

FEDERAL STATE BUDGET EDUCATIONAL INSTITUTION
OF HIGHER EDUCATION
"ROSTOV STATE MEDICAL UNIVERSITY"
MINISTRY OF HEALTH OF THE RUSSIAN FEDERATION

THERAPEUTIC AND PROPHYLACTIC
Department



CONFIRM

Supervisor
educational program

/ E.S. Belousova /
(FULL NAME.)

(signature)

" 30 " августа 2023

DISCIPLINE WORKING PROGRAM
MICROBIOLOGY AND VIROLOGY

Speciality 31.05.01 General medicine

Form of education full-time

Rostov-on-Don
2023

I. GOALS AND OBJECTIVES OF MASTERING THE DISCIPLINE

1.1. The purpose of mastering the discipline: mastering knowledge about the patterns of interaction between micro- and macroorganisms, as well as the principles of microbiological, molecular biological and immunological diagnostic methods, the main directions of treatment and prevention of infectious and opportunistic diseases.

1.2. Objectives of studying the discipline:

- students' acquisition of knowledge about the structure and functioning of microbes as living systems, their role in ecology and interaction with the human body, including modern ideas about infectious antigens and the immune response to their appearance;
- training students in the most important methods of microbiological, molecular biological and immunological research, allowing them to interpret the results in order to correctly diagnose an infectious disease;
- training students in choosing optimal methods for taking material for microbiological examination in infectious diseases and drawing up an algorithm for differential diagnosis;
- training students in the most important methods of decontamination, including the basics of disinfection and sterilization techniques, to prevent the spread of infectious diseases and the occurrence of hospital-acquired infections;
- familiarization of students with the principles of organizing work in a microbiological laboratory, with occupational health and safety measures;
- developing students' skills in working with scientific literature;
- formation of communication skills with patients, taking into account ethics and deontology, depending on the identified pathology;
- formation of students' communication skills with the team;

II. REQUIREMENTS FOR THE RESULTS OF DISTRICT MASTERING

The study of the discipline is aimed at developing competencies in accordance with the Federal State Educational Standard of Higher Education and the EP of Higher Education in this specialty:

2.2. General professional (OPK): OPK-9.

III. THE PLACE OF DISCIPLINE IN THE STRUCTURE OF EP VO

3.1. The discipline "Microbiology, Virology" is a compulsory part.

IV. CONTENT AND STRUCTURE OF DISCIPLINE

The complexity of the discipline in section 7, hour 252.

IV.1. Sections of the discipline studied in 3-4 semesters

Section number	Section name	Number of hours			SRS
		Total	Contact work		
			L	ETC	
Semester 3					
1	Morphology and ultrastructure of microorganisms.	24	4	12	8
2	Physiology and ecology of microorganisms	22	2	12	8
3	Microbial factor and infectious process. Fundamentals of immunology.	24	4	12	8
4	Introduction to virology. Bacteriophages. Genetics and variability of bacteria.	21	6	9	6
	Interim certification form (test)	17	-	3	14

Total for the semester		108	16	48	44
Semester 4					
5	Clinical bacteriology.	78	12	36	thirty
6	Clinical virology.	thirty	4	12	14
Total for the semester		108	16	48	44
	Interim certification form (exam)	36			
<i>Total for the discipline:</i>		252	32	96	88

SRS –independent work of students

L– lectures

ETC- practical lessons

IV.2. Contact work

Lectures

Section number	Lecture no.	Lecture topics	Qty hours
Semester 3			
1	1	Introduction to General Microbiology.	2
1	2	Structure of a bacterial cell. Growth and reproduction of bacteria. Sanitary microbiology.	2
2	3	Ecology of microorganisms. The human microbiota is normal.	2
3	4	The doctrine of infection. Characteristics of the infectious process. Microbial factor in the infectious process. Pathogenicity and virulence of bacteria.	2
3	5	Immune means free!	2
4	6	Introduction to the study of viruses. The principle of organization of viruses, their systematics and taxonomy, evolution and emergence of viruses.	2
4	7	Bacterial viruses are bacteriophages. Genetics and variability of microbes.	2
4	8	Introduction to Clinical Microbiology.	2
Total hours per semester			16
Semester 4			
5	9	Microbiological characteristics of meningococcal and gonococcal infections.	2
5	10	Microbiology of anthrax, brucellosis, plague, tularemia.	2
5	eleven	Gastrointestinal microbial pathology. Family of intestinal bacteria. Escherichia coli. Escherichiosis. Intestinal dysbacteriosis.	2
5	12	Microbiology of diphtheria. Microbiology of tuberculosis and leprosy.	2
5	13	Anaerobic wound infection. Causative agents of tetanus, botulism, pseudomembranous nosocomial colitis.	2
5	14	Pathogenic spirochetes. Treponematosi s, borreliosis, leptospirosis.	2
6	15	Viruses are causative agents of acute respiratory diseases.	2
6	16	Enteric viruses. Viral hepatitis.	2
Total hours per semester			16
<i>Total hours discipline:</i>			32

Seminars, practical work

Section number	Seminar No.,	Topics of seminars, practical work	Number of hours	Forms current
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number	PR			control
Semester 3				
1	1	The structure of the bacteriological laboratory and the rules of work in it. Basic methods of microbiological diagnosis of infectious diseases. Morphology of bacteria, molds and yeast-like fungi.	3	interview
1	2	Types of microscopy. Technique for preparing and staining a bacteriological preparation (smear). Simple and complex methods for staining preparations.	3	testing, oral survey
1	3	The structure of a bacterial cell. Acid-fast bacteria. Ziehl-Neelsen staining. Sporulation in bacteria and its significance.	3	testing, oral survey
1	4	Test lesson on the section "Morphology and ultra-structure of microorganisms".	3	solving situational problems, oral questioning
2	5	Chemical composition of a bacterial cell. Nutrition and respiration of bacteria. Nutrient media. Bacteriological research method. Isolation of pure cultures of aerobes and anaerobes.	3	testing, oral survey
2	6	Growth and reproduction of bacteria. Isolation of a pure culture of aerobes. The influence of physical and chemical factors on microorganisms. Sterilization methods. Disinfection. Asepsis. Antiseptic.	3	testing, oral survey
2	7	Ecology of microbes (microecology). Distribution of microbes in the environment. Microbiota of the human body	3	testing, oral survey
2	8	Test lesson on the section "Physiology and ecology of microorganisms".	3	solving situational problems, oral questioning
3	9	Infectious process. Properties of pathogens of infectious diseases. Types of immunity and mechanisms of anti-infectious resistance.	3	testing, oral survey
3	10	Antigens. Antibodies. Serological reactions.	3	testing, oral survey
3	eleven	The body's immune system. Specific immunoprophylaxis and immunotherapy.	3	testing, oral survey
3	12	Test lesson on the section "Microbial factor and infectious process. Fundamentals of immunology".	3	solving situational problems, oral questioning
4	13	General characteristics of viruses, features reproductions. Viral oncogenesis. Methods diagnosis of viral infections.	3	testing, oral survey
4	14	Virological diagnostic method. Interferons, classification, mechanism of action, practical application. Features of antiviral immunity. Bacteriophages. Genetics and variability of bacteria. Antibiotics.	3	testing, oral survey
4	15	Test lesson on the section "Introduction to Virology.	3	solving situa-

		Bacteriophages. Genetics and variability of bacteria".		tional problems, oral questioning
1-4	16	Final test session.	3	testing
Total hours per semester			48	
Semester 4				
5	17	Microbiological characteristics of staphylococcal, streptococcal and pneumococcal infections. Pathogens and microbiological diagnosis of sepsis.	3	oral survey
5	18	Microbiological characteristics of meningococcal and gonococcal infections. Haemophilus influenzae, Bordetella, Legionella and Pseudomonas aeruginosa.	3	oral survey
5	19	Pathogens of zoonotic infections: brucellosis, anthrax, plague, tularemia, glanders and melioidosis. Microbiological diagnosis of zoonotic infections.	3	oral survey
5	20	Test lesson based on the material from practical classes 17-19 of the "Clinical Bacteriology" section.	3	solving situational problems, oral questioning
5	21	General characteristics of the Enterobacteriaceae family. Escherichiosis, klebsiella. Intestinal eubiosis and dysbiosis.	3	oral survey
5	22	Microbiological characteristics of salmonellosis (typhoid fever, paratyphoid fever, hospital-acquired salmonellosis), shigellosis, campylobacteriosis and helicobacteriosis.	3	oral survey
5	23	Microbiological characteristics of cholera, pseudotuberculosis, intestinal yersiniosis and microbial food poisoning.	3	oral survey
5	24	Test lesson based on the material of practical classes 21-23 of the "Clinical Bacteriology" section.	3	solving situational problems, oral questioning
5	25	Microbiological characteristics of diphtheria, tuberculosis, leprosy.	3	oral survey
5	26	Microbiological characteristics of pathogenic anaerobes.	3	oral survey
5	27	Microbiological characteristics of pathogens lei spirochetal infections, rickettsial infections, chlamydia and mycoplasmosis.	3	oral survey
5	28	Test lesson based on the material from practical classes 25-27 of the "Clinical Bacteriology" section.	3	solving situational problems, oral questioning
6	29	Pathogens of ARVI, their role in pathology. Characteristics of influenza viruses, parainfluenza, adenoviruses. Characteristics of measles, mumps, rubella viruses.	3	oral survey
6	thirty	Characteristics of intestinal viruses: polio viruses, Coxsackie, ECHO, rota-, noro-, astro-, pare-	3	oral survey

		choviruses, caused diseases, microbiological diagnostics. Viral hepatitis.		
6	31	Herpetic infection. HIV infection. Characteristics of the rabies virus. Characteristics of arboviruses, tick-borne encephalitis viruses, hemorrhagic fevers. Human papillomaviruses. Smallpox group viruses.	3	oral survey
6	32	Test lesson on the section “Clinical Virology”.	3	solving situational problems, oral survey
Total hours per semester			48	
<i>Total hours discipline:</i>			96	

IV.3. Independent work of students

Section number	Type of student’s independent work	Number of hours	Forms of current control
Semester 3			
1	Preparation for classes and ongoing monitoring.	8	testing, solving situational problems, oral questioning
2	Preparation for classes and ongoing monitoring.	8	solving situational problems, oral questioning
3	Preparation for classes and ongoing monitoring.	8	testing, solving situational problems, oral questioning
4	Preparation for classes and ongoing monitoring.	6	testing, solving situational problems, oral questioning
1-4	Preparing for the final test.	14	testing
Total hours per semester		44	
Semester 4			
5	Preparation for classes and ongoing monitoring	thirty	testing, solving situational problems, oral questioning
6	Preparation for classes and ongoing monitoring	14	testing, solving situational problems, oral questioning
Total hours per semester		44	
<i>Total for the discipline:</i>		88	

V. ASSESSMENT MATERIALS FOR CURRENT CONTROL, INTERMEDIATE CERTIFICATION (are an appendix to the work program).

VI. EDUCATIONAL AND METHODOLOGICAL SUPPORT OF DISCIPLINE

6.1. Printed publications:

1. Microbiology, virology and immunology Guide to practical classes: textbook [for students of medical universities] / ed. V. V. Zvereva, M. N. Boychenko. – 2nd ed., revised. and additional – Moscow: GEOTAR-Media, 2022. – 402 p.

2. Borisov L.B. Medical microbiology, virology, immunology / L.B. Borisov. - 5th ed., rev. - M.: MIA, 2016. – 792 p.
3. Zverev V.V. Medical microbiology, virology and immunology: textbook / V.V. Zverev, A.S. Bykov. – M.: MIA, 2016. – 816 p.
4. Microbiology, virology: a guide to practical exercises: textbook. manual for university students / ed. V.V. Zvereva, M.N. Boychenko. – M.: GEOTAR-Media, 2015. – 359 p.
5. Vaccines and vaccination: national leadership: brief edition / ed. V.V. Zvereva, R.M. Khaitova. – M.: GEOTAR-Media, 2014. – 640 p.
6. Kovalchuk L.V. Clinical immunology and allergology with the basics of general immunology: textbook [rec. State Educational Institution of Higher Professional Education “Moscow. honey. Academy named after THEM. Sechenov”]: for university students / L.V. Kovalchuk, L.V. Gankovskaya, R.Ya. Meshkova. – M.: GEOTAR-Media, 2014. – 639 p.
7. HIV infection and AIDS: national leadership / ed. V.V. Pokrovsky; Association of Medical Societies for Quality. – M.: GEOTAR-Media, 2013. – 606 p.

6.2. Internet resources:

Springer Nature database. - URL: https://link.springer.com/ via IP addresses of RostSMU and remotely after registration, remotely via RFBR CIAS https://kias.rfbr.ru/reg/index.php	Access is not limited
Wiley Online Library /John Wiley & Sons. - URL: http://onlinelibrary.wiley.com via IP addresses of RostSMU and remotely after registration(<i>National project</i>)	Access limited
Questel database Orbit Premium edition: patent search database http://www.orbit.com/ by IP addresses of RostSMU(<i>National project</i>)	Access limited
Nano Database: reference publications on nanomaterials.- URL: https://nano.nature.com via IP addresses of RostSMU and remotely after registration	Access limited
Russian education. Single window of access /Federal portal. - URL: http://www.edu.ru/ .– New educational environment.	Open access
Electronic Library of the Russian Foundation for Basic Research(RFBR). -URL: http://www.rfbr.ru/rffi/ru/library	Open access
Federal Electronic Medical Library of the Russian Ministry of Health. - URL: http://femb.rucml.ru/femb/	Open access
Archive of scientific journals/NEICON. - URL: https://arch.neicon.ru/xmlui/(Yandex search engine)	Open access
CyberLeninka: scientific electron. beep. - URL: http://cyberleninka.ru/	Open access
BEARWEST. Russian doctor portal: library, knowledge base.- URL: https://medvestnik.ru	Open access
Medical Bulletin of the South of Russia. - URL: http://www.medicalherald.ru/jour or from the RostSMU website (Yandex search engine)	Open access
Journal of Urology (“Urology Herald”): magazine of RostSMU. – URL: http://www.urovest.ru/jour or from the RostSMU website (Yandex search engine)	Open access
South Russian Journal of Therapeutic Practice. –URL: http://www.therapeutic-j.ru/jour/index	Open access
National Library of Medicine (PubMed). - URL: http://pubmed.ncbi.nlm.nih.gov/	Open access
Directory of Open Access Journals: full-text journals from 121 countries, incl. in medicine, biology, chemistry. -URL: http://www.doaj.org/	Open access

	Free Medical Journals. -URL: http://freemedicaljournals.com	Open access
	Free Medical Books. -URL: http://www.freebooks4doctors.com	Open access
	International Scientific Publications. –URL: http://www.scientific-publications.net/ru/	Open access
	Univadis.ru: international honey. portal. - URL: http://www.univadis.ru/	Open access
	ECO-Vector Journals Portal/Open Journal Systems. - URL: http://journals.eco-vector.com/	Open access
	Evrika.ru information and educational portal for doctors. – URL: http://www.evrika.ru/	Open access
	Med-Edu.ru: medical video portal. - URL: http://www.med-edu.ru/	Open access
	DoctorSPB.ru: information-reference portal about medicine. - URL: http://doctorspb.ru/	Open access
	Rubricator of clinical recommendations Ministry of Health of Russia. - URL: http://cr.rosminzdrav.ru/	Open access
	Dictionaries and encyclopedias on Academician. - URL: http://dic.academic.ru/	Open access
	Official Internet portal of legal information. - URL: http://pravo.gov.ru/	Open access
	Education on Russian: portal / State. Institute of Russian language them. A.S. Pushkin. -URL: http://pushkininstitute.ru/	Open access
	World Health Organization. - URL: http://who.int/ru/	Open access
	Ministry of Science and higher education Russian Federation. -URL: http://minobrnauki.gov.ru/	Open access
	Modern problems of science and education: electron. magazine. - URL: http://www.science-education.ru/ru/issue/index	Open access
	Other Open resources can be found at: http://rostgmu.ru →Library→Electronic catalogue→Open Internet resources→further by keyword...	

6.3. Guidelines for students on mastering the discipline.

An important condition for successful mastery of the discipline “microbiology, virology” is the creation of a system of proper organization of work that allows you to distribute the educational load evenly in accordance with the schedule of the educational process. Training consists of classroom lessons, including lectures and practical exercises, and independent work. The main teaching time is allocated to practical classes in microbiology.

When studying an academic discipline, it is necessary to use the ability to navigate various sections of general and specific microbiology and master practical skills: interpretation of the results of microscopic examination of drugs in Gram stain, results of antibiotic sensitivity and resistance, bacteriological, serological and genetic (PCR) studies.

Practical classes are conducted in the form of discussions, demonstrations of smears, bacteriological cultures, videos, multimedia presentations, and the use of visual aids. Solving situational problems, answers to test tasks.

Independent work of students involves preparation for current control and includes preparation for classes and testing in sections of the academic discipline.

Work with educational literature is considered as a type of educational work in the discipline “microbiology, virology” and is carried out within the hours allotted for its study (in the SRS section).

Each student is provided with access to the library funds of the University and the department.

For each section of the academic discipline, methodological instructions for teachers “Methodological instructions for general and specific microbiology” and methodological recommendations for students “Teaching aids” have been developed:

1. Morphology and ultrastructure of microorganisms: educational method. allowance / Yu.L. Naboka, L.I. Vasilyeva, M.L. Chernitskaya [and others]. – Rostov n/d: Publishing house RostGMU, 2022. – 65 p.

Same[Electronic resource]: electronic copy. – Access from EUB RostSMU.

2. Physiology and ecology of microorganisms: educational method. allowance / Yu.L. Naboka, L.I. Vasilyeva, M.L. Chernitskaya [and others]. – Rostov n/d: Rostov State Medical University Publishing House, 2022. – 66 p.

Same[Electronic resource]: electronic copy. – Access from EUB RostSMU.

3. Microbial factor and infectious process. Fundamentals of immunology: educational method. allowance / Yu.L. Naboka, L.I. Vasilyeva, M.L. Chernitskaya [and others]. – Rostov n/d: Rostov State Medical University Publishing House, 2022. – 62 p.

Same[Electronic resource]: electronic copy. – Access from EUB RostSMU.

4. Introduction to virology. Bacteriophages. Genetics and variability of bacteria: educational method. allowance / Yu.L. Naboka, L.I. Vasilyeva, M.L. Chernitskaya [and others]. – Rostov n/a: Publishing house of Rostov State Medical University, 2021. – 65 p.

Same[Electronic resource]: electronic copy. – Access from EUB RostSMU.

5. Pathogenic cocci and gram-negative bacteria. Pathogens of zoonoses: educational method. allowance / Yu.L. Naboka, L.I. Vasilyeva, M.L. Chernitskaya [and others]. – Rostov n/d: Publishing house RostGMU, 2022. – 63 p.

Same[Electronic resource]: electronic copy. – Access from EUB RostSMU.

6. Basic bacterial pathology of the gastrointestinal tract: educational method. allowance / Yu.L. Naboka, L.I. Vasilyeva, M.L. Chernitskaya [and others]. – Rostov n/d: Rostov State Medical University Publishing House, 2022. – 70 p.

Same[Electronic resource]: electronic copy. – Access from EUB RostSMU.

7. Pathogens of diphtheria, tuberculosis, anaerobic infections. Spirochetoses, chlamydia: educational method. allowance / Yu.L. Naboka, L.I. Vasilyeva, M.L. Chernitskaya [and others]. – Rostov n/d: Publishing house RostGMU, 2022. – 55 p.

Same[Electronic resource]: electronic copy. – Access from EUB RostSMU.

8. Clinical virology: educational method. allowance / Yu.L. Naboka, L.I. Vasilyeva, M.L. Chernitskaya [and others]. – Rostov n/d: Publishing house RostGMU, 2022. – 61 p.

Same[Electronic resource]: electronic copy. – Access from EUB RostSMU.

Student work in a group develops a sense of teamwork and communication skills.

Teaching students helps develop their communication skills with patients, taking into account the ethical and deontological characteristics of pathology and patients.

The initial level of students' knowledge is determined by testing, the current control of mastering the subject is determined by oral questioning during classes, when solving typical situational problems and answering test tasks.

At the end of studying an academic discipline, an intermediate control of knowledge is carried out using test control, testing practical skills and solving situational problems. When preparing for the intermediate certification, it is advisable to: carefully study the list of questions and determine which sources contain the information necessary to answer them, carefully read the recommended literature and draw up brief notes on the answers (answer plans).

VII. MATERIAL AND TECHNICAL SUPPORT OF DISCIPLINE

Name of special* premises and premises for independent work	Equipmentspecial rooms and rooms for independent work
344022, Rostov region, Rostov-on-Don, lane.	The room is equipped with specialized educa-

<p>Nakhichevsky, 38/57-59/212-214 (No. 44, Liter S, 2nd floor) Audience No. 1 Classroom for conducting practical classes in the discipline “microbiology, virology”, independent work.</p>	<p>tional furniture: tables (7), chairs (14), educational board, sets of demonstration equipment and educational visual aids, providing thematic illustrations: tables (15), microscopes (2), sets of demonstration microbiological smears (2), demonstration material by topic (bacteriological loops, test tubes, pipettes, set of disks with antibiotics, anaerostats) (1)</p>
<p>344022, Rostov region, Rostov-on-Don, lane. Nakhichevsky, 38/57-59/212-214 (No. 44, Liter S, 2nd floor) Audience No. 2 Classroom for conducting practical classes in the discipline “microbiology, virology”, independent work.</p>	<p>The room is equipped with specialized educational furniture: tables (8), chairs (16), educational board, sets of demonstration equipment and educational visual aids, providing thematic illustrations: tables (15), microscopes (2), sets of demonstration microbiological smears (2), demonstration material by topic (bacteriological loops, test tubes, pipettes, set of disks with antibiotics, anaerostats) (1)</p>
<p>344022, Rostov region, Rostov-on-Don, lane. Nakhichevsky, 38/57-59/212-214 (No. 44, Liter S, 2nd floor) Audience No. 3 Classroom for conducting practical classes, group consultations, individual consultations, ongoing monitoring of intermediate certification in the discipline “microbiology, virology”.</p>	<p>The room is equipped with specialized educational furniture: tables (8), chairs (16), educational board, sets of demonstration equipment and educational visual aids, providing thematic illustrations: tables (15), microscopes (2), sets of demonstration microbiological smears (2), demonstration material by topic (bacteriological loops, test tubes, pipettes, set of disks with antibiotics, anaerostats) (1)</p>
<p>344022, Rostov region, Rostov-on-Don, lane. Nakhichevsky, 38/57-59/212-214 (No. 44, Liter S, 2nd floor) Auditorium No. 4 Classroom for conducting practical classes, group consultations, individual consultations, ongoing monitoring of intermediate certification in the discipline “microbiology, virology”.</p>	<p>The room is equipped with specialized educational furniture: tables (8), chairs (16), educational board, sets of demonstration equipment and educational visual aids, providing thematic illustrations: tables (15), microscopes (2), sets of demonstration microbiological smears (2), demonstration material by topic (bacteriological loops, test tubes, pipettes, set of disks with antibiotics, anaerostats) (1), multimedia complex (1) (laptop, projector, screen).</p>
<p>344022, Rostov region, Rostov-on-Don, lane. Nakhichevsky, 38/57-59/212-214 (No. 44, Liter S, 2nd floor) Auditorium No. 7 Classroom for conducting practical classes in the discipline “microbiology, virology”.</p>	<p>The room is equipped with specialized educational furniture: tables (8), chairs (16), educational board, sets of demonstration equipment and educational visual aids, providing thematic illustrations: tables (15), microscopes (2), sets of demonstration microbiological smears (2), demonstration material by topic (bacteriological loops, test tubes, pipettes, set of disks with antibiotics, anaerostats) (1)</p>