FEDERAL STATE BUDGETARY
EDUCATIONAL INSTITUTION OF HIGHER EDUCATION
«AMUR STATE MEDICAL ACADEMY»
MINISTRY OF HEALTH OF THE RUSSIAN FEDERATION

AGREED
Vice-Rector for Academic Affairs,

_____N.V. Loskutova

April17, 2025

Decision of the CCMC
April17, 2025

Protocol No. 7

APPROVED
by decision of the Academic Council of the FSBEI HE Amur SMA of the Ministry of Health of the Russian Federation
April 22, 2025

Protocol No. 15

Acting Rector of the FSBEI HE Amur SMA of the Ministry of Health of the Russian Federation

_____I.V. Zhukovets

April22, 2025

ДОКУМЕНТ ПОДПИСАН
ЭЛЕКТРОННОЙ ПОДПИСЬЮ

Сертификат: 50AB2242604E64520B52614FA420034A
Владелец: Жуковец Ирина Валентиновна
Действителен: с 15.04.2025 до 09.07.2026

EDUCATIONAL PROGRAM

disciplines «Microbiology, Virology»

Specialty: 31.05.01 General Medicine
Course: 2, 3
Semester: 4, 5
Total hours: 252 hrs.
Total credits: 7 credit units
Control form: examination, 5 semester

Blagoveshchensk, 2025

The educational program of the discipline is designed in accordance with the requirements of the Federal State Educational Standard of Higher Education - specialist in specialty 31.05.01 General Medicine, approved by the order of the Ministry of Education and Science of Russia dated 08.12.2020 No. 988 (registered with the Ministry of Justice of Russia on 08.26.2020 No. 59493), BPEP HE (2021).

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APPROVED at the meeting of the Department of General Hygiene,
Protocol No. 12 dated April15, 2025

Head of Department, Holder of an Advanced Doctorate (Doctor of Sciences) in Medical Sciences, Professor _____ N.V. Korshunova

Conclusion of the Expert Commission on the review of the Educational Programs:
Protocol No. 2 dated April 16, 2025

Expert of the expert commission,
Holder of an Advanced Doctorate (Doctor of Sciences) in Medical Sciences,
Professor _____ N.V. Korshunova

APPROVED at the meeting of the CMC No. 1:
Protocol No. 7 dated April16, 2025

Chairman of the CMC No. 5
Holder of the Advanced Doctorate (Doctor of Sciences) in Medical Sciences,
Professor _____ N.V. Korshunova

AGREED: Dean of the Faculty of Medicine,
Ph.D. of Medical Sciences, Associate Professor _____ N.G. Brush

April17, 2025

CONTENT

1. EXPLANATORY NOTE

1.1. Characteristics of the discipline

The reform of healthcare and higher medical education requires the training of qualified doctors who are able to solve complex issues of early recognition, rational treatment and prevention of various diseases. E-health is a new paradigm of protection of personal and public health of citizens, implemented based on comprehensive use of information and communication technologies.

E-health implies a systematic approach to solving the full range of public health protection tasks, implemented based on comprehensive electronic document management, which necessarily includes personal medical data, provides prompt access to all information, the possibility of its joint remote analysis by doctors and contacts between doctors and patients based on telemedicine technologies.

The high diversity of bacteria and viruses, their variability, and the ability to quickly adapt to the human body, and consequently cause a wide range of diseases, make these pathogens relevant. It is especially important to understand the mechanisms of the impact of various social, environmental and endogenous factors on viruses, bacteria and other microbes. Microbiology and virology are located at the junction of fundamental and clinical disciplines according to the Federal State Educational Standard of Higher Education (FGOS HE).

Modern microbiology and virology are closely related to literally all medical specialties. Advances in genetics, molecular biology, and biotechnology have led to the creation of fundamentally new biological objects, including genetically modified ones, the development of new diagnostic systems with high specificity, and preventive and curative immunobiological drugs.

Teaching of microbiology and virology at a medical university is conducted in the form of a lecture course and practical classes in full-time and distance learning, with credits in the main modules of the discipline (general microbiology, virology and private microbiology, virology), intermediate certification (testing in the Moodle system) and an exam. The discipline is studied in the 4th and 5th semesters. Teaching is integrated with the programs of related departments, while students' self-training and acquisition of professional competencies play an essential role. The peculiarities of studying the discipline "Microbiology, virology" are the interdependence between the goals of information and medical education; the universality and fundamentality of the course; the peculiarity of constructing their content depending on the nature and general goals of the doctor's training and his specialization.

1.2. Goals and objectives of the discipline

The purpose of studying the discipline is for students to acquire basic knowledge about the patterns of interaction between micro– and macroorganisms, practical skills in methods of prevention, etiological (microbiological, molecular biological and immunological) diagnostics, and the main directions of specific and etiotropic treatment of infectious and opportunistic human diseases.

Academic objectives of the discipline:

− formation of universal, general professional competencies, a set of knowledge, skills and abilities that a student must master as a result of studying the discipline of microbiology, virology;

− Formation of ideas about the patterns of interaction of the human body with the world of microbes, including the response to infectious antigens;

− Study of the principles and techniques of interpretation of the results of microbiological, molecular biological and immunological studies of biological fluids, virus-containing materials and pure cultures of microbes;
− Teaching students prevention methods for the prevention of bacterial, fungal, parasitic and viral diseases;
− Study of etiotropic and specific therapy of infectious and opportunistic human diseases (bacterial, fungal, parasitic, viral); − formation of students' skills in working with scientific literature and electronic resources;
− Familiarization of students with the principles of organization of the microbiological laboratory, with occupational safety and health measures;
− Formation of students' ideas about the storage conditions of chemical reagents and medicines.

1.3. The place of discipline in the structure of the main professional educational program of higher education.

In accordance with the Federal State Educational Standard for Higher Education – specialty 05/31/01 Medical Science (2020), the discipline "Microbiology, virology" belongs to the disciplines of the basic part, Block 1. The total labor intensity is seven units (252 hours). The discipline is taught in the 4th and 5th semesters in the second and third courses. Form of control: exam in the 5th semester.

Students are trained based on the continuity of knowledge and skills acquired in the course of biology, histology, anatomy and other general education disciplines. "Microbiology, virology" is the basic one for subsequent clinical disciplines: infectious diseases, phthisiology, dermatovenerology, obstetrics and gynecology, faculty therapy; hospital therapy, polyclinic therapy; faculty surgery, hospital surgery, urology, traumatology and orthopedics, dentistry, oncology, etc.

The discipline "Microbiology, Virology" consists of 2 modules, which present the most important and necessary information defining the educational process:
Module 1: General Microbiology.
Module 2: Private microbiology, virology.
There are four sections inside module 1:

− Morphology of microorganisms;
− Physiology of microorganisms;
− General virology;
− Ecology and genetics of microorganisms.

There are five sections inside module 2:

− Pathogenic cocci;
− Pathogens of bacterial intestinal infections;
− Pathogens of acute respiratory viral infections and toxinemic infections;
− Causative agents of spirochaetosis and vector-borne infections;
− Pathogens of viral infections

1.4. Requirements for students

To study the discipline "Microbiology, Virology", a student must have the necessary knowledge, skills and abilities developed in institutions of secondary (full) general education:

Latin language
Knowledge: basic medical and pharmaceutical terminology in Latin
Skills: to be able to apply knowledge for communication and obtaining information from foreign sources of medical literature, medical documentation. (II-III level)
Competencies: applies medical and pharmaceutical terminology in Latin in professional activities
History of medicine
Knowledge: prominent figures of medicine and healthcare, Nobel laureates, outstanding medical discoveries in the field of microbiology, virology, the influence of humanistic ideas on medicine.(II-III level)
Skills: to be able to present and analyze the contribution of Russian scientists to the development of microbiology, virology and medicine in general competently and independently.
Competencies: using modern communication resources to search, process and transmit information
Histology
Knowledge: embryogenesis of tissues and systems of the macroorganism, the structure of the immune system and the function of immunocompetent cells (ICCS). (II-III level)
Skills: be able to identify age-related patterns of organ and tissue development and the role of the immune system in the development of infectious diseases.
Competencies: working with a light and electron microscope, taking into account safety regulations
Chemistry
Knowledge: of the chemical and biological essence of processes occurring in a living organism at the molecular and cellular levels.(II-III level).
Skills: to analyze the contribution of chemical processes to the functioning of a living organism.
Competencies*:* safe work in chemical laboratories
Biochemistry
Knowledge: the structure and biochemical properties of the main classes of biologically important compounds, the main metabolic pathways of their transformation; the role of cell membranes and their transport systems in metabolism (II-III level).
Skills: be able to analyze the contribution of biochemical processes to the functioning of macroorganism systems,
Competencies: to interpret the results of the most common laboratory diagnostic methods for detecting disorders in the macroorganism.
Biology

Knowledge: laws of genetics, its importance for medicine; patterns of heredity and variability in individual development as the basis for understanding the pathogenesis and etiology of hereditary and multifactorial diseases; biosphere and ecology, the phenomenon of parasitism and bioecological diseases.(II-III level)
Skills: be able to analyze the patterns of heredity and variability in the development of relationships between macro- and microorganisms
Competencies: working with a light microscope and working in biological laboratories
Anatomy
Knowledge: Anatomical and physiological features of the structure of organs and tissues. (II-III level)
Skills: be able to analyze the age-sex features of the structure of organs and tissues of a macroorganism.
Competencies: determining the localization of specific organs and tissues and their interrelationships
Foreign language
Knowledge: basic medical and pharmaceutical terminology in a foreign language
Skills: language (II-III level)
Competencies: be able to apply knowledge to communicate and obtain information from foreign sources.

1.5. Interdisciplinary relations of the discipline with subsequent disciplines

Knowledge, skills and abilities necessary for the study of subsequent disciplines:

Interdisciplinary connections with subsequent disciplines			
№ п/п	**Names of subsequent disciplines**	**The sections of the discipline necessary for the study of subsequent disciplines**	
		General Microbiology, Virology	**Private microbiology, virology**
1	Nervous diseases and neurosurgery	+	+
2	Faculty therapy	+	+
3	Hospital therapy	+	+
4	Faculty Surgery	+	+
5	Hospital surgery	+	+
6	Obstetrics and Gynecology	+	+

7	Infectious diseases	+	+
8	Childhood illnesses	+	+
9	Dermatovenerology	+	+

1.6. Requirements for the results of mastering the discipline

The study of the discipline "Microbiology, Virology" is aimed at the formation of the following competencies: universal (CC-4, 8) and general professional (OPK-2, 4, 5, 10).

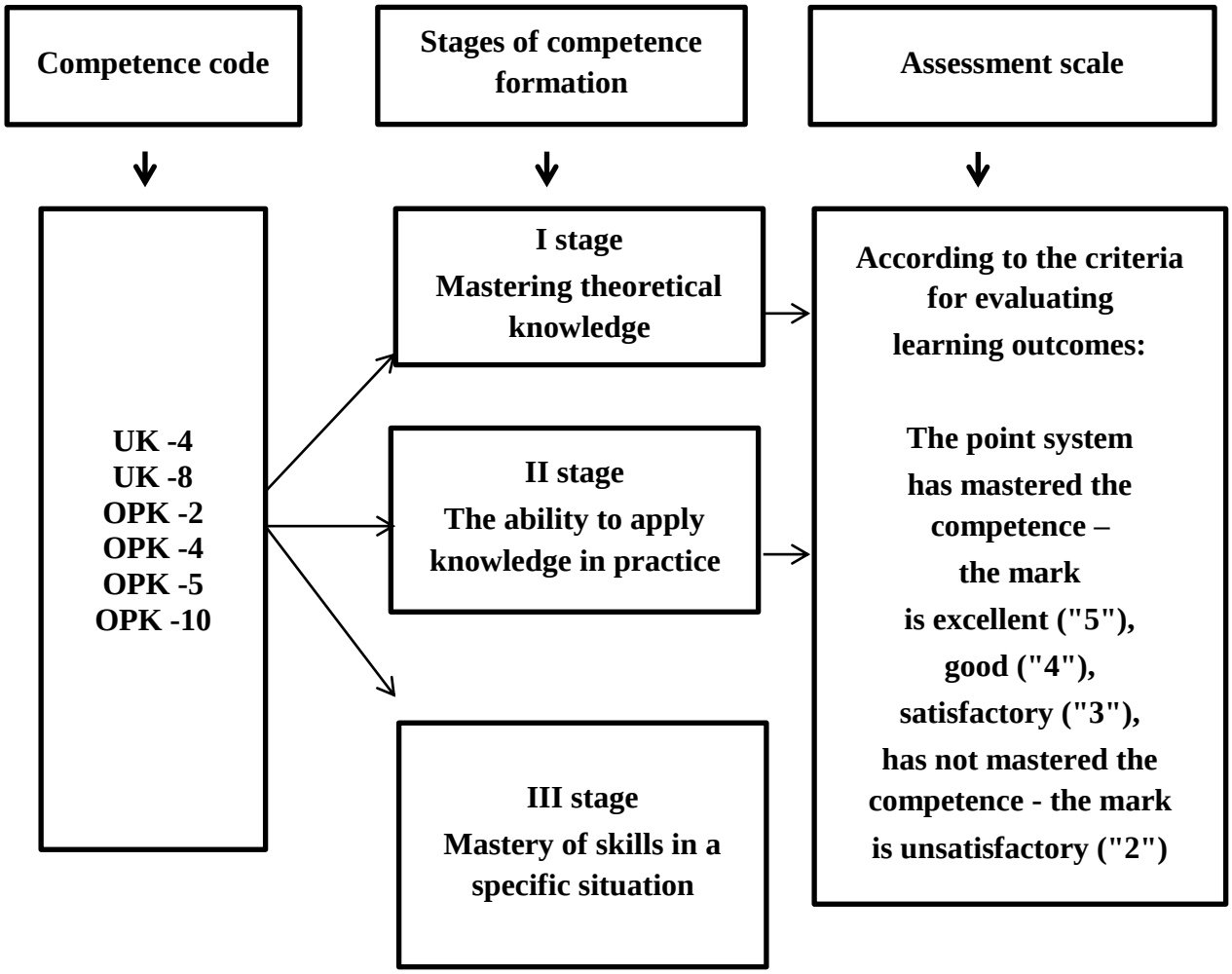
No. p / p	Code and name of the competence	The code and name of the competence achievement indicator
	Universal competencies	
1	**UK -4.** Able to apply modern communication technologies, including in a foreign language(s), for academic and professional interaction	**ID UK-4.2.** Uses modern communication resources to search, process and transmit information necessary for the high-quality performance of professional tasks and the achievement of professionally significant goals.
	UK -8. He is able to create and maintain safe living conditions in daily life and in professional activities to preserve the natural environment and ensure the sustainable development of society, including in the event of threats and emergencies and military conflicts.	**ID UK -8.4.** He has the skills of safe work in biological laboratories and the ability to handle burners, alcohol burners and electrical appliances, animals.
	General professional competencies	
2	**OPK -2**. The ability to carry out and monitor the effectiveness of preventive measures, the formation of a healthy lifestyle and sanitary and hygienic education of the population	**OPK -2.7.** Examines the main and side effects of drugs and their combinations, taking into account the morphofunctional characteristics and the physiological state of the human body.
	OPK -4. He is able to use medical devices prescribed by the procedure for providing medical care, as well as to conduct examinations of the patient in order to establish a diagnosis.	**ID OPK -4.1.** It uses modern medical technologies, specialized equipment and medical products, disinfectants, medicines, including immunobiological and other substances and their combinations in solving professional problems from the standpoint of evidence-based medicine.

	OPK -5. The ability to assess morphofunctional, physiological conditions and pathological processes in the human body for solving professional problems	**ID OPK -5.2.** Knows the etiology, pathogenesis, development of the disease, basic concepts of nosology.
	OPK -10. He is able to solve standard tasks of professional activity using information, bibliographic resources, medical and biological terminology, information and communication technologies, taking into account the basic requirements of information security.	**ID OPK -10.2.** Performs an effective search for information necessary to solve the tasks of professional activity using legal reference systems.

Modules of the discipline and the code of the formed competence

No. p/ p	Section name	The code of the generated competence
1	General Microbiology, Virology	**UK** -4, **UK** -8 **OPK** -2, **OPK** -4, **OPK** -5, **OPK** -10
2	Private microbiology, virology	**UK** -4, **UK** -8 **OPK** -2, **OPK** -4, **OPK** -5, **OPK** -10

1.7. Stages of competence formation and description of assessment scales



1.8. Forms of training organization and types of control

The form of organization of students' education	**Brief description**
Lectures	The lecture material contains the key and most problematic issues of the discipline, the most significant in the preparation of a specialist.
Practical exercises	They are intended for the analysis (consolidation) of theoretical positions and control over their assimilation, followed by the application of the acquired knowledge during the study of the topic.
Interactive forms of learning	- solving situational tasks and exercises with subsequent discussion, - interactive survey; - performing creative tasks, - the small group method, - discussions, - online course of discipline in the Moodle system, - testing in the Moodle system.
Participation in the research work of the department, student circle and conferences	- preparation of oral presentations and poster presentations for presentation at a student circle or scientific conference; - writing theses and abstracts in the chosen scientific field; - preparation of a literary review using educational, scientific, reference literature and online sources.
Types of control	**Brief description**
Entrance control	Examination of theoretical knowledge and practical skills formed by the computer science program in institutions of secondary (full-time) general education. The entrance control of knowledge includes: - testing in the Moodle system (input knowledge control test), - solving situational tasks and exercises. The results of the entrance control are systematized, analyzed and used by the teaching staff of the department to develop measures to improve and update the teaching methods of the discipline.
Current control	Current knowledge control includes: - verification of the solution of situational tasks and exercises performed independently (extracurricular independent work); - assessment of the assimilation of theoretical material (oral survey and computer testing); - control over the technique of performing the experiment in practical classes and registration of the protocol; - testing in the Moodle system on all subjects of the discipline (tests include questions of theoretical and practical nature); - individual assignments (practical and theoretical) for each topic of the discipline being studied.

Intermediate certification	The intermediate assessment is represented by a test at the end of the 4th semester, a test with an assessment at the end of the 5th semester. The test includes the following stages:: - assessment of knowledge of theoretical material (oral interview and co-interview); - testing in the Moodle system (intermediate certification test); - checking the assimilation of practical skills and abilities; - solving situational tasks and exercises on each subject of the discipline.

2. STRUCTURE AND CONTENT OF THE DISCIPLINE

2.1. Scope of the discipline and types of educational activities

No. p/p	Types of educational work	Total hours	Term	
			4	5
1	Lectures	42	36	6
2	Practical exercises	102	60	42
3	Independent work of students	72	48	24
	Exam	36	-	36
	Total labor intensity in hours	**252**	**144**	**108**
	Total labor intensity in credit units	**7**	**4**	**3**

2.2. Thematic plan of lectures and their content

2.3.

No. p/p	Topics and content of lectures	Codes of formed competencies	Workload intensity (hours)
1	Medical microbiology, virology. Subject, methods, tasks, sections, history of development. Stages of microbiology development: heuristic, morphological, physiological, immunological, molecular genetic. The works of L. Pasteur and his school. The works of R. Koch and his school. The discovery of viruses. D.I. Ivanovsky is the founder of virology. Medical microbiology in the first half of the 20th century. The modern molecular genetic period in the development of medical microbiology (the second half of the 20th century- the 21st century).	UK -4; UK -8; OPK-2; OPK-4; OPK-5; OPK-10;	2
2	**Systematics and nomenclature of microbes.** Morphology of a bacterial cell. Modern classification of bacteria. The main forms of bacteria. Permanent and non-permanent bacterial cell structures. Chemical composition and functional significance of individual structural components. Differences in the structure of gram-positive and gram-negative bacteria. Protoplasts, spheroplasts, and L-forms of bacteria.	UK -4; UK -8; OPK-2; OPK-4; OPK-5; OPK-10;	2
3	**General virology.** The structure and biology of viruses. Classification and taxonomy of viruses. The concept of simple and complex viruses. Virion and its components. Nucleic acid, capsid, capsomers, core, supercapsid shell. Types of nucleocapsid symmetry. The interaction of the virus with the host cell. Bacterial viruses (bacteriophages), their structure, morphological types. Electron microscopic methods of virus research.	UK -4; UK -8; OPK-2; OPK-4; OPK-5; OPK-10;	2
4	**General protozoology.** Classification and structure. Biology of protozoa Pathogenic protozoa for humans, features of structure, mobility, development cycles. Taxonomy. Classification. Nutrition, respiration, reproduction, life cycles of protozoa. Ecology of protozoa. Staining methods for detecting trophozoites, cysts and other forms of protozoa. Features of cultivation. Methods of laboratory diagnostics of diseases caused by them.	UK -4; UK -8; OPK-2; OPK-4; OPK-5; OPK-10;	2

5	**General mycology.** Classification. Structure. The main forms of mushrooms. Dimorphic mushrooms. The structure of mushrooms. Structural features of the cytoplasmic membrane and cell wall of microscopic fungi. Sporulation. Fungal spores (vegetative, endospores, exospores, sexual). Methods for studying the morphology of fungi (microscopy of native and stained preparations). Features of mushroom cultivation. Nutrition, breathing. Nutrient media used in mycology. Methods of reproduction. Methods of laboratory diagnostics of mycotic infections.	UK -4; UK -8; OPK-2; OPK-4; OPK-5; OPK-10;	2
6	**The physiology of bacteria and viruses.** Constructive metabolism. Nutrition of bacteria. Classification of bacteria by food type. The concept of autotrophs, heterotrophs, saprophytes, absolute and facultative parasites, prototrophs, auxotrophs. Requirements for nutrient media. Classification of nutrient media. Transport of substances into the bacterial cell: non-volatile (simple and facilitated diffusion), energy-dependent (active, radical translocation). Features of biosynthesis of proteins, nucleic acids, carbohydrates, lipids by a bacterial cell. Bacterial enzymes. Catabolic metabolism. Classification of bacteria by energy production methods. The concept of phototrophs, hemolyto- and chemoorganotrophs.	UK -4; UK -8; OPK-2; OPK-4; OPK-5; OPK-10;	2
7	**Genetics of bacteria and viruses.** The organization of the genetic material in bacteria and viruses. The concept of genotype and phenotype. Bacterial chromosome. The operon. Features of functioning, distinguishing features from the chromosome of eukaryotic cells. Mobile genetic elements, characteristics (plasmids, transposons, insertion sequences, moderate bacteriophages). Types of variability in bacteria. Modification variability. Genotypic variability. Genetic recombination in bacteria. Types of genetic recombination in bacteria: homologous, site-specific, illegal. The organization of the genetic apparatus of viruses. DNA and RNA are carriers of genetic information. Genetic variability of viruses, causes of their occurrence. Mutations. Recombination. Genetic reactivation. Modification variability of viruses. Microbiological foundations of genetic engineering and biotechnology. Principles of creating hybrid strains. The concept of bioproducts. The main directions of medical biotechnology. The use of genetic and molecular biological methods in the diagnosis of infectious diseases. Biosensors, biochips.	UK -4; UK -8; OPK-2; OPK-4; OPK-5; OPK-10;	2

8	**The microflora of the human body.** The functions of normal microflora are morphogenetic, detoxifying, immunogenic, metabolic, regulatory, and anti-infective. The role in the development of endogenous infections and the spread of genes. Factors influencing the quantitative and specific composition of the microflora of the human body. Dysbiosis. Methods of study, conditions of occurrence, clinical manifestations, laboratory diagnostics, practical significance of research on dysbiosis. Drugs to restore normal human microflora. Classification of eubiotics. The concept of probiotics. The microflora of newborns, its formation during the first year of life. The influence of the mechanism of childbirth (natural or cesarean section), the sanitary state of the environment during childbirth, the joint or separate stay of mother and child in the first days of life, breastfeeding or artificial feeding on the dynamics of colonization of the body and the composition of the microflora of the child.	UK -4; UK -8; OPK-2; OPK-4; OPK-5; OPK-10;	2
9	**The doctrine of the infectious process.** Conditions for the occurrence of the infectious process. Forms of interaction between micro- and macroorganisms: mutualism, commensalism, parasitism. Infection as a type of parasitism. Evolution of microbial parasitism. Forms of infectious diseases. Stages of development. The concept of sapronoses and others. Pathogenicity of microorganisms, definition. Obligately pathogenic, conditionally pathogenic, and non-pathogenic microorganisms. Virulence, definition, units of measurement (DLm, LD50, etc.). Pathogenicity factors of microorganisms. Characteristics of pathogenicity factors. Toxicity of bacteria and viruses. Endotoxins, chemical composition, properties, and mechanism of action. Main differences from protein toxins. Genetic control of pathogenicity factors in microorganisms. Heterogeneity of microbial populations in terms of virulence and pathogenicity factors.	UK -4; UK -8; OPK-2; OPK-4; OPK-5; OPK-10;	2
10	**Chemotherapeutic drugs.** Antibacterial and antiviral agents. The concept of chemotherapy and antibiotics. The history of the development of chemotherapy. The role of P. Ehrlich, G. Domagk in the development of chemotherapy. A. Fleming, 3. Wachsman, the history of the discovery of antibiotics (penicillin, streptomycin). Classification of antibiotics by chemical composition the building. The spectrum of action. Targets of antimicrobial action. Bactericidal and bacteriostatistical effects of antibiotics. Units of measurement of	UK -4; UK -8; OPK-2; OPK-4; OPK-5; OPK-10;	2

	antimicrobial activity. Side effect of antibiotics. Complications of antibiotic therapy. Principles of rational chemotherapy. Antiviral drugs. Classification. Chemotherapeutic antiviral agents. Mechanisms of action. Interferon and interferon inducers, mechanisms of their antiviral action. Immunomodulators.		
11	**Immunobiological preparations.** Classification. Vaccines. Types of vaccines: live, killed, chemical, associated, recombinant, etc. Anatoxins. The technology of their production, examples. Adjuvants. Therapeutic and preventive vaccines; The concept of the cold chain. Serum preparations, the main groups. Serums and immunoglobulins, Production of immune and monoclonal serums, application, units of measurement of their activity. The mechanism of action of antitoxic serums, their practical application, methods and rules of administration. Immunoglobulins: therapeutic, diagnostic. Homologous, heterologous, for intravenous administration. Diagnosticums. Allergens. Application. Bacteriophages: diagnostic, therapeutic, and preventive.	UK -4; UK -8; OPK-2; OPK-4; OPK-5; OPK-10;	2
12	**Pathogenic and conditionally pathogenic gram-positive and gram-negative cocci.** Etiological and pathogenetic role. Pathogenesis of staphylococcal infections, their role in hospital infections. Features of immunity. Methods of microbiological diagnostics of staphylococcal processes. Preparations for specific prevention and therapy. Streptococci. Taxonomy. Biological properties. Etiological and pathogenetic role of group A streptococci. Characteristics of toxins and enzymes of pathogenicity. Pathogenesis of streptococcal infections. Features of immunity. Methods of microbiological diagnostics of streptococcal diseases. Group B streptococci and their role in neonatal pathology. Enterococci. Biological properties. Role in human pathology. Enterococci as an indicator of the sanitary state of the environment. Neisseria. Taxonomy. Biological properties. Causes of meningococcal infection. Morphology and antigenic properties. Cultivation. Pathogenicity factors. Etiopathogenesis. Laboratory diagnostics. Specific prevention and therapy. Causes of gonococcal infection. Morphology, antigenic properties. Cultivation. Pathogenicity factors. Etiology and pathogenesis. Laboratory diagnostics. Prevention and therapy.	UK -4; UK -8; OPK-2; OPK-4; OPK-5; OPK-10;	2
13	**Enterobacteria are the causative agents of AKI.** Pathogenic E. coli.	UK -4; UK -8;	2

	The physiological role in the human intestine and the sanitary significance of Escherichia coli, their importance in genetic and genetic engineering work. Diarrhoeogenic Escherichia coli, their differentiation from opportunistic pathogens. Features of entero-hemorrhagic E. coli. Microbiological diagnosis of escherichiosis. Specific and etiotropic treatment. Prevention. Shigella. Biological properties. Pathogenesis of dysentery. The role of invasion factors, spread, Shiga toxins and shiga-like toxins. Immunity. Methods of microbiological diagnostics. The problem of specific prevention. Etiotropic therapy. Salmonella. Taxonomy. Classification. Pathogenicity for humans and animals. Salmonella is the causative agent of typhoid fever and paratyphoid A, B. Biological properties. The antigenic structure. Pathogenesis of diseases. Pathogenetic foundations of microbiological diagnostics. Features of immunity. Bacterial carrier. Specific prevention and etiotropic therapy. Salmonella is the causative agent of salmonellosis. Pathogenesis. The role of entero- and endotoxins in the development of diarrheal syndrome. Microbiological diagnostics. Etiotropic therapy. Salmonella is the causative agent of hospital infections.	ОРК-2; ОРК-4; ОРК-5; ОРК-10;	
14	**Pathogenic vibrions and campylobacteria. Vibrio cholerae, biological properties, biovars.** Antigenic properties. Classification of vibrios according to Heiberg. Cultivation. Pathogenicity factors. Cholera pathogen toxins, characteristics. Etiopathogenesis and immunity in cholera. The role of the ecosystem mechanism in the spread of cholera. Vibration transmission. Methods of microbiological diagnostics. Transport and enrichment environments. Express diagnostic methods. Means of specific prevention and etiotropic therapy of cholera. Halophilic vibrios. Importance in human pathology. Features of laboratory diagnostics. Campylobacteria. Characteristics of the main properties. Antigenic properties. Classification. Cultivation. Pathogenicity factors. Methods of microbiological diagnosis of diseases caused.	UK -4; UK -8; ОРК-2; ОРК-4; ОРК-5; ОРК-10;	2
15	**Pathogens of quarantine and acute respiratory infections.** The causative agents of the plague. The role of Russian scientists in the study of the plague. Pathogenesis, immunity, methods of microbiological diagnosis and specific prevention.	UK -4; UK -8; ОРК-2; ОРК-4; ОРК-5;	2

	The causative agent of tularemia. Biological properties. Pathogenesis, immunity, methods of microbiological diagnosis and specific prevention of tularemia. Brucella. Taxonomy. Characteristics of the main properties. Morphological, cultural, and biochemical features. Antigenic structure. Differentiation of brucella. Pathogenicity for humans and animals. Pathogenicity factors. Pathogenesis and immunity in brucellosis. Methods of microbiological diagnostics. Drugs for specific prevention and therapy. The causative agent of anthrax. Morphological, cultural, biochemical and antigenic properties. Resistance. Pathogenicity for humans and animals. Pathogenicity factors, toxins. Pathogenesis of the disease in humans, immunity. Microbiological diagnostics. Specific treatment and prevention of anthrax.	ОРК-10;	
16	**Pathogenic and opportunistic anaerobes.** Clostridia of wound anaerobic infection. Morphological, cultural, biochemical and antigenic properties. Pathogenicity factors, toxins. Enterotoxin and its role in food poisoning. Pathogenesis of wound anaerobic infection. The role of microbial associations in pathogenesis. Antitoxic immunity. Laboratory diagnostics. Specific treatment and prevention. Tetanus clostridium. Morphological, cultural, biochemical and antigenic properties. Pathogenicity factors, toxins. The pathogenesis of the disease. Tetanus in newborns. Antitoxic immunity. Laboratory diagnostics. Specific treatment and prevention of tetanus. Clostridia of botulism. Morphological, cultural, biochemical and antigenic properties. Pathogenicity factors, botulinum toxins, pathogenesis of the disease. Antitoxic immunity. Laboratory diagnostics. Specific treatment and prevention of botulism. Clostridia of antibiotic-associated diarrhea and pseudomembranous colitis. Morphological, cultural, biochemical and antigenic properties. Microbiological diagnostics, etiotropic treatment. Non-spore-forming anaerobes, their characteristics, features of laboratory diagnostics of diseases caused by them.	УК -4; УК -8; ОРК-2; ОРК-4; ОРК-5; ОРК-10;	2
17	**Pathogenic bordetella, Corynebacteria and mycobacteria.** The causative agent of whooping cough. Morphological, cultural, and antigenic properties. Pathogenicity for humans and localization in the body. The pathogenesis of the disease in humans. Immunity. Laboratory diagnostics. Specific prevention. Etiotropic therapy. Corynebacteria.Taxonomy. The causative agent of diphtheria. Morphological, cultural,	УК -4; УК -8; ОРК-2; ОРК-4; ОРК-5; ОРК-10;	2

	biochemical and antigenic properties. Resistance. Biovars. Pathogenicity factors, diphtheria toxin. The pathogenesis of diphtheria. Antitoxic immunity. Laboratory diagnostics. Specific treatment and prevention. Mycobacteria. General characteristics. Classification. Features of metabolism. The causative agent of tuberculosis. Morphological, cultural, biochemical, antigenic and allergenic properties. Chemical composition features and resistance. Pathogenicity factors. Pathogenesis of tuberculosis, features of immunity. Laboratory diagnostics. Specific treatment and prevention. The causative agent of leprosy. Morphology, cultivation. Pathogenesis of the disease, immunity. Laboratory diagnostics. Antimicrobial drugs. Pathogens of mycobacteriosis.		
18	**Pathogenic spirochaetes and rickettsias.** The causative agent of syphilis. Morphological and cultural properties. Pathogenesis and immunogenesis. Microbiological diagnostics and etiotropic therapy. Borrelia. Pathogens of epidemic and endemic recurrent typhus, tick-borne borreliosis. Morphological and cultural properties. Pathogenesis and immunity. Microbiological diagnostics. Non-specific prevention and treatment. Leptospira. Characterization and differentiation of basic properties. Causative agents of leptospirosis. Morphological and cultural properties. Leptospir serovars. Pathogenicity for humans and animals. Etiopathogenesis. Immunity. Microbiological diagnostics. Specific prevention. Treatment. Rickettsia. Ehrlichy. The Coxiellas. The Bartonells. Taxonomy. Classification. The causative agents of epidemic typhus and Brill-Zinsser disease, endemic typhus, tick-borne typhus (North Asian rickettsiosis), tsutsugamushi fever. The causative agent of Ku fever. Pathogens of ehrlichiosis. Biological properties. Ecology. Laboratory diagnostics. Etiotropic therapy. Specific prevention.	UK -4; UK -8; OPK-2; OPK-4; OPK-5; OPK-10;	2
19	**Pathogens of acute respiratory viral infections.** Human influenza viruses. The structure and chemical composition of the virion. Features of the genome. Cultivation. Sensitivity to physical and chemical factors. Characteristics of antigens. Types of antigenic variability, its mechanisms. Etiopathogenesis. The importance of secondary microflora. Immunity. Laboratory diagnostics. Specific prevention and treatment. Paramyxoviruses (family Paramyxoviridae). General characteristics and classification. The structure of the virion. Hemagglutinating and hemadsorbating properties. Antigens.	UK -4; UK -8; OPK-2; OPK-4; OPK-5; OPK-10;	2

	Cultivation. Resistance. Human parainfluenza viruses, mumps virus. Role in human pathology. Immunity. Specific prevention. Respiratory syncytial virus. Morphology, biological properties. The pathogenesis of the disease. Immunity and specific prevention. Adenoviruses (family Adenoviridae). General characteristics and classification. The structure of the virion. Antigens. Cultivation. Resistance to physical and chemical factors. Pathogenesis of diseases. Persistence. Oncogenic serotypes of adenoviruses. Laboratory diagnostics. Coronaviruses. General characteristics and classification. The structure of the covid 19 virion. Antigens. Etiopathogenesis. Laboratory diagnostics. Specific prevention and treatment.		
20	**Pathogens of parenteral hepatitis and HIV.** Hepadnaviruses (family Hepadnaviridae). HBV is the causative agent of hepatitis B. The history of discovery. The structure of the virion. Antigens: HBs, HBc, HBe, HVc, their characteristics. Features of the disease pathogenesis. Persistence. Immunity. Laboratory diagnostics. Vaccination and treatment of hepatitis B. Flaviviruses – HCV. Morphology, antigenic properties. Variability. The concept of a quasi-individual. Features of the disease pathogenesis. Persistence. Immunity. Laboratory diagnostics. Retroviruses (family Retrovindae). General characteristics. Classification. Human immunodeficiency virus. Morphology and chemical composition. Features of the genome. Variability and its mechanisms. Cultivation, stages of interaction with sensitive cells. Resistance to the action of physico-chemical factors. The pathogenesis of HIV infection. Target cells in the human body, characteristics of interaction with these cells. Immunological disorders and immunity. AIDS-associated infections. Laboratory diagnostics. Treatment (etiotropic, immunomodulatory and immunosuppression therapy). Retroviral prevention and prospects for specific prevention. Infection control measures.	UK -4; UK -8; OPK-2; OPK-4; OPK-5; OPK-10;	2
21	**Pathogens of arbovirus and arbovirus infections. General characteristics.** Classification. Causative agents of tick-borne encephalitis Etiopathogenesis. Laboratory diagnostics. Specific prevention. Pathogens of Japanese encephalitis. Etiopathogenesis. Laboratory diagnostics. Specific prevention. Pathogens of HFRS. Etiopathogenesis. Laboratory	UK -4; UK -8; OPK-2; OPK-4; OPK-5;	2

	diagnostics. Specific prevention. The causative agents of Ebola fever. Etiopathogenesis. Laboratory diagnostics. Specific prevention. The causative agents of Zika fever. Etiopathogenesis. Laboratory diagnostics. Specific prevention.	OPK-10;	
Total hours			42

2.3. The thematic plan of practical classes and their content.

No. p/p	Naming of practical training topics	The content of practical training topics	Codes of emerging competencies and indicators of their achievement	Types of control	Labor intensity (hours)
	4th semester				
1	Microbiology, virology as a science. The main forms of bacteria. Simple coloring techniques	Entrance control (verification of theoretical knowledge and practical skills developed by previous disciplines. **The theoretical part:** The history of the discipline's development. The contribution of Russian scientists to the development of microbiology and virology. Nobel laureates. Research methods. Types of microscopy. **The practical part:** Microscopy of preparations in a light microscope with an immersion lens, staining of micro-preparations using a simple method. workbook design.	UK-4: ID - 4.2, ID 4.4; UK-8: ID 8.4.	Situational problem solving, front-end survey, system testing Moodle.	3,75

2	The structure of a bacterial cell. Sophisticated coloring techniques	**Theoretical part:** Bacterial cell structure. Bacterial shell structures. Their importance for the vital activity of bacteria. The difference between the cell wall of gram-positive and gram-negative bacteria. Cytoplasm and its elements. their significance and methods of detection. The nucleoid of a bacterial cell, its structure, functions and significance for the vital activity of the cell. Flagella, cilia, structure, functions and significance for the vital activity of a microbial cell. Disputes, structure, education, meaning **Practical part:** prepare a preparation from a microbial culture, color it according to Gram, Neisser Ozheshko. according to Burry-Gins.	UK-4: ID - 4.2, ID 4.4; UK-8: ID 8.4.	Testing Front-end survey	3,75
3	Morphology of cellular forms of microorganisms: fungi, actinomycetes, rickettsias, spirochaetes, chlamydia, mycoplasmas. Methods of detection	**Theoretical part:** Morphology, structure, classification of pathogenic fungi. Morphology of spirochaetes. Structural features. Methods of their detection. Rickettsias, morphological forms, coloring methods, Methods of their detection. Chlamydia, features of structure and development. Methods of their detection. Mycoplasma. Morphological features. Methods of their detection. Actinomycetes. Morphology. Methods of their detection. **Practical part:** prepare a micropreparation from a suspension of rickettsias, color it using the Zdradovsky method, prepare the preparation "crushed drop" from a colony of fungi. To microscopize demonstration preparations of protozoa, to sketch. The tables provide information	UK-4: ID - 4.2, ID 4.4; UK-8: ID 8.4.	Front-end survey Interactive survey, Practical skills development.	3,75

		on the morphology of pathogenic spirochaetes, mycoplasmas, and chlamydia.			
4	Control session	**Theoretical part:** To consolidate students' knowledge about microbiology, virology as a science, the peculiarities of the chemical composition of microorganisms, their morphology and ultrastructure. **Practical part:** Checking the assimilation of competencies in the preparation of smears from microbial cultures and the rules of working with microbial cultures.	UK-4: ID - 4.2, ID 4.4; UK-8: ID 8.4.	Front-end survey Interactive survey, Practical skills development.	3,75
5	Cultivation of bacteria. Nutrition, breathing. Highlighting pure culture bacteria (1 day)	**Theoretical part:** The concept of metabolism of microorganisms. Processes of nutrition and respiration of microorganisms. Transport of nutrients into the microbial cell. Types of breathing. The mechanism of respiration. Principles of preparation and application of nutrient media. Stages of cultivation of aerobic bacteria. **Practical part:** seeding of material for isolation of pure culture of aerobic microorganisms according to the method of Drigalsky and Koch.	UK-4: ID - 4.2, ID 4.4; UK-8: ID 8.4.	Front-end survey Interactive survey, Practical skills development.	3,75
6	Growth and reproduction of microorganisms. Isolation of pure bacterial culture (2 days). Cultural properties of bacteria.	**Theoretical part**: To study the processes of growth and reproduction of microorganisms. To master the methods of cultivation and isolation of pure cultures of aerobic and anaerobic bacteria. **Practical part:** cultural properties of bacteria, to produce crops and replanting to isolate cultures of anaerobic bacteria.	UK-4: ID - 4.2, ID 4.4; UK-8: ID 8.4.	Front-end survey Interactive survey, Practical skills development.	3,75

7	Biochemical properties of bacteria. Identification of bacteria	**Theoretical part:** Methods and principles of identification of microorganisms (morphological, cultural, biological, immunological and molecular genetic). Methods for determining the total number of microbial cells per unit of test material. **Practical part:** To sow a pure bacterial culture from a beveled agar into a short "mottled" row to determine the enzymatic activity of bacteria, to sow on chromogenic nutrient media, and to set an approximate agglutination reaction with monovalent agglutinating serums.	UK-4: ID - 4.2, ID 4.4; UK-8: ID 8.4.	Front-end survey Interactive survey, Practical skills development.	3,75
8	Control session	**Theoretical part:** To consolidate students' knowledge about the processes of nutrition, respiration, and bacterial reproduction. Stages of isolation of pure cultures of aerobic and anaerobic bacteria and their identification. **Practical part:** To answer the test tasks of the current control.	UK-4: ID - 4.2, ID 4.4; UK-8: ID 8.4.	Front-end survey Interactive survey, Practical skills development.	3,75
9	Fundamentals of virology. Morphology of viruses and bacteriophages. Methods of detection	**Theoretical part:** morphology and ultrastructure of simple and complex viruses, bacteriophages, as well as the stages of their interaction with the cell; methods of studying their structure. **Practical part:** methods for detecting the presence of viruses (virus indication). Methods for quantifying viruses in the studied material.	UK-4: ID - 4.2, ID 4.4; UK-8: ID 8.4.	Front-end survey Interactive survey, Practical skills development.	3,75

10	Virus cultivation. Cell cultures. Ways to identify viruses.	**Theoretical part:** rules for collecting material for virological examination, basic methods of cultivation. Cell cultures, classification. Characteristic. Media for cell cultures. The requirements for them are reasonable. Methods of diagnosis of human viral diseases, methods of virus identification. **Practical part:** Evaluate reactions: hemagglutination, RHA, RTGA, ELISA, write down the conclusion. To study the methods of rapid diagnosis of viral infections.	UK-4: ID - 4.2, ID 4.4; UK-8: ID 8.4.	Front-end survey Interactive survey, Practical skills development.	3,75
11	The doctrine of the infectious process. Pathogenic and virulent properties of microorganisms. Control session	**The theoretical part:** Infection, the infectious process. The concept of pathogenicity and virulence. The structure and properties of toxins, the mechanisms of their action. Know the methods of studying pathogenic and virulent properties of microorganisms. **Practical part:** methods for assessing the degree of pathogenicity of bacteria and detecting the main virulent properties.	UK-4: ID - 4.2, ID 4.4; UK-8: ID 8.4.	Front-end survey Interactive survey, Practical skills development.	3,75
12	The influence of physical and chemical factors on bacteria. The microflora of the environment. Sterilization. Disinfection.	**Theoretical part:** ecology of microorganisms and natural microbiocenoses, the spread of pathogenic and sanitary-indicative bacteria in the air, soil, water, medical institutions, food products. Mechanisms of action of environmental factors on microorganisms. Sterilization, disinfection. The concept, types and methods. **Practical part:** Determination by classical sanitary and bacteriological methods of sanitary indicative	UK-4: ID - 4.2, ID 4.4; UK-8: ID 8.4.	Front-end survey Interactive survey, Practical skills development.	3,75

		microorganisms of water, soil, air, and food products.			
13	The microflora of the human body in age and gender aspects.	**The theoretical part:** The normal microflora of the human body. Features of microflora of individual biotopes of a macroorganism. Factors influencing the nature of the microflora. The concept of dysbiosis and the directions of its correction. Eubiotics. Characteristics and application. **Practical part:** methods for assessing the state of microbiocenosis of the human body.	UK-4: ID - 4.2, ID 4.4; UK-8: ID 8.4.	Front-end survey Interactive survey, Practical skills development.	3,75
14	Genetics of microorganisms (bacteria and viruses)	**The theoretical part:** the structure of the genetic apparatus of microorganisms, the genetic mechanisms of its variability, the forms of variability, the genetic basis for the development of resistance to chemotherapeutic agents and the basics of genetic engineering and biotechnology. **Practical part:** methods for assessing external impacts on populations of bacteria and viruses. To get acquainted with recombinant medicines.	UK-4: ID - 4.2, ID 4.4; UK-8: ID 8.4.	Front-end survey Interactive survey, Practical skills development.	3,75
15	Chemotherapeutic drugs. Antibacterial and antiviral drugs.	**Theoretical part:** Classification of chemotherapeutic agents. The history of discovery, the main groups of antibiotics, the spectrum of their action on microorganisms. Methods for determining the content of antibiotics in blood and urine, be able to evaluate the results of the study. **Practical part:** To evaluate the effectiveness of antibiotic therapy and determine the sensitivity of bacteria to antibiotics. Determine the MPC.	UK-4: ID - 4.2, ID 4.4; UK-8: ID 8.4.	Front-end survey Interactive survey, Practical skills development.	3,75

16	Immunobiological preparations. Vaccines. Serums. Final lesson	**Theoretical part:** Methods of obtaining immunobiological preparations: vaccines. The concept of a "cold chain". Serums, bacteriophages, diagnostic drugs. Methods of administration, application in medicine, advantages and disadvantages. **Practical part:** to evaluate the quality of immunobiological preparations based on their appearance, to select those necessary for the diagnosis, prevention and therapy of infectious diseases.	UK-4: ID - 4.2, ID 4.4; UK-8: ID 8.4.	Front-end survey Interactive survey, Practical skills development.	3,75
Total					**60**
5 th semester					
17	Pathogenic cocci: staphylococci, streptococci, meningococci, gonococci	**Theoretical part:** characterization of general and particular properties of pyogenic cocci. To master microbiological methods for the diagnosis of diseases caused by pathogens of gonorrhea, meningococcal, streptococcal, staphylococcal infections. To study the means of etiotropic treatment and specific prevention. **Practical part:** Select adequate materials and research methods, perform diagnostic tests to indicate purulent cocci. To evaluate the main laboratory tests.	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Situational problem solving, front-end survey, and online testing in the Moodle system.	2,47
18	A control lesson on pathogenic cocci. Enterobacteria. Pathogenic E. coli	**Theoretical part:** To summarize the study of the section "Pathogenic cocci" by completing individual assignments, test control or oral interview. To study the biological properties of pathogenic E. coli. To master laboratory methods of diagnosis, specific prevention and etiotropic therapy of escherichiosis.	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Testing Front-end survey Interactive survey, etc.	2,47

		Practical part: To identify bacteria of the genus Escherichia by their biochemical and antigenic properties. To study the means of specific prevention and etiotropic treatment of patients.			
19	Salmonella. Pathogens of typhoid fever, paratyphoid, salmonella gastroenteritis	**Theoretical part:** biological features of salmonella, rules for collecting material from a patient, etiopathogenesis and age-related features of the formation of the infectious process, principles of laboratory diagnosis, therapy and prevention of salmonellosis. **Practical part:** identification of bacteria of the genus Salmonella by morphological, biochemical and antigenic properties. Consider Vidal's reaction. To study the means of specific prevention, diagnosis and etiotropic therapy of salmonellosis. Solve situational problems.	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Solving situational problems Testing Front-end survey Interactive survey, etc.	2,47
20	Shigella. Pathogenic vibrios	**Theoretical part:** To study the basic properties of causative agents of dysentery and vibrionosis. To master the methods of microbiological examination in case of suspected bacterial dysentery and cholera. To study the features of taking material from a patient with suspected dysentery, cholera. To study specific means of prevention and therapy. **Practical part:** to identify bacteria of the genera Shigella and vibro by their biochemical and antigenic properties. To outline measures for the organization and implementation of specific prevention in the foci of dysentery and cholera.	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Solving situational problems Testing Front-end survey Interactive survey, etc.	2,47
21	Pathogens of pseudotuberculosis and	**Theoretical part:** The main properties of the causative agents of AKI and the diseases they cause. Methods of	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5:	Solving situational problems	2,47

	intestinal yersiniosis. Control session	laboratory diagnostics, means of specific prevention and therapy. **Practical part:** To determine the morphological, cultural and biochemical properties of bacterial AKI pathogens. Evaluate the results of the study.	ID 5.2, OPK-10: ID 10.2	Testing Front-end survey Interactive survey, etc.	
22	Pathogens of plague, tularemia, anthrax and brucellosis	**Theoretical part:** basic properties of quarantine infection pathogens, rules for collecting material and working with OOI pathogens, basic methods of microbiological research. **Practical part:** it is rational to choose the material for research, methods of rapid identification of bacteria, take into account the results of serological and microbiological studies, and evaluate them.	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Testing Front-end survey Interactive survey, etc.	2,47
23	Pathogenic and opportunistic anaerobes: spore-forming and non-spore-forming	**Theoretical part:** The main properties of pathogens of anaerobic infections, methods of microbiological diagnosis of anaerobic infections, their specific prevention and etiotropic therapy. Methods of administration of antitoxic sera. **Practical part:** To collect material for research, to carry out cultivation, to evaluate the results obtained, to rationally use the means of specific prevention and etiotropic therapy.	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Solving situational problems. Testing Front-end survey Interactive survey, etc.	2,47
24	Pathogenic and opportunistic Corynebacteria and bordetella	**Theoretical part:** to know the biological properties of the causative agents of diphtheria and whooping cough, the ways of penetration into the body, the features of the formation of the infectious process. rules for collecting material from the patient and methods of laboratory diagnostics. **The practical part:** is to decipher and evaluate the research results obtained, determine the toxicogenicity	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Solving situational problems. Testing Front-end survey Interactive survey, etc.	2,47

		of corynebacteria, and use means of specific prophylaxis, specific and etiotropic therapy**.**			
25	Pathogenic and conditionally pathogenic microbacteria A control lesson	**Theoretical part:** To study the biological features of tuberculosis and leprosy pathogens, to master laboratory diagnostic methods, as well as means of specific prevention and etiotropic therapy. **The practical part:** is to collect the material correctly and choose the methods for its study, color the Ciel-Nielsen brushstrokes, take into account and evaluate the results obtained.	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Solving situational problems. Testing Front-end survey Interactive survey, etc.	2,47
25	Pathogenic spirochaetes: treponemes, borrelia, leptospira	**Theoretical part:** to master the microbiological properties of pathogenic spirochetes, the features of laboratory diagnostics of diseases caused by them, their specific prevention and etiotropic treatment. **The practical part:** is to select the material for the study correctly, perform the "thick drop" smear preparation procedure. The main diagnostic reactions and give them a clinical assessment.	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Solving situational problems. Testing Front-end survey Interactive survey, etc.	2,47
26	Pathogens of rickettsiosis, ehrlichiosis, bartonella, coxiella. Pathogenic chlamydia and mycoplasmas.	**Theoretical part:** To form an idea of the morphological structure of pathogens, their biological properties (rickettsia, Ehrlichia, bartonella, coxiella) Pathogenic chlamydia and mycoplasmas. Methods of laboratory diagnostics of infections caused by them. **Practical part:** to evaluate the morphological structure of pathogens, their biological properties, collect material and send it to the laboratory for research, choose rational means of therapy and specific prevention	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Solving situational problems. Testing Front-end survey Interactive survey, etc.	2,47
27	Control session	**The theoretical part:** To summarize the module being studied.	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5:	Testing Front-end survey	2,47

		Practical part: to evaluate methods of microscopic and serological diagnostics of infections caused by pathogens of spirochaetosis and rickettsiosis, ehrlichiosis, bartonella, coxiella. Pathogenic chlamydia and mycoplasmas	ID 5.2, OPK-10: ID 10.2	Interactive survey, etc.	
28	Pathogens of acute respiratory viral infections	**Theoretical part:** The main properties of SARS and covid-19 pathogens, laboratory diagnostic methods, means of specific prevention and specific therapy. **Practical part:** choose methods for collecting material for research and rapid diagnosis of SARS pathogens. To evaluate accelerated diagnostic methods for pathogens of respiratory viral infections. To make a conclusion on the reactions of hemagglutination and inhibition of hemagglutination.	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Solving situational problems. Testing Front-end survey Interactive survey, etc.	2,47
29	Pathogens of viral intestinal infections (enteroviruses, rotaviruses, hepatitis A and E.	**Theoretical part:** Biological properties of viruses, pathogens of polio, Coxsackie, ECHO, rotaviruses, astroviruses, noroviruses, enteric hepatitis viruses A, E and methods of laboratory diagnostics, specific therapy and specific prevention. **Practical part:** to evaluate neutralization reactions, inhibition of hemagglutination, other immunological and virological tests, and make a conclusion. To study the means of specific prevention and etiotropic therapy of these diseases.	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Solving situational problems. Testing Front-end survey Interactive survey, etc.	2,47
30	Pathogens of parenteral hepatitis.	**Theoretical part:** To study the morphology and biological properties of pathogens of parenteral hepatitis, etiopathogenesis, features of immune reactions, modern methods of laboratory diagnosis confirmation, specific and antiviral therapies and specific prophylaxis.	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Solving situational problems. Testing Front-end survey Interactive survey, etc.	2,47

		Practical part: safely take clinical materials for laboratory testing, make a referral to the laboratory, objectively evaluate the results of laboratory analysis, and navigate the complex of specific prevention and treatment tools.			
31	Pathogens of slow viral infections. HIV.	**Theoretical part:** To form students' modern ideas about the biological properties of pathogens of slow infections: rabies viruses, measles, lentiviruses, prions (causative agents of Creutzfeldt-Jakob disease and Kuru); persistence and its mechanisms, pathogenesis of diseases and methods of pathogen detection. **Practical part:** safely take and transfer materials from a patient or corpse for laboratory examination; make a referral to the laboratory; evaluate the results of the study; implement individual and collective protection measures. To determine by immunological criteria of immunodeficiency, methods of detection of opportunistic microbes.	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Solving situational problems. Testing Front-end survey Interactive survey, etc.	2,47
32	Pathogens of arbovirus and arbovirus infections.	**Theoretical part:** The main properties of pathogens of arbovirus and arbovirus infections, methods of laboratory diagnostics, means of specific prevention and specific therapy. **The practical part:** To pick up the material for research. To choose the most optimal methods of laboratory diagnostics of infectious diseases. Make a conclusion on serological reactions and prescribe specific therapy and prophylaxis.	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Solving situational problems. Testing Front-end survey Interactive survey, etc.	2,47

33	Control session	**Theoretical part:** To consolidate students' theoretical knowledge about the basic properties of infectious disease agents and methods of laboratory diagnostics of diseases caused by them. **Practical part:** To choose the most optimal methods of laboratory diagnostics of infectious diseases. Make a conclusion on serological reactions and **prescribe specific therapy and prophylaxis.**	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Solving situational problems. Testing Front-end survey Interactive survey, etc.	2,47
34	Final lesson	**The intermediate certification includes:** - assessment of knowledge of theoretical material; - testing in the Moodle system; - checking the assimilation of practical skills and abilities; - solving situational tasks and exercises.	OPK-2: ID 2.7. OPK -4: ID 4.1, OPK-5: ID 5.2, OPK-10: ID 10.2	Testing Interactive survey, etc.	2,47
Total for 5 semesters:					**42**
Total:					**102**

2.4. INTERACTIVE FORMS OF LEARNING

Interactive teaching methods (interactive survey, small group work, computer test control, etc.), participation in educational research and scientific research are widely used in practical classes to enhance students' cognitive activity.

Interactive forms of classes

No. p/p	The topic of the practical lesson, lectures	Labor intensity in hours	Interactive form of education	Labor intensity in hours, in % of class
4th semester				
1	Microbiology, virology as a science. The main forms of bacteria. Simple coloring techniques.	3,75	Interactive survey	15 minutes (0.25 hours) / 11.1%
2	The structure of a bacterial cell. Sophisticated coloring techniques.	3,75	Computer simulations.	15 minutes (0.25 hours) / 11.1%
3	Morphology of fungi, actinomycetes, rickettsias, spirochaetes, chlamydia, and mycoplasmas. Methods of detection	3,75	Mutual censorship.	15 minutes (0.25 hours) / 11.1%
4	Control session	3,75	Interactive survey	15 minutes (0.25 hours) / 11.1%
5	Cultivation of bacteria. Nutrition, breathing. Isolation of pure bacterial culture (1 day)	3,75	The small group method	15 minutes (0.25 hours) / 11.1%
6	Growth and reproduction of microorganisms. Isolation of pure bacterial culture (2 days). Cultural properties of bacteria	3,75	Simulation tasks	15 minutes (0.25 hours) / 11.1%
7	Isolation of pure bacterial culture (day 3). Biochemical properties of bacteria and methods of their identification	3,75	Situational tasks	15 minutes (0.25 hours) / 11.1%
8	Control session	3,75	Interactive survey	15 minutes (0.25 hours) / 11.1%

9	Fundamentals of virology. Morphology of viruses and bacteriophages. Methods of detection	3,75	Discussion	15 minutes (0.25 hours) / 11.1%
10	Virus cultivation. Cell cultures. Ways to identify viruses	3,75	Interactive survey	15 minutes (0.25 hours) / 11.1%
11	The doctrine of the infectious process. Pathogenic and virulent properties of microorganisms A control lesson	3,75	Simulation tasks	15 minutes (0.25 hours) / 11.1%
12	The influence of physical and chemical factors on bacteria. The microflora of the environment. Sterilization. Disinfection	3,75	Discussion	15 minutes (0.25 hours) / 11.1%
13	The microflora of the human body (child) in age and gender aspects	3,75	Interactive survey	15 minutes (0.25 hours) / 11.1%
14	Genetics of microorganisms	3,75	Computer presentations	15 minutes (0.25 hours) / 11.1%
15	Chemotherapeutic drugs. Antibiotics. Antiviral drugs	3,75	Interactive survey	15 minutes (0.25 hours) / 11.1%
16	Immunobiological preparations. Vaccines. Serums.	3,75	Computer presentations	15 minutes (0.25 hours) / 11.1%
17	Control session	3,75	Interactive survey	15 minutes (0.25 hours) / 11.1%
5th semester				
18	Pathogenic cocci: staphylococci, streptococci, meningococci,	2,47	Interactive survey	15 minutes (0.25 hours) / 11.1%
19	A control lesson on pathogenic cocci. Enterobacteria. Pathogenic E. coli	2,47	Mutual review of notes	15 minutes (0.25 hours) / 11.1%

20	Salmonella. Pathogens of typhoid fever, paratyphoid, salmonella gastroenteritis.	2,47	Computer simulations.	15 minutes (0.25 hours) / 11.1%
21	Shigella. Pathogenic vibrios.	2,47	Simulation tasks	15 minutes (0.25 hours) / 11.1%
22	Pathogens of pseudotuberculosis and intestinal yersiniosis. Control session.	2,47	Situational tasks	15 minutes (0.25 hours) / 11.1%
23	Pathogens of plague, tularemia, anthrax and brucellosis.	2,47	Interactive	15 minutes (0.25 hours) / 11.1%
24	Pathogenic and conditionally pathogenic anaerobes: spore-forming and non-spore-forming.	2,47	Situational tasks	15 minutes (0.25 hours) / 11.1%
25	Pathogenic and conditionally pathogenic corynebacteria and bordetella.	2,47	Interactive survey	15 minutes (0.25 hours) / 11.1%
26	Pathogenic and conditionally pathogenic mycobacteria. A control lesson	2,47	Computer presentations	15 minutes (0.25 hours) / 11.1%
27	Pathogenic spirochaetes: treponema, borrelia, leptospira.	2,47	Situational tasks	15 minutes (0.25 hours) / 11.1%
28	Pathogens of rickettsiosis, chlamydia and mycoplasma. Control session.	2,47	Computer presentations	15 minutes (0.25 hours) / 11.1%
29	Pathogens of acute respiratory viral infections.	2,47	Interactive survey. Simulation tasks.	15 minutes (0.25 hours) / 11.1%
30	Pathogens of viral intestinal infections (enteroviruses, rotaviruses, hepatitis A and E.	2,47	Situational tasks	15 minutes (0.25 hours) / 11.1%
31	Pathogens of parenteral hepatitis.	2,47	Interactive survey	15 minutes (0.25 hours) / 11.1%
32	Pathogens of slow viral infections. HIV.	2,47	Computer presentations	15 minutes (0.25 hours) / 11.1%

33	Control session	2,47	Interactive survey	15 minutes (0.25 hours) / 11.1%
34	Final lesson	2,47	Online testing	100 min.

2.5. Criteria for assessment of students' knowledge

The assessment of acquired knowledge is carried out in accordance with the Regulations on the system for assessing the educational results of students of the Federal State Budgetary Educational Institution of Higher Education Amur State Medical Academy of the Ministry of Health of the Russian Federation.

The basis for determining the level of knowledge, skills, and abilities are the assessment criteria - completeness and correctness:

- correct, precise answer;
- correct but incomplete or imprecise answer
- incorrect answer; no answer.

When assigning marks, the classification of errors and their quality are taken into account:

- gross errors;
- similar errors;
- minor errors; shortcomings.

The success of students in mastering the topics of the discipline «Physics, Mathematics» is determined by the quality of mastering knowledge, skills and practical abilities; the assessment is given on a five-point scale: "5" - excellent, "4" - good, "3" - satisfactory, "2" - unsatisfactory.

Evaluation criteria

Quality of development	Mark on a 5-point scale
90 - 100%	**"5"**
80 - 89%	**"4"**
70 - 79%	**"3"**
less than 70%	**"2"**

Entrance control

Conducted at the first lesson, includes: solving problems and exercises; testing in the Moodle sys-tem

Access mode for 4 semesters: https://educ-amursma.ru/enrol/index.php?id=271

Access mode for 5th semester: https://educ-amursma.ru/enrol/index.php?id=79

Test control includes questions on the physics course studied in secondary (complete) general education institutions.

Current control

Current control includes initial and final control of knowledge.

Initial control **is** carried out by the teacher at the beginning of each class in the form of a frontal interview, solving problems and exercises.

Final control – includes control over the technique of performing the experiment and fulfillment of the protocol, written test by the variants, testing in the Moodle system .

Access mode for 4 semesters: https://educ-amursma.ru/enrol/index.php?id=271

Access mode for 5th semester: https://educ-amursma.ru/enrol/index.php?id=79

The final grade during the current knowledge assessment is given on the day of the practical class, as the arithmetic mean result for all types of activities provided for in the given class of the discipline's educational program.

Criteria for assessing the oral answer

- **«5» (excellent)** – the student demonstrates deep and complete knowledge of the educational material, does not allow inaccuracies or distortions of facts when presenting, delivers the material in a logical sequence, is well oriented in the presented material, and can provide justification for the judgments expressed.
- **«4» (good)** - the student has mastered the educational material in full, is well oriented in the educational material, presents the material in a logical sequence, but makes inaccuracies when answering.
- **«3» (satisfactory)** – the student has mastered the basic principles of the topic of the practical lesson, but when presenting the educational material, he/she makes inaccuracies, presents it incompletely and inconsistently, requires leading questions from the teacher to present it, and has difficulty substantiating the judgments expressed.
- **«2» (unsatisfactory)** – the student has fragmented and unsystematic knowledge of the educational material, is unable to distinguish between the main and the secondary, makes mistakes in defining basic concepts, distorts their meaning, and cannot independently present the material.

Assessment criteria for the practical part

- **«5» (excellent)** – the student has fully mastered the practical skills and abilities provided for by the course educational program.
- **«4» (good)** – the student has fully mastered the practical skills and abilities provided for the course program, but makes some inaccuracies.
- **«3» (satisfactory)** – the student has only some practical skills and abilities.
- **«2» (unsatisfactory)** – the student demonstrates the performance of practical skills and abilities with gross errors.

Distribution of marks in practical classes, 4-5 semesters

No. p/p	The topic of the practical lesson	The theoretical part	The practical part	Overall assessment
1	Microbiology, virology as a science. The main forms of bacteria. Simple coloring techniques.	2-5	2-5	2-5

2	The structure of a bacterial cell. Sophisticated coloring techniques.	2-5	2-5	2-5
3	Morphology of fungi, actinomycetes, rickettsias, spirochaetes, chlamydia, and mycoplasmas. Methods of detection.	2-5	2-5	2-5
4	Control session	2-5	2-5	2-5
5	Cultivation of bacteria. Nutrition, breathing. Isolation of pure bacterial culture (1 day).	2-5	2-5	2-5
6	Growth and reproduction of microorganisms. Isolation of pure bacterial culture (2 days). Cultural properties of bacteria.	2-5	2-5	2-5
7	Isolation of pure bacterial culture (day 3). Biochemical properties of bacteria and methods of their identification.	2-5	2-5	2-5
8	Control session.	2-5	2-5	2-5
9	Fundamentals of virology. Morphology of viruses and bacteriophages. Methods of detection.	2-5	2-5	2-5
10	Virus cultivation. Cell cultures. Ways to identify viruses.	2-5	2-5	2-5
11	The doctrine of the infectious process. Pathogenic and virulent properties of microorganisms. Control session.	2-5	2-5	2-5
12	The influence of physical and chemical factors on bacteria. The microflora of the environment. Sterilization. Disinfection.	2-5	2-5	2-5
13	The microflora of the human body (child) in age and gender aspects.	2-5	2-5	2-5
14	Genetics of microorganisms.	2-5	2-5	2-5
15	Chemotherapeutic drugs. Antibiotics. Antiviral drugs.	2-5	2-5	2-5
16	Immunobiological preparations. Vaccines. Serums.	2-5	2-5	2-5
17	Control session.	2-5	2-5	2-5
18	Pathogenic cocci: staphylococci, streptococci, meningococci, gonococci.	2-5	2-5	2-5

19	A control lesson on pathogenic cocci. Enterobacteria. Pathogenic E. coli.	2-5	2-5	2-5
20	Salmonella. Pathogens of typhoid fever, paratyphoid, salmonella gastroenteritis.	2-5	2-5	2-5
21	Shigella. Pathogenic vibrios.	2-5	2-5	2-5
22	Pathogens of pseudotuberculosis and intestinal yersiniosis. A test session.	2-5	2-5	2-5
23	Pathogens of plague, tularemia, anthrax and brucellosis.	2-5	2-5	2-5
24	Pathogenic and conditionally pathogenic anaerobes: spore-forming and non-spore-forming.	2-5	2-5	2-5
25	Pathogenic and conditionally pathogenic corynebacteria and bordetella.	2-5	2-5	2-5
26	Pathogenic and conditionally pathogenic mycobacteria A control lesson.	2-5	2-5	2-5
27	Pathogenic spirochaetes: treponemes, borrelia, leptospira.	2-5	2-5	2-5
28	Pathogens of rickettsiosis, chlamydia and mycoplasma. A test session.	2-5	2-5	2-5
29	Pathogens of acute respiratory viral infections.	2-5	2-5	2-5
30	Pathogens of viral intestinal infections (enteroviruses, rotaviruses, hepatitis A and E).	2-5	2-5	2-5
31	Pathogens of parenteral hepatitis.	2-5	2-5	2-5
32	Pathogens of slow viral infections. HIV, rabies.	2-5	2-5	2-5
33	Arboviruses. Rhabdoviruses. A test session.	2-5	2-5	2-5
34	Final lesson	2-5	2-5	2-5

Working off discipline debts.

1. If a student has missed a lesson for a valid reason, he has the right to work it out and get the maximum mark provided by the discipline's work program for this lesson. A valid reason must be documented.

2. If a student has missed a lesson for a disrespectful reason or receives a mark of "2" for all types of activities in the classroom, then he is obliged to work it out. At the same time, 0.8 multiplies the mark received for all types of activities.

3. If a student is excused from classes on the recommendation of the dean's office (participation in sports, cultural events and other events), then a mark "5" is given to him for this lesson, provided that a report is provided on the completion of mandatory extracurricular independent work on the topic of the missed lesson.

Evaluation criteria (the actual text of the report, the abstract and the defense):

- information sufficiency;
- compliance of the material with the topic and plan;
- the presence of a logical structure for constructing the text (introduction with a statement of the problem; the main part, divided by main ideas; conclusion with conclusions obtained as a result of reasoning);
- style and language of presentation (appropriate use of terminology, explanation of new concepts, conciseness, logic, correctness of application and design of quotations, use of professional terms, quotations, stylistic construction of phrases, etc.);
- adequacy and number of sources used
- ownership of the material;
- the presence of a pronounced own position;
- adequacy of arguments in substantiating a personal position;
- aesthetic design of the work (neatness, text formatting, highlighting, etc.).

Criteria for final assessment (intermediate assessment) in the exam

"Excellent" - for the depth and completeness of mastering the content of the educational material, in which the student is easily guided, for the ability to combine theoretical questions with practical ones, express and justify their judgments, competently and logically state the answer. The practical skills provided by the discipline's work program have been fully mastered.

"Good" - the student has fully mastered the educational material, is guided by it, competently states the answer, but the content and form have some inaccuracies. The fully practical skills and abilities provided for in the discipline's work program, however, allow for some inaccuracies

"Satisfactorily" - the student has mastered the knowledge and understanding of the main provisions of the educational material, but presents it incompletely, inconsistently, does not know how to express and justify his judgments. He has only some practical skills and abilities.

"Unsatisfactory" - the student has a disjointed and haphazard knowledge of the educational material, does not know how to distinguish the main and secondary, makes mistakes in defining concepts, distorts their meaning, randomly and does not confidently present the material. Performs practical skills and abilities with gross errors.

A student can apply for an excellent grade automatically if he has won a prize in disciplinary or interdisciplinary Olympiads at university or regional levels and has an average score of at least 4.5 points based on current academic performance.

The intermediate certification is conducted through a 3-stage assessment system:

1. Testing in the "Moodle" system:

Access mode for 4 semesters: https://educ-amursma.ru/enrol/index.php?id=271

Access mode for 5th semester: https://educ-amursma.ru/enrol/index.php?id=79

2. Full implementation of the practical part of the discipline: provides for attendance at all practical classes, performing experiments with protocol design. Based on the assessments of the current control of knowledge, skills, and practical exercises, the average score of current academic performance is calculated, which is recorded in the educational (electronic) journal. The average score of the current knowledge control is taken into account during the intermediate assessment.

3. Transfer of practical skills (control of the level of competence formation).

Assessment criteria for the intermediate assessment (5th semester)

Stages	A mark on a 5-point scale	The point system
Test control in the "Moodle" system	3-5	**5 – "excellent"** **4 – "good"** **3 –"satisfactory"**
Full implementation of the practical part of the discipline	3-5	
Transfer of practical skills (control of competence formation)	3-5	
Test control in the "Moodle" system	2	**2- "unsatisfactory"**
Full implementation of the practical part of the discipline	2	
Transfer of practical skills (control of competence formation)	2	

2.6 Independent work of students: classroom and extracurricular work.

The organization of students' classroom independent work is carried out with the help of methodological guidelines for students, which contain educational goals, a list of basic theoretical questions to study, a list of practical works and methods for conducting them, instructions on the design of the results obtained, their discussion and conclusions, tasks for self-control with response standards, a list of recommended literature.

From 1/4 to 1/2 of the practical lesson time is allocated for students' independent work: conducting research, recording results, discussing them, formulating conclusions, and completing individual assignments. The preparatory stage, or the formation of an indicative basis for action, begins with students during extracurricular time in preparation for a practical lesson, and ends in class.

All subsequent steps are carried out in the classroom. The stage of materialized actions (solving problems using an algorithm or without an algorithm, with an unknown answer in advance) is carried out independently. If necessary, the teacher conducts consultations, provides assistance, and at the same

time monitors the quality of students' knowledge and their ability to apply existing knowledge to solve assigned tasks.

No. p/p	Topic of practical class	Time for student to prepare for the class	Forms of extracurricular independent work	
			Mandatory and uniform for all students	A student's choice
1	Microbiology, virology as a science. The main forms of bacteria. Simple coloring techniques.	2 hours	Preparation on theoretical issues (reading lectures, basic and additional literature, methodological recommendations, abstracting, making notes, diagrams, algorithms, etc.), solving a test assignment (in writing), making a workbook.	Computer presentation, tablet preparation, tables
2	The structure of a bacterial cell. Sophisticated coloring techniques.	3 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations, abstracting, Preparing a report, solving situational Problems.	Production of micrographs, review literature, magazines, and newspapers on the topic.
3	Morphology of fungi, actinomycetes, rickettsias, spirochaetes, chlamydia, and mycoplasmas. Methods of detection.	3 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations, abstracting. Preparation of a report, an abstract.	Preparation for diagnostic procedures.
4	Control session	2 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations, study of test tasks.	Computer presentation
5	Cultivation of bacteria. Nutrition, breathing. Isolation of pure bacterial culture (1 day).	3 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations, abstracting, Preparation of a report, an abstract.	Computer presentation. Production of the table.
6	Growth and reproduction of microorganisms. Isolation of pure bacterial culture (2 days). Cultural properties of bacteria.	2 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations)	Computer presentation. Production of the table.

7	Isolation of pure bacterial culture (day 3). Biochemical properties of bacteria and methods of their identification.	3 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations, preparation of a report, an abstract).	Computer presentation. Solving situational problems.
8	Control session	3 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations, study of test tasks).	Computer presentation.
9	Fundamentals of virology. Morphology of viruses and bacteriophages.	3 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations, abstracting. Preparation of the report, Solving situational Problems.	Making a table.
10	Virus cultivation. Cell cultures. Ways to identify viruses.	3 hours	Theoretical training (reading lectures, basic and additional literature, methodological recommendations). Preparation of a report, an abstract.	Computer presentation. Solving situational problems.
11	Pathogenic and virulent properties of microorganisms. Monitoring activity.	3 hours	Theoretical training (reading lectures, basic and additional literature, methodological recommendations, Preparation of a report, an abstract.	Computer presentation. Production of the table. Solving situational problems
12	The influence of physical and chemical factors on bacteria. The microflora of the environment. Sterilization. Disinfection	3 hours	Theoretical training (reading lectures, basic and additional literature, methodological recommendations, Preparation of a report, an abstract.	Computer presentation. Production of the table.
13	The microflora of the human body in age and gender aspects	3 hours	Theoretical training (reading lectures, basic and additional literature, methodological	Production of the table.

			recommendations, Preparation of a report, an abstract.	
14	Genetics of microorganisms	3 hours	Theoretical training (reading lectures, basic and additional literature, methodological recommendations, Preparation of a report, an abstract.	Computer presentation. Production of the table.
15	Chemotherapeutic drugs. Antibiotics. Antiviral drugs.	3 hours	Theoretical training (reading lectures, basic and additional literature, methodological recommendations, Preparation of a report, an abstract.	Computer presentation. Solving situational problems.
16	Immunobiological preparations. Vaccines. Serums.	3 hours	Theoretical training (reading lectures, basic and additional literature, methodological recommendations, Preparation of a report, an abstract.	Computer presentation. Solving situational problems.
17	Final lesson	3 hours	Reading basic and additional literature, methodological recommendations.	Solving situational problems.
Labor intensity in hours		**48 hours**	**32**	**16**
5th semester				
18	Pathogenic cocci: staphylococci, streptococci, meningococci, gonococci.	1 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations). Preparation of a report, an abstract.	Computer presentation. Production of the table.
19	A control lesson on pathogenic cocci. Enterobacteria. Pathogenic E. coli.	2 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations). Preparation of a report, an abstract.	Computer presentation. Production of the table.

20	Salmonella. Pathogens of typhoid fever, paratyphoid, salmonella gastroenteritis.	1 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations). Preparation of a report, an abstract.	Computer presentation. Production of the table.
21	Shigella. Pathogenic vibrios.	1 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations). Preparation of a report, an abstract.	Computer presentation. Production of the table.
22	Pathogens of pseudotuberculosis and intestinal yersiniosis. Control session.	2 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations). Preparation of a report, an abstract.	Computer presentation. Production of the table.
23	Pathogens of plague, tularemia, anthrax and brucellosis.	1 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations). Preparation of a report, an abstract.	Computer presentation. Production of the table.
24	Pathogenic and conditionally pathogenic anaerobes: spore-forming and non-spore-forming.	1 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations). Preparation of a report, an abstract.	Computer presentation. Production of the table.
25	Pathogenic and conditionally pathogenic Corynebacteria and bordetella.	1 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations). Preparation of a report, an abstract.	Computer presentation. Production of the table.
26	Pathogenic and conditionally pathogenic mycobacteria. A control lesson.	1 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations). Preparation of a report, an abstract.	Computer presentation. Solving situational problems.

27	Pathogenic spirochaetes: treponema, borrelia, leptospira.	1 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations). Preparation of a report, an abstract.	Computer presentation. Production of the table.
28	Pathogens of rickettsiosis, chlamydia and mycoplasma. Control lesson.	2 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations, preparation of a report, an abstract).	Computer presentation. Production of the table.
29	Pathogens of acute respiratory viral infections.	1 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations, Preparation of a report, an abstract.	Computer presentation. Production of the table.
30	Causative agents of viral intestinal infections (enteroviruses, rotaviruses, hepatitis A and E).	1 hours	Preparation of lectures on theoretical issues, basic (reading and additional literature, methodological recommendations, preparation of a report, an abstract).	Computer presentation. Production of the table.
31	Pathogens of parenteral hepatitis.	2 hours	Preparation no theoretical issues (reading lectures, basic and additional literature, methodological recommendations. Preparation of a report, essay.	Computer presentation. Solving situational problems.
32	Pathogens of slow viral infections. HIV.	2 hours	Theoretical training (lectures, basic and additional literature, methodological recommendations, preparation of the abstract. Report, abstract.	Computer presentation. Production of the table.
33	Control session.	2 hours	Preparation of theoretical lecture questions, (lectures, main additional literature, methodological recommendations, preparation of a report, abstract.	Computer presentation. Solving situational problems.

34				
Labor intensity in hours		**24**	**16**	**8**
Total labor intensity in hours			**72**	

2.7 Scientific research (project) work

The research (project) work of students is a mandatory section of the study of the discipline and is aimed at the comprehensive formation of universal and general professional competencies of students. Research (project) work involves the study of specialized literature and other scientific and technical information on the achievements of domestic and foreign science and technology in the relevant field of knowledge, participation in scientific research, etc. The topic is determined by the students themselves or in consultation with the teacher.

List of recommended research (project) topics:

1. Bacterial and viral drugs for the prevention, treatment and diagnosis of infectious diseases
2. Mechanisms of formation of new varieties of pathogens of hospital and epidemic diseases.
3. The effect of viruses on the immune system
4. Covid-19 virus
5. The genetic variability of viruses
6. Problems of modern biotechnology
7. Modern chemotherapeutic drugs
8. Mechanisms of acquired antibiotic resistance
9. Actinomycetes as producers of antibiotics
10. Modern disinfection products
11. Microflora of medical institutions
12. Functional nutrition
13. Diagnosis of chlamydia-bacterial infections.
14. Modern methods of identification of fungi of the genus Candida and determination of their pathogenicity
15. Biological characteristics of Pseudomonas aeruginosa resistant to chloramine.
16. Laboratory diagnostics and epidemiology of campylobacteriosis.
17. Protocols for the diagnosis, treatment and prevention of intrauterine infections
18. Pathogens of Lyme disease.
19. Sepsis in modern medicine
20. Mycotic infections: diagnosis, treatment
21. Pneumocystis pneumonia: a clinical and diagnostic algorithm
22. Laboratory diagnosis of HIV infection in infants

23. Etiological structure of acute purulent meningitis and methods of their microbiological diagnosis
24. The state and prospects of laboratory diagnosis of streptococcal infection
25. Formation of intestinal microflora in children of the first year of life
26. Modern technologies in clinical microbiology and chemotherapy
27. Antiviral drugs for the prevention and treatment of infectious diseases
28. Features of laboratory diagnosis of HIV infection
29. Modern methods of laboratory diagnosis of diphtheria 30. The causative agents of Ebola fever
31. Zika viruses.

The criterion for evaluating the research (project) work of students:

- the material on the research results in the report is presented in detail, the special literature is well developed, scientific and technical information on the achievements of domestic and foreign science and technology in the relevant field of knowledge is studied - "credited".

- the material on the research results in the report is not presented correctly enough, the specialized literature is poorly developed, scientific and technical information on the achievements of domestic and foreign science and technology in the relevant field of knowledge is studied - "not counted".

3. EDUCATIONAL, METHODOLOGICAL, LOGISTICAL AND INFORMATIONAL SUPPORT OF THE DISCIPLINE

3.1. Main literature:

1. Zverev, V. V. Medical microbiology, virology and immunology: Vol. 1: textbook / ed. Zvereva V. V., Boychenko M. N. - Moscow: GEOTAR-Media, 2020. - 448 p. - ISBN 978-5-9704-5835-8. - Text: electronic (accessed: 05/04/2021). Access mode: (http://www.studmedlib.ru/ru/book/ISBN9785970436417.html)

2. Zverev V. V. Medical microbiology, virology and immunology: Vol. 2: textbook / ed. Zvereva V. V. , Boychenko M. N. - Moscow : GEOTAR-Media, 2021. - 472 p. - ISBN 978-5-9704-5836-5. - Text: electronic (accessed: 05/04/2021). Access mode: (http://www.studmedlib.ru/ru/book/ISBN9785970436424.html)

3.2 Additional literature:

1. Sboychakov, V. B. Microbiology, virology and immunology: a guide to laboratory classes: studies. the manual / [V. B. Sboychakov et al.]; edited by V. B. Sboychakov, M. M. Karapats. - Moscow: GEOTAR-Media, 2018. 320 p.: ill. 320 p. - ISBN 978-5-9704-4858-8. -

Text : electronic // URL Access mode: http://www.studmedlib.ru/book/ISBN9785970448588.html

2. Zverev, V. V. Microbiology, virology : a guide to practical exercises : textbook. manual / Zverev V. V. [et al.]; edited by V. V. Zverev, M. N. Boychenko - Moscow : GEOTARMedia, 2017.

360 p. - ISBN 978-5-9704-4006-3. - Text: electronic (date of access: 05.05.2021). - Access mode http://www.studmedlib.ru/book/ISBN9785970440063.html

3.3 Educational and methodological support of the discipline, prepared by the staff of the department:

Training Manuals (UMS):

1. Textbook "Disinfection in therapeutic and preventive medical organizations"; DV medicine. - Vladivostok. - 2014 - 162 p. - V.B. Turkutyukov, G.I. Chubenko -
Approved by the Ministry of Medical and Pharmaceutical Education of Russian Universities in 2014.

Electronic and digital technologies:

1. **Online course on the discipline** "Microbiology. Virology." in the EIOS of the Amur State Medical Academy

Access mode for 4 semesters: https://educ-amursma.ru/enrol/index.php?id=271

Access mode for 5th semester: https://educ-amursma.ru/enrol/index.php?id=79

Characteristics of the modules in the electronic information and educational course

Educational	Controlling
Theoretical (lecture) material, video experiments, scientific, educational and educational films	Methodological recommendations for students on extracurricular independent work.
Methodological recommendations for students for practical classes. Methodological recommendations for solving problems and exercises on discipline topics.	The list of recommended topics of the abstract papers and the regulations for the design of the abstract.
Reference material, tables of standard values.	Tests of the entrance, current and final knowledge controls.

2. **Multimedia presentations (Microsoft PowerPoint 2016), for lecture-type classes, according to the thematic lecture plan:**

Access mode for 4 semesters: https://educ-amursma.ru/enrol/index.php?id=271

Access mode for 5th semester: https://educ-amursma.ru/enrol/index.php?id=79

3. **Video materials:** − Ready-made smears of microorganisms, including pathogens of cholera, diphtheria, tuberculosis, etc.

− Ready-to-sow microbial cultures on various nutrient media

− Sets of immunobiological preparations (vaccines, serums, allergens, diagnostic systems, etc.)

− Situational tasks

− Demonstration serological reactions (RA, RP, RPGA, RGA, RSK, RTGA, ELISA, PH, etc.)

− Desiccators
− Anaerostat , etc .

3.4. Equipment used for the educational process List of equipment used in teaching students

No. p/p	Name of special premises	Provision of special rooms and facilities for independent work	Quantity
1	A classroom for conducting lecture-type classes Lecture hall No. 6, Blagoveshchensk, Gorky St., 103 letter A, 1st floor	Rooms equipped with specialized furniture, multimedia equipment (screen, projector, and laptop), and sound amplifying equipment.	1
2	Classroom for practical classes, group and individual consultations, ongoing monitoring and intermediate certification (No. 12) Blagoveshchensk, Gorky St., 103 letter A, 1st floor	Specialized furniture (laboratory tables – 10 pcs., chairs – 16 pcs., educational board – 1 pc., cabinets -2, microscopes- 6, microbial cultures, table lamps for microscopy, devices for disinfection of wastewater-1 set of teaching materials, visual aids on the morphology of microorganisms)	1
3	Classroom for practical classes, group and individual consultations, ongoing monitoring and intermediate certification (No. 14) Blagoveshchensk, Gorky St., 103 letter A, 1st floor	Specialized furniture (laboratory tables – 9 pcs., chairs – 16 pcs., educational board – 1 pc., cabinets -2, microscopes-6 microbial cultures) Table lamps for microscopy, devices for disinfection of wastewater. (A set of educational and methodological materials, visual aids on the genetics of microorganisms).	1
4	Classroom for practical classes, group and individual consultations, ongoing monitoring and intermediate certification (No. 15) Blagoveshchensk, Gorky St., 103 letter A, 1st floor	Specialized furniture (tables – 11 pcs., stools – 18 pcs., blackboard – 1 pc. cabinets- 2 microscopes-6, microscopy table lamps, microbial cultures, laptop, multimedia projector, screen, devices for wastewater disinfection-1.) A set of educational and methodological materials, visual aids for laboratory diagnostics of infections.	1

5	Classroom for practical classes, group and individual consultations, ongoing monitoring and intermediate certification (No. 43) Blagoveshchensk, Gorky St., 103 letter A, 1st floor	Specialized furniture (tables – 11 pcs., chairs – 16 pcs., stools – 2 pcs., blackboard – 1 pc. cabinets - 2, microscopes-6 microbial cultures, microscopy table lamps, wastewater disinfection device-1, stands-2).	1
6	Bacteriological Laboratory of the Department of Microbiology and Virology (No. 17-31) Blagoveshchensk, Gorky St., 103 letter A, 1st floor	Specialized furniture, bactericidal irradiators-4 pcs., dry-air sterilizer-1 pc., Aqua distiller- 1 pc.; refrigerators-3 pcs., electric stove- 1 pc., scales with balances; sewage disinfection device-2 pcs., autoclaves-2 pcs., laminar flow boxes-2 pcs., UNIPLAN reader- 1 pc., PROPLAN mixer- 1 pc., incubator shaker- 1 pc., Eppendorf centrifuge-1 pc.	1
7	Facilities for storage, equipment and maintenance of the educational process	Tables, stands, tablets, fixed micro-preparations, tripods with test tubes, pipettes, various vials with reagents and dyes, chemical glasses, sets of dry nutrient media).	4
8	Computer room.	Specialized furniture, computers for entrance and current controls - 3 pcs.	1
9	Educational and methodical office.	Training manuals Educational and methodical materials, sets of test tasks, sets of situational tasks	1

3.5. Professional databases, information and reference systems, electronic educational resources.

Name of the resource	**Resource description**	**Access**	**Resource address**
Electronic library systems			
"Student's Consultant" Electronic Library of Medical University.	For students and teachers of medical and pharmaceutical universities. Provides access to electronic versions of textbooks, teaching aids, and periodicals.	library, individual access	http: //www.studmedlib.ru/
"Doctor's consultant" Electronic medical library.	The materials posted in the library were developed by leading Russian specialists based on modern scientific knowledge (evidence-based medicine). The information has been prepared taking into account the position of the scientific and practical	library, individual access	http://www.rosmedlib.ru /cgi-bin/mb4x

	medical society (world, European and Russian) in the relevant specialty. All materials have undergone mandatory independent review.		
PubMed	A free search engine in the largest medical bibliographic database MedLine. Documents medical and biological articles from the specialized literature, as well as provides links to full-text articles.	library, free access	http://www.ncbi.nlm.nigov/pubmed/
Oxford Medicine Online.	The Oxford Publishing House's collection of publications on medical subjects, combining over 350 publications into a common resource with the possibility of cross-search. Publications include The Oxford Handbook of Clinical Medicine and The Oxford Textbook of Medical Medicine, the electronic versions of which are constantly updated.	library, free access	http://www.oxfordmedicine.com
Knowledge base on human biology	Background information on physiology, cell biology, genetics, biochemistry, immunology, and pathology. (Resource of the Institute of Molecular Genetics of the Russian Academy of Sciences.)	library, free access	http://humbio.ru/
Online Medical Library	Free reference books, encyclopedias, books, monographs, abstracts, English-language literature, tests.	library, free access	http://med-lib.ru/
Information systems			
Russian Medical Association	Professional Internet resource. Purpose: to promote the effective professional activities of medical staff. It contains the charter, personnel, structure, rules of entry, and information about the Russian Medical Union.	library, free access	http://www.rmass.ru/
Web medicine	The site is a catalog of professional medical resources, including links to the most reputable thematic sites, journals, societies, as well as useful documents and programs. The website is intended for doctors, students, staff	library, free access	http: //webmed.irkutsk.ru/

	of medical universities and scientific institutions.		
Databases			
World Health Organization	The website contains news, statistical data on countries belonging to the World Health Organization, newsletters, reports, WHO publications and much more.	library, free access	http://www.who.int/ru/
Ministry of Science and Higher Education of the Russian Federation	The website of the Ministry of Science and Higher Education of the Russian Federation contains news, newsletters, reports, publications and much more.	library, free access	http://www.minobrnauki.gov.ru
Ministry of Education of the Russian Federation.	The website of the Ministry of Education of the Russian Federation contains news, information bulletins, reports, publications, and much more.	library, free access	https://edu.gov.ru/
Federal portal "Russian Education"	A single window of access to educational resources. This portal provides access to textbooks on all branches of medicine and healthcare.	library, free access	http: //www .edu.ru/ http://window.edu.ru/catalog/?p rubr=2.2.81.1
Bibliographic databases			
B D "Russian medicine"	It has been created in the CNMB and covers the entire fund since 1988. The database contains bibliographic descriptions of articles from domestic journals and collections, dissertations and their abstracts, as well as domestic and foreign books, collections of proceedings of institutes, conference materials, etc. Thematically, the database covers all areas of medicine and related fields of biology, biophysics, biochemistry, psychology, etc.	library, free access	http://www.scsml.rssi.ru/
eLIBRARY.RU	The Russian information portal in the field of science, technology, medicine and education, containing abstracts and full texts of more than 13 million scientific articles and publications. On the eLibrary platform.Electronic versions of more than 2,000 Russian scientific and technical journals are	library, free access	http://elibrary.ru/defaultx.asp

	available, including more than 1,000 open access journals.		
Portal Electronic library of dissertations	Currently, the Electronic Library of Dissertations of the Russian State Library of Economics contains more than 919,000 complete texts of dissertations and abstracts.	library, free access	http://diss.rsl.ru/?menu=disscatalog/
Medline.ru	A medical and biological portal for specialists. Biomedical Journal. Last updated on February 7, 2021	library, free access	http://www.medline.ru

3.6. Licensed and freely distributed software used in the educational process.

I. I. Commercial software products		
1.	The operating system MS Windows 7 Pro	License number 48381779
2.	The operating system MS Windows 10 Pro, MS Office	Contract №142 A от 25.12.2019
3.	MS Office	License number: 43234783, 67810502, 67580703, 64399692, 62795141, 61350919
4.	Kaspersky Endpoint Security for Business Advanced	Contract № 977 по/20 от 24.12.2020
5.	1C: University PROF.	LICENSE AGREEMENT № 2191 от 15.10.2020
6.	1C: PROF Library	LICENSE AGREEMENT № 2281 от 11.11.2020
II. Freely distributed software		
1.	Google Chrome	Distributed for free Distribution conditions: https://play.google.com/about/play-terms/index.html
2.	The Yandex Browser	Distributed for free License agreement for the use of Yandex Browser programs https://yandex.ru/legal/browser_agreement/
3.	Dr.Web CureIt!	Distributed for free Distribution conditions: https://st.drweb.com/static/new-www/files/license_CureIt_ru.pdf
4.	OpenOffice	Distributed for free License:

		http://www.gnu.org/copyleft/lesser.html
5.	LibreOffice	Distributed for free License: https://ru.libreoffice.org/about-us/license/

3.7. Resources of the Internet information and telecommunication network

- Library of the Amur State Museum of Fine Arts. Access mode: https://amursma.ru/obuchenie/biblioteki/biblioteka-amurskoy-gma/
- EBS "Student Consultant". Access mode: http://www.studmedlib.ru/cgi-bin/mb4x
- Electronic library of medical literature. Access mode: https://www.books-up.ru/ru/entrance/97977feab00ecfbf9e15ca660ec129c0/

4. ASSESSMENT FUND

4.1. Current test control (input, initial, output), final.

4.1.1 Examples of input control test tasks (with response standards)

The test tasks are located in the "Moodle" system.
Access mode: https://educ-amursma.ru/enrol/index.php?id=271
The total number of tests is 100.

1.ABIOGENIC ENVIRONMENTAL FACTORS INCLUDE
1) Physical and chemical (temperature, light, pH, humidity, salt concentration, medications)
2) anthropogenic
3) biological (interactions in populations, animals, plants)
4) social (living conditions, nutrition, work activity)

2.THE TRANSMISSIBLE PATHWAY OF TRANSMISSION OF THE PATHOGEN IS REALIZED
1) when inhaling it
2) through household items
3) during sexual contact
4) when bitten by a vector

3. A SPECIES IS A COLLECTION OF ORGANISMS THAT HAVE
1) common genetic, morphological and physiological features
2) Common origin
3) a common habitat
4) similar metabolism

Response standards: 1; 2-4; 3-1

4.1.2. Examples of initial control test tasks

The test tasks are located in the "Moodle" system.
Access mode: https://educ-amursma.ru/enrol/index.php?id=271
The total number of tests is 200.

Module 1. General Microbiology, Virology

1. EUKARYOTES INCLUDE
    1) mushrooms
    2) viruses
    3) mycoplasmas
    4) rickettsias
2. BY COLORING ACCORDING TO THE GRAM METHOD, IT IS REVEALED:
    1) Capsules
    2) disputes
    3) the cell wall
    4) cytoplasmic membrane
3. THE CAPSULE PERFORMS THE FOLLOWING FUNCTION:
    1) participation in the breathing process
    2) protection against phagocytosis
    3) skeletal
    4) High temperature protection

Benchmarks of responses:
1- 1; 2 - 3; 3 – 2

Module 2. Private microbiology, virology

1. FOR EMERGENCY SPECIFIC PREVENTION OF WATER FEVER APPLY
    1) antibiotics
    2) the vaccine
    3) immunoglobulin
    4) sulfonamides
2. THE RIT REACTION IS EVALUATED BY
    1) delayed hemolysis
    2) ring formation
    3) sediment formation
    4) mobility of the pathogen
3. THE MAIN PATHOGENICITY FACTOR OF LEPTOSPIRA IS
    1) invasiveness
    2) exotoxins

3) endotoxins
4) the presence of periplasmic flagella

Response standards: 1-3; 2-4; 3-1

4.1.3 Examples of output control test tasks (with response standards)

The test tasks are located in the "Moodle" system.
Access mode: https://educamursma.ru/enrol/index.php?id=79
The total number of tests is 200.

1. IN CASE OF MENINGOCOCCAL INFECTION, THE TEST MATERIAL IS TAKEN
   1) with a pharyngeal swab
   2) "cough" plates
   3) nasopharyngeal swab
   4) flushing from the mouth
2. COAGULASE-POSITIVE STAPHYLOCOCCI INCLUDE
   1) Staphylococcus aureus
   2) Staphylococcus epidermidis
   3) Staphylococcus hominis
   4) Staphylococcus saprophyticus
3. THE CAPSULE PERFORMS THE FOLLOWING FUNCTION:
   1) participation in the breathing process
   2) protection against phagocytosis
   3) skeletal
   4) High temperature protection

Response standards: 1-1; 2-1; 3-2

4.1.4 Examples of practical skills control test tasks (with response standards)

The test tasks are located in the "Moodle" system.
Access mode: https://educ-amursma.ru/enrol/index.php?id=79
The total number of tests is 200.

1. BY COLORING ACCORDING TO THE GRAM METHOD, IT IS REVEALED:
   1) Capsules
   2) disputes
   3) the cell wall
   4) cytoplasmic membrane
2. THE RIT REACTION IS EVALUATED BY
   1) delayed hemolysis
   2) ring formation
   3) sediment formation
   4) mobility of the pathogen
3. THE MAIN PATHOGENICITY FACTOR OF LEPTOSPIRA IS
   1) invasiveness

2) exotoxins
3) endotoxins
4) the presence of periplasmic flagella

Response standards: 1-3; 2-4; 3-1

4.1.5. Examples of final control test tasks (with response standards)

The test tasks are located in the "Moodle" system.
Access mode: https://educ-amursma.ru/enrol/index.php?id=79
The total number of tests is 200.

1. IN ANGINA, CROSS-ANTIGENS CAUSE A COMPLICATION
   1) purulent lymphadenitis
   2) pneumonia 3) otitis media
   4) myocarditis
2. CAUSES SCARLET FEVER AND ERYSIPELAS
   1) Streptococcus anginosus
   2) Streptococcus pyogenes
   3) Streptococcus pneumoniae
   4) Streptococcus faecalis
3. NEWBORN PEMPHIGUS IS CAUSED BY A TOXIN
   1) Gonococcus
   2) meningococcal diseases
   3) Staphylococcus
   4) Streptococcus

Response standards: 1-4; 2-2; 3-3

4.2. Situational tasks of current control

Task number 1

In a 30-year-old patient with purulent fasciitis of the left tibia, gram-positive cocci located in pairs or in short chains were isolated from the discharge. The growth of isolated bacteria was observed only on blood agar, and a zone of complete hemolysis was found around the S-form colonies.
1. What kind of pathogen can you think of?
   A) Staphylococcus epidermidis
   B) Staphylococcus aureus
   C) Streptococcus pyogenes
   D) Streptococcus agalactiae
   E) Streptococcus pneumoniae
2. Carry out further identification of the pathogen. What are the differential diagnosis tests?

Task number 2

On the fifth day of life, a newborn child developed clinical signs of purulent meningitis.

1. Which of the following microorganisms infect the fetus during passage through the birth canal and can cause meningitis of newborns?

A) Staphylococcus epidermidis
B) Staphylococcus aureus
C) Streptococcus pyogenes
D) Streptococcus agalactiae
E) Streptococcus pneumoniae

2.Select the research material. How to get it to the lab correctly?

Task number 3

Patient K. Turned to a dermatologist complaining of soreness and the presence of pustular rashes on the skin of the face, scalp, and trunk.
These rashes appeared 3 days after outdoor recreation and swimming in the lake. Microscopy of the purulent discharge revealed gram-positive bacteria of oval shape arranged in pairs
1) Which pathogen could cause the disease?

A)Staphylococcus epidermidis
B) Staphylococcus aureus
C) Streptococcus pyogenes
D) Streptococcus pneumoniae

2) Is it possible to carry out specific therapy?

Benchmarks of responses to situational tasks:
Task 1 – b; test with optochine, 6.5% NaCl, litmus milk Task 2 – g, liquor in a thermos bag at a temperature of 35-37 ° C.
Task 3- b; yes, by a specific bacteriophage

4.3. The list of practical skills that a student should possess after mastering the discipline.

1. Calcination of the bacterial loop.
2. Prepare the "hanging drop" preparation.
3. Prepare the preparation "crushed drop".
4. Prepare a smear from a microbial culture.
5. Color the Gram smear, demonstrate.
6. Paint a brush stroke on the Neiser, demonstrate.
7. Paint a smear on the burns, demonstrate.
8. Color the Burry - Gins swab, demonstrate.
9. Color the brushstroke using a simple method, demonstrate.
10. Demonstrate the finished colored micropreparation.
11. Sow the material using the Koch method.
12. Sow the material using the Drigalsky method.
13. Sow the material using the serial dilution method.
14. Sow the microbial culture with an injection on a short mottled row.
15. Describe the cultural properties of bacteria in demonstration crops.
16. Put an approximate agglutination reaction on the glass. Make a conclusion.
17. Evaluate on the RTGA tablet. Make a conclusion.
18. Rate on the RGA tablet. Make a conclusion.

19. Rate on the ELISA tablet. Make a conclusion.
20. Evaluate the reaction of the color sample. Make a conclusion.
21. Evaluate the neutralization reaction of the color sample. Make a conclusion.
22. Prepare laboratory utensils for sterilization.
23. Determine the effectiveness of disinfection.
24. Sow the air of the study room using the Koch method to determine the OHMS.
25. Determine the OHMS of the water.
26. Prepare a plaque smear.
27. Perform quantitative seeding of the material by Gooold.
28. Evaluate the result of a dysbiosis study.
29. To sow the material for antibiotic sensitivity using the disk method.
30. To evaluate the sensitivity of bacteria using the serial dilution method.
31. Determine the minimum inhibitory concentration using the hexadisk method.
32. Make a selection of active prevention tools
33. Make a selection of passive prevention products 34. Make a selection of specific therapy products
35. Morphological identification of smears:
    - The causative agent of staphylococcal infection
    - The causative agent of streptococcal infection
    - The causative agent of gonorrhea
    - Causative agent of diphtheria
    - The causative agent of tuberculosis
    - The causative agent of anthrax
    - The causative agent of the plague
    - Causative agent of tetanus
    - The causative agent of candidiasis

4.4. List of exam questions

The general part

1. The place of microbiology and virology in modern medicine. The role of microbiology and virology in the training of clinicians and preventive service doctors. 2. Achievements of microbiology, virology, and immunology.
3. The main stages of the development of microbiology and virology. The works of L. Pasteur, R. Koch and their significance for the development of microbiology.
4. L. Pasteur is the founder of microbiology as a science. The influence of Pasteur's works on the formation and development of applied immunology.
5. The role of I.I.Mechnikov in the formation of the doctrine of immunity. The doctrine of immunity to infectious diseases as a stage in the development of medicine.
6. The significance of D.I. Ivanovsky's discovery.
7. The role of Russian scientists (G.N. Gabrichevsky, N.F. Gamaleya, S.N.Vinogradsky, P.F. Zdradovsky, L.A.Zilber, A.A. Smorodintsev, M.P.Chumakov, Z.V.Ermolyeva, V.D.Timakov, V.M.Zhdanov, etc.) in the development of microbiology and virology.
8. Prospects for the development of microbiology and virology.
9. Microbiologists and virologists are laureates of State prizes. Their contribution to science.
10. Basic principles of classification of microbes.

11. Systematics and nomenclature of bacteria. Principles of taxonomy. The concept of a species, subspecies, population, strain, clone.
12. The difference between eukaryotes and prokaryotes.
13. Principles of mushroom classification.
14. Principles of classification of protozoa.
15. Principles of classification of viruses.
16. Types of microbiological laboratories. The structure, equipment, and facilities of backlabs.

I. Morphology of microbes

1. Morphological and tinctorial properties of bacteria. Methods of coloring.
2. The structure and chemical composition of the bacterial cell. Structural features of gram-positive and gram-negative bacteria.
3. Morphology and ultrastructure of rickettsias, chlamydia, and mycoplasmas. Name the pathogenic species.
4. Methods of studying the morphological structures of bacteria. Types of microscopy. Methods of staining microbes.
5. Morphological features of spirochaetes. Ways to identify them. Taxonomy. Pathogenic species.
6. Rod-shaped and convoluted forms of bacteria. Diseases caused by them.
7. Bacterial spores, stages of spore formation. Methods for detecting spores.
8. L-forms of bacteria. Causes of occurrence. Its importance in the vital activity of the microbial cell and in human pathology.
9. Morphology of protozoa.
10. Features of virus biology.
11. What is the difference between bacteria and viruses?
12. Morphology and chemical composition of viruses.
13. Methods of virus cultivation. Types of cell cultures. The nature of cytopathic action.
14. Morphology and ultrastructure of bacterial viruses (bacteriophages). Phases of interaction of virulent and moderate phages with a bacterial cell. The prophage. Practical application of phages.
15. Microscopy methods (luminescent, dark-field, phase contrast, electron).
16. Morphology and ultrastructure of fungi. Classification. Importance in human pathology.
17. Morphology and ultrastructure of actinomycetes. Pathogenic representatives. Actinomycetes as producers of antibiotics.

II. The physiology of microbes

1. The growth and reproduction of bacteria. The rate and phases of reproduction.
2. Methods of obtaining energy by bacteria (respiration, fermentation). Methods of cultivation of anaerobes.
3. Types and mechanisms of bacterial nutrition.
4. Classification of bacteria by type of nutrition. Virus nutrition.
5. Basic principles of bacterial cultivation. Factors affecting the growth and reproduction of bacteria.

6. The main types and essence of the respiration process in bacteria. Fermentation. Characteristics and examples.

7. Artificial nutrient media, their classification. Requirements for nutrient media.

8. Principles and methods of isolation of pure bacterial cultures.

9. Principles and methods of isolation of pure cultures of anaerobic bacteria.

10. The sequence (stages) of isolation of pure culture of microorganisms.

11. Cultural properties of microorganisms. Types of colonies, signs. Importance for the identification of pathogens.

12. Bacterial enzymes. Identification of bacteria by enzymatic activity. Growth factors

13. Intraspecific identification of bacteria (epidemic labeling). Principles of accelerated identification of microorganisms.

14. Features of the physiology of fungi.

15. Features of the physiology of protozoa.

16. Types of virus-cell interaction. Stages of virus reproduction.

17. The relationship of microorganisms in the population. Commensalism, mutualism, antagonism.

18. Bacteriophages. Interaction of a phage with a bacterial cell. Moderate and virulent bacteriophages. Lysogeny.

19. The use of phages in biotechnology, microbiology and medicine.

20. Methods of virus cultivation.

III. The ecology of microbes. The influence of environmental factors on microbes

1. The normal microflora of the human body and its functions.

2. Normal microflora of the skin and mucous membranes.

3. Dynamics of intestinal microflora of newborns.

4. Dysbiosis. Causes and risk factors of its occurrence. The concept of colonization resistance.

5. Drugs for restoring normal microflora: probiotics, prebiotics, synbiotics.

6. Methods of spreading and localization of pathogenic microorganisms in the human body.

7. The effect of physical and chemical factors on microorganisms. The concept of sterilization, disinfection, asepsis and antiseptics.

8. Methods of sterilization, equipment.

9. Sterilization, types, methods, its difference from disinfection. Methods of quality control of sterilization.

IV. Sanitary microbiology

1. Tasks of sanitary microbiology. Features of the methods

2. Research.

3. The doctrine of sanitary-indicative microorganisms. The requirements for them are reasonable.

4. Microflora of air and methods of its research, equipment.

5. Pathogenic microbes in the air, the mechanism of spread and ways of transmission of infection.

6. Sanitary-indicative microorganisms for the air. Standards for medical institutions.

7. Microflora of food products. Sanitary-indicative microorganisms and methods of their determination.

8. Microflora of water. Factors affecting the number of microbes in the water. Sanitary-proven microorganisms.

9. Methods of sanitary and bacteriological examination of water (microbial number, coli-index, coli-titer).

10. Sampling, storage, transportation of water samples for sanitary and microbiological research.

11. Soil microflora. Factors influencing the quantitative and specific composition of soil microbes.

12. Pathogenic microorganisms transmitted through soil.

13. Sanitary and microbiological examination of the soil. Microbial number, kohl-titer, perfringens-titer of the soil.

14. Sanitary and bacteriological examination of environmental objects, examination of hand washes, inventory, equipment.

15. Control of dressing and surgical materials for sterility.

16. Sanitary and microbiological examination of food products.

17. Sanitary and bacteriological examination of milk and dairy products.

18. Sanitary and bacteriological examination of meat and meat products.

19. Sanitary and bacteriological examination of medicines.

V. The genetics of bacteria. Fundamentals of biotechnology

1. Genetics of microorganisms. Concept, meaning. Forms of hereditary bacterial variability.

2. The structure of the bacterial genome. The concept of genotype and phenotype. Types of variability. Mobile genetic elements (plasmids, insertion sequences, transposons, moderate bacteriophages), characteristics, and their role in bacterial evolution.

3. Mechanisms of transmission of genetic material in bacteria.

4. Bacterial plasmids, their functions and properties. The use of plasmids in genetic engineering.

5. Genetic recombination: transformation, transduction, conjugation.

6. The genetic variability of viruses. Intraspecific and interspecific exchange of genetic material.

7. Medical biotechnology, its tasks and achievements, methods used.

8. Modern methods of genodiagnostics used in the diagnosis of infectious diseases (DNA sensing, PCR, restriction analysis, etc.).

9. Lysogeny. Meaning.

10. Genetic analysis and its principles.

VI. Microbiological foundations of chemotherapy

1. The concept of chemotherapy. The history of the discovery of chemotherapy drugs. The main groups of chemotherapeutic agents.

2. Antibiotics. Natural and synthetic. Classification of antibiotics by chemical structure, mechanism, spectrum and type of action. Methods of obtaining.

3. Units of measurement of antibiotic activity

4. Mechanisms of action of the main groups of antibacterial drugs.

5. Complications of antibiotic therapy, their prevention.

6. Mechanisms of formation of drug resistance of pathogens of infectious diseases. Ways to overcome it.

7. Methods for determining the sensitivity of bacteria to antibiotics. Qualitative, quantitative, accelerated.

8. Principles of rational antibiotic therapy.

VII. Infection. Diagnostic reactions

1. The concept of infection. Conditions of the infectious process.
2. Forms of the infectious process. The concept of relapse, reinfection, superinfection, persistence of microbes.
3. The difference between infectious and somatic diseases. Stages of development of an infectious disease.
4. The fate of bacteria and viruses in the development of infectious and epidemic processes.
5. Carriage of pathogenic and opportunistic microorganisms.
6. Pathogenicity and virulence of bacteria. The concept. Characteristics of pathogenicity factors.
7. Quantitative determination of virulence. DLm-ways to determine it.
8. Enzymes of microbial aggression. The role of individual microbial cell structures in virulence.
9. Microbial toxins, classification, their nature, properties, chemical composition. Genetic determinants of toxigenicity.
10. Bacterial exotoxins, characteristics.
11. Toxic substances of viruses.
12. Persistence and its place in the infectious process.
13. Biofilms as a bacterial survival strategy. Stages of education. Importance for medicine
14. The agglutination reaction. Kinds. Components, mechanism, and staging methods. Application in medicine.
15. Reactions of co-agglutination, latex agglutination. Mechanism, components. Application.
16. Passive hemagglutination reaction (RPG). Components. Evaluation. Application.
17. Hemagglutination inhibition reaction (RTGA). Mechanism. Components. Principles of evaluation.Application.
18. Precipitation reactions. Mechanism. Components. Methods of staging. Application in medicine.
19. Complement binding reaction (CSC). Mechanism. Components. Application in the diagnosis of infectious diseases.
20. The reaction of neutralizing the toxin with antitoxin. Mechanism. Methods of formulation, application.
21. The immunofluorescence reaction (RIF). Components, principles of direct and indirect reaction formulation. Application.

22. Enzyme immunoassay (ELISA), immunoblotting. Mechanism, components, and application.
23. Treponema immobilization reactions (RT). Principles of staging and evaluation.
24. IHA (immunochromatographic analysis). Principles of setting, evaluation
25. Methods of virus identification.
26. Serological reactions used to diagnose viral infections. Principles of evaluation.
27. Virus neutralization reactions. The neutralization reaction of the color sample. The reaction of neutralization of plaque formation, the reaction of neutralization of cytopathic action, etc. Meaning, application.
28. Modern methods of gene diagnostics.

VIII. The special part

When answering questions about private microbiology, we recommend following the following plan:

✓ Taxonomy of the pathogen: for bacteria - division (Gracilicutes, Firmicutes, Tenericutes), family, genus, species; for eukaryotes - classes, species;

✓ for viruses - DNA or RNA genomic viruses, family, genus, species, serogroup.

✓ Characteristics of the pathogen: morphological, tinctorial, cultural, biochemical, antigenic properties, pathogenicity factors, resistance to various factors; biological models.

✓ Diseases caused - brief epidemiological characteristics (sources of infection, mechanism, ways and factors of transmission, susceptible collective), pathogenesis, main clinical manifestations, features of immunity.

✓ Microbiological diagnostics: the studied material, applied diagnostic methods.

✓ Specific prevention and etiotropic treatment (vaccines, serums, phages, chemotherapy).

Private Microbiology

1. Methods of microbiological diagnostics of infectious diseases.
2. Causative agents of escherichiosis. Taxonomy. Characteristic. The role of E. coli in the norm and pathology. Microbiological diagnosis of escherichiosis. Treatment.
3. Enteropathogenic E. coli. Characteristic. Laboratory diagnostics. Specific prevention and therapeutic measures.
4. Pathogens of intestinal yersiniosis. Taxonomy. Characteristic. Microbiological diagnostics. Treatment.
5. Pathogens of pseudotuberculosis. Features of laboratory diagnostics.
6. Pathogens of shigellosis. Taxonomy. International classification. Characteristic. Microbiological diagnostics. Specific prevention and treatment.
7. Causative agents of salmonellosis. Taxonomy. Classification. Salmonella is the causative agent of acute gastroenteritis. Characteristic. Immunity. Microbiological diagnosis of salmonellosis. Treatment.
8. Salmonella typhoid and paratyphoid. Pathogenesis, immunity, laboratory diagnostics of diseases. Specific prevention and etiotropic therapies.
9. Klebsiella and the diseases they cause. Laboratory diagnostics. Medicinal products. Prevention.
10. Causative agents of food poisoning and intoxication. Laboratory diagnostics.

11. Pathogens of cholera. Taxonomy. Classification. Characteristic. Distinctive features of the causative agent of serovar O139. Pathogenesis. Microbiological diagnostics. Specific prevention and treatment.
12. Halophilic vibrios. Virulence factors, pathogenesis, laboratory diagnostics of diseases caused by them. Means of therapy and prevention.
13. Campylobacteria. Taxonomy. Characteristic. Virulence factors Microbiological diagnosis of diseases.
14. Helicobacteria. Taxonomy. Characteristic. Virulence factors. Microbiological diagnosis of diseases. Prevention and etiotropic therapy.
15. Staphylococcus. Taxonomy. Characteristic. Microbiological diagnosis of diseases caused by staphylococci. Specific prevention and treatment.
16. Streptococci. Taxonomy. Classification. Characteristic. Importance in human pathology. Microbiological diagnosis of streptococcal infections. Specific therapy and prevention.
17. Laboratory diagnosis of scarlet fever. Immunity. Means of therapy and prevention.
18. Meningococci. Taxonomy. Characteristic. Cultural properties. Microbiological diagnostics. Specific prevention and therapy.
19. Causative agents of bacterial meningitis (hemophilic bacteria, pneumococci, meningococci). Features of laboratory diagnostics. Means of specific prevention.
20. Gonococci. Taxonomy. Characteristic. Microbiological diagnosis of gonorrhea and blennorrhea. Therapeutic and diagnostic drugs.
21. The causative agent of tularemia. Taxonomy. Characteristic. Immunity. Microbiological diagnostics. Specific prevention and treatment.
22. The causative agent of anthrax. Taxonomy. Morphology, characteristics. Pathogenesis. Immunity. Microbiological diagnostics. Specific prevention and treatment.
23. The causative agent of brucellosis. Taxonomy and characteristics. Microbiological diagnostics. Immunity. Specific prevention and treatment.
24. The causative agent of the plague. Taxonomy, morphology, pathogenesis, immunity. Microbiological diagnostics (express methods). Specific prevention and treatment. Contribution of Russian scientists to the study of the pathogenesis and prevention of the disease.
25. Features of microbiological diagnosis in quarantine infections. Expressdiagnostics.
26. Pathogens of anaerobic gas infection. Taxonomy and characteristics. Virulence factors. Microbiological diagnostics. Specific prevention and treatment.
27. Bacteroids. Characteristics, laboratory diagnostics. Importance in infectious pathology.
28. The causative agent of botulism. Taxonomy and characteristics. The mechanism of action of the toxin. Microbiological diagnostics (reaction of neutralization of a toxin by antitoxin). Specific prevention and specific therapy.
29. The causative agent of tetanus. Morphology, biological properties. The pathogenesis of the disease. Microbiological diagnostics. Specific therapy and specific prevention.
30. Causative agent of diphtheria. Taxonomy and characteristics. Conditionally pathogenic corynobacteria. The pathogenesis of diphtheria. Microbiological diagnostics. Detection of antitoxic immunity. Specific prevention and treatment.
31. Pathogens of whooping cough and paracoccussis. Taxonomy, morphology, characteristics. Microbiological diagnostics. Specific prevention and treatment.
32. Pathogens of tuberculosis and mycobacteriosis. Taxonomy. Characteristic. Pathogenesis of diseases, immunity. Microbiological diagnosis of tuberculosis. Therapeutic and diagnostic drugs. Specific prevention of tuberculosis.

33. Causative agent of leprosy. Taxonomy. Characteristic. Microbiological diagnostics. Therapeutic and diagnostic drugs.
34. Actinomycetes. Taxonomy. Characteristic. Microbiological diagnostics. Treatment.
35. The causative agent of epidemic typhus. Taxonomy. Biological features. Differential diagnosis with Brill-Zinsser disease. Microbiological diagnostics. Specific prevention and treatment.
36. Rickettsia. The causative agent of epidemic and endemic typhus, Ku fever, tick-borne rickettsiosis. Pathogenesis, immunity, laboratory diagnostics. Medicinal products. Specific prevention.
37. The causative agent of Ku fever. Taxonomy. Characteristic. Microbiological diagnostics. Specific prevention and treatment.
38. Causative agents of chlamydia. Taxonomy. Characteristics of pathogens of ornithosis, blenorrhea with inclusions, and urogenital diseases. Pathogenesis. Microbiological diagnostics. Treatment.
39. The causative agent of legionellosis. Taxonomy. Characteristic. Etiopathogenesis. Microbiological diagnostics. Treatment.
40. The causative agent of syphilis. Taxonomy. Characteristic. Microbiological diagnostics. Treatment.
41. Causative agents of leptospirosis. Taxonomy. Characteristic. Microbiological diagnostics. Specific prevention. Treatment.
42. Causative agents of borreliosis. Taxonomy. Characteristic. Microbiological diagnostics. 43. Mycoplasmas. Taxonomy. Biological properties. Pathogenicity. Laboratory diagnostics.
43. The causative agent of Lyme disease. Characteristic. Laboratory diagnostics. Emergency prevention.
44. Causative agents of recurrent typhus. Pathogenesis. Immunity. Laboratory diagnostics. Medicinal products.
45. Opportunistic pathogenic microorganisms as pathogens of nosocomial infections. Criteria of etiological assessment.
46. Methods of laboratory diagnostics of nosocomial infections.
47. Pseudomonads. Biological properties, pathogenetic features of diseases caused by them. Laboratory diagnostics. Means of specific therapy.
48. Pseudomonas aeruginosa. Taxonomy. Characteristic. Microbiological diagnosis and treatment.
49. Non-spore-forming anaerobes. Taxonomy. Characteristic. Microbiological diagnosis and treatment.
50. Classification of fungi. Characteristic. Role in human pathology. Laboratory diagnostics. Treatment.
51. Pathogens of deep mycoses, their characteristics. Pathogenesis of diseases. Laboratory diagnostics. Medicinal products.
52. Pathogens of subcutaneous mycoses. Characteristic. Pathogenesis. Laboratory diagnostics. Therapeutic drugs, prevention.
53. Pathogenic fungi (penicilli, aspergillus, candida). Morphology, cultural properties. Diseases caused by them. Laboratory diagnostics. Therapeutic drugs, prevention.
54. Causative agents of superficial mycoses. Laboratory diagnostics. Specific therapy.
55. Pathogens of malaria. Taxonomy. Characteristic. Microbiological diagnostics. Treatment.
56. The significance of D.I. Ivanovsky's discovery. Stages of virology development. The role of Russian scientists in the development of virology.
57. Methods of virus identification.
58. Pathogens of acute respiratory viral infections. Taxonomy. Characteristic. Laboratory diagnostics. Specific prevention and treatment.

59. The causative agent of influenza. Taxonomy. Morphology. Characteristic. The variability of the virus. Avian and swine flu viruses. Etiopathogenesis, immunity. Laboratory diagnostics. Specific prevention and treatment.
60. Paramyxoviruses. Characteristic. Pathogenetic features, the nature of CPD. Means of specific therapy and prevention of diseases caused by them.
61. Adenoviruses. Characteristic. The mechanism of infection. Laboratory diagnostics. Specific prevention of diseases caused by them
62. Coronaviruses. Taxonomy. Morphology. The causative agent of covid19. Characteristic. The variability of the virus. Etiopathogenesis, immunity. Laboratory diagnostics. Specific prevention and treatment.
63. The causative agent of polio and polio-like diseases. Taxonomy and characteristics. Pathogenesis. Laboratory diagnostics. Specific prevention.
64. Rotaviruses, morphology, cultural properties. Pathogenesis. Laboratory diagnostics. Means of therapy and prevention.
65. Pathogens of hepatitis A and E. Taxonomy. Characteristic. Pathogenesis. Laboratory diagnostics. Specific prevention and therapy.
66. Arboviruses. Taxonomy. Characteristic. Laboratory diagnostics of diseases. Specific prevention and treatment.
67. The causative agent of tick-borne encephalitis. Taxonomy. Characteristic. Laboratory diagnostics. Specific prevention.
68. The causative agent of Crimean hemorrhagic fever, characteristics. Laboratory diagnostics. Means of therapy.
69. Pathogens of hemorrhagic fevers. The causative agent of HFRS. Pathogenesis. Laboratory diagnostics.
70. The causative agent of Ebola hemorrhagic fever. Taxonomy. Morphology. Characteristic. Etiopathogenesis, immunity. Laboratory diagnostics. Specific prevention and treatment.
71. The causative agent of Zika fever. Morphology. Characteristic. Etiopathogenesis, immunity. Laboratory diagnostics, prevention and treatment.
72. The causative agent of Zika fever. Morphology. Characteristic. Etiopathogenesis, immunity. Laboratory diagnostics, prevention and treatment.
73. The causative agent of rabies. Taxonomy. Characteristic. Mechanism of infection, pathogenesis. Laboratory diagnostics. Specific prevention and therapy.
74. The causative agent of chickenpox. Taxonomy. Characteristic. Laboratory diagnostics. Specific prevention.
75. The causative agent of rubella. Taxonomy. Characteristic. Laboratory diagnostics. Specific prevention.
76. The measles virus. Taxonomy. Characteristic. Laboratory diagnostics. Specific prevention.
77. Herpes viruses. Taxonomy, general characteristics of pathogens. Diseases caused by them. Laboratory diagnostics. Specific prevention and specific therapy.
78. Cytomegaly viruses. Pathogenesis. Immunity. Laboratory diagnostics of diseases. Medicinal products.
79. Pathogens of hepatitis: B, C, D, G, F. Taxonomy. Characteristic. Similarities and differences. The carrier. Laboratory diagnostics. Specific prevention and therapy.
80. The causative agent of hepatitis D. Morphological features. Importance in human pathology. Laboratory diagnostics.
81. Pathogens of HIV infection. Taxonomy, morphology, characteristics of pathogens. Etiopathogenesis. Laboratory diagnostics, antiviral therapy and prevention.

82. AIDS-associated infections. Means of basic therapy and methods of prevention.
83. Classification and characterization of oncogenic viruses. Classification. Mechanisms of oncogenesis.
84. Defective viruses. The concept. Examples.
85. Prions. Similarities and differences from classic viruses. Biological properties. Laboratory diagnostics of prion infections.
86. General characteristics of pathogens of slow viral infections. Classification. Diseases caused by them

APPROVEDAt the meeting of the Department of Microbiology, Virology

Protocol No. 21_ dated February 02, 2021

Head of the Department  G.I. Chubenko

ADDITIONS AND CHANGES TO THE WORK PROGRAM

IN THE DISCIPLINE "MICROBIOLOGY, VIROLOGY"

SPECIALTY 05/31/01 "MEDICAL SCIENCE"

FOR THE 2021-2022 ACADEMIC YEAR

In accordance with the Order of the Ministry of Science and Higher Education of the Russian Federation dated 11/26/2020 No. 1456 "On Amendments to Federal Standards of Higher Education" (registered with the Ministry of Justice of Russia on 05/27/2021 No. 63650) and in connection with amendments to the basic professional educational program of higher education in the specialty 05/31/02 Pediatrics, the year of commencement of training 2021, approved The Academic Council of the Amur State Medical Academy of the Ministry of Health of the Russian Federation dated 06/21/2021, Protocol No. 20 (put into effect by Order No. 212P dated 06/25/2021), introduces the following changes to the discipline's work program:In the section of the work program 1.6 "Requirements for the results of mastering the discipline" in the table, amend the wording of the competence of OPK - 10.

OPK-10. He is able to solve standard tasks of professional activity using information, bibliographic resources, medical and biological terminology, information and communication technologies, taking into account the basic information security requirements for the formulation.

OPK-10. He is able to understand the principles of modern information technologies and use them to solve professional tasks.

APPROVED

At the meeting of the Department of Microbiology and Virology

Protocol No. 29_ dated June 23, 2022.

Head of the Department G.I. Chubenko

ADDITIONS TO THE DISCIPLINE'S WORK PROGRAM

"MICROBIOLOGY, VIROLOGY"

SPECIALTY 05/31/01 "MEDICAL SCIENCE"

FOR THE 2022-2023 ACADEMIC YEAR.

Add additional information to the list of educational and methodological support:

List of software (commercial software products)

N. p/p	**List of software (commercial software products)**	**Details of supporting documents**
1	The operating system is MS Windows 7 Pro	License number 48381779
2	The operating system is MS Windows 10 Pro	Contract No. UT-368 dated 21.09.2021
3	MS Office	License number: 43234783, 67810502, 67580703, 64399692, 62795141, 61350919
4	Kaspersky Endpoint Security for Business is the Standard Russian Edition.	Contract No. 165A dated 25.11.2022
5	50-99 Node 2 year Educational Renewal License	LICENSE AGREEMENT 612/L dated 02.02.2022
6	1C Accounting and 1C Salary	LICENSE AGREEMENT No. CB-1151 dated 01.14.2022
7	1C: PROF Library	LICENSE AGREEMENT № 2281 dated 11.11.2020
8	Consultant Plus	Contract No. 37/C dated 25.02.2022
9	Contour.Tolk	Contract No. K007556/22 dated 19.09.2022
10	3KL e-learning Environment (Russian Moodle)	Contract No. 1362.3 dated 21.11.2022
11	Astra Linux Common Edition	Contract No. 142 A dated 21.09.2021
12	Information system "Plans"	Contract No. 9463 dated 25.05.2022
13	1C: Document management	Contract No. 2191 dated 15.10.2020
14	R7-Office	Contract No. 2 KS dated 18.12.2020

List of freely distributed software

N. p/p	List of freely distributed software	Links to the license agreement
1.	The Yandex Browser	Distributed for free License agreement for the use of Yandex Browser programs https://yandex.ru/legal/browser_agreement/
2.	Yandex.Teleconference	Distributed for free Software License Agreement https://yandex.ru/legal/telemost_mobile_agreement/
3.	Dr.Web CureIt!	Distributed for free License Agreement: https://st.drweb.com/static/new-www/files/license_CureIt_ru.pdf
4.	OpenOffice	Distributed for free License: http://www.gnu.org/copyleft/lesser.html
5.	LibreOffice	Distributed for free License: https://ru.libreoffice.org/about-us/license/

APPROVED

At the meeting of the Department of Microbiology and Virology

Protocol No. 27 dated May 23, 2023.

Head of the Department G.I. Chubenko

ADDITIONS TO THE DISCIPLINE'S WORK PROGRAM

"MICROBIOLOGY, VIROLOGY"

SPECIALTY 05/31/02 "PEDIATRICS"

FOR THE 2023-2024 ACADEMIC YEAR.

In section 3.6 "Licensed and freely distributed software used in the educational process", replace the table.

List of software (commercial software products)

N. p/p	**List of software (commercial software products)**	**Details of supporting documents**
1	The operating system is MS Windows 7 Pro	License number 48381779
2	The operating system is MS Windows 10 Pro	Contract No. UT-368 dated 21.09.2021
3	MS Office	License number: 43234783, 67810502, 67580703, 64399692, 62795141, 61350919
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1.	The Yandex Browser	Distributed for free License agreement for the use of Yandex Browser programs https://yandex.ru/legal/browser_agreement/
2.	Yandex.Teleconference	Distributed for free Software License Agreement https://yandex.ru/legal/telemost_mobile_agreement/
3.	Dr.Web CureIt!	Distributed for free License Agreement: https://st.drweb.com/static/new-www/files/license_CureIt_ru.pdf
4.	OpenOffice	Distributed for free License: http://www.gnu.org/copyleft/lesser.html
5.	LibreOffice	Distributed for free License: https://ru.libreoffice.org/about-us/license/