

**Plan of practical classes in Microbiology, Virology, Immunology
2026-2027 academic year, Specialty "General Medicine" 5th semester**

Section «Special medical microbiology»

LABORATORY CLASS 1	Date: 01.09.2026–07.09.2026
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TOPIC: Methods for microbiological diagnostics of acute intestinal infections caused by Enterobacteria
Diagnostics of escherichiosis, typhoid fever, paratyphoid fever, salmonellosis

Suggested reading for self-study:

Enterobacteriaceae: systematic position, general characteristics, classification, pathogenic and opportunistic species, role in human pathology. Acute intestinal infections: prevalence, etiology, pathogenesis. *Escherichia*: classification, general characteristics. *E. coli*, morphological, cultural, biochemical properties, serological classification, sensitivity to environmental factors. Opportunistic *E. coli*, biological role. Opportunistic infections. Hospital ecovars. Obligate pathogenic (diarrheagenic) *E. coli*, pathogenicity factors, serovars. Prevalence, pathogenesis, clinical forms, microbiological diagnosis of escherichiosis.

Salmonella: general characteristics, taxonomy and serological classification, pathogenicity factors.

Salmonellosis, properties of pathogens, prevalence, association with food intake, enteral, general toxic, septic syndromes, microbiological diagnostics, prevention. Nosocomial anthroponotic salmonellosis, pathogens, features of epidemiology, multiple resistance of the pathogens to antibiotics and antiseptics.

LABORATORY CLASS 2	Date: 08.09.2026–14.09.2026
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TOPIC: Methods for microbiological diagnostics of shigellosis. Serologic diagnostics of typhoid and paratyphoid fever

Suggested reading for self-study:

Etiology, pathogenesis, immunity, microbiological diagnostics of typhoid and paratyphoid fever, carrier state, relapses. Phage typing and genotyping of salmonella. Preparations for immunoprophylaxis and chemotherapy of typhoid fever.

Shigella: general characteristics, classification, sensitivity to environmental factors, pathogenicity factors. Prevalence, pathogenesis, immunity, microbiological diagnostics of shigellosis (bacterial dysentery). Preparations for the etiotropic treatment.

Providencia, *morganella*, *citrobacter*, *edwardsiella*, *enterobacter*, *hafnia*, *serratia*: general characteristics, role in human pathology.

LABORATORY CLASS 3	Date: 15.09.2026–21.09.2026
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TOPIC: Methods for microbiological diagnostics of diseases caused by Klebsiella, Yersinia, Campylobacter, Pseudomonas. Principles of food poisoning diagnosis

Suggested reading for self-study:

Yersinia: general characteristics, sensitivity to environmental factors, main species. Etiology, pathogenesis, immunity, microbiological diagnostics of intestinal yersiniosis.

Klebsiella: general characteristics. Opportunistic klebsiella (*K. pneumoniae*, *K. oxytoca*) and their role in human pathology. Klebsiella hospital ecovars, antibiotic resistance, production of extended spectrum beta-lactamase and carbapenemase. Hypervirulent (hypermuroid) *K. pneumoniae* strains and their role in infectious pathology. Microbiological diagnosis of Klebsiellosis. Pathogens of ozena and scleroma.

Proteus: classification, distinctive features. Role in human pathology. Infection of the urinary system. The principle of microbiological diagnosis.

Campylobacter: properties, culture requirements, species, sensitivity to environmental factors. Human campylobacteriosis, pathogenesis, immunity, microbiological diagnostics.

Pseudomonas: characteristics, classification, properties, existence in the hospital environment. *Pseudomonas aeruginosa*: pathogenicity factors, role in human pathology, sensitivity to antibiotics, antiseptics, disinfectants and environmental factors. Methods of microbiological diagnostics.

Burkholderia. Properties, role in human pathology.

Acinetobacteria - properties, role in human pathology. *Acinetobacter baumannii*: role in the etiology of healthcare-associated infections (HAI), features of antibiotic resistance.

Stenotrophomonas - properties, features of natural (species) antibiotic resistance, role in human pathology.

LABORATORY CLASS 4**Date: 22.09.2026–28.09.2026**

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: 29.09.2026–05.10.2026**

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: 06.10.2026–12.10.2026**

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: 13.10.2026–19.10.2026**

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: 20.10.2026–26.10.2026
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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: 27.10.2026–02.11.2026
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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: 03.11.2026–09.11.2026
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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: 10.11.2026–16.11.2026
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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: 17.11.2026–23.11.2026
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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: 24.11.2026–30.11.2026**

TOPIC: Virological diagnostics of diseases caused by arboviruses and reoviruses. Oncogenic viruses. Slow infection.

Suggested reading for self-study:

General features of arboviruses and arboviral infections.

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

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

Rabdoiruses. Taxonomy and characteristics of rabdoiruses. 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: 01.11.2026–07.12.2026**

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: 08.12.2026–14.12.2026**

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: 15.12.2026–21.12.2026**

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: 22.12.2026–28.12.2026
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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. Antibioticogram.

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

LABORATORY CLASS 18	Date: 29.12.2026–04.01.2027
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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 31, 2026, protocol No. 1.

Head of the Department

I.A.Gavrilova

