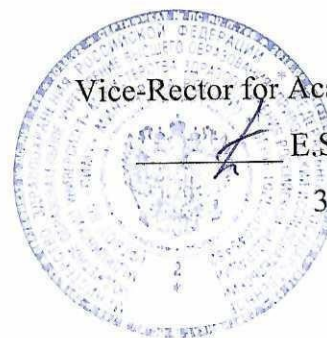


Federal State Budgetary Educational Institution of Higher Education
"Privolzhsky Research Medical University"
Ministry of Health of the Russian Federation



APPROVED

Vice-Rector for Academic Affairs

E.S. Bogomolova

31 August 2021

WORKING PROGRAM

Name of the academic discipline: **MICROBIOLOGY, VIROLOGY**

Specialty: **31.05.01 GENERAL MEDICINE**

Qualification: **GENERAL PRACTITIONER**

Department: **EPIDEMIOLOGY, MICROBIOLOGY AND EVIDENCE-BASED MEDICINE**

Mode of study: **FULL-TIME**

Labor intensity of the academic discipline: **252 academic hours**

Nizhny Novgorod
2021

The working program has been developed in accordance with the Federal State Educational Standard for the specialty **31.05.01 GENERAL MEDICINE** approved by Order of the Ministry of Science and Higher Education of the Russian Federation No. 988 dated of August 12, 2020.

Developers of the working program:

Makhrova Tatyana Vladimirovna Ph.D. of Medical Sciences, Docent, Associate Professor at the Department of Epidemiology, Microbiology and EBM of FSBEI HE PRMU MOH Russia

The program was reviewed and approved at the department meeting (protocol No. 12, date 15.04.2021)

Head of the Department of Epidemiology,
microbiology and evidence-based medicine,
DSci. of Medical Sciences, Associate Professor



(Kovalishena O.V.)

(signature)

15.04.2021

AGREED

Deputy Head of EMA ph.d. of biology



Lovtsova L.V.

(signature)

April 15, 2021

1. The purpose and objectives of mastering the academic discipline "Microbiology, virology" (hereinafter – the discipline):

1.1. The purpose of mastering the discipline: (*participation in forming the relevant competencies*).

The purpose of mastering the discipline: participation in the formation of competencies - UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16 (learning by students of the theoretical foundations and patterns of interaction of micro - and macroorganism, microbiological diagnostics, the main directions of the treatment of human infectious diseases, the combination of general biological knowledge of students with elements of clinical thinking, the education of a preventive approach - the main thing in the fight against the spread of infectious diseases).

1.2. Tasks of the discipline:

- formation of students' knowledge on the main theoretical issues of microbiology, virology;
- students study the etiology and pathogenesis of the most relevant infectious diseases;
- teaching students the principles and methods of laboratory diagnosis and prevention of infectious diseases;
- mastery of safety rules by students when working in microbiological laboratories with microbial cultures, reagents, instruments, laboratory animals;
- teaching students the principles and methods of disinfection and sterilization, the main disinfectants and the rules for their use;
- involvement of students in scientific research aimed at solving fundamental and applied problems in the field of public health protection;
- formation of the foundations of medical thinking, medical ethics, corporate culture among students, expansion of scientific and cultural horizons;
- the formation of a motivated attitude among students to the prevention of morbidity, sanitary and educational work.

In the course of general microbiology and virology: the formation of students' general ideas about the structure and functioning of microbes as living systems, the most important biological properties of pathogenic microorganisms and their relationship with the human body in certain conditions of the natural and social environment, methods of decontamination, including basics of disinfectology and sterilization techniques; familiarization of students with the principles of organizing work in a microbiological laboratory, with measures for labor protection and safety; formation of students' ideas about the conditions of storage of chemical reagents and medicines.

In the course of private microbiology: knowledge of the elements of pathogenetic microbiology of various infectious diseases; mastering the basic and getting acquainted with promising methods for diagnosing infectious diseases in accordance with the program, developing the basics of medical thinking, medical ethics, corporate culture among students, expanding scientific and cultural horizons, and skills in working with scientific literature.

1.3. Requirements to the deliverables of mastering the discipline

As a result of completing the discipline, the student should

Know:

• safety regulations and work in physical, chemical, biological laboratories, with reagents, instruments, animals; • biosphere and ecology, the phenomenon of parasitism and bioecological diseases; the role of individual representatives of the microbial world in the etiology and pathogenesis of major human infectious diseases; • classification, morphology and physiology of microbes, their indication and identification. The spread of microbes, their impact on human health. Ecology of microorganisms, their role in the circulation of substances. • methods of microbiological diagnostics of infectious and non-infectious human diseases. • main groups of antimicrobial chemotherapeutic and immunobiological drugs, their use.

Be able to:

• carry out sampling, marking and formalizing the direction of biological material from the patient and environmental objects for microbiological examination. • interpret the results of the most common methods of laboratory diagnostics - microbiological, molecular biological; • substantiate from microbiological positions the choice of material for research when diagnosing infectious diseases; • to conduct a microscopic examination of the material, its sowing on nutrient media, to determine the

morphological, tinctorial, cultural, antigenic, genetic and biochemical properties. • use physical, chemical and biological equipment; • observe safety precautions, work with magnifying equipment (microscopes, optical and simple magnifiers), interpret microscopy data; • use educational, scientific, popular science literature, the Internet for professional activities;

Possess: • skills in making a preliminary diagnosis based on the results of a laboratory (microbiological) examination • medical and anatomical conceptual apparatus; • information on the principles of sterilization, disinfection and antiseptic treatment of instruments and equipment in order to avoid infection of the doctor and patient; • the skills of making a preliminary diagnosis based on the results of laboratory and instrumental examinations.

2. Position of the academic discipline in the structure of the General Educational Program of Higher Education (GEP HE) of the organization.

2.1. The discipline "**Microbiology, virology**" refers to the core part of Block 1 of GEP HE ((B1.O.18)).

The discipline is taught in 4 and 5 semester/ II and III year of study.

2.2. The following knowledge, skills and abilities formed by previous academic disciplines are required for mastering the discipline:

in the cycle of Humanitarian, social and economic disciplines (philosophy, bioethics; history of medicine; Latin language; foreign language); in the cycle of Mathematical, natural sciences and biomedical disciplines (physics, mathematics; computer science, medical informatics and statistics; biological chemistry; biology with ecology; human anatomy, topographic anatomy; histology, embryology, cytology, normal physiology).

2.3. Mastering the discipline is required for forming the following knowledge, skills and abilities for subsequent academic disciplines:

infectious diseases, pathological physiology, dermatovenereology, obstetrics and gynecology, faculty and hospital therapy; pediatrics; surgery; traumatology and orthopedics, dentistry, oncology, radiation therapy; ophthalmology.

3. Deliverables of mastering the academic discipline and metrics of competence acquisition

Mastering the discipline aims at acquiring the following universal (UC) or/and general professional (GPC) or/and professional (PC) competencies

№	Competence code	The content of the competence (or its part)	Code and name of the competence acquisition metric	As a result of mastering the discipline, the students should:		
				know	be able to	possess
1.	UC-1	Able to carry out a critical analysis of problem situations based on a systematic approach, develop an action strategy	1.1 Knows: methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis 1.2 Able to: gain new knowledge based on analysis, synthesis, etc.; collect data on complex scientific problems related to the professional field; search for information and solutions based on action, experiment and experience 1.3 Has practical experience: researching the problem of professional activity using analysis, synthesis and other methods of intellectual activity;	1.1 Knows: methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis	1.2 Able to: gain new knowledge based on analysis, synthesis, etc.; collect data on complex scientific problems related to the professional field; search for information and solutions based on action, experiment and experience	1.3 Has practical experience: researching the problem of professional activity using analysis, synthesis and other methods of intellectual activity;

			developing an action strategy to solve professional problems			problems
2.	UC-8	Able to: create and maintain safe living conditions in everyday and professional life for the preservation of the natural environment, ensuring sustainable development of society, including in the case of a threat and occurrence of emergency situations and military conflicts	8.1 Knows: factors of harmful influence on vital activity; algorithms of actions in case of emergencies and military conflicts; 8.3 safety regulations in the workplace 8.2 Is able to: identify dangerous and harmful factors in the framework of the activities carried out, create and maintain safe living conditions in everyday life and in professional activities 8.3 Has practical experience: participation in scheduled exercises to develop rules of conduct in case of emergencies, first aid; adheres to safety regulations at work	8.1 Knows: factors of harmful influence on vital activity; algorithms of actions in case of emergencies and military conflicts	8.2 Able to: identify dangerous and harmful factors within the framework of its activities, create and maintain safe living conditions in everyday and professional life	8.3 Has practical experience in: participation in planned exercises to work out the rules of conduct in case of emergencies, first aid; complies with safety regulations at the workplace
3.	GPC-4	GPC-4. Able to apply medical products, provided by the order of healthcare delivery, as well as examine patients for the purpose of determining the diagnosis	4.1 Knows the methodology for collecting anamnesis of life and diseases, complaints from patients (their legal representatives); method of examination and physical examination; clinical picture, diagnostic methods of the most common diseases; methods of laboratory and instrumental studies for assessing the state of health, medical indications for conducting studies, rules for interpreting their results; international statistical classification of diseases and related health problems (ICD); conditions requiring emergency medical care; the procedure for the use of medical devices in accordance with the current procedures for the provision of medical, clinical recommendations (treatment protocols) on the provision of medical care, care, taking into account the standards of medical care 4.2 Is able to: identify risk factors and causes of diseases; apply methods of examination and physical examination of patients; interpret the results of the examination and physical examination of patients; diagnose the most common pathology in patients; identify risk factors for cancer; formulate a preliminary diagnosis, draw up a plan for	4.1 Knows the methodology of collecting anamnesis of life and diseases, complaints of patients (their legal representatives); examination procedure; and physical examination; clinical aspect, methods of diagnosis of the most common diseases; methods of laboratory and instrumental investigations to assess the state of health, medical indications for conducting research, rules for interpreting their results; international statistical classification of diseases and health-related problems (ICD); conditions requiring emergency medical care;	4.2 Able to: collect complaints, anamnesis of life and disease of patients (their legal representatives), identify risk factors and causes of diseases; apply methods of examination and physical survey of patients; interpret the results of examination and physical examination of patients; diagnose the most common pathology among patients; identify risk factors for cancer; formulate a preliminary diagnosis, to make a plan for conducting laboratory, instrumental and additional investigations of patients in accordance with the procedures	4.3 Has practical experience in: collecting complaints, anamnesis of life and disease of patients (their legal representatives), identifying risk factors and causes of disease development; examination and physical survey of patients; diagnosis of the most common diseases; identification of risk factors for major oncological diseases; formulation of a preliminary diagnosis, drawing up a plan for instrumental, laboratory, additional investigations, consultations of specialist

			<p>conducting laboratory, instrumental and additional studies in patients in accordance with the procedures for providing medical care, clinical recommendations, taking into account the standards of medical care; refer patients for laboratory, instrumental and additional studies in accordance with the current procedures for the provision of medical care, clinical recommendations, taking into account the standards of medical care; refer patients for consultations to specialist doctors in accordance with the procedures for providing medical care, clinical recommendations, taking into account the standards of medical care; interpret and analyze the results of consultations with patients' specialists; interpret and analyze the results of basic (clinical) and additional (laboratory, instrumental) examination methods; to carry out differential diagnostics of diseases in patients; identify clinical signs of sudden acute diseases, conditions, exacerbations of chronic diseases without obvious signs of a threat to life, requiring emergency medical care; apply medical devices in accordance with the current procedures for the provision of medical, clinical recommendations (treatment protocols) on the provision of medical care, care, taking into account the standards of medical care</p> <p>4.3 Has practical experience in: collecting complaints, anamnesis of life and disease in patients (their legal representatives), identifying risk factors and causes of diseases; examination and physical examination of patients; diagnosis of the most common diseases; identification of risk factors for major cancers; formulating a preliminary diagnosis, drawing up a plan for instrumental, laboratory, additional studies, consultations with specialist doctors; referral of patients for</p>	<p>procedure for the use of medical devices in accordance with the current procedures for providing medical care, clinical recommendations (treatment protocols) on the medical care delivery taking into account the standards of medical care</p>	<p>for providing medical care, clinical recommendations taking into account the standards of medical care; to refer patients to laboratory, instrumental and additional investigations in accordance with the current procedures for providing medical care, clinical recommendations, taking into account the standards of medical care; refer patients for consultations to medical specialists in accordance with the procedures of medical care, clinical recommendations taking into account the standards of medical care; interpret and analyze the results of consultations to medical specialists in accordance with the procedures of medical care, clinical recommendations taking into account the standards of medical care; to interpret and analyze the results of consultations by medical specialists of patients; to interpret and analyze the results of basic (clinical) and additional (laboratory, instrumental) examination methods; carry out differential diagnosis of diseases of patients; identify clinical signs of sudden acute diseases, conditions, exacerbations of chronic diseases</p>	<p>doctors; referral of patients for instrumental, laboratory, additional investigations, consultations of specialist doctors in accordance with the current procedures for providing medical care, clinical recommendations taking into account the standards of medical care; interpretation of data from additional (laboratory and instrumental) examinations of patients; making a preliminary diagnosis in accordance with the international statistical classification of diseases and problems related to health (ICD); differential diagnosis of diseases; recognition of conditions arising from sudden acute diseases, exacerbation of chronic diseases without obvious signs of a threat to the patient's life and requiring urgent medical care; the use of</p>
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			instrumental, laboratory, additional studies, consultations of medical specialists in accordance with the current procedures for the provision of medical care, clinical recommendations, taking into account the standards of medical care; interpretation of data from additional (laboratory and instrumental) examinations of patients; making a preliminary diagnosis in accordance with the international statistical classification of diseases and related health problems (ICD); carrying out differential diagnostics of diseases; recognition of conditions arising from sudden acute diseases, exacerbation of chronic diseases without obvious signs of a threat to the patient's life and requiring emergency medical care; the use of medical devices in accordance with the current procedures for the provision of medical, clinical recommendations (treatment protocols) on the provision of medical care, assistance taking into account the standards of medical care		without obvious signs of life-threatening, requiring medical care in an urgent form; use medical devices in accordance with current medical procedures, clinical recommendations (treatment protocols) on the provision of medical care, assistance taking into account the standards of medical care	medical devices in accordance with current medical procedures, clinical recommendations (treatment protocols) on the issues of medical care delivery, assistance taking into account the standards of medical care
4.	GPC-5	GPC-5. Able to assess morphofunctional, physiological conditions and pathological processes in the human body to solve professional problems	5.1 Knows: anatomy, histology, embryology, topographic anatomy, physiology, pathological anatomy and physiology of human organs and systems 5.2 Able to: evaluate the basic morphological and functional data, physiological conditions and pathological processes in the human body 5.3 Has practical experience: assessment of basic morphological and functional data, physiological conditions and pathological processes in the human body when solving professional problems	5.1 Knows: anatomy, histology, embryology, topographic anatomy, physiology, pathological anatomy and physiology of human organs and systems	5.2 Able to: evaluate the basic morphological and functional data, physiological conditions and pathological processes in the human body	5.3 Has practical experience in: assessment of basic morphological and functional data, physiological conditions and pathological processes in the human body when solving professional problems
5.	GPC-10	GPC-10. Able to understand the principles of modern information technologies and use them to solve the tasks of professional activity	10.1 Knows: the possibilities of reference and information systems and professional databases; methods of information search, information and communication technologies; modern medical and biological terminology; basics of information security in	10.1 Knows: the capabilities of reference information systems and professional databases; methods of information retrieval,	10.2 Able to: apply modern information and communication technologies to solve the tasks of professional activity; carry out an effective search for	10.3 Has practical experience in the use of modern information and bibliographic resources, the use of special

			<p>professional activity 10.2 Able to: apply modern information and communication technologies to solve the problems of professional activity; to carry out an effective search for information necessary to solve the problems of professional activity using reference systems and professional databases; use modern medical and biological terminology; master and apply modern information and communication technologies in professional activities, taking into account the basic requirements of information security 10.3 Has practical experience in: using modern information and bibliographic resources, using special software and automated information systems to solve standard tasks of professional activity, taking into account the basic requirements of information security</p>	<p>information and communication technologies; modern medical and biological terminology; fundamentals of information security in professional activities</p>	<p>information necessary to solve the tasks of professional activity using reference systems and professional databases; use modern medical and biological terminology; master and apply modern information and communication technologies in professional activity, taking into account the basic requirements of information security</p>	<p>software and automated information systems to solve standard tasks of professional activity, taking into account the basic requirements of information security</p>
6.	PC-16	<p>PC-16 Able to: organize and monitor the immunoprophylaxis of infectious diseases in the adult population, prescribe preventive measures to patients taking into account risk factors in accordance with the current procedures for providing medical care, clinical recommendations (treatment protocols) on the provision of medical care taking into account the standards of medical care and monitor compliance with preventive measures</p>	<p>16.1 Knows: the principles of application of specific and non-specific prevention of infectious diseases, the national calendar of preventive vaccinations and the calendar of preventive vaccinations according to epidemic indications; legislation of the Russian Federation in the field of health protection, sanitary rules and regulations; preventive measures, taking into account the diagnosis in accordance with the current procedures for the provision of medical care, clinical recommendations (treatment protocols) on the provision of medical care, taking into account the standards of medical care 16.2 Knows how to: organize and conduct immunoprophylaxis of infectious diseases in the adult population in accordance with the current procedures for the provision of medical care, clinical recommendations (treatment protocols) on the provision of medical care, taking into account the standards medical care;</p>	<p>16.1 Knows: principles of application of specific and non-specific prevention of infectious diseases, the national calendar of preventive vaccinations and the calendar of preventive vaccinations for epidemic indications; legislation of the Russian Federation in the field of health protection, sanitary rules and regulations; preventive measures taking into account the diagnosis in accordance with the current procedures for medical care,</p>	<p>16.2 Able to: organize and carry out immunoprophylaxis of infectious diseases in the adult population in accordance with the current procedures for the provision of medical care, clinical recommendations (treatment protocols) on the provision of medical care taking into account standards of medical care; prescribe preventive measures to patients taking into account risk factors for the prevention and early detection of diseases,</p>	

			prescribe preventive measures to patients, taking into account risk factors for the prevention and early detection of diseases, including socially significant diseases	clinical recommendations (treatment protocols) about medical care delivery taking into account the standards of medical care	including socially significant diseases	
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4. Sections of the academic discipline and competencies that are formed when mastering them

№	Competence code	Section name of the discipline	The content of the section in teaching units
	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	General medical microbiology	1. Medical microbiology. Subject and tasks. Significance in the practice of a doctor. The main stages of development. The role of domestic scientists in the development of microbiological science. Principles of classification and nomenclature of bacteria. 2. The structure of a bacterial cell. Chemical composition and functions of the structural elements of the cell. Morphological features of individual groups of microorganisms (actinomycetes, rickettsia, chlamydia, mycoplasmas, spirochetes). 3. Physiology of microorganisms Types of metabolism: anabolism and catabolism. Classification of microorganisms according to the types of nutrition and energy production. Bacterial respiration as biological oxidation. Growth and reproduction of microorganisms. bacterial enzymes. Practical use of enzymes of microbial origin by humans. Basic principles of cultivation and identification of bacteria by cultural and enzymatic properties. 5. Atypical bacteria. Morphological features of actinomycetes, rickettsia, chlamydia, mycoplasmas, spirochetes. Significance in biology and medicine. 6. Microbiological bases of chemotherapy for infectious diseases. Sulfonamides. Antibiotics. Classification, spectrum and mechanism of action. Side effect on the body. The problem of drug resistance of microorganisms.
	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	Ecology of microorganisms	Spread of microbes in the environment. The role of microbes in the cycle of substances in nature. Microflora of soil, water, air, domestic and medical facilities. Microflora of the human body and its functions. Probiotics (eubiotics). Sanitary microbiology. Destruction of microbes in the environment. Disinfectology. The principle of decontamination. The concept of disinfection and sterilization. Aseptic and antiseptic. Physical and chemical factors of decontamination. The concept of antibiotics, antiseptics, disinfectants. Methods for monitoring the effectiveness of sterilization and disinfection. The practical significance of phages in biology and medicine.
	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	General virology	1. Viruses. Bases of classification. History of development of virology. Hypotheses about the origin and nature of viruses. Fundamental differences between viruses and prokaryotic cells. Modern principles of classification and nomenclature of viruses. Features of the structural organization of viruses. Ecology of viruses. Concept of virus and virion. Viroids and prions, their role in pathology. Stages of interaction of the virus with the cell. Methods for culturing viruses. 2. Molecular bases of virus reproduction. Features of the reproduction of RNA viruses (plus-RNA viruses, minus-RNA viruses), DNA viruses, retroviruses. Outcomes of the interaction of the virus with the cell. Productive, abortive and integrative infections. Virus persistence. Mechanisms and types of persistence. Virogeny. Methods for studying

			viruses. Bacteriophages. Classification, mechanisms of interaction of a bacteriophage with a cell. Lysogeny. The concept of a prophage.
	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	Genetics of bacteria	Variability of microorganisms. Phenotypic and genotypic variability. Modifications. Mutations. Spontaneous and induced mutations. genetic recombination. Transformation. Transduction (general and specific). Conjugation. Extrachromosomal factors of heredity (plasmids), their properties. The concept of genetic engineering.
	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	Antibiotics	Symbiosis and antibiosis. Antibiotics. Discovery history. Classification by origin, chemical composition. Narrow and broad spectrum, bacteriostatic and bactericidal action. The mechanism of action of antibiotics on prokaryotic cells. Bacteriocins.
	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	Infectious process Pathogenicity and virulence of microorganisms	1. Infection. infectious process. Infectious disease. The role of the microorganism in the infectious process. pathogenicity and virulence. The role of the macroorganism in the infectious process. Nonspecific factors protecting the body from infection. The role of the environment and social conditions in the occurrence of infectious diseases. Principles of combating infectious diseases. 2. Pathogenicity virulence The main factors of bacterial virulence at various stages of the interaction of a microorganism with a sensitive macroorganism. Toxins of bacteria, classification of toxins.
	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	Special medical microbiology	1. Methods of laboratory diagnostics of infectious diseases of microbiological research (express diagnostics, microbiological and immunological). 2. Pyogenic cocci. Staphylococci. Streptococci. Meningococcus. Gonococcus. Classification. Characteristic. role in pathology. Immunity. Laboratory diagnostics. Treatment and prevention. 3. Family Enterobacteriaceae. Escherichia. Shigella. Salmonella. causative agents of cholera. Taxonomy and classification. Morphology and other biological properties. Pathogenesis and clinic of caused diseases. Immunity. Prevention. Nosocomial infections caused by enterobacteria. 4. Pathogens of diphtheria, whooping cough, paraptussis. biological properties. Pathogenesis and clinic of caused diseases. Immunity. specific prophylaxis. 5. Mycobacterium tuberculosis. Characteristic. Pathogenesis and clinic of tuberculosis. Immunity. specific prophylaxis. 6. Causative agents of zoonotic infections: plague, tularemia, brucellosis, anthrax. biological properties. Pathogenesis and clinic of caused diseases. Ecology of pathogens. specific prophylaxis. 7. Pathogenic clostridia and clostridia. Causative agents of tetanus, anaerobic wound infection, botulism. Ecology of pathogens. Pathogenesis and clinic of caused diseases. Specific therapy and prevention of clostridial infections. 8. Pathogenic spirochetes and spirochetosis. The causative agent of syphilis. biological properties. Pathogenesis and clinic of syphilis. Immunity. Prevention. The causative agent of systemic tick-borne borreliosis (Lyme disease). Characteristic. Pathogenesis and clinic of the disease. Prevention. 9. Mycoplasmas. Chlamydia. Rickettsia. Features of morphology, physiology. Pathogenesis and clinic of caused diseases. Prevention.
	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	Special medical virology	1. Orthomyxoviruses. Influenza virus. Structure and other biological properties. Influenza pathogenesis. Immunity. Diagnostics. specific prophylaxis. 2. Paramyxoviruses. measles virus. Characteristic. Pathogenesis and clinic of measles. Measles in conditions of mass vaccination. Prevention. 3. Rubella virus. Characteristic. congenital rubella syndrome. Rubella

		prevention. 4. Rabdoviruses. Rabies virus. Biological properties and ecology. role in human pathology. Prevention. 5. Picornaviruses. Polio virus. Pathogenesis and clinic of poliomyelitis. specific prophylaxis. Coxsackie and ESCO viruses are the causative agents of poliomyelitis-like diseases. 6. Hepatitis viruses. Hepatitis A virus. Hepatitis B virus. Hepatitis C, D, E, G viruses. Pathogenesis and clinic of viral hepatitis. Immunity. Prevention. 7. Human immunodeficiency virus (HIV). Pathogenesis and clinic of the disease. Diagnostics. Prevention. 8. Human herpesviruses. Herpes simplex virus. Primary and recurrent herpes. Varicella zoster virus. Cytomegalovirus. Pathogenesis and clinic of caused diseases. Diagnostics. Prevention. 9. Arboviruses. Structure and biological properties. Ecology. Pathogenesis and clinic of caused diseases. Diagnostics. Prevention.
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5. Volume of the academic discipline and types of academic work

Type of educational work	Labor intensity		Labor intensity (AH) in semesters	
	volume in credit units (CU)	volume in academic hours (AH)	4	5
Classroom work, including	3,7	132	66	66
Lectures (L)		28	14	14
Laboratory practicum (LP)*				
Practicals (P)		104	52	52
Seminars (S)				
Student's individual work (SIW)	2,3	84	42	42
Mid-term assessment	1	36		36
credit/exam (<i>specify the type</i>)				
TOTAL LABOR INTENSITY	7	252	108	144

6. Content of the academic discipline

6.1. Sections of the discipline and types of academic work

№	Name of the section of the academic discipline	Types of academic work* (in AH)					Total
		L	LP	P	S	SIW	
1	General medical microbiology Antibiotics	6		27		13	46
2	Ecology of microorganisms. Human normobiota	2		5		5	12
3	General medical virology			6		10	16
4	General mycology	2		3		5	10
5	Variability of microorganisms - genetics of bacteria	2		3		5	10
6	Infectious process Pathogenicity, virulence of microorganisms	2		5 3		4	14
7	Special medical microbiology	6		37		11	54
8	Special medical virology	8		15		31	54
		28	-	104	-		
	TOTAL		132			84	216

* - L – lectures; LP – laboratory practicum; P – practicals; S – seminars; SIW – student's individual work.

6.2. Thematic schedule of educational work types:

6.2.1 Thematic schedule of lectures

№	Name of lecture topics	Volume in AH	
		semester 4	semester 5
1	Introduction to medical microbiology.	2	
2	Infection process	2	
3	Pathogenicity of microorganisms. Bacterial toxins.	2	
4	Bacterial genetics. Genetic bases of bacterial pathogenicity.	2	
5	Normal microbiota of the human body.	2	
6	Introduction on medical mycology.	2	
7	Groups of infectious diseases: especially dangerous and arbovirus infections. The concept of emerging infections.	2	
8	Streptococci		2
9	General characteristics of enterobacteria. Shigella.		2
10	Mycobacterium tuberculosis.		2
11	Orthomyxoviruses.		2
12	Herpesviruses.		2
13	Human immunodeficiency viruses (HIV).		2
14	Hepatitis viruses. General characteristics		2
		14	14
	TOTAL (total - AH)	28	
	Pseudomonas aeruginosa.		2
	Topical issues of medical microbiology		2
	Chlamydia. Mycoplasmas. Rickettsia		2
	Paramyxoviruses.		2
	Hepatitis B and C viruses.		2

6.2.2. The thematic plan of laboratory practicums (if this type of classes is stipulated in the curriculum)

6.2.3. Thematic plan of practicals

№	Name of the topics of practicals	Volume in AH	
		semester	
		4	5
1.	Morphology of bacteria and methods for its study Introduction to medical microbiology. Working hours of the microbiological laboratory. Classification of microorganisms. The main groups of microorganisms. Prokaryotes and their properties. Gram stain. Morphological classification of bacteria.	5	
2.	Morphology of bacteria and methods for its study Structural and functional organization of a bacterial cell. Microscopic research methods. Tinctorial properties of bacteria. Special staining procedures for studying structure of bacteria. The methods of bacteria staining.	3 2	
3.	Physiology of bacteria. Cultivation of bacteria. Bacteriological analysis Nutrient media, classification. Growth and reproduction of bacteria. Phases of development of a bacterial population. Bacteriological (cultural) research method.	5	
4.	Physiology of bacteria. Constructive and energy metabolism of bacteria. 1. Anabolism. Bacterial growth and cell division. Phases of growth in bacterial culture. Culture media for growing bacteria. Types of media. 2. Catabolism. 3. Principles of anaerobes culturing. Enzymatic activity of bacteria. Pigments of microorganisms. Principles of identification of pure culture.	5	
5.	Chemotherapeutic drugs. Antagonism of microbes and principles of its detection. History	5	

	of antibiotic discovery. Classification of antibiotics. The modes of action of antimicrobial agents on bacterial cells. Resistance of bacteria. Mechanisms of resistance.		
6.	General virology General characteristics and classification of viruses. Ecology of viruses. Components of virion. Viroids and prions. Principles of cultivation of viruses. Stages of viral replication. Mechanisms of viral reproduction. Functions of virion proteins. The results of virus-cell interaction. Productive, abortive and persistent infections. Mechanism of viral persistence. Methods for detecting viruses in infected objects. Principles of antiviral therapy.	6	
7.	<u>Nontypical bacteria.</u> Structure and general properties of mycoplasmas, rickettsia, chlamydia, mycobacteria, spirochaetes, and actinomyces. Methods of sterilization and disinfection. Principles of sterilization in microbiology.	5	
8.	Genetics of microorganisms Factors and mechanisms of pathogenicity of microorganisms.	2 3	
9.	Infectious process.	5	
10.	Ecology of microorganisms. Normal microbiota of the human body. Introduction in medical mycology.	3 3	
11.	Principles of laboratory diagnostics of infectious diseases. Rules for taking and transporting material for microbiological research. Staphylococci. Pseudomonas aeruginosa.		5
12.	1. General characteristics of Streptococci. S.pyogenes. Pneumococci. <i>Haemophilus influenza</i>		6
13.	1. Neisseria. Neisseria gonorrhoeae, Neisseria meningitidis. 2. Mycoplasma		5
14.	1. Enterobacteria. General characteristics. 2. Escherichia. 3. Shigella. 4. Salmonella. 5. <i>Vibrio cholerae</i> .		6
15.	1. Corynebacteria. <i>Corynebacterium diphtheria</i> . 2. Mycobacteria. <i>Mycobacterium tuberculosis</i>		5
16.	1. Clostridia. C. perfringens, C. tetani, C. botulinum, C. difficile. 2. Bacilli. Bacillus anthracis.		5
17.	Chlamydia, rickettsia. Pathogenic spirochetes. Treponema pallidum		5
18.	1. Principles and methods for diagnosing viral infections. 2. Orthomyxoviruses. 3. Paramyxoviruses.		5
19.	1. Human immunodeficiency virus (AIDS-virus). 2. Rhabdoviruses 3. Herpesviruses		5
20.	1. Picornaviruses. Polioviruses. 2. Hepatitis viruses.		5
		52	52
	TOTAL (total - AH)		104

6.2.4. Thematic plan of seminars (if this type of classes is stipulated in the curriculum)

6.2.5. Types and topics of student's individual work (SIW)

№		Types and topics of SIW	Volume in AH	
			semester 4	semester 5
1.	General medical microbiology Antibiotics	Working with literature sources, including lecture material; preparation for classes in an interactive form; preparation for boundary control, incl. work with electronic educational resources (on-line computer testing on the distance education website of PIMU)	13	
2.	Ecology of microorganisms.	Working with literature sources, including	10	

	Human normobiota	lecture material; preparation for classes in an interactive form; preparation for boundary control, incl. work with electronic educational resources (on-line computer testing on the distance education website of PIMU)		
3.	General medical virology	work with electronic educational resources (on-line computer testing on the distance education website of PIMU), writing essays*	5	
4.	General mycology	Working with literature sources, including lecture material; preparation for classes in an interactive form; preparation for boundary control, incl. work with electronic educational resources (on-line computer testing on the distance education website of PIMU)	5	
5.	Variability of microorganisms - genetics of bacteria	Working with literature sources, including lecture material; preparation for classes in an interactive form; preparation for boundary control	5	
6.	Infectious process Pathogenicity, virulence of microorganisms	Working with literature sources, including lecture material; preparation for classes in an interactive form; preparation for boundary control, incl. work with electronic educational resources (on-line computer testing on the distance education website of PIMU)	4	
7.	Special medical microbiology	Working with literature sources, including lecture material; preparation for classes in an interactive form; preparation for boundary control, incl. work with electronic educational resources (on-line computer testing on the distance education website of PIMU), writing essays*		11
8.	Special medical virology	Working with literature sources, including lecture material; preparation for classes in an interactive form; preparation for boundary control, incl. work with electronic educational resources (on-line computer testing on the distance education website of PIMU), writing essays*		31
TOTAL (total 84 AH):			42	42

7. Types of assessment formats for ongoing monitoring and mid-term assessment

№	Semester No.	Types of control		Name of section of academic discipline	Competence codes	Assessment formats		
						Types	number of test questions	number of test task options
1.	4	Current monitor	Control of mastering the	General Medical Microbiology	UC-1, UC-8,	Control questions (33)	5	2

		ing	topic Monitoring the student's individual work		GPC-4, GPC-5, GPC-10, PC-16	12) Situational tasks	1	5
						Test tasks	20	Unlimited (when conducting computer testing)
						Test questions	1	30
						Exam questions	1	21
2	4	Current monitoring	Control of the topic Monitoring the student's individual work	Antibiotics	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	Test tasks	20	Unlimited (when conducting computer testing)
						Control questions (9)	5	2
						Report	1	15
						Контрольная работа по разделу Control questions	1	28
2.	4	Current monitoring	Control of the topic Monitoring the student's individual work	Ecology of microorganisms. Human normobiota	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	Test tasks	20	Unlimited (when conducting computer testing)
						Control questions (9)	5	2
						Control questions	1	всего вопросов по разделу – 35
3	4	Current monitoring	Control of the topic Monitoring the student's individual work	General Medical virology	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	Test tasks	20	Unlimited (when conducting computer testing)
						Control questions (12)	5	2
						Control questions	1	7
						Report	1	2
4	4	Current monitoring	Control of the topic Monitoring the student's individual work	General mycology	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	Test tasks	5	Unlimited
						Exam questions	1	2
						Security questions	3	2

5.	4	Current monitoring	Control of the topic Monitoring the student's individual work	Variability of microorganisms - genetics of bacteria	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	Test tasks	20	Unlimited (when conducting computer testing)
						Report	1	5
						Control questions (6)	1	42
						Exam questions	1	4
						Report	1	2
6	4	Current monitoring	Control of the topic Monitoring the student's individual work	Infectious process Pathogenicity, virulence of microorganisms	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	Test task	15	Unlimited (when conducting computer testing)
						Control questions (8)	5	2
						Test	2	5
						Control questions (9)	1	14
7	5	Current monitoring	Control of the topic Monitoring the student's individual work	Special medical microbiology	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	Test tasks	15	Unlimited (when conducting computer testing)
						Control questions	5	2
						Control work: written control work on the section "Private microbiology"; individual survey (terminal control)	5	2
						Report	1	5
8	5	Current monitoring	Control of the topic Monitoring the student's individual work	Special medical virology	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	Test tasks		Unlimited (when conducting computer testing)
						Control questions	5	2
						Oral individual survey. Control work: written control work on the section "Private virology"; individual survey	2	5

						(terminal control) Report	1	5
						Control questions	1	80
2.	4	Mid-term assessment	Exam	All sections of the discipline	UC-1, UC-8, GPC-4, GPC-5, GPC-10, PC-16	Security questions	3	80
						Situational tasks	2	46

8. Educational, methodological and informational support for mastering the academic discipline (printed, electronic publications, the Internet and other network resources)

8.1. Key literature references

p/no.	Name according to bibliographic requirements	Number of instances	
		in the library	at the department
1	2	3	4
1	Zverev, V.V. Medical Microbiology, Virology, Immunology: textbook. Vol. 1: textbook / V. V. Zverev, M. N. Boichenko; Zverev V. V.; Boichenko M. N. - Moscow: GEOTAR-Media, 2020. - 384 p. – ISBN 978-5-9704-5607- 1		
2	Zverev, V.V. Medical Microbiology, Virology, Immunology : textbook : Vol. 2. : textbook / V. V. Zverev, M. N. Boichenko; Zverev V. V.; Boichenko M. N. - Moscow: GEOTAR-Media, 2020. - 392 p. – ISBN 978-5-9704-5719-1.		
3	Medical Microbiology, Virology and Immunology. Lecture Notes: textbook / M. N. Artamonova, N. I. Potaturkina-Nesterova, N. A. Ilyina, I. S. Nemova; Artamonova M. N.; Potaturkina-Nesterova N.I.; Ilyina N. A.; Nemova I. S. - Moscow: GEOTAR-Media, 2021. - 352 p. – ISBN 978-5-9704-6043-6.		
4	Murray, P. R. Basic medical microbiology / P. R. Murray. – Philadelphia : Elsevier, 2018. – 232 p. : il. – (Student consult). – ISBN 9780323476768.		
5	<i>Jawetz, Melnick and Adelberg's medical microbiology / K. C. Carroll, J. A. Hobden, S. Miller, S. A. Morse. – 27th ed. – New York : McGraw-Hill Education, 2016. – IX, 852 p. : il. – ISBN 978-1-2592-5534-2.</i>		

8.2. Further reading

p/no.	Name according to bibliographic requirements	Number of instances	
		in the library	at the department
1	2	3	4
1.	General microbiology and microflora of plants : textbook / M. I. Zaslavskaya, T. V. Makhrova, N. I. Ignatova [et al.] ; FSBEI HE PRMU MOH Russia. – N. Novgorod : Publishing House of Privolzhskiy Research Medical University, 2021.		
2.	General microbiology: bacteriology, virology, mycology : textbook / M. I. Zaslavskaya, T. V. Makhrova, N. I. Ignatova [et al.] ; FSBEI HE PRMU		

	MOH Russia. – N. Novgorod : Publishing House of Privolzhskiy Research Medical University, 2021.		
3.	General microbiology and microbiota of the oral cavity = General microbiology and microbiota of the oral cavity : testbook / M. I. Zaslavskaya, T. V. Makhrova, O. A. Lukova [and others]. - Nizhny Novgorod: PIMU Publishing House, 2021. - 1 file (4.3 Mb). Maiyanskii, A.N.		
4	Zaslavskaya, M. I. Applied microbiology and immunology : textbook for the international english speaking medical students / M. I. Zaslavskaya ; Zaslavskaya M. I. – N. Novgorod : Published House NSMA, 2007. – 92		
5	Mims`medical microbiology and immunology / P. L. Chiodini, H. M. Dockrell, R. Goering, M. Zuckerman. – 6th ed. – Edinburgh ; London ; New York : Elsevier, 2019. – 551 p. : il. – (Student consult). – ISBN 978-0-7020-7156-0.		

8.3. Electronic educational resources for teaching academic subjects

8.3.1. Internal Electronic Library System of the University (IELSU)

Name of the electronic Resource	Brief description (content)	Access conditions	Number of users
Internal Electronic Library System (ELS) http://nbk.pimunn.net/MegaPro/Web	The works of the teaching staff of the University: textbooks, textbooks, collections of tasks, methodological manuals, laboratory work, monographs, collections of scientific papers, scientific articles, dissertations, abstracts of dissertations, patents	From any computer and mobile device using an individual login and password. Access mode: http://nbk.pimunn.net/MegaPro/Web	Not limited

8.3.2. Electronic educational resources acquired by the University

№ p/p	Name electronic resource	Brief description (content)	Access conditions	Quantity users
1.	The digital library system " Student's Consultant "	contains full-text versions of digital textbooks and study guides in all areas and disciplines of medical education in accordance with the curricula and requirements of the Federal State Educational Standard. There is an English interface.	<i>on the platform of the PRMU Digital Library through the appropriate banner or directly through the e-book found in the catalog. To access the full text, you need to log in to the reader's Personal Account (login – the number of the campus card (eleven numerals), password – date of birth without spaces (for example – 05022002) directly on the platform of DLS "Student's Consultant". To access the resource, it is necessary to pass a personal registration from the computers of the Scientific Library or</i>	Not limited Validity period: until 31.12.2022

			<p><i>University.</i></p> <p>In the future, you can work from any computer or mobile device.</p> <p>Users who have not worked with the database for more than a year need to confirm their registration: log in to the database with their user name and password from the computers of the Scientific Library or University or through the Personal Account of the user of the PRMU Digital Library.</p>	
2.	The digital library "Doctor's Consultant" i	<p>includes:</p> <ul style="list-style-type: none"> • national guidelines for all areas of medicine • clinical recommendations • training manuals • monographs • atlases • pharmaceutical reference books 	<p>on the <u>platform of the PRMU Digital Library</u> using the appropriate banner or directly through the e-book found in the catalog. To access the full text, you need to log into the Reader's Personal Account (login – the number of the campus card (eleven numerals), password – date of birth without spaces (for example – 05022002))</p> <p>directly on the <u>DLS "Doctor's Consultant"</u> platform or on the <u>DLS "Student's Consultant"</u> platform. To access the resource, it is necessary to pass a personal registration from the computers of the Scientific Library or University. Please note: for users already registered in the Student's Consultant DLS, the re-registration is not required.</p> <p>In the future, you can work from any computer or mobile device.</p>	<p>Not limited</p> <p>Access until 31.12.23</p>
3.	The digital library BookUp	The digital library BookUp contains educational and scientific medical literature of Russian publishers. The list of publications available for reading can be found in the section "My Books".	<p>on the <u>platform of the PRMU Digital Library</u> through the appropriate banner or directly through the e-book found in the catalog. To access the full text, you need to log in to the reader's Personal Account (login – the number of the campus card (eleven numerals), password – date of birth without spaces (for example – 05022002))</p>	<p>Not limited</p> <p>until 31.05.2022</p>

			<p><i>directly on the platform DLS "BookUp" :</i></p> <p><i>- access is free from university computers (without authorization);</i></p> <p><i>- to access from external IP addresses, it is necessary to pass a personal registration from the computers of the Scientific Library or University. In the future, you can work from any computer or mobile device.</i></p>	
4.	The digital library "Urait".	has a collection of publications on psychology, ethics, conflictology	<p>1. By means of the corresponding banner on the home page of the PRMU Digital Library or directly through an e-book found in the catalog. To access the full text, you need to log in (login – the number of the campus card, password – date of birth without spaces (for example – 05022002);</p> <p>2. Next, select the section "Catalog", "Subscriptions of educational institutions" (Privolzhsky Research Medical University). To work with a specific digital publication, you need to go to the section you are interested in, select the desired book and click the "Study" button.</p>	<p>Not limited</p> <p>Access until 11.02.2023</p>
5.	Electronic periodicals as part of the database "Scientific Electronic Library eLibrary https://elibrary.ru	Electronic medical magazines	From university computers. Access mode: https://elibrary.ru	<p>Not limited</p> <p>until 31.12.2022</p>
6.	Integrated Information and Library system (IBS) of the scientific and educational medical cluster of the Volga Federal District - "Srednevolzhsky" (contract on a free basis)	Electronic copies of scientific and educational publications from the collections of libraries participating in the scientific and educational medical cluster of the Volga Federal District "Srednevolzhsky"	Access by individual login and password from any computer and mobile device. Access mode: websites of libraries participating in the project	<p>Not limited</p> <p>Validity period: Unlimited</p>
7.	Electronic legal reference system "Consultant Plus"	Regulatory documents regulating the activities of medical and pharmaceutical	From the computers of the scientific library. Access mode:	Not limited

	(contract on a free basis) http://www.consultant.ru	institutions	http://www.consultant.ru/	Validity period: unlimited
8.	National Digital Library (NDL)	The Virtual Reading Room of the National Digital Library (NDL) contains a combined digital catalog of the collections of major Russian libraries, archives, museums and digital copies of works on a wide range of subject areas. Some publications (works that have passed into the public domain; works of educational and scientific significance that have not been reprinted in the last 10 years) are on open access.	Works restricted by copyright are accessible only from the Library computers (Medizinskaya Str.3a, Hall of Catalogues and Electronic Information Resources). You can get acquainted with the content of the NDL at: rusneb.ru	Not limited Access to the resource until 13.11.2023

8.3.3 Open access resources

№ p/p	Name electronic resource	Brief description (content)	Access conditions	Number of users
Russian resources				
1.	Federal Electronic Medical Library (FEMB) http://неб.рф	Full-text electronic copies of printed publications and original electronic publications on medicine and biology	From any computer located on the Internet. Access mode: http://неб.рф	Not limited
2.	Scientific Electronic Library eLIBRARY.RU https://elibrary.ru	Abstracts and full texts of scientific publications, electronic versions of Russian scientific journals	From any computer located on the Internet. Access mode: https://elibrary.ru	Not limited
3.	Scientific electronic library of the Open CyberLeninka access http://cyberleninka.ru	Full texts of scientific articles with annotations published in scientific journals of Russia and neighboring countries	From any computer located on the Internet. Access mode: https://cyberleninka.ru	Not limited
Foreign resources				

1.	digital scientific resources of Springer publishing house	<ul style="list-style-type: none"> • Access to digital scientific resources of Springer publishing house is open for students and employees of PRMU. Materials from the following digital collections are available: • Full-text collection of digital journals (1997-2021) and Springer e-books (2005-2021): https://rd.springer.com/ • Full-text collection of digital journals Springer Nature : http://www.nature.com/site/index/index.html • Collection of scientific protocols on various branches of knowledge Springer Protocols: www.springerprotocols.com • Abstract database on pure and applied mathematics Zentralblatt MATH: https://zbmath.org/ • Collection of scientific materials in the field of physical sciences and engineering Springer Materials: http://materials.springer.com/ • Nano database (information about nanomaterials and nanodevices): http://nano.nature.com/ 	<p>from PRMU computers</p> <ul style="list-style-type: none"> - free access;- from external IP addresses: with individual login / password (personal registration from the university network using corporate mail is required - pimunn.net); send an email to lib@pimunn.ru with indication of full name, personal corporate mail) 	Not limited
2.	the full-text database of periodicals of the American publishing house "Wiley"	<p>Journals annually occupy leading positions in the Journal Citation Report and have high impact factors. The content is represented by more than 1,600 scientific journals in various disciplines, including medicine and natural sciences. Chronological coverage: 2015-2022</p>	<ul style="list-style-type: none"> - from PRMU computers- free access; - from external IP addresses - with individual login / password (<i>personal registration from the university network is required</i>). Attention! Remote access is valid for 60 days. To renew, you need to log in to your account from the university network. Access to the collection at: 	Not limited

			www.onlinelibrary.wiley.com	
3.	the digital collection " Freedom "	the platform Science Direct (over 3000 periodicals published by Elsevier). Subject: natural, technical and medical sciences. Chronological coverage: 2011-2022	From the computers of the university, from any computer with an individual login and password.	from PRMU computers at: https://www.sciencedirect.com Online catalog of publications at the link
4.	Scopus Database www.scopus.com	Scopus is an international scientometrical database of abstracts and citations of peer-reviewed scientific literature with built-in tools for monitoring, analysis and visualization of research data.	Access to the resource only from PRMU computers: www.scopus.com .	Not limited
5.	Web of Science Core Collection Database https://www.webofscience.com	International Abstract Database of Scientific Citation	From the computers of the university, from any computer with an individual login and password. Access mode: https://www.webofscience.com	Not limited
6.	Questel database Orbit https://www.orbit.com	The patent database of the company Questel	From university computers. Access mode: https://www.orbit.com	Not limited
Foreign open access resources (the main ones are indicated)				
1.	PubMed URL: www.ncbi.nlm.nih.gov/pubmed US National Library of Medicine search engine PubMed (Bookshelf) URL: www.ncbi.nlm.nih.gov/books Full-text collection of books on medicine and biological sciences of the US National Library of Medicine	The search engine of the US National Library of Medicine for the databases "Medline", "PreMedline"	From any computer and mobile device. Access mode: https://www.ncbi.nlm.nih.gov/pubmed	Not limited
2.	Directory of Open Access Journals http://www.doaj.org	Directory of open access to the full-text collection of periodicals	From any computer and mobile device. Access mode: http://www.doaj.org	Not limited
3.	Directory of open access books (DOAB) URL: www.doabooks.org Directory of open access to the full-text collection	Directory of open access to the full-text collection of scientific books	From any computer and mobile device. Access mode: http://www.doabooks.org	Not limited

	of scientific books (over 10 thousand)			
4	Science Direct	Catalog of magazines and books of the Elsevier publishing house (more than 250 thousand articles in the public domain)	URL: www.sciencedirect.com	
5	World Health Organization	Reports, reviews, guidelines, recommendations of the World Health Organization	URL: www.who.int/en/	
6	BASE	The system of the international project ORCID DE provides a search for scientific information among 100 million open access documents of the world's archival collections	URL: www.base-search.net	
7	EDP OPEN	Collection of journals, books, materials of scientific conferences on the platform of the publishing house "EDP Science"	URL: www.edp-open.org	
8	Proceedings of the National Academy of Science (PNAS)	Polythematic database of scientific articles of the US National Academy of Sciences	URL: www.pnas.org	
9	The Online Books Page	University of Pennsylvania website offering free access to full-text scientific publications	URL: onlinebooks.library.upenn.edu	

9. Material and technical support for mastering an academic discipline

9.1. List of premises for classroom activities for the discipline

1. 1. For lectures there are: - lecture audiences of BFC (large and small halls); - Lecture room of the Morphological building; - lecture hall of hostel No. 3; - Lecture room of building No. 9. 2. For practical training on the basis of building No. 2 (BFK) there is: 4 specially equipped rooms (audiences) for holding seminars and practical classes in the study of disciplines with an area of 12, 15, 43, 44.3 m²; including a training laboratory for practical classes in microbiology and immunology with an area of 59 m².

9.2. List of equipment for classroom activities for the discipline

Computers: - Celeron 1700 - Core i3, i7-920 - NEW/C2D - laptop Fujitsu Siemens Amilo Laser
 printers: ML-1645 - Samsung ML-1210 MFP Canon ME-Y018, 3110 Overhead projector H
 1110 Multimedia projector Epson EMP-S3 Microscopic and macroscopic slides for practical
 training* Tables for practical exercises** Tables for lectures** Stands: - on the organization of
 the educational process at the department - Chronology of discoveries in microbiology and
 immunology - virology Equipment 1. Immersion microscopes. 2. Fluorescent microscope. 3.
 Thermostats. 4. Autoclaves. 5. Anaerostats. 6. Centrifuges. 7. FEK. 8. Laminar box 9. Electronic
 analytical balance 10. Household refrigerators 11. Microanaerostats 12. Disintegrators 13.
 Spectrophotometer 14. Pipette dispensers 15. pH microvoltmeter 16. Desks 17. Student and
 classroom tables 18. Water distiller 19. Tocacci microtiter 20. Drying cabinet 21. Air sterilizer
 22. Laboratory table 23. Bactericidal portable irradiator 24. Bactericidal wall irradiator 25.
 Single-element board for chalk 1000*2000

9.3. A set of licensed and freely distributed software, including domestic production

Item no.	Software	number of licenses	Type of software	Manufacturer	Number in the unified register of Russian software	Contract No. and date
1	Wtware	100	Thin Client Operating System	Kovalev Andrey Alexandrovich	1960	2471/05-18 from 28.05.2018
2	MyOffice is Standard. A corporate user license for educational organizations, with no expiration date, with the right to receive updates for 1 year.	220	Office Application	LLC "NEW CLOUD TECHNOLOGIES"	283	without limitation, with the right to receive updates for 1 year.
3	LibreOffice		Office Application	The Document Foundation	Freely distributed software	
4	Windows 10 Education	700	Operating systems	Microsoft	Azure Dev Tools for Teaching Subscription	
5	Yandex. Browser		Browser	«Yandex»	3722	
6	Subscription to MS Office Pro for 170 PCs for FGBOU VO "PIMU" of the Ministry of Health of Russia	170	Office Application	Microsoft		23618/HN10030 LLC "Softline Trade" from 04.12.2020

10. List of changes to the working program (to be filled out by the template)

Federal State Budgetary Educational Institution of Higher Education
"Privolzhsky Research Medical University"
Ministry of Health of the Russian Federation
(FSBEI HE "PRMU" of the Ministry of Health of Russia)

Department of

EPIDEMIOLOGY, MICROBIOLOGY AND EVIDENCE-BASED MEDICINE

CHANGE REGISTRATION SHEET

working program for the academic discipline

MICROBIOLOGY, VIROLOGY

Specialty: **31.05.01 GENERAL MEDICINE**

Qualification: **GENERAL PRACTITIONER**

Mode of study: **FULL-TIME**

Position	Number and name of the program section	Contents of the changes made	Effective date of the changes	Contributor's signature
1				

Approved at the department meeting
Protocol No. _____ of _____ 20__

Head of the Department of Epidemiology,
microbiology and evidence-based medicine, DSci. of
Medical Sciences, Associate Professor _____ / (Kovalishena O.V.)
(signature) (print name)