristics of obligate intracellular parasites);
3.	Microbiology diagnostic methods of diseases caused by Chlamydia and Mycoplasma.
4.	<b>I colloquium - MCQ testing.</b>
5.	Microbiology diagnostic methods of polioviruses and other enteroviruses, rhinoviruses.
6.	Microbiology diagnostic methods of Buniaviruses (California encephalitis virus, Rift-valley fever virus, Nairovirus - Crimean-Congo haemorrhagic fever, hantavirus - Hantaan haemorrhagic fever).

	Microbiology diagnostic methods of Togaviruses (Sindbis virus, Semliki forest virus, chikungunya virus, o'nyong'nyong virus, horses encephalitis virus, rubella virus).
	Microbiology diagnostic methods of Flaviviruses (Omsk haemorrhagic fever, Kyasanur forest disease, Japanese encephalitis, yellow fever, West Nile, dengue, yellow fever, <a href="#">tick-borne encephalitis</a> viruses)
7.	Microbiology diagnostic methods of ortho- and paramyxoviruses (influenza virus, parainfluenza virus, mumps virus, measles virus and subacute sclerosing panencephalitis (SSPE), respiratory syncytial virus).
8.	Microbiology diagnostic methods of rhabdoviruses (rabies, vesicular stomatitis viruses), filoviruses (Marburg and Ebola viruses), Coronaviruses.
9.	Microbiology diagnostic methods of retroviridae (human immunodeficiency virus), Arenaviridae (lymphocytic choriomeningitis virus, Lassa virus, <a href="#">Junin virus</a> <a href="#">Machupo virus</a> and others), Caliciviridae, Hepeviridae (hepatitis E virus).
10.	<b>II colloquium - MCQ testing.</b>
11.	Microbiology diagnostic methods of Papilloma-, Poliomyoviridae, Adenoviridae, Herpes-and Poxviridae.
12.	Microbiology diagnostic methods of slow infections, prion diseases, hepatitis B, D, C, G and oncogenic viruses.
13.	Microbiology diagnostic methods of keratomycosis, cutaneous, subcutaneous, systemic and opportunistic mycosis.
14.	Microbiology diagnostic methods of protozoan infection (amebiasis, leishmaniasis, malaria, balantidiosis, trichomonosis).
15.	<b>III colloquium - MCQ testing</b>