

Federal State Budgetary Educational Institution of
Higher Education
"NORTH OSSETIAN STATE MEDICAL ACADEMY"
of the Ministry of Health of the Russian Federation

APPROVED
Rector of the Federal State Budgetary
Educational Institution of Higher
Education "North-Ossetian State Medical
Academy" the Ministry of Health of the
Russian Federation (in abbreviated form-
NOSMA MOH Russia)



[Signature] O.Remizov
«24» May, 2023

WORKING PROGRAM OF THE DISCIPLINE

«MICROBIOLOGY, VIROLOGY, IMMUNOLOGY»

the main professional educational program of higher education -
specialist programs in the specialty 31.05.01 Medicine,
approved on May 24, 2023

Form of study _____ full-time

The term for the development of the MPER of HE is 6 years

Department of Microbiology

When developing the work program of the discipline, the following are taken as the basis:

1. FSES of HE in the specialty 31.05.01 Medicine, approved
Ministry of Education and Science of the Russian Federation on February 09, 2016 No. 95.
2. Curricula of the MPER of HE by specialty 31.05.01 Medicine
ЛД-16-03-18 ИИ,
ЛД-16-04-19 ИИ,
ЛД-16-05-20 ИИ, approved by the Scientific Council of the Federal State Budgetary
Educational Institution of Higher Education NOSMA of the Ministry of Health Russia
on May 24, 2023, Protocol No. 8.

The work program of the discipline was approved at a meeting of the Department of Microbiology on May 15, 2023, protocol No. 10.

The work program of the discipline was approved at a meeting of the central coordinating educational and methodological council on May 23, 2023, protocol No. 5.

The work program of the discipline is approved by the Academic Council FSBEI of HE NOSMA of the MOH Russia dated May 24, 2023, Protocol No. 8.

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Content of the work program

1. The name of the discipline;
 2. A list of planned learning outcomes in the discipline, correlated with the planned results of mastering the educational program;
 3. Indication of the place of the discipline in the structure of the educational program;
 4. The volume of discipline in credit units indicating the number of academic or astronomical hours allocated for contact work of students with a teacher (by type of training) and for independent work of students;
 5. The content of the discipline, structured by topics (sections) indicating the number of academic or astronomical hours allocated to them and types of training sessions;
 6. A list of educational and methodological support for independent work of students in the discipline;
 7. A fund of evaluation tools for conducting intermediate certification of students in the discipline;
 8. A list of basic and additional educational literature necessary for mastering the discipline;
 9. A list of resources of the information and telecommunications network "Internet" (hereinafter referred to as the network "Internet") necessary for mastering the discipline;
 10. Methodological instructions for students on mastering the discipline;
 11. A list of information technologies used in the implementation of the educational process in the discipline, including a list of software and information reference systems (if necessary);
 12. Description of the material and technical base necessary for the implementation of the educational process in the discipline.
 13. Conducting educational activities using e-learning and distance learning technologies
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2. The list of planned learning outcomes in the discipline and the results of mastering the educational program

No. p / p	Number / index of competence	Topic of the lesson (section)	Development results		
			To know	To be able to	To own
one	2	four	6	7	eight
1.	GPC-7	General microbiology. Research methods in microbiology. Microscopic research method. Morphology of bacteria. Simple coloring methods.	The classification, morphology and physiology of microbes and viruses, their biological and pathogenic properties, the impact on public health;	Use educational, scientific, popular science literature, the Internet for professional activities	Immersion microscopy method
2.		The structure of a bacterial cell. Chemical composition and functions of the structural elements of the cell. Sophisticated staining methods.	The structure of a bacterial cell. Chemical composition and functions of the structural elements of the cell. Sophisticated staining methods.	Use educational, scientific, popular science literature, the Internet for professional activities	Immersion microscopy method
3.		Morphology of spirochetes, actinomycetes, rickettsia, chlamydia, mycoplasmas. <u>Delivery of the module on the topic:</u> "General microbiology. Structure of a bacterial cell.	The structure of spirochetes, actinomycetes, rickettsii, chlamidium, mycoplasmas. The chemical composition and functions of the structural elements of the cell.	Use educational, scientific, popular science literature, the Internet for professional activities	Immersion microscopy method
4.		Physiology of microorganisms. Principles of cultivation of microorganisms. Nutrition of	Principles of cultivation of microorganisms. Bacteria nutrition	Use a microscope, bacteriological loop	Smear preparation technique, pure culture isolation method

		bacteria.			
5.		Physiology of microorganisms. Principles of cultivation of microorganisms. Bacterial respiration.	Principles of cultivation of microorganisms. Breath bacteria..	Use a microscope, bacteriological loop	Smear preparation technique, pure culture isolation method
		Physiology of microorganisms. Principles of cultivation of microorganisms. Enzymes of bacteria. Viruses.	Principles of classification of bacterial enzymes.	Use a microscope, bacteriological loop	Smear preparation technique, pure culture isolation method
6.		Viruses. Virus cultivation.	Classification, morphology and physiology of viruses.	use a microscope	Virological research technique

7.		<p>Microflora of the human body. Sanitary microbiology.</p> <p>Antibiotics.</p> <p><u>Delivery of the module on the topic:</u> "Physiology of microorganisms. Viruses. Microflora of the human body. Sanitary Microbiology.</p>	<p>Microflora of the human body. Sanitary microbiology.</p> <p>The role of the resident microflora of the body in the development of opportunistic diseases;</p>	<p>Use a microscope, bacteriological loop</p> <p>Use the knowledge gained to determine the tactics of antibacterial , antiviral and immunotropic - Noah therapy;</p>	<p>Smear preparation technique, culture isolation method</p> <p>Antimicrobial selection methods and immunobiological preparations for adequate prevention and treatment of infectious and non-infectious diseases;</p>
8.		<p>Infection and immunity. Nonspecific protective factors of the body.</p>	<p>Mechanisms of nonspecific defense of the organism.</p>	<p>Determine the content of lysozyme in saliva; determine the phagocytic number.</p>	<p>Methods for diagnosing immunopathological conditions</p>
9.		<p>Structure and functions of antigens and antibodies.</p>	<p>The property and structure of the antigen; properties and structure of immunoglobulins.</p>	<p>Interpret the results of the serological test.</p>	<p>Methods for diagnosing immunopathological conditions.</p>
10.		<p>Pathology of the immune system.</p>	<p>Allergic reaction. IH, DH . The immune status of a person.</p>	<p>Interpret the results of immunological methods of their research</p>	<p>Methods for diagnosing immunopathological conditions, methods for selecting immunomodulators</p>

11.		Immunity. Serological reactions. <u>Delivery of the module on the topic</u> : “Infection and immunity. Structure and functions of antigens and antibodies”.	Serological reactions: IHR, DHR, AR, CFR	Interpret the results of immunological research methods	Technique for setting serological reactions
12.		Pathogens of diseases caused by pyogenic cocci (staphylococci, streptococci, meningococci, gonococci)	Etiology and biological properties of pathogens, laboratory diagnostics	Interpret the results of microbiological research methods	Technique of microbiological research
13.		Causative agents of bacterial intestinal infections (escherichi, shigella)	Etiology and biological properties of pathogens, laboratory diagnostics	Interpret the results of microbiological research methods	microbiological research technique
14.		Causative agents of bacterial intestinal infections (salmonella)	Etiology , biological properties of pathogens, laboratory diagnostics	Interpret the results of microbiological research methods	microbiological research technique
15.		Causative agents of bacterial intestinal infections (cholera, nosocomial infections caused by enterobacteria)	Etiology , biological properties of pathogens, laboratory diagnostics	Interpret the results of microbiological research methods	microbiological research technique
16.		<u>Delivery of the module on the topic:</u> «Pathogens of diseases caused by pathogenic cocci. Causative agents of bacterial intestinal infections».	Etiology and biological properties of pathogens, laboratory diagnostics	Interpret the results of microbiological research methods	microbiological research technique
17.		The causative agents of diphtheria, whooping cough, paraptussis.	Etiology , biological properties of pathogens, laboratory diagnostics	Interpret the results of microbiological research methods	microbiological research technique
18.		Pathogenic and opportunistic mycobacteria (mycobacterium tuberculosis, leprosy)	Etiology and biological properties of pathogens, laboratory diagnostics	Interpret the results of microbiological research methods	microbiological research technique
19.		Causative agents of zoonotic infections (plague, tularemia,	Etiology and biological properties of pathogens,	Interpret the results of microbiological research	microbiological research technique

		brucellosis, anthrax)	laboratory diagnostics	methods	
20.		<u>Delivery of the module on the topic:</u> «Pathogens of diphtheria, whooping cough, parapertussis. Causative agents of zoonotic infections»	Etiology and biological properties of pathogens, laboratory diagnostics	Interpret the results of microbiological research methods	microbiological research technique
21.		Causative agents of anaerobic clostridial infections (tetanus, gas gangrene, botulism)	Etiology and biological properties of pathogens, laboratory diagnostics	Interpret the results of microbiological research methods	microbiological research technique
22.		Pathogenic spirochetes and spirochetosis. Mycoplasmas. Chlamydia.	Etiology and biological properties of pathogens, laboratory diagnostics	Interpret the results of microbiological research methods	microbiological research technique
23.		<u>Delivery of the module on the topic:</u> Causative agents of anaerobic clostridial infections. Pathogenic spirochetes and spirochetosis. Mycoplasmas. Chlamydia.	Etiology and biological properties of pathogens, laboratory diagnostics	Interpret the results of microbiological research methods	microbiological research technique
24.		Causative agents of respiratory viral infections.	– the role of individual representatives of viruses in the etiology and pathogenesis of ARVI	Interpret the results of virological research methods	Virological research technique
25.		Causative agents of enterovirus infections.	– the role of individual representatives of viruses in the etiology and pathogenesis of enterovirus infections	Interpret the results of virological research methods	Virological research technique
26.		Hepatitis viruses B, C, D, G. Immunodeficiency virus (HIV).	– the role of individual representatives of viruses in the etiology and pathogenesis of hepatitis and HIV	And interpret the results of virological research methods	Technique of virological research

27.		Herpesviruses. Tick-borne encephalitis virus.	– the role of individual representatives of viruses in the etiology and pathogenesis of herpes and tick-borne encephalitis	Interpret the results of virological research methods	Virological research technique
28.		Fungi are the causative agents of human infectious diseases.	– the role of individual representatives of fungi in the etiology and pathogenesis of mycoses	Interpret the results of mycological research methods	Mycological research technique

3.The place of discipline in the structure of the educational program

The discipline "Microbiology, virology, immunology" is a discipline of the mandatory part of Block 1 of the Federal State Educational Standard of Higher Education majoring in 31.05.01 Medicine.

4.Scope of discipline

No. p / p	Type of work	Total credits	Total hours	Semesters	
				IV	V
				Number of hours	
one	2	3	four	5	6
1.____	Contact work of students with the teacher (total), including:	-	178	78	100
2.____	Lectures (L)	-	46	18	28
3.____	Clinical Practice (CP)	-	132	60	72
4.____	Seminars (S)	-	-	-	-
5.____	Laboratory work (LW)	-	-	-	-
6.____	Student Independent Work (SIW)		74	30	44
7.____	Type of intermediate attestations	credit (C)	-	-	-
		exam (E)	-	36	36
8.____	TOTAL: Total laboriousness	hours	-	288	108
		Z	8.0	3.0	5.0

5.The content of the discipline

No p / p	semes ter numb er	Name of the topic (section) of the discipline	Types of learning activities (in hours)					Forms of current progress control
			L	LW	CP	SIW	Total	
1	2	3	4	5	6	7	8	9
1.____	4	General microbiology. Morphology of microbes.	2	-	10	4	16	Written test, oral survey
2.____	4	Physiology of microorganisms.	2	-	14	6	22	
3.____	4	Fundamentals of genetics of microbes. Fundamentals of genetic engineering and medical biotechnology	2	-	6	6	14	
4.____	4	General virology	2	-	8	4	14	
5.____	4	Human symbiosis with microbes. Doctrine of infection	2		6	4	12	
6.____	4	Medical immunology. Medical immunobiological preparations	8		16	6	30	

7. ____	5	Private medical microbiology. Bacteria-causative agents of human infectious diseases	16		40	22	78	
8. ____	5	Private virology. Viruses-causative agents of human infectious diseases	12		32	22	66	
TOTAL:			46	-	132	74	252 +36	Exam

6. The list of educational and methodological support for independent work of students in the discipline

No. p / p	semester number	Name of educational and methodical development
1.	4.5	Methods of laboratory diagnostics of infectious diseases. / Guidelines for students of medical, medical and preventive pediatric, dental, pharmaceutical ft , VSO . (Second revised edition). Vladikavkaz, 2020. / L. Ya Plakhtiy .
2.		Methods of laboratory diagnostics of infectious diseases. / Methodological recommendations for students of medical, medical and preventive pediatric, dental, pharmaceutical schools , VSO . Vladikavkaz, 2020. / L.Ya Plakhtiy , M.V. Valiev.
3.		Educational and methodological recommendations for oral immunology. / Vladikavkaz, 2020. / L.Ya. Plakhtiy , M.V. Valiev.
4.		Collection of methodological developments in microbiology for students of medical, pediatric, medical and preventive faculties (part 1). Vladikavkaz, 2020./ L.Ya. Plakhtiy , I.E. Tretyakova, A.K. Tadeeva , A.Ch. Tskhovrebov , L.V. Alborov .
5.		Collection of methodological developments in microbiology for students of medical, pediatric, medical and preventive faculties. (Part 2). Vladikavkaz, 2020. / L.Ya. Plakhtiy , I.E. Tretyakova, A.K. Tadeeva ,
6.		Textbook on practical skills of the Department of Microbiology for students of medical, pediatric, medical and preventive dental and pharmaceutical faculties./Vladikavkaz, 2020/ L.Ya.Plakhtiy , I.E. Tretyakova , A.Ch. _ Tskhovrebov , A.K. Tadeeva .
7.		Guidelines for performing extracurricular independent work of 2nd year students of medical, pediatric, medical and preventive, pharmaceutical faculties in the cycle of microbiology, virology and immunology. Vladikavkaz. 2020./ L.Ya. Plakhtiy and the staff of the department
8.		Guidelines for performing independent extracurricular work of students for practical classes in microbiology, virology and immunology./ Vladikavkaz. 2020./ L.Ya. Plakhtiy and the staff of the department
9.		Textbook on practical skills of the Department of Microbiology for students of medical, pediatric, dental, medical and preventive pharmaceutical faculties./Vladikavkaz, 2020/L.Ya. Plakhtiy , I.E. Tretyakova, A.Ch. Tskhovrebov , A.K. Tadeeva .
10.		Guidelines for performing extracurricular independent work of 2nd year students of medical, pediatric, medical and preventive, pharmaceutical faculties in the cycle of microbiology, virology and immunology. Vladikavkaz. 2020./ L.Ya. Plakhtiy and the staff of the department.
11.		Guidelines for performing independent extracurricular work of 3rd year students for practical classes in microbiology, virology and immunology./ Vladikavkaz.

		2020./ L.Ya. Plakhtiy and the staff of the department.
12.		Guidelines for students of the Faculty of Preventive Medicine (spring semester) / Vladikavkaz. 2020/.L.Ya. Plakhtiy , Gatieva E.I.
13.		Guidelines for students of the medical faculty (autumn semester) / Vladikavkaz. 2020/.L.Ya. Plakhtiy , Gatieva E.I.
14.		Guidelines for teachers of the Faculty of Preventive Medicine (spring semester) / Vladikavkaz. 2020/L.Ya. Plakhtiy .Gatieva E.I.
15.		Guidelines for teachers of the Faculty of Preventive Medicine (autumn semester) / Vladikavkaz. 2020/L.Ya. Plakhtiy .Gatieva E.I.
16.		Guidelines for independent extracurricular work for 2nd year students of the Faculty of Preventive Medicine in General Microbiology (spring semester) / Vladikavkaz. 2020/.L.Ya. PlakhtiyGatieva E.I.
17.		Guidelines for independent extracurricular work for 3rd year students of the Faculty of Preventive Medicine in General Microbiology (autumn semester) / Vladikavkaz. 2020/L.Ya. Plachtiy . Gatieva E.I.
18.		Immunobiological preparations used for the prevention, treatment and diagnosis of infectious diseases / Vladikavkaz. 2020/ L.Ya.Plakhtiy and the staff of the department.
19.		Collection of methodological developments for students of the Faculty of Medicine and Prevention for the spring semester, Vladikavkaz, 2020 / Chertkoeva M.G. Gatieva E.I. , edited by L.Ya. Plachtiy
20.		Collection of methodological developments for students of the Faculty of Medicine and Prevention for the autumn semester, Vladikavkaz, 2020 / Chertkoeva M.G. Gatieva E.I. , edited by L.Ya. Plachtiy
21.		Collection of methodological developments for teachers for the spring semester for the Faculty of Medicine and Prevention, Vladikavkaz, 2020 / Chertkoeva M.G. Gatieva E.I. under the editorship of L.Ya. Plachtiy
22.		Collection of methodological developments for teachers for the autumn semester for the Faculty of Medicine and Prevention, Vladikavkaz, 2020 / Chertkoeva M.G. under the editorship of L.Ya. Plachtiy
23.		Fundamentals of modern immunology 4th revised edition. UMO Ministry of Health of the Russian Federation, Moscow, 2020 / edited by L.Ya. Plakhtiy , staff of the department
24.		Guidelines for practical exercises for students to lay down , ped , dentistry , MPF and farm. Faculties “Streptococci. Microbiological diagnosis of diseases caused by pathogenic streptococci”, 2020/ edited by L.Ya. Plakhtiy , staff of the department
25.		Textbook for students of medical universities and students of the postgraduate education system “Laboratory diagnosis of acute respiratory viral infections, 2020 / edited by L.Ya. Plakhtiy , staff of the department
26.		Workbook -practicum on microbiology , virology and immunology for 3rd year students of the Faculty of Preventive Medicine for the autumn semester
27.		Test tasks for checking the initial level of knowledge for students of medical, pediatric, dental, preventive and pharmaceutical faculties, 2020 / edited by L.Ya. Plakhtiy , staff of the department
28.		Test tasks to check the current level of knowledge for students of medical, pediatric, dental, preventive and pharmaceutical faculties, 2020.
29.		Textbook for students of medical universities and students of the postgraduate education system “Fundamentals of modern immunology (edition 4 revised and enlarged) / UMO Ministry of Health of the Russian Federation - Moscow, 2020 / edited by L.Ya. Plakhtiy , staff of the department

7. Fund of assessment tools for conducting intermediate certification of students in the discipline

No. p / p one	List of competencies 2	No. semester 3	Indicator l (s) evaluation four	Criteria and (s) assessment 5	Evaluation scale 6	Name FOS 7
1.	GPC-7	4, 5	see control standard quality education at the Federal State Budgetary Educational Institution of Higher Education SOGMA of the Ministry of Health of the Russian Federation (Reg. No. 211/o from 20/08/2014)	see control standard quality education at the Federal State Budgetary Educational Institution of Higher Education SOGMA of the Ministry of Health of the Russian Federation (Reg. No. 211/o from 20.08.2014)	see control standard quality education at the Federal State Budgetary Educational Institution of Higher Education SOGMA of the Ministry of Health of the Russian Federation (Reg. No. 211/o from 20.08.2014)	exam tickets, test tasks

8. List of basic and additional educational literature necessary for mastering the discipline

No. p / p	Name	The authors)	Year, place of publication	Number of copies		EBS name / EBS link
				in library	at the depart ment	
one	2	3	four	5	6	7
Main literature						
1.	Medical microbiology, virology and immunology: textbook. T.1	ed. V.V. Zvereva, M.N. Boychenko.	M.: GEOTAR- Media, 2011 2016	176 65	eight	"Student Advisor" http://www.studmedlib.ru/book/ISBN9785970436417.html
2.	Medical microbiology, virology and immunology: textbook. T.2	ed. V.V. Zvereva, M.N. Boychenko.	M.: GEOTAR- Media, 2011 2016	178 58		"Student Advisor" http :// www .studmedlib . ru / book / ISBN9785970436424.html _
3.	Microbiology, virology and immunology: textbook	ed. V.N. Tsareva	M.: Practice, 2009 2010	96 5	eight	

4.	Immunology: textbook	ed. R.M. Haytova	M.: GEOTAR-Media, 2015 2006	31 102		"Student Advisor" www.studmedlib.ru / ru / book / ISBN 978597043345 4.html
5.	Microbiology, Virology and Immunology: Lab Guide: Study Guide	ed. V.B. Sboyshakov	M.: GEOTAR-Media, 2012	56	-	"Student Advisor" http://www.studmedlib.ru / book / ISBN 978597043575 5.html
6.	Medical microbiology: textbook	Pozdeev O.K.	M.: GEOTAR-Media, 2006, 2010	102	eight	"Student Advisor" http://www.studmedlib.ru / book / ISBN 978597041530 6.html
7.	Microbiology: textbook	A.A. Vorobiev and others.	M., Medicine 2003	23		
8.	Guide to practical exercises in medical microbiology, virology and immunology	ed. V.V. Teza	M.: Medicine, 2002	229		
additional literature						
1.	Medical and sanitary microbiology, virology and immunology: textbook	A.A. Vorobyov, Yu. S. Krivoshein, V. P. Shirobokov	Moscow: Academy, 2003	fourteen	-	
2.	Workshop of laboratory work with illustrated situational tasks in microbiology, immunology and virology	ed. A.A. Vorobiev	M.: MIA, 2008	one	-	
3.	Guide to medical microbiology : a textbook for postgraduate education. Book	ed. A.S. Labinskaya	M. : Binom, 2008	one	one	

	1. General and sanitary microbiology					
4.	Guide to medical microbiology: textbook for postgraduate education. Book 2. Private medical microbiology and etiological diagnosis of infections	ed. A.S. Labinskaya	M. : Binom, 2012	one	one	
5.	Guide to medical microbiology: textbook for postgraduate education. Book 3. T.1. Opportunistic infections: pathogens and etiological diagnosis.	ed. A.S. Labinskaya	M. : Binom, 2013		one	
6.	Guide to medical microbiology: textbook for postgraduate education. Book 3. T.2. Opportunistic infections: clinical and epidemiological aspects .	ed. A.S. Labinskaya	M. : Binom, 2014	one	one	
7.	Medical microbiology, virology and immunology: textbook	ed. A.A. Vorobiev	M. : MIA, 2004	fifteen		
8.	Collection of methodological developments in microbiology for students of medical, pediatric, preventive and pharmaceutical	Edited by L.Ya. Plachtius	2008 Vladikavkaz	eighteen	ten	

	faculties					
9.	Microbiology, virology: a guide to practical exercises: textbook	ed. V. V. Zverev	M.: GEOTAR-Media, 2015	51		"Student Advisor" www.studmedlib.ru/ru/book/ISBN9785970434956.html

9. List of resources of the information and telecommunication network "Internet" necessary for mastering the discipline

Electronic version of the Atlas on microbiology, immunology and virology.

C D -program (training): situational illustrated tasks.

Thematic presentations and sets of slides, etc.

Databases, information and reference and search systems - Internet resources that correspond to the subject of the discipline.

— information and reference materials of the Ministry of Health and Social Development of the Russian Federation;

- databases on electronic components (Garant, Consultant plus "Version prof ": comments on legislation);

— information retrieval system of the Federal Service for Intellectual Property, Patents and Trademarks;

- databases on electronic components (medical search engines - [MedExplorer](#), [MedHunt](#), PubMed);

— portal INFOMINE;

- databases MEDLINE, WebMedLit , National Electronic Library.

- <http://www.elibrary.ru> - scientific electronic library, the search is carried out by thematic section, journal name, author. Contains a catalog of Russian and foreign publications.

- <http://www.studmedlib.ru> - Electronic library of the medical university "Student Consultant".

Student Advisor www.studmedlib.ru/ru/book/ISBN9785970429143.html, Student Advisor

www.studmedlib.ru/ru/book/ISBN9785970415306.html, Student Advisor

[www.studmedlib.ru/ru/book/ ISBN9785970415306.html](http://www.studmedlib.ru/ru/book/ISBN9785970415306.html), "Student Advisor"

www.studmedlib.ru/ru/book/ISBN9785970415306.html, "Student Advisor"

www.studmedlib.ru/ru "Student Advisor" www.studmedlib.ru/ru

- ru.wikipedia.org - Search through articles of the free universal encyclopedia written in Russian. Selected articles, interesting facts, current day in history, links to thematic portals and related projects.

Computer testing program TestPro - a software package for statistical data processing, methodological materials, a fund of evaluation tools for conducting current, intermediate certification

Educational, methodological and informational support of the discipline is realized by the access of each student to databases and library collections. During self-study, students are provided with access to the Internet.

Each student in the main educational program is provided with at least one educational and one educational and methodical printed and / or electronic publication on the discipline, released over the past 5 years.

The fund of additional literature, in addition to educational, includes official, reference and bibliographic and periodicals in the amount of 1-2 copies for every 100 students . Each

student is provided with access to the sets of the library fund, consisting of at least 45 titles of domestic and at least 2-3 foreign journals from the following list:

- Bulletin of normative acts of Federal bodies
- Bulletin of Experimental Biology and Medicine
- Hygiene and sanitation
- Journal of Microbiology, Epidemiology and Immunology
- Clinical and laboratory diagnostics
- Occupational Health and Industrial Ecology
- medical newspaper
- Medical parasitology and parasitic diseases
- Medical equipment
- Medical Gazette
- International Medical Journal
- Problems of social hygiene, public health and the history of medicine
- Epidemiology and infectious diseases.

10. Guidelines for students on mastering the discipline

Training consists of contact work (178 hours), including a lecture course (46 hours) and practical classes (132 hours), as well as independent work of students (74 hours). The main study time is allocated to laboratory work on the preparation of micropreparations, bacteriological studies, and serological reactions. When studying an academic discipline, it is necessary to use knowledge and master practical skills in microbiology.

Practical classes are conducted in the form of laboratory work, independent practical work by students using visual aids, as well as solving situational problems, answers to test tasks. In accordance with the requirements of the Federal State Educational Standards, active and interactive forms of conducting classes are widely used in the educational process (non-imitation technologies: problem lectures, programmed learning). The proportion of classes conducted in interactive forms is at least 10% of classroom classes.

Work with educational literature is considered as a type of educational work in the discipline "Microbiology" and is performed within the hours allotted for its study (in the SIW section). Each student is provided with access to the library funds of the academy and the department. For each section of the academic discipline, methodological recommendations for students have been developed "Collection of methodological developments in microbiology for students of medical, pediatric, medical-prophylactic and pharmaceutical faculties. Part 1, 2." and guidelines for teachers.

During the study of the discipline, students independently carry out practical work, draw up protocols for laboratory work and submit them to the teacher for signature. Independent work of students contributes to the formation of an active life position of behavior, accuracy, discipline. The initial level of knowledge of students is determined by testing, the current control of the assimilation of the subject is determined by an oral survey during classes, when solving situational problems and answering test tasks. At the end of the study of the discipline, an intermediate control of knowledge is carried out using test control, testing of practical skills and solving situational problems.

This program for the study of microbiology, virology, suggests the possibility of including in the educational modules of cross-cutting education on topical health issues, for example, "The problem of nosocomial infection and antibiotic resistance of strains", "The problem of tuberculosis infection", "The problem of sexually transmitted infections", "The problem of parenteral hepatitis and HIV infection", etc. This topic can also be used during olympiads and role-playing games.

The work of a student in a group forms a sense of collectivism and sociability. Independent work with literature, abstracts, preparation of presentations and reports form the ability to analyze medical and social problems, the ability to put into practice the acquired

knowledge of biomedical sciences in various types of professional and social activities. Various types of educational activities, including independent work of the student, form the ability in the conditions of the development of science and practice to reassess the accumulated experience, analyze one's capabilities, the ability to acquire new knowledge, use various forms of education, information and educational technologies. Questions on the academic discipline are included in the Final State Attestation of Graduates.

11. List of information technologies used in the implementation of the educational process in the discipline

The educational technologies used in the study of this discipline make up 10% of interactive lessons from the volume of classroom lessons.

Examples of interactive forms and methods of conducting classes:

imitation technologies: problematic lectures, programmed learning. Non- imitation technologies are carried out in combination with extracurricular work in order to form and develop the professional skills of students.

12. Description of the material and technical base necessary for the implementation of the educational process in the discipline

No. n / n	Equipment identification	Quantity	Technical condition
1	2	3	4
Special equipment			
1.	Thermostat	one	Satisfactory
2.	Drying cabinet	one	Satisfactory
3.	Sterilizer (autoclave)	one	Satisfactory
4.	Microscopes	thirty	Satisfactory
5.	Anaerostat	one	Satisfactory
6.	Binocular microscope	one	Satisfactory
Office equipment			
7.	Notebook	one	Satisfactory
8.	Projector	one	Satisfactory

13. Conducting educational activities using electronic learning and distance learning technologies

In the context of the introduction of restrictive measures (quarantine), related to the unfavorable epidemiological situation, the threat spread of a new coronavirus infection and other force majeure events that do not allow for training sessions in full-time mode, possible to study this discipline or part of it using e-learning and distance learning technologies.

Teaching discipline in the situations described above will be carried out through the development of an electronic course with access to video lectures and interactive course materials: presentations, articles, additional materials, tests and various tasks. When conducting training sessions, current monitoring of progress, as well as intermediate assessment of students can be used by the platform of electronic information and educational environment of the academy and/or other systems e-learning recommended for use in the academy, such as Moodle, Zoom, Webinar and others

Lectures can be presented in the form of audio, video files, "live lectures", etc.

Conducting seminars and practical classes is possible online both in synchronous and asynchronous mode. Seminars can be conducted in the form of web conferences.