

Plan of practical classes in Microbiology, Virology, Immunology 2025-2026 academic year, Specialty "General Medicine" 5th semester

Learning Session: from 01.09.2025– to 09.01.2026.

Practical classes begin on 01.09.2025.

Public holidays: November 7, December 25, January 1 and 2. Classes for these days are not planned, but are shifted a week later (if there are enough training weeks).

Section «Special medical microbiology»

LABORATORY CLASS 1	Date: 01.09.2025–05.09.2025
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TOPIC: Microbiological diagnostics of acute enteric infections caused by enterobacteria

Suggested reading for self-study:

General characteristics of Enterobacteriaceae family. Differences between genera. General principles of diagnostics of acute enteric infections caused by pathogenic enterobacteria. Differential diagnostic media, composition, principle of work.

Escherichia, systematic position, general characteristics. The biological role of Escherichia coli. Molecular mechanisms of escherichiosis pathogenesis. Enteropathogenic, enterotoxigenic, enteroinvasive and enterohaemorrhagic Escherichia coli. Escherichiosis diagnostics. Antibiotic treatment.

Salmonella, classification and general characteristics. Serological classification of Salmonella. Identification of Salmonella. Molecular biological typing.

Causative agents of typhoid and paratyphoid. The pathogenesis of typhoid. Microbiological diagnostics of typhoid fever, depending on the stage of pathogenesis.

LABORATORY CLASS 2	Date: 08.09.2025–12.09.2025
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TOPIC: Microbiological diagnostics of acute enteric diseases caused by enterobacteria

Suggested reading for self-study:

Characteristics of immunity in typhoid and paratyphoid fever. Serological diagnosis of typhoid and paratyphoid fever. Formulation and analysis of Vidal reaction. Methods for distinguishing infection, anamnestic and postvaccinal titer. Diagnosis of bacteria carrier state in typhoid fever.

Salmonella - causative agents of acute gastroenteritis. Salmonella phage typing and indication.

Shigella. Causative agents of dysentery, classification, general characteristics. Molecular mechanisms of pathogenesis, immunity, methods of laboratory diagnosis of acute and chronic dysentery. Approaches to the prevention of dysentery. Antibiotic treatment.

LABORATORY CLASS 3	Date: 15.09.2025–19.09.2025
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TOPIC: Microbiological diagnostics of diseases caused by Klebsiella, Yersinia, Campylobacter and pseudomonada. Methods for food poisoning diagnostics

Suggested reading for self-study:

Klebsiella, classification and general characteristics, main diseases caused. Pathogenesis, immunity, methods of microbiological diagnosis of acute and chronic klebsiellosis.

The causative agent of intestinal yersiniosis, general characteristics. Pathogenesis, immunity, methods of microbiological diagnostics.

Campylobacter, general characteristics, role in human pathology. Mechanisms of pathogenesis. Diagnosis of campylobacteriosis. Helicobacter.

Pseudomonas aeruginosa, general characteristics, pathogenicity factors, role in human pathology. Methods of microbiological diagnostics Pseudomonas infection.

Classification, etiology of food poisoning. Principles of microbiological diagnostics.

LABORATORY CLASS 4	Date: 22.09.2025–26.09.2025
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TOPIC: Microbiological diagnostics of diseases caused by Corynebacteria, bordetella, haemophilus, legionella, listeria.

Suggested reading for self-study:

Corynebacterium diphtheria. Systematics, general characteristics of the pathogen. Types of Corynebacterium diphtheria, their distinctive features. Diphtheria toxin and antitoxic serum. The pathogenesis of diphtheria. Methods of microbiological and molecular biological diagnosis of diphtheria.

Principles of therapy and prevention of diphtheria. Determination of the effectiveness of post-vaccinal immunity.

Bordetella pertussis. Characteristics of the pathogen, pathogenicity factors. Differentiation with parapertussis agent. The pathogenesis of pertussis, immunity, diagnostics. Principles of therapy and prevention of pertussis.

Haemophilus, general characteristics, role in human pathology.

Legionella, general characteristics, role in human pathology.
 Listeria, general characteristics, role in human pathology.

LABORATORY CLASS 5	Date: 29.09.2025–03.10.2025
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TOPIC: Methods of microbiological diagnosis of diseases caused by mycobacteria and actinomycetes.

Methods of microbiological diagnostics anaerobic infections.

Suggested reading for self-study:

Actinomycetes, systematic position, general characteristics, role in human pathology.
 Mycobacteria classification. TB germs, general characteristics. Pathogenesis, immunity, methods of microbiological diagnostics, principles of treatment and prevention of tuberculosis. Mantoux test.
 The causative agent of leprosy, general characteristics, role in human pathology.
 Mycobacteriosis. Nocardia.
 Anaerobes, classification, general characteristics. Causative agents of gas gangrene, tetanus, botulism. Systematics and general characteristics. Exotoxins. properties Principles of therapy and prevention of anaerobic infections.
 Clostridial gastroenteritis. Clostridium difitsile role in human pathology.
 Nonspore anaerobes. Bacteroides. Peptococci. General characteristics, pathogenicity factors, role in human pathology.
 General principles and methods for anaerobic infections diagnosis. Molecular biological diagnostics - PCR.

LABORATORY CLASS 6	Date: 06.10.2025–10.10.2025
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TOPIC: Microbiological diagnostics of especially dangerous infections.

Suggested reading for self-study:

Classification and general characteristics of the especially dangerous infections. Demands to collection and transportation of biological material. Principles of diagnostics.
 Vibrio cholerae, the systematic position. Classification and general characteristics, pathogenicity factors. Biovars. Differentiation from noncholera vibrio. Pathogenesis of cholera. Methods of microbiological diagnostics. Rapid methods. Principles of treatment and prevention.
 The causative agent of plague, systematic position, characteristics, pathogenicity factors. Differences from other Yersinia. Pathogenesis, principles of treatment and prevention of plague.
 The causative agent of tularemia, systematics, general characteristics. Pathogenesis, principles of treatment and prevention.
 Causative agents of brucellosis. Systematics and general characteristics, pathogenicity factors, pathogenesis. Microbiological diagnosis of brucellosis. Principles of treatment and prevention.
 Anthrax. Systematics and general characteristics, pathogenicity factors. Differences from non-pathogenic bacilli. Pathogenesis. Microbiological diagnosis of anthrax. Principles of treatment and prevention.

LABORATORY CLASS 7	Date: 13.10.2025–17.10.2025
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TOPIC: Microbiological diagnostics of diseases caused by spirochetes.

Suggested reading for self-study:

Spirochetes, classification, general characteristics. Treponema. Systematics and general characteristics. Pathogenesis and immunity in syphilis. Material for the study. Methods of microbiological diagnosis of syphilis. Principles of therapy and prevention of syphilis.
 Fusospirochetosis pathogens.
 Leptospira. Systematics and general characteristics. Pathogenesis, methods of microbiological diagnostics, principles of treatment and prevention of leptospirosis.
 Borrelia. Systematics and general characteristics. Pathogenesis and methods of microbiological diagnosis of relapsing fever. The causative agent of Lyme borreliosis, principles of treatment and prevention.

LABORATORY CLASS 8	Date: 20.10.2025–24.10.2025
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TOPIC: Microbiological diagnostics of diseases caused by Rickettsia, Chlamydia and Mycoplasma.

Suggested reading for self-study:

Rickettsiae, systematic position, classification, general characteristics, role in human pathology. Rickettsia typhi, pathogenesis, immunity and methods of microbiological diagnostics. Other pathogenic rickettsia.
 Chlamydia, general characteristics, role in human pathology. Pathogens of psittacosis, trachoma, respiratory and urogenital chlamydiosis. Methods of microbiological diagnosis of chlamydiosis. PCR in chlamydiosis diagnostics.
 Mycoplasma, general characteristics, role in human pathology. Methods of microbiological diagnostics of mycoplasmosis.

LABORATORY CLASS 9**Date: 27.10.2025–31.10.2025****TOPIC: Microbiological diagnostics of diseases caused by Mycoplasma.**

Mycoplasma, general characteristics, role in human pathology. Methods of microbiological diagnostics of mycoplasmosis.

COLLOQUIUM “Special medical microbiology” A list of questions and practical skills will be included in the educational module.

Section «General and special medical virology»**LABORATORY CLASS 10****Date: 03.11.2025–07.11.2025****TOPIC: Methods of investigations in virology. Bacteriophages.****Suggested reading for self-study:**

Viruses. Taxonomy and morphology of viruses. Mechanisms of reproduction. Strict parasitism and cytotropism of viruses.

The types of viral infection. The mechanisms of antiviral immunity.

Methods of viral infections diagnostics. Culturing of viruses in hen embryos and in laboratory animals. Methods of infection, indication and identification of viruses. Serological methods in virology. Hemagglutination inhibition test (HIT), hemadsorption inhibition test, neutralization test, immunoenzyme analysis (ELISA). Molecular-genetic methods.

Viruses of bacteria (bacteriophages). Virulent and moderate bacteriophages. Methods for bacteriophages titration. Use of bacteriophages in medical practice. Phagodiagnosics and phagotyping.

LABORATORY CLASS 11**Date: 10.11.2025–14.11.2025****TOPIC: Virologic diagnostics of diseases caused by ortho-, paramyxoviruses and coronaviruses.****Suggested reading for self-study:**

Orthomyxoviruses. Taxonomy and characteristics of the family. Influenza viruses A, B, C. Morphology. Antigenic structure and serotypes. Antigenic diversity (shift and drift) and its consequences. Influenza, prevalence, pathogenesis, immunity. Methods for influenza diagnostics. Principles of therapy and prophylaxis, preparations for specific immunoprophylaxis and chemoprophylaxis of influenza. Avian and swine influenza.

Paramyxoviruses. Taxonomy and characteristics of the family. Differentiation with orthomyxoviruses. Parainfluenzaviruses, properties, importance for human pathology. Pathogenesis, immunity, diagnostics. Mumps virus, properties, pathogenesis, immunity, specific prophylaxis. Morbillivirus, morphology, properties, pathogenesis, immunity, specific prophylaxis.

HRSV, properties, importance for human pathology.

Coronaviruses: classification, characteristics, sensitivity to the physical and chemical factors. SARS-CoV coronavirus, severe acute respiratory syndrome (SARS). MERS-CoV coronavirus, Middle East respiratory syndrome (MERS). SARS-CoV-2 coronavirus. Coronavirus infection COVID-19: pathogenesis, immunity, etiological diagnosis, prevention, vaccine development, approaches for treatment, epidemiological situation in Europe and in the World.

LABORATORY CLASS 12**Date: 17.11.2025–21.11.2025****TOPIC: Methods of diagnostics for diseases caused by picornaviruses, rotaviruses and retroviruses.****Suggested reading for self-study:**

Picornaviruses. Taxonomy and characteristics of the family, importance for human pathology. Etiology, pathogenesis, immunity, diagnostics and immunoprophylaxis of poliomyelitis. Problem of poliomyelitis eradication.

Coxsackieviruses and ECHO-viruses, importance for human pathology. Methods for discrimination. Rhinoviruses. Taxonomy. Structure and characteristics. Prevalence, pathogenesis, immunity.

Rotaviruses, characteristics, role in pathology.

Retroviruses. Taxonomy and characteristics of the family. Human immunodeficiency virus (HIV-1, HIV-2). Morphology. Pathogenesis, role of CD4+ and CD8+ T-cells. AIDS-associated diseases. HIV diagnostics, prophylaxis, treatment. HIV in Belarus.

LABORATORY CLASS 13**Date: 24.11.2025–28.11.2025****TOPIC: Virological diagnostics of diseases caused by arboviruses and reboviruses. Oncogenic viruses. Slow infection.****Suggested reading for self-study:**

General features of arboviruses and arboviral infections.

Toga-, flavi-, bunja-, arenaviruses, taxonomy, virion structure, role in human pathology. Etiology, pathogenesis, immunity, methods for tick encephalitis diagnostics. Hemorrhagic fever with kidney insufficiency syndrome (HFKS) or

HFRS).

Rubella virus. General characteristics. Role in human pathology. Prophylaxis.

Rabdo­viruses. Taxonomy and characteristics of rabdo­viruses. Pathogenesis, immunity and specific prophylaxis of rabies.

Filoviruses. Marburg and Ebola viruses.

Oncogenic viruses (DNA and RNA). Viral cancerogenesis mechanisms.

Slow infections etiology.

LABORATORY CLASS 14	Date: 01.12.2025–05.12.2025
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TOPIC: Virologic diagnostics of diseases caused by hepatitis viruses, herpes- and adenoviruses.

Suggested reading for self-study:

Hepatitis viruses A, B, C, D, E, F, G, TTV and SEN. Taxonomy and characteristics, role in human pathology. Pathogenesis and immunity in hepatitis A, B, C. Laboratory diagnostics. Specific and non specific prophylaxis.

Herpesviruses. Taxonomy and family characteristics. HSV-1, HSV-2, properties, role in human pathology, pathogenesis, immunity, diagnostics, chemo and immunotherapy. HZV, properties, pathogenesis, immunity, diagnostics, prophylaxis. CMV: properties, pathogenesis. EBV features, role in human pathology. Pathogenesis, immunity, diagnostics. HHV6, HHV-7, HHV-8, role in human pathology.

Adenoviruses. Taxonomy and family characteristics. Human adenoviruses. Virions structures, pathogenesis, immunity, laboratory diagnostics.

LABORATORY CLASS 15	Date: 08.12.2025–12.12.2025
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Topic: Etiology of slow infections. Prions and prion diseases.

Slow infections of viral etiology: (HIV infection, subacute sclerosing panencephalitis, rabies, congenital rubella, chronic viral hepatitis B and C, herpes encephalitis).

Prions: History of discovery, properties, pathogenesis, clinical manifestations, and laboratory diagnosis of prion diseases (Creutzfeldt-Jakob disease, Gerstmann-Sträussler-Scheinker syndrome, Kuru, fatal familial insomnia, transmissible spongiform encephalopathy of cattle).

COLLOQUIUM: "General and Special Medical Virology."

A list of questions and practical skills will be included in the educational module.

Section «Clinical microbiology»

LABORATORY CLASS 16	Date: 15.12.2025–19.12.2025
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TOPIC: Clinical microbiology. Microbiological diagnostics of sepsis and purulent infections of the skin.

Suggested reading for self-study:

Clinical Microbiology: definition, objectives. Opportunistic microbes (OPM). Epidemiology, pathogenesis, diagnosis of diseases caused by UPM.

Clinical forms and the etiology of septic infections of the skin and subcutaneous tissue. Methods of microbiological diagnostics. Bacteriological method. Material for the research (pus, exudate), rules and methods of sampling. Criteria for assessment of the etiological significance of isolated microorganisms. Susceptibility to antibiotics.

Bacteremia. Sepsis. Pyosepticemia. Etiology, definitions. Methods of microbiological diagnosis of sepsis. Bacteriological method. Rules and methods of blood collection for the research, peculiarities of pathogen isolation and results interpretation Susceptibility to antibiotics testing.

LABORATORY CLASS 17	Date: 22.12.2025–26.12.2025
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TOPIC: Clinical microbiology. Microbiological diagnostics of purulent infections of urinary tract. Hospital-acquired infection.

Suggested reading for self-study:

Clinical forms and etiology of septic-purulent (opportunistic) infections of the bronchi and lungs. Methods of microbiological diagnostics. Material for the research, rules and methods of sampling. Bacteriological method. Criteria for assessing the etiological role of isolated bacteria. Susceptibility to antibiotics.

Etiology and clinical forms of septic-purulent (opportunistic) infections of the urogenital tract. Methods of microbiological diagnostics. Material for the study, rules and methods of sampling. Urine culture. Criteria for assessing the etiological role of isolated microbes. Susceptibility to antibiotics. Antibiotogramm.

Nosocomial infections. Pathogens. Principles of microbiological diagnosis. Prevention.

LABORATORY CLASS 18	Date: 29.12.2025–02.01.2026
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TOPIC: Microbiological diagnostics of fungal and protozoan infections.

Suggested reading for self-study:

General characteristics and classification of protozoa. Pathogenic representatives. Laboratory diagnosis of malaria, toxoplasmosis, amebiasis, giardiasis, trichomoniasis.

The causative agent of cryptosporidiosis.

Classification and general characteristics of fungi. Pathogens of ringworm, keratomycosis, deep mycoses. Candidiasis and conditions which promote its development. General principles of fungal infections diagnostics.

Pathogen of pneumocystosis.

Plans for laboratory classes were reviewed and approved at a meeting of the department on August 29, 2025, protocol No. 1.

Ass. professor



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