

AMENDMENTS AND CHANGES TO THE CURRICULUM IN THE EDUCATIONAL DISCIPLINE
«Microbiology, virology, immunology»

for the specialty 1-79 01 08 «Pharmacy»
for 2024/2025 academic year

Amendments and changes	Basis/Reason
Changes have been introduced into the Explanatory Note (appendix 1)	Educational Plan for 2024/2025 academic year
Changes have been introduced into the Thematic Plan (appendix 2)	Educational Plan for 2024/2025 academic year
Changes have been introduced into the Educational Discipline Curricular Chart (appendix 3)	Educational Plan for 2024/2025 academic year

The curriculum is revised and approved at the department meeting of the Department of microbiology, virology, immunology (protocol #16 of 19.06.2024)

Head of the department



T.A. Kanashkova

APPROVED

Dean of the Medical Faculty for International Students



O.S. Ishutin

Changes in the Explanatory Note

Total number of hours for the study of the discipline is 200 academic hours, of which 103 classroom hours and 97 hours of student independent work. Classroom hours according to the types of studies: lectures – 15 hours (including 3 hours of supervised student independent work (SSIW)), laboratory classes – 88 hours).

ALLOCATION OF ACADEMIC TIME ACCORDING TO SEMESTERS OF STUDY

Code, name of the specialty	semester	Number of academic hours					out-of-class self-studies	Form of intermediate assessment
		total	in-class	including				
				lectures	supervised student independent work	laboratory classes		
1-79 01 08 «Pharmacy»	4	110	63	6	3	54	47	credit
	5	90	40	6	—	34	50	exam

THEMATIC PLAN

Section (topic) name	Number of class hours	
	lectures (incl. SSIW)	laboratory
1. General and sanitary microbiology	6	30
1.1. Microbiology as a science. World of microbes	–	3
1.2. Basic methods for studying the morphology of microorganisms	–	3
1.3. Physiology and biochemical activity of bacteria. Basic principles and methods of bacterial cultivation. Bacteriological research method	1,5	6
1.4. Genetics of microorganisms	–	3
1.5. Ecology of microorganisms. Fundamentals of the doctrine of infection. Biological research method	1,5	6
1.6. Microbiological ground of antimicrobial chemotherapy. Antimicrobial measures	1,5	3
1.7. Sanitary and bacteriological research methods. Microbiological examination of medicinal raw materials and finished dosage forms	1,5	6
2. Theoretical and applied medical immunology	3	24
2.1. The immune system. Immunity. Types, immune systems. Immunocompetent cells and molecules	1,5	3
2.2. Antigens. Antibodies	–	3
2.3. Mechanisms of immune response development	1,5	3
2.4. Immunodiagnostics. Serological and cellular reactions	–	3
2.5. Immunopathology. Assessment of immune status. Immunoprophylaxis and immunotherapy of infectious diseases	–	12
3. Medical microbiology	1,5	20
3.1. Methods for microbiological diagnosis of purulent infections caused by staphylococci, streptococci, and <i>Pseudomonas aeruginosa</i>	1,5	2
3.2. Methods for microbiological diagnosis of purulent infections caused by <i>Proteus</i> , <i>Bacteroides</i> , <i>Clostridia tetani</i> , causative agent of gas gangrene	–	2
3.3. Methods for microbiological diagnosis of meningococcal infection, whooping cough, diphtheria	–	2
3.4. Methods for microbiological diagnosis of diseases caused by pathogenic mycobacteria, hemoglobinophilic (hemophilic) bacteria, <i>Klebsiella</i> , <i>Nocardia</i> , <i>Actinomycetes</i>	–	2
3.5. Methods for microbiological diagnosis of acute intestinal infections caused by enterobacteria	–	2

3.6. Methods for microbiological diagnosis of bacterial intestinal infections caused by <i>Vibrio cholerae</i> , <i>Clostridia botulinum</i> , <i>Campylobacter</i> , <i>Helicobacter</i> , <i>Listeria</i>	–	2
3.7. Methods for microbiological diagnosis of sexually transmitted infections	–	2
3.8. Methods for microbiological diagnosis of bacterial zoonotic infections	–	2
3.9. Methods for microbiological diagnosis of rickettsial infections	–	2
3.10. Fundamentals of medical mycology and protozoology	–	2
4. Medical virology	4,5	14
4.1. General virology. Methods of virological research. Bacteriophages	1,5	2
4.2. Causative agents of respiratory viral infections: orthomyxoviruses, paramyxoviruses, coronaviruses, adenoviruses. <i>Rubivirus</i> . <i>Parvoviruses</i>	1,5	2
4.3. Herpesviruses	1,5	2
4.4. Ecological group of arboviruses and reoviruses	–	2
4.5. Picornaviruses, reoviruses, noroviruses, hepatitis viruses A, E, B, C	–	2
4.6. Retroviruses, rhabdoviruses, poxviruses, polyoma and papilloma viruses. Oncogenic viruses. Etiology of slow infections. Prions and prion diseases	–	4
Total number of hours	15	88

ACADEMIC DISCIPLINE CURRICULAR CHART

Section, topic #	Section (topic) name	Number of hours		Supervised student independent work	Practical skills	Form of control	
		lectures	laboratory			of practical skills	of current / intermediate assessment
4 semester							
	Lectures	6		3			
1.3.	1. Microbiology as a science. The world of microorganisms Systematics, nomenclature and classification of microorganisms. Physiology of microorganisms.						
1.5.	2. Экология микроорганизмов. Основы учения об инфекции. Ecology of microorganisms. Fundamentals of the doctrine of infection.	1,5	–	–			Computer testing
1.6.	3. Microbiological basis of antimicrobial chemotherapy.	–	–	1,5			
1.7.	4. Sanitary and bacteriological research methods. Microbiological examination of medicinal raw materials and finished dosage forms.	1,5	–	–			
2.1.	5. Immunology. The immune system.	1,5	–	–			

	Innate immunity.						Computer testing
2.3.	6. Humoral and cellular immune response. Anti-infective immunity.	-	-	1,5			
	Laboratory classes		54				
1.1.	1. Morphology of microorganisms. Basic forms of bacteria. Bacterioscopic research method. Simple staining methods.				1. Use of aseptic technique when working with Risk Group I microorganisms 2. Preparation of a fixed smear from an agar culture of bacteria 3. Preparation of a fixed smear from a broth culture of bacteria 4. Staining of fixed smear with aqueous solution of basic fuchsin = 5. Staining of fixed smear with aqueous solution of methylene blue 6. Immersion microscopy technique	Laboratory work	Oral questioning, written lab report*
1.2.	2. Bacterioscopic research method. Structure of a bacterial cell. Complex staining methods. Features of morphology and methods for studying spirochetes, rickettsia, chlamydia, mycoplasmas.	-	3	-	1. Preparation of a fixed smear from an agar culture of bacteria 2. Staining of fixed smear with Gram's method 3. Immersion microscopy technique 4. Detection and determination of the staphylococci morphology in Gram-stained smears 5. Detection and determination of the enterobacteria morphology in Gram-stained smears 6. Detection of the determination of the	Laboratory work	Quiz, computer test, oral questioning, written lab report*
		-	3	-			

					morphology of <i>Klebsiella</i> in smears stained with Burri-Gins' method 7. Microscopic examination of sputum smears stained with Ziehl-Neelsen method to detect mycobacteria 8. Detection and determination of the morphology of corynebacteria in smears stained by Loeffler		
1.4.	3. Genetics of microorganisms. Methods for studying the genetics of bacteria. Molecular genetic methods				Evaluation of polymerase chain reaction (detection of amplification products, interpretation of results)	Laboratory work	Quiz, computer test, questioning, written lab report*
1.3.	4. Cultural (bacteriological) research method. Methods for isolating pure bacterial cultures.	–	3	–	1. Determination of the colony morphology on a solid nutrient medium in a Petri dish 2. Aseptically transfer of an isolated bacterial colony from an agar plate to a sterile agar slant (subculturing)	Laboratory work	Computer test, oral questioning, written lab report*
1.3.	5. Cultural (bacteriological) research method. Methods for identifying pure bacterial cultures	–	3	–	Immersion microscopy technique	Laboratory work	Quiz, computer test, oral questioning, written lab report*
1.5.	6. Ecology of microorganisms. Methods for studying the normal microflora of the human body. Fundamentals of the doctrine of infection.	–	3	–	Use of aseptic technique when working with Risk Group 1 microorganisms	Laboratory work	Quiz, computer test, oral questioning, written lab report*
1.6.	7. Microbiological basis of antimicrobial chemotherapy. Methods for studying the sensitivity of microbes to antibiotics	–	3	–	Determination and interpretation the disk diffusion method results for the assessment of antimicrobial susceptibility of bacteria	Laboratory work	Quiz, computer test, oral questioning, written lab report*
1.7.	8. Antimicrobial measures: methods of	–	3	–	Use of aseptic technique when	Laboratory work	Quiz, computer

	sterilization and disinfection, antiseptics. Asepsis. Sanitary and bacteriological research methods.				working with Risk Group 1 microorganisms		test, oral questioning, written lab report*
1.7.	9. Microbiological examination of plant raw materials and finished dosage forms.				Determination of the colony morphology on a solid nutrient medium in a Petri dish	Laboratory work	Quiz, computer test, oral questioning, written lab report*
1.5.	10. Biological (experimental) research method. Final lesson on the section: «General and sanitary microbiology».	–	3	–	1. Preparation of a fixed smear from an agar culture of bacteria 2. Preparation of a fixed smear from a broth culture of bacteria 3. Staining of fixed smear with Gram's method 4. Immersion microscopy technique 5. Detection and determination of the staphylococci morphology in Gram-stained smears 6. Detection and determination of the streptococci morphology in Gram-stained smears 7. Detection and determination of the enterobacteria morphology in Gram-stained smears 8. Detection and determination of the Bacillus spp. morphology in Gram-stained smears 9. Detection and determination of the morphology of Klebsiella in smears stained with Burri-Gins' method	Individual practical work during current assessment*	Computer test, written report*, colloquium*
		–	3	–			

					10. Determination and interpretation the disk diffusion method results for the assessment of antimicrobial susceptibility of bacteria)		
2.1.	11. Immunology. The immune system. Innate immunity.				Detection and determination of the morphology of gonococci in Gram-stained smears of pus	Laboratory work	Quiz, computer test, oral questioning, written lab report*
2.2.	12. Antigens. Antibodies.	-	3	-	Evaluation of the single radial immunodiffusion (Mancini method) to determine the concentration of total immunoglobulins G	Laboratory work	Quiz, computer test, oral questioning, written lab report*
2.3.	13. Mechanisms of immune response development. Humoral and cellular immune response.	-	3	-			Quiz, computer test, oral questioning
2.4.	14. Immunodiagnostics. Serological and cellular reactions.				1. Performing slide agglutination and interpreting the results 2. Registration and interpretation of the passive (indirect) hemagglutination test to evaluate the immunity to diphtheria 3. Evaluation of tube agglutination test for determination of antibody titer 4. Evaluation of the enzyme immunoassay results (filling out the research protocol, assessing the reliability of the experiment and interpreting the results)	Laboratory work	Quiz, computer test, oral questioning, written lab report*
		-	3	-			
2.5.	15. Methods of clinical and infectious immunology. Allergy.	-	3	-	Immersion technique	microscopy Laboratory work	Quiz, computer test, oral questioning,

2.5.	16. Anti-infective immunity. Immunophylaxis and immunotherapy of infectious diseases. Methods of vaccinal immunity evaluation.	–	3	–	Registration and interpretation of the passive (indirect) hemagglutination test to evaluate the immunity to diphtheria	Laboratory work	Quiz, computer test, questioning, written lab report*
2.5.	17. Immune status of the body. Immunodeficiency states. Autoimmune diseases.	–	3	–	Registration and interpretation of the passive (indirect) hemagglutination test	Laboratory work	Quiz, computer test, questioning, written lab report*
2.5.	18. The concept of immunocorrection. Final lesson on the section: «Theoretical and applied immunology». CREDIT	–	3	–	1. Performing slide agglutination and interpreting the results 2. Registration and interpretation of the passive (indirect) hemagglutination test to evaluate the immunity to diphtheria	Individual practical work during current assessment*	Computer test, colloquium*

5 semester

	Lectures	6		–			
3.1.	1. The etiological agents of purulent infections.	1,5	–	–			
4.1.	2. General virology. Viral infections. Antiviral immunity. Chemotherapy and chemoprophylaxis of viral infections.	1,5	–	–			
4.2.	3. Orthomyxoviruses. Paramyxoviruses. Coronaviruses. Adenoviruses. Rubivirus. Parvoviruses.	1,5	–	–			
4.3.	4. Herpesviruses. Hepatitis viruses A, E, B, C. Retroviruses.	1,5	–	–			
	Laboratory classes		34				
3.1.	1. Methods for microbiological diagnosis of wound infections and purulent inflammatory	–	2	–	1. Detection of the	and Laboratory work	Quiz, computer test, oral

	processes caused by <i>Staphylococci</i> , <i>Streptococci</i> , <i>Pseudomonas aeruginosa</i> .				staphylococci morphology in Gram-stained smears 2. Detection and determination of the streptococci morphology in Gram-stained smears		questioning, written lab report*
3.2.	2. Methods for microbiological diagnosis of wound infections and purulent inflammatory processes caused by <i>Proteus</i> , <i>Bacteroides</i> , gas gangrene group <i>Clostridia</i> and <i>Clostridium tetanus</i> .				Immersion microscopy technique	Laboratory work	Quiz, computer test, oral questioning, written lab report*
3.3.	3. Methods for microbiological diagnosis of meningococcal infection, whooping cough, diphtheria.				1. Preparation of a fixed smear from an agar culture of bacteria 2. Staining of fixed smear with aqueous solution of methylene blue 3. Detection and determination of the morphology of corynebacteria in smears stained by Loeffler 4. Detection and determination of the morphology of gonococci in Gram-stained smears of pus	Laboratory work	Quiz, computer test, oral questioning, written lab report*
3.4.	4. Methods for microbiological diagnosis of diseases caused by pathogenic mycobacteria, hemoglobinophilic (hemophilic) bacteria, <i>Klebsiella</i> , <i>Nocardia</i> , <i>Actinomyces</i> .		2		1. Determination of the colony morphotype on a solid nutrient medium in a Petri dish 2. Detection and determination of the morphology of <i>Klebsiella</i> in smears stained with Burri-Gins' method 3. Microscopic examination of sputum smears stained with Ziehl-Neelsen method to detect mycobacteria	Laboratory work	Quiz, computer test, oral questioning, written lab report*
3.5.	5. Methods for microbiological diagnosis		2		1. Detection and	Laboratory work	Quiz, computer

	of bacterial intestinal infections caused by enterobacteria (<i>Escherichia</i> , <i>Shigella</i> , <i>Salmonella</i>).				determination of the enterobacteria morphology in Gram-stained smears 2. Performing slide agglutination and interpreting the results		test, oral questioning, written lab report*
3.6.	6. Methods for microbiological diagnosis of bacterial intestinal infections caused by <i>Vibrio cholerae</i> , <i>Yersinia enterocolitica</i> , <i>Clostridia botulinum</i> , <i>Campylobacter</i> , <i>Helicobacter</i> , <i>Listeria</i> .	–	2	–	1. Immersion technique 2. Detection and determination of vibrio morphology in Gram-stained smears	Laboratory work	Quiz, computer test, questioning, written lab report*
3.7.	7. Methods for microbiological diagnosis of sexually transmitted infections.	–	2	–	Immersion technique	Laboratory work	Quiz, computer test, questioning, written lab report*
3.8.	8. Methods for microbiological diagnosis of bacterial zoonotic infections caused by agents of tularemia, brucellosis, plague, anthrax, leptospirosis.	–	2	–	Detection and determination of the <i>Bacillus spp.</i> morphology in Gram-stained smears	Laboratory work	Quiz, computer test, questioning, written lab report*
3.9.	9. Methods of microbiological diagnostics of infections caused by <i>Borrelia</i> , <i>Rickettsia</i> , and <i>Coxiella</i> .	–	2	–	Immersion technique	Laboratory work	Quiz, computer test, questioning, written lab report*
3.10.	10. Fundamentals of medical mycology and protozoology. Final lesson on the section: «Medical microbiology».				1. Detection and determination of staphylococci morphology in Gram-stained smears 2. Detection and determination of streptococci morphology in Gram-stained smears 3. Detection and determination of the enterobacteria morphology in Gram-stained smears 4. Detection and determination of the <i>Bacillus</i>	Individual and practical work during current assessment*	Computer test, written report*, colloquium*

					<i>spp.</i> morphology in Gram-stained smears 5. Detection and determination of the morphology of <i>Klebsiella</i> in smears stained with Burri-Gins' method 6. Detection and determination of the morphology of gonococci in Gram-stained smears of pus 7. Microscopic examination of sputum smears stained with Ziehl-Neelsen method to detect mycobacteria 8. Detection and determination of the morphology of corynebacteria in smears stained by Loeffler 9. Detection and determination of <i>Candida</i> morphology in Gram-stained smears		
4.1.	11. Methods of virological research. Bacteriophages.	–	2	–	Registration and interpretation of the hemagglutination inhibition test for serodiagnosis of viral infection	Laboratory work	Quiz, computer test, oral questioning, written lab report*
4.2.	12. Methods of virological diagnostics of diseases caused by orthomyxoviruses, paramyxoviruses, coronaviruses, rubiviruses.	–	2	–	1. Registration and interpretation of the hemagglutination inhibition test for serodiagnosis of viral infection 2. Registration and interpretation of the hemagglutination inhibition test for influenza virus seroidentification	Laboratory work	Quiz, computer test, oral questioning, written lab report*
4.4.	13. Methods of virological diagnostics of diseases caused by togaviruses, flaviviruses,	–	2	–			Quiz, computer test, oral

	bunyaviruses, arenaviruses, filoviruses, rhabdoviruses.					questioning
4.3.	14. Methods of virological diagnostics of diseases caused by herpes viruses, adenoviruses, papillomaviruses, parvoviruses.	—	2	—		
4.5.	15. Methods of virological diagnostics of diseases caused by picornaviruses, reoviruses, noraviruses, hepatitis A, hepatitis E, hepatitis B, hepatitis C viruses.	—	2	—	Evaluation of the enzyme immunoassay results (filling out the research protocol, assessing the reliability of the experiment and interpreting the results)	Quiz, computer test, oral questioning, written lab report*
4.6.	16. Methods of virological diagnostics of diseases caused by retroviruses.	—	2	—	Immersion microscopy technique	Quiz, computer test, oral questioning, written lab report*
4.6.	17. Etiology of slow infections. Prions and prion diseases. Final lesson on the section: "General and specific medical virology".	—	2	—		Computer test, colloquium*
						Exam