MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION,
MINISTRY OF EDUCATION AND SCIENCE OF THE KYRGYZ REPUBLIC

Government-run Educational Institution of Higher Professional Education
Kyrgyz-Russian Slavic University
School of Medicine

ENDORSED BY
Prof. Ines Zarifyan
26.06. 2021 г.

MICROBIOLOGY, VIROLOGY
Course Outline (Module)

Assigned to the department of	Microbiology and virology
Academic Curriculum	31050150__21_13iLD.pli.xml 31.05.01. General Medicine
Mode of Study	Full-time
Total Credit Value	**7 credit points**

Course Hours	252
Including:	
In-class learning	180
Individual work	54
Exams	18

Scope of Testing Semesters:
exams 4
credits 3

Discipline hours distribute in the semesters

Course Hours Scheduling (per semester)						
Semester Academic Year	**3 (2.1)**		**4 (2.2)**		Total	
Weeks	18		19.3			
Type of training	AC	CO	AC	CO	AC	CO
Lectures	36	36	18	18	54	54
Practical Session	54	54	72	72	126	126
Including interactive Session	4	4	5	5	9	9
Total In-class Session	90	90	90	90	180	180
Face-to-face Learning	90	90	90	90	180	180
individiual Work	18	18	36	36	54	54
Hours for control			18	18	18	18
Total	108	108	144	144	252	252

The Course outline developed by:

Teacher of microbiology and virology, Koshokova E.A.

The Head of Department, doctor of medical sciences, professor Sadybakasova G.K.

Reviewer(s):

Candidate of medical sciences, associate professor of microbiology, virology and immunology department, Niyazalieva M.S.

Candidate of medical sciences, associate professorof infectious diseases department of KRSU, Kuvatova D.J.

Управление кадров

ПОДПИСЬ ЗАВЕРЯЮ
УК ГОУВПО КРСУ
ИНН 01512199310054

The Course outline

Microbiology and virology

Developed in full compliance with FSES 3+:

Federal State Education Standards of Higher Professional Education for students trained for specialty 31.05.01 (The Ministry of Education and Science of the Russian Order of «12».08/2020 №988)

In accordance with Academic Curriculum:

31.05.01, 560001 KR - General medicine

Confirmed by KRSU Board of Academics in 29/06/2021 record № 11

The Course Outline endorsed by **Microbiology and virology** Department Meeting

Record of **23.08.2021** year № **1**

Valid for: 2021-2027 academic year

The Head of Department, doctor of medical sciences, professor Sadybakasova G.K.

The course outline endorsed for the following academic year

Chairman of the Educational and Methodological Board

07.12 2018 y.

The course outline has been revised, considered and endorsed for implementation
in 2018-2019 academic Year at the Staff Meeting of **Microbiology and virusology** Department

Record of 26.06. 2018 y. № 11

The head of department, doctor of medical sciences, professor Sadybakasova G.K.

The course outline endorsed for the following academic year

Chairman of the Educational and Methodological Board

04.09. 2019 y.

The course outline has been revised, considered and endorsed for implementation
in 2019-2020 academic Year at the Staff Meeting of **Microbiology and virusology** Department

Report from 27.08 2019 y. № 1

The head of department. doctor of medical sciences. professor Sadybakasova G.K.

The course outline endorsed for the following academic year

Chairman of the Educational and Methodological Board

23.09. 2020 y.

The course outline has been revised, considered and endorsed for implementation
in 2020-2021 academic Year at the Staff Meeting of **Microbiology and virusology** Department

Record of 14.09. 2020 y. № 2

The head of department, doctor of medical sciences, professor Sadybakasova G.K.

The course outline endorsed for the following academic year

Chairman of the Educational and Methodological Board

09.09. 2021 y.

The course outline has been revised, considered and endorsed for implementation
in 2021-2022 academic Year at the Staff Meeting of **Microbiology and virusology** Department

Record of 23.08. 2021 y. № 1

The head of department, doctor of medical sciences, professor Sadybakasova G.K.

The course outline endorsed for the following academic year

____ _____ 2022 y.

The course outline has been revised, considered and endorsed for implementation
in 2022-2023 academic Year at the Staff Meeting of **Microbiology and virusology** Department

Record of ____ _____ 2022 y. № ____

The head of department, doctor of medical sciences, professor Sadybakasova G.K._____

The course outline endorsed for the following academic year

Chairman of the Educational and Methodological Board

____ _____ 2023 y.

The course outline has been revised, considered and endorsed for implementation
in 2023-2024 academic Year at the Staff Meeting of **Microbiology and virusology** Department

Record of ____ _____ 2023 y. № ____

The head of department, doctor of medical sciences, professor Sadybakasova G.K._____

1. COURSE OUTLINE OBJECTIVES	
1.1	Knowledge of pathogenic and opportunistic pathogenic microorganisms in humans;
1.2	Microbial structure, physiology, genetics and ecology;
1.3	The role of microorganisms in the etiology and pathogenesis of infectious diseases;
1.4	Immunity as a state of the microorganism, the infectious process and its changes under the influence of environmental factors;
1.5	Methods of microbiological diagnosis, specific prophylaxis and therapy of infectious diseases.
1.6	Structure and functions of microbes as living systems, their role in ecology, decontamination methods, including the basics of disinfection and sterilization techniques; laws of interaction of the human body with microbial diversity, modern theories about the immune response to infectious and non-infectious agents (antigens); the study of the principles and methods of interpretation of the results obtained during microbiological, molecular biological and immunological studies of biological fluids, virus-containing materials and pure cultures of microbes; preventive measures against bacterial, fungal, parasitic and viral diseases; directions of treatment of infectious and opportunistic human diseases (bacterial, fungal, parasitic, viral); familiarization with the principles of organization of work in the microbiological laboratory, with measures for labor protection and safety; the conditions of storage of chemical reagents and medicines.
2. PLACE OF THE COURSE IN THE BASIC EDUCATIONAL PROGRAM (BEP).	
Educational Program Units:B1.B	B1.B
2.1	**Students' Preliminary Training Requirements:**
2.1.1	Philosophy
2.1.2	Biochemistry
2.1.3	Psychology and pedagogy
2.1.4	History of medicine
2.1.5	Biology
2.1.6	Physics, mathematics
2.1.7	Chemisrty
2.1.8	Histology, embryology, cytology
2.1.9	Normal physiology
2.1.10	Anatomy
2.2	**Course Units and Practical Sessions imposing the prior Proficiency**
2.2.1	Dermatovenerology
2.2.2	Stomatology
2.2.3	Ophthalmology
2.2.4	Otolaryngology
2.2.5	Pediatrics
2.2.6	Urology
2.2.7	Epidemiology
2.2.8	Obstetrics and gyneclogy
2.2.9	Infectious diseases
2.2.10	General surgery
2.2.11	Hygiene
2.2.12	Immunology
3. STUDENTS' COMPETENCIES RESULTING FROM THE COURSE UNIT (MODULE)	
PC-1: the ability and readiness to implement a set of measures aimed at preserving and strengthening human health including the formation of a healthy lifestyle, prevention of the occurrence and (or) spreading of diseases, early diagnosis, identification of the causes and conditions of their occurrence and development, as well as elimination of the harmful effects on human health factors of its habitat	

Knowledge:	
Level 1	Morphology, ultrastructure, physiology, genetics of microorganisms (bacteria, viruses, protozoa, fungi). Factors of pathogenicity, virulence, methods of their determination. Importance in the development of the infectious process. Peculiarities of pathogenesis
Level 2	Classification and characterization of biological properties of pathogens, epidemiology, pathogenesis, susceptibility, immunity, the main clinical manifestations of diseases caused by pathogenic and conditionally pathogenic bacteria, their sensitivity to antimicrobials
Level 3	Fundamentals of medical bacteriology, Virology, Mycology, protozoology
Skills:	
Level 1	To make a preliminary diagnosis based on the results of bacterioscopic, bacteriological, serological and allergic methods of research.
Level 2	By methods of interpretation of results of microbiological research, to determine of antimicrobial activity of chemotherapeutic preparations and microbiologically reasonable rules of their application for treatment of patients.
Level 3	To apply methods of selection of anti-microbial and immunobiological preparations for specific prophylaxis and treatment of infectious diseases.
Expertise:	
Level 1	Determination of material and methods of microbiological research based on the pathogenetic characteristics of diseases caused by both pathogenic and conditionally pathogenic microorganisms,
Level 2	Making micropreparations from the studied material, make sowing on the appropriate nutrient medium, differentiation of the pure culture of the pathogen, identification the morphological, cultural, toxigenic, biochemical and antigenic properties.
Level 3	Evaluation of microscopy results, of crops on the appropriate nutrient media. Interpretation of serological studies results. Cultivation of the viruses and their subsequent display and differentiation

Final Students' Competences

3.1	**Knowledge:**
3.1.1	The main stages in the development of Microbiology. The relationship of microbiology to other disciplines, goals and methods of research, principles of microorganism systematics.
3.1.2	Bacterial cell structure and shape; function of various formations, chemical composition, physiology, biochemistry of bacteria, especially nutrition, respiration, growth, reproduction.
3.1.3	Peculiarities of morphology and physiology of actinomycetes, spirochetes, rickettsiae, chlamydia, mycoplasmas, fungi, protozoa.
3.1.4	Distribution and role of microbes in the environment. Influence of environmental factors on microorganisms.
3.1.5	Morphology, ultrastructure, classification and nature of viruses. Features of replication of DNA and RNA genomic viruses, their cultivation, antigens, production and application of phages.
3.1.6	Genetic features of bacteria and viruses. The role of mutations, recombinations in the evolution of bacteria. Non-chromosomal factors of inheritance. The concept of genetic engineering, practical application.
3.1.7	Sources and methods of antibiotic production, their classification by structure, spectrum and mechanism of action. Features of genetic control of pathogenicity and antibiotic resistance of microbes, mechanisms of antibiotic resistance and principles of its overcoming. Complications of antibiotic therapy, methods for determining the sensitivity of microbes to antibiotics.
3.1.8	The concept of the infectious process, its classification. Pathogenicity and virulence, toxicity of the microbes. The role of conditionally pathogenic microflora in human pathology, nosocomial infections.
3.1.9	Structure and functions of the immune system in adults and adolescents, its age characteristics, mechanisms of development and functioning, basic methods of immunodiagnostics, methods for assessing immune status and indications for immunotropic therapy
3.1.10	Types of immunity, factors: immunocompetent cells, their interaction in cellular and humoral immunity. Antigens and their properties, types. Antibodies, characteristics of different classes of immunoglobulins, mechanisms of interaction of antigens and antibodies.
3.1.11	Vaccines, their types; diagnostic, therapeutic preparations. Principles of their production and application.
3.1.12	The morphology, fundamental physiological properties of staphylo-, strepto-, Gono-, and meningococci, pathogens of diphtheria, whooping cough, leprosy, actinomycosis, intestinal, anaerobic, zoonotic diseases; rickettsial, viral, fungal, protozoal infections and spirochetosis. Pathogenesis and clinical manifestations. Methods of microbiological diagnostics. Specific prophylaxis. Principles of etiotropic and specific therapy.

3.2	**Skills:**
3.2.1	Observe the rules of sanitary-hygienic and antiepidemic regime and safety in the bacteriological laboratory.
3.2.2	To prepare solutions of disinfectant and antiseptic substances for decontamination of infectious material and treatment of hands of laboratory personnel.
3.2.3	To justify from microbiological positions the choice of material (sputum, pus, blood, urine, fecal, swab, etc.) for bacteriological, virological and serological studies in children and adults.
3.2.4	To take swabs from hands, environmental objects (utensils, tables, surgical instruments, etc.) for carrying out sanitary and bacteriological research.
3.2.5	To evaluate the results of bacteriological, virological and serological research methods.
3.2.6	To make preparations from the studied material (pus, sputum, blood, etc.) and pure culture of microorganisms.
3.2.7	To paint smears using simple and complex methods (Gram, ZIL-Nielsen, Neusser, Gins, Romanovsky-Gimza, etc.).
3.2.8	To differentiate some organisms from others according to their morphology by microscopy and painted native products.
3.2.9	To adjust and operate phase contrast, luminescent and dark field microscopes;
3.2.10	To prepare basic nutrient media for the cultivation of microorganisms
3.2.11	To produce crops of the test material on liquid and dense nutrient medium.
3.2.12	To isolate pure culture of aerobic and obligate anaerobic microorganisms.
3.2.13	Identify the selected culture of the pathogen by morphological, tinctorial, cultural, biochemical and antigenic properties.
3.2.14	To define focustitle and fagoted culture of bacteria;
3.2.15	To determine the sensitivity of the pathogen to antibiotics.
3.2.16	To justify the choice of methods for the microbiological, immunological and molecular biological diagnostics of infectious diseases; to interpret the obtained results.
3.2.17	To determine the tactics of antibacterial, antiviral and immunotropic therapy and the principles of emergency prevention and anti-toxic therapy.
3.2.18	To use educational, scientific literature and the Internet resources for professional activities
3.3	**Expertise:**
3.3.1	Basic methods of sterilization, disinfection and antiseptic treatment of instruments and equipment to avoid the risk of infection for the doctor and patient.
3.3.2	Skills in making preliminary diagnosis based on the results of laboratory microbiological examination of adults and
3.3.3.	The methodology of result interpretation for microbiological research, determination of antimicrobial activity of antibiotic preparations and microbiologically reasonable rules of their application for treatment of patients.
3.3.4	Basic skills of working with material containing pathogenic and conditionally pathogenic microorganisms.
3.3.5	Methods of selection of antimicrobial and immunobiological preparations for adequate prevention and treatment of infectious diseases.
3.3.6	Basic skills of working with modern devices used to diagnose infectious diseases

4. COURSE (MODULE) STRUCTURE AND CONTENT							
Class Code	**Subject Name /Type of Class/**	**Semester / Academic Year**	**Hours**	**Competence**	**Literature**	**Interactive session**	**Notes**
	Section 1. Morphology of microorganisms. Microscopic methods of research.						
1.1	Introduction. The subject and goals of medical Microbiology. Modern aspects of its development. Systematics and nomenclature of microorganisms. /Lec/	3	2	PC-1		0	
1.2	Safety rules in a microbiological laboratory. Microscopes: biological, phase contrast, luminescent, electronic. Microscopy technique. /Pr/	3	3	PC-1		0	Work with immersion system of the microscope. Determining the size of microbes
1.3	Structure of a bacterial cell. /Lec/	3	2	PC-1		0	
1.4	Forms of bacteria, methods of their study. Preparation and staining of specimens, pure cultures of bacteria. Simple staining method. Microscopy /Pr/	3	3	PC-1		1	Microscopy of coccoid, rod shaped and convoluted forms of bacteria. Preparation of plaque for negative stain.
1.5	Complex (differential) methods of staining. Sporulation in bacteria. /Pr/	3	3	PC-1		1	Gram staining technique, acid fast stain (Ziehl Nielsen), spore stain(Orzeszko).
1.6	Morphology of actinomycetes, spirochetes, rickettsiae, mycoplasmas, chlamydia, their biological features and role in human pathology /Lec/	3	2	PC-1		0	
1.7	Structure of a bacterial cell. Methods of detection of various bacterial structures. /Pr/	3	3	PC-1		0	Albert , negative stains, "hanging drop" method. Phase-contrast microscopy of preparations.
1.8	Oral test №1 /Pr/	3	3	PC-1		0	

1.9	Modern methods of Express-diagnostics in medical Microbiology /SIW/	3	1	PC-1		0	
	Section 2. Physiology of microorganisms.			PC-1			
2.1	Physiology and biochemistry of bacteria, chemical composition. Microbial enzymes, their classification. Mechanisms and types of nutrition. /Lec/	3	2	PC-1		0	
2.2	Sterilization. Nutrition and cultivation of bacteria /Pr/	3	3	PC-1		0	Familiarization with the equipment, methods of sterilization, sterility control. Reading a textbook, working with lecture notes
2.3	The growth and reproduction of bacteria. Stages of bacterial population growth. Principles of cultivation of microorganisms. Methods of isolation. aerobic and anaerobic bacterial pure cultures /Lec/	3	2	PC-1		0	
2.4	The growth of microbes. Cultivation and isolation of pure cultures of aerobic and anaerobic bacteria /Pr/	3	3	PC-1		1	Morphological characteristics of colonies. Growth curve. Reading a textbook, additional literature. Work with lecture notes..
2.5	Antibiotics. The sources of their production. Classification by chemical structure, spectrum and mechanism of action. Complications of antibiotic therapy. Mechanisms of drug resistance formation /Lec/	3	2	PC-1		0	
2.6	Identification and differentiation of bacterial culture by enzymatic activity. Determining the sensitivity of bacteria to antibiotics /Pr/	3	3	PC-1		0	Differential media. To explain proteolytic activity, pigmentation of bacteria. Reading a textbook, additional literature. Work with lecture notes
2.7	Morphology, ultrastructure, classification and nature of viruses. Features of a virus reproduction /Lec/	3	2	PC-1		0	

2.8	Phages are viruses of bacteria. Nature, structure, properties. Value, practical application. /Lec/	3	2	PC-1		0	
2.9	Morphology, microscopic and virological methods of research. Methods of virus cultivation and display. /Pr/	3	3	PC-1		0	Cell culture, types. The algorithm for preparation of cell cultures stocks before infection, CPE, hemadsorption. Indication by the color of the sample. Phages curative, diagnostic.
2.10	Genetics of bacteria and viruses. Variability of microbes. Mutations, their classification. Mutagen. Genetic recombination. Principles of genetic engineering, achievements. /Lec/	3	2	PC-1		0	
2.11	Genetics of microorganisms. Organization of the genetic apparatus in bacteria and viruses. Modifications, mutations, dissociations. Recombination in bacteria: transformation, conjugation, transduction. Identification of nucleic acids. Polymerase-chain reaction. /Pr/	3	3	PC-1		1	Genetics of microorganisms. Organization of the genetic apparatus in bacteria and viruses. Modifications, mutations, dissociations. Recombination in bacteria: transformation, conjugation, transduction. Identification of nucleic acids. Polymerase-chain reaction.
2.12	Vaccines, bacteriophage in biotechnology	3	1	PC-1		0	
2.13	Genetic engineering and application of its achievements in human life and medical microbiology /SIW/	3	3	PC-1		0	
2.14	Colloquium №1 /Pr/	3	1	PC-1		0	
2.15	Ways to overcome the drug resistance in microbes. Restrictions on the use of medications for pregnant women and children. /SIW/	3	1	PC-1		0	
2.16	Microflora of the human body throughout life and its role in normal physiological processes and pathological conditions. /SIW/	3	2	PC-1		0	
2.17	Infectious process. Pathogenicity, virulence, pathogenicity factors. Form of the infection. The role of conditionally pathogenic microflora in human pathology. /Lec/	3	2	PC-1		0	

2.18	Infectious process, dynamics of development, forms of its manifestation. Virulence characterization: adhesion, colonization, aggression, invasiveness, toxigenicity. The experimental infection. /Pr/	3	2	PC-1		0	
2.19	Types of symbioses between different organisms /SIW/	3	1	PC-1		0	
2.20	Features of antibacterial immunity /SIW/	3	1	PC-1		0	
2.21	Features of antiviral immunity /SIW/	3	1	PC-1		0	
2.22	Features of anti-fungal immunity's. /SIW/	3	1	PC-1		0	
2.23	Features of antiparasitic immunity . /SIW/	3	1	PC-1		0	
	Section 3. Bacteriology			PC-1			
3.1	Pathogenic cocci (staphylococci, streptococci). Morphology. Biology. Diseases, pathogenesis, immunity. Laboratory diagnostics. Specific prevention and therapy. /Lec/	3	2	PC-1		0	
3.2	Microbiological diagnosis of diseases caused by Staphylococcus, Streptococcus, pneumococcus. /Pr/	3	3	PC-1		0	Reading a textbook, additional literature. Work with lecture notes. To make the scheme of microbiological diagnosis of staphylococcal and streptococcal infections. Seeding of pus in the bloodstream and ZHSA. To distinguish pure culture, to identify it by morphological, biochemical, toxigenic and antigenic properties.
3.3	Pathogens of meningococcal, gonococcal infection. Pathogens of nongonococcal urethritis. /Lec/	3	2	PC-1		0	

3.4	Microbiological diagnosis of diseases caused by neisseriae, chlamydia, Mycoplasma /Pr/	3	3	PC-1		0	Reading a textbook, additional literature. Work with lecture notes. To make the scheme of microbiological diagnostics of meningococcal, gonococcal , chlamydial, Mycoplasma infections. Sow the test material in appropriate nutrient medium, to allocate a pure culture, not easy to identify on morfologicheski them and antigenic properties. Note RSK, ELISA.
3.5	The causative agents of diphtheria and whooping cough. /Lec/	3	2	PC-1		0	
3.6	Microbiological diagnosis of diphtheria, pertussis, parapertussis. /Pr/	3	3	PC-1		0	Reading a textbook, additional literature. Work with lecture notes. To make the scheme of microbiological diagnosis of diphtheria, pertussis and paracoccus. To produce crops in the appropriate medium for each pathogen. To allocate a pure culture and identify it by morphological, biochemical and antigenic properties. To perform the precipitation reaction to determine the toxicity of the diphtheria wand.
3.7	The causative agents of tuberculosis, leprosy. Actinomycetes. /Lec/	3	2	PC-1		0	

3.8	The microbiological diagnosis of tuberculosis, leprosy, actinomycosis /Pr/	3	3	PC-1		0	Reading a textbook, additional literature. Work with lecture notes. To make the scheme of microbiological diagnosis of tuberculosis, leprosy, actinomycosis. Prepare smear from sputum and stain by Ziehl - Nielsen. To microscopical, to sketch the drug. Take into account the nature of growth in the appropriate nutrient media pathogens of tuberculosis and actinomycosis. To select drugs for specific treatment and prevention.
3.9	Colloquium №2 /Pr/	3	3	PC-1		0	
3.10	The causative agents of mycoses: superficial, subcutaneous, deep, opportunistic (candidiasis, zygomycosis, aspergillosis, penicillin, fusarium.) /Lec/	3	2	PC-1		0	
3.11	Pathogenic fungus. microbiological diagnosis of candidiasis. /Pr/	3	3	PC-1		0	Reading a textbook, additional literature. Work with lecture notes. To make the scheme of microbiological diagnosis of candidiasis. To prepare a native preparation of the test material, microscopical and sketching. To study colonies of different types of Candida fungi and the nature of pseudomycelia in nutrient media.
3.12	Classification of Enterobacteriaceae family. Pathogenes of intestinal infections-intestinal coli and Shigella. Morphology, cultural and pathogenic properties, epidemiological features. Role in human pathology. Principles of laboratory diagnostics, treatment and prevention. /Lec/	3	2	PC-1		0	

3.13	Microbiological diagnostics of coloenterites and dysentery. Preparations for etiotropic and specific therapy, General and specific prevention of these pathologies. /Pr/	4	4	PC-1		1	Reading a textbook, additional literature. Work with lecture notes. To make schemes of microbiological diagnostics of coli-infections, dysentery. To produce sowing suspensions of feces on the surface of the medium Endo in a Petri dish. To isolate a colorless colony on Endo agar, replant it on the Ressel media. To identify by morphological, biochemical and antigenic properties.
3.14	Pathogens of typhoid fever, paratyphoid A and B. Pathogens of salmonellosis-food toxicoinfections'. Pathogenes of cholera. Morphology, culture and pathogenic properties, epidemiological features. Role in human pathology. Principles of laboratory diagnostics, treatment and prevention. /Lec/	4	2	PC-1		0	
3.15	Microbiological diagnostics of typhoid, paratyphoid and food poisoning. Preparations for etiotropic and specific therapy, General and specific prevention of this pathologies. /Pr/	4	4	PC-1		0	Reading a textbook, additional literature. Work with lecture notes. To make the scheme of microbiological diagnosis of typhoid - paratyphoid and food poisoning. To identify pure culture of Salmonella by carbohydrate and protein tests in the Hiss media and nutrient broth. Take into account the reaction of agglutination to determine antibodies in the serum of the patient (Vidal reaction) and the type of Salmonella.

3.16	Microbiological diagnostics of cholera. Preparations for etiotropic and specific therapy, General and specific prevention of this pathology. Test №2 /Pr/	4	4	PC-1		0	Reading a textbook, additional literature. Work with lecture notes. To make the scheme of microbiological diagnostics of cholera. Study demonstration materials on morphology, cultural, biochemical, antigenic properties, phagotherapy of V. cholerae.
3.17	Causative agents of anaerobic infections - Clostridium gas gangrene, tetanus, botulism. Morphology, cultural and pathogenic properties, epidemiological features. Role in human pathology. Principles of laboratory diagnostics, treatment and prevention. /Lec/	4	2	PC-1		0	
3.18	Microbiological diagnostics of botulism, tetanus, gas gangrene. Preparations for etiotropic and specific therapy, General and specific prevention of these pathologies. /Pr/	4	4	PC-1		1	Reading a textbook, additional literature. Work with lecture notes. To make schemes of microbiological studies in anaerobic infections. To study gas gangrene, botulism, tetanus morphology, stain, growth on nutrient media by demonstrative tables. To study the scheme of neutralization reaction toxin by antitoxic serum.
3.19	Causative agents of plague and brucellosis. Morphology, culture and pathogenic properties, epidemiological features. Role in human pathology. Principles of laboratory diagnostics, treatment and prevention. /Lec/	4	2	PC-1		0	
3.20	Microbiological diagnostics of plague, tularemia. Preparations for etiotropic and specific therapy, General and specific prevention of these pathologies /Pr/	4	4	PC-1		0	Reading a textbook, additional literature. Work with lecture notes. To make the scheme of microbiological diagnostics of plague and tularemia. To study and draw morphology of the sticks of plague and tularemia in finished smears of organs and pure culture.

3.21	Microbiological diagnostics of brucellosis, anthrax. Preparations for etiotropic and specific therapy, General and specific prevention of these pathologies. /Pr/	4	4	PC-1		1	Reading a textbook, additional literature. Work with lecture notes. To make the scheme of microbiological diagnosis of anthrax and brucellosis. On finished preparations to study morphology of anthrax sticks in organs and in pure culture. Put the reaction of Ascoli to determine the contamination of raw materials (leather, fur).
3.22	Pathogens of spirochetosis-syphilis, relapsing fever, leptospirosis. Morphology, culture and pathogenic properties, epidemiological features. Role in human pathology. Principles of laboratory diagnostics, treatment and prevention. Microbiological diagnostics of syphilis, epidemic and endemic relapsing fever, leptospirosis. Preparations for etiotropic and specific therapy, General and specific prevention of these pathologies. /Pr/	4	4	PC-1		0	Reading a textbook, additional literature. Work with lecture notes. To make the scheme of microbiological diagnosis of syphilis, relapsing fever, leptospirosis. Take into account the results of Wasserman reaction. Perform microprecipitation reaction with cardiolipin antigen. Draw a table with the necessary ingredients for the reaction of immobilization treponema, and immunofluorence. To microscopy and draw Borrelia in a smear of blood from a patient with relapsing fever.
3.23	Rickettsiae of epidemic and endemic typhus. Coxiella burneti of Q-fever. Morphology, culture and pathogenic properties, epidemiological features. Role in human pathology. Principles of laboratory diagnostics, treatment and prevention. /Lec/	4	2	PC-1		0	

3.24	Microbiological diagnostics of epidemic and endemic typhus, Q-fever. Preparations for etiotropic and specific therapy, General and specific prevention of these pathologies. /Pr/	4	4	PC-1		0	Reading a textbook, additional literature. Work with lecture notes. To make the scheme of bacteriological and serological diagnosis of rickettsiosis disease. Classification of rickettsioses.
3.25	Colloquium №3 /Pr/	4	4	PC-1		0	
3.26	The role of staphylococci in the development of generalized processes in children of the first year of their life /SIW/	4	1	PC-1		0	
3.27	The Lyell's Syndrome /SIW/	4	1	PC-1		0	
3.28	The role of streptococci in development immune inflammation connective tissue, in development rheumatism /SIW/	4	1	PC-1		0	
3.29	Classification of mycobacteria /SIW/	4	1	PC-1		0	
3.30	Pathogens of keratomycosis (epidermophytosis, microsporia, trichophytosis), morphological and biological properties, diagnostics, treatment and prevention. /SIW/	4	1	PC-1		0	
3.31	The causative agents of ringworm – types, morphological and biological properties, diagnosis, treatment and prevention. The causative agents of mycoses subcutane (sporotrichosis, mycetoma), morphological and biological properties, diagnosis, treatment and prevention. /SIW/	4	1	PC-1		0	
3.32	The causative agents of (visceral) deep mycoses (histoplasmosis, the coccidioidomycosis, cryptococcosis), morphological and biological properties, diagnosis, treatment and prevention /SIW/	4	1	PC-1		0	
3.33	The role of E. coli in pathology of children of the first year of their life /SIW/	4	1	PC-1		0	
3.34	The role of Proteus and Klebsiella in human pathology. /SIW/	4	1	PC-1		0	
3.35	Particularly dangerous and quarantine infections: characteristics, properties of microbes-selection criteria, causative agents of especially dangerous infections, principles of diagnosis. /SIW/	4	1	PC-1		0	
3.36	Modern classification of rickettsiosises' /SIW/	4	1	PC-1		0	

	Section 4. Medical Virology			PC-1			
4.1	ARVI Viruses, influenza, parainfluenza, Rhino, corona, RS-, and adenoviruses. Measles virus, parotitis. Morphology, antigens, cultivation, pathogenesis and clinical features. Principles of laboratory diagnostics, treatment and prevention /Lec/	4	2	PC-1		0	
4.2	Microbiological diagnostics of infections caused by viruses of influenza, parainfluenza, adenovirus, rhinovirus, coronavirus, RS virus, mumps viruses, measles. Preparations for etiotropic and virus specific therapy, General and specific prevention of these pathologies. /Pr/	4	4	PC-1		1	Reading a textbook, additional literature. Work with lecture notes. To make the scheme of virological and serological diagnosis of acute respiratory diseases. To perform hemagglutination inhibition test of HAI for the detection of anti-influenza antibodies with paired serum in patients with influenza.
4.3	Enteroviruses: polioviruses, Coxsackie, ECHO. Hepatitis A, E, B, C, D viruses. Morphology, antigens, cultivation, pathogenesis and clinical features. Principles of laboratory diagnosis, treatment and prevention. / Lec /	4	2	PC-1		0	
4.4	Microbiological diagnostics of infections caused by viruses of polio, Coxsackie, echo. Diagnosis of viral hepatitis A and E. Drugs for etiotropic and specific therapy, General and specific prevention of these pathologies. /Pr/	4	4	PC-1		0	Reading a textbook, additional literature. Work with lecture notes. Take into account the reaction of biological neutralization of BNT in poliomyelitis
4.5	HIV – human immunodeficiency virus. Morphology, antigens, cultivation, pathogenesis and clinical features. Principles of laboratory diagnostics, treatment and prevention. /Lec/	4	2	PC-1		0	
4.6	Microbiological diagnostics of infections caused by viruses hepatitis B, C and d Delta viruses. Microbiological diagnosis of HIV -infections. Preparations for the specific therapy, General and specific prevention of this pathology. /Pr/	4	4	PC-1		1	Reading a textbook, additional literature. Work with lecture notes. Draw a sequence diagram for ELISA test to identify antigens in the blood serum of the patient with HIV infection. To name the tests used for differential diagnosis of parenteral hepatitis B,C,D.

4.7	Arbo - and rhabdoviruses – encephalitis and hemorrhagic fever. Rabies. Virus Morphology, antigens, cultivation, pathogenesis and clinical. Features Principles of laboratory diagnostics, treatment and prevention. /Lec/	4	2	PC-1		0	
4.8	Microbiological diagnostics of arbovirus infections – encephalitis, hemorrhagic fever. Microbiological diagnosis of rubella, rabies. Preparations for etiotropic and specific therapy, General and specific prevention of this pathologies. /Pr/	4	4	PC-1		0	Reading a textbook, additional literature. Work with lecture notes. To make schemes of virological, serological, biological diagnostics of viral encephalitis and hemorrhagic fever. Draw Taurus Babesh-Negri in smears of prints and histological sections of the brain.
4.9	Herpesviridae family viruses –herpes, chickenpox, cytomegalovirus. Morphology, antigens, cultivation, peculiarities of pathogenesis and clinical features. Principles of laboratory diagnostics, treatment and prevention. Slow viral infections. Prions and prion diseases. Oncogenic viruses. /Lec/	4	2	PC-1		0	
4.10	Microbiological diagnostics of herpesvirus infections and smallpox. Preparations for the specific and specific therapies. General and specific prevention of this pathology. /Pr/	4	4	PC-1		0	Reading a textbook, additional literature. Work with lecture notes. To make the scheme of microbiological diagnosis of herpes virus infections and smallpox. Classification features of the structural organization, properties of herpes viruses.
4.11	Oncogenic viruses. History. Oncogenicity of viruses. genomic DNA, genomic RNA. Features of the interaction between oncogenic viruses and cells. Oncogenic retroviruses. Pathogens of slow viral infections. The history of the discovery. Slow viral infections caused by prions (prion diseases). / Lec /	4	2	PC-1		0	

4.12	Slow viral and prion diseases. Causes and characteristics of diseases. Principles of diagnosis, treatment, prevention. Oncogenic viruses – genomic DNA and RNA, classification. Mechanism of viral oncogenesis. /Pr/	4	4	PC-1		0	Reading a textbook, additional literature. Work with lecture notes. To make the scheme of microbiological diagnosis
4.13	Protozoan infections: etiology, ways of transmission of infection, mechanisms of disease development, methods of laboratory diagnostics. Principles of therapy and prevention: general and specific. /Pr/	4	4	PC-1		0	
4.14	Colloquium №4 /Pr/	4	4	PC-1		0	
4.15	Nosocomial infection: etiology, ways of transmission, mechanisms of disease, methods of laboratory diagnostics. Principles of therapy and prevention: general and specific. /Pr/	4	4	PC-1		0	
4.16	The virus of atypical pneumonia, role in human pathology. Laboratory diagnostics. Therapy and prevention /SIW/	4	1	PC-1		0	
4.17	Viruses of hand -foot and -mouth disease. Pathogenesis. Laboratory diagnosis. Therapy and prevention. /SIW/	4	1	PC-1		0	
4.18	Principles of therapy and prevention of HIV infection and AIDS. Development of drugs for treatment and prevention. Congenital HIV- infection. /SIW/	4	2	PC-1		0	
4.19	Ebola virus. Pathogenesis. Laboratory diagnostics. Therapy and prevention. /SIW/	4	1	PC-1		0	
4.20	HTLV – human T-lymphotropic viruses. Pathogenesis. Laboratory diagnostics. Therapy and prevention /SIW/	4	1	PC-1		0	
4.21	Toxoplasmosis. Types. Pathogenesis of diseases. Diagnostics. Therapy and prevention. Teratogenic effect of germs on the foetus. /SIW/	4	1	PC-1		0	
4.22	Plasmodium malaria. Types. Cycles of developments. Pathogenesis. Diagnostics. Therapy and prevention. /SIW/	4	2	PC-1		0	
4.23	Leishmaniasis. Types. Pathogenesis of disease. Diagnostics. Therapy and prevention /SIW/	4	2	PC-1		0	

4.24	Lambliasis. Pathogenesis. Diagnostics. Therapy and prevention /SIW/	4	2	PC-1		0	
4.25	Amoebae. Types. Pathogenesis. Diagnostics. Therapy and prevention. /SIW/	4	2	PC-1		0	
4.26	Trichomonas. Types. Pathogenesis of disease. Diagnostics. Therapy and prevention. /SIW/	4	2	PC-1		0	
4.27	Dysbacteriosis. Factors affecting its formation. Diagnostics. Treatment and prevention /SIW/	4	2	PC-1		0	
4.28	Opportunistic infection: etiological factor, mechanism of development of the disease, diagnosis, principles of treatment and prevention. /SIW/	4	2	PC-1		0	
4.29	Childhood viral infections. Features of antiviral immunity's. achievements and challengin antiviral drug therapy. /SIW/	4	2	PC-1		0	

5. ASSESSMENT FUND

5.1. Advancement Questions and Assignments

Questions to check students competence knowledge:
3rd semester
Systematics and nomenclature of microorganisms,
Prokaryotes (bacteria), and microbial eukaryotes (protozoa and fungi), structure, chemical composition, function.
Taxonomic categories: Kingdom, division, family, genus, species.
Intraspecific categories: biovar, serovar, pagevar, mortar.
Population, culture, strain, clone.
The morphology of the bacteria. The main forms (coccoid, rod-shaped, twisted), the size of bacterial cells.
Permanent and non-permanent bacterial cell structures: nucleoid, cytoplasm, ribosomes, cytoplasmic membrane, mesosomes, cell wall; spores, capsule, saw, flagella, inclusions.
Chemical composition and functional value of individual organoids.
The difference in the structure of gram-positive and gram-negative bacteria.
Protoplasts, spheroplasts and L-forms of bacteria.
The main methods of investigation of bacteria morphology: light microscopy with immersion lens, dark-field , phase-contrast, fluorescent microscopy.
Bacterial preparations. Simple and complex staining methods.
Methods of gram staining, Ziehl-Nielsen, Agesci, Nasser, Burri-Gins, etc.
Structural features of actinomycetes, spirochetes, rickettsiae, chlamydia, mycoplasma.
Feeding bacteria. Sources of nitrogen, carbon, minerals and growth factors. Autotrophs, heterotrophs.
The mechanism of transfer of nutrients to the bacterial cell (simple and light diffusion, active transport).
Breathing in bacteria. Aerobic and anaerobic types of biological oxidation.
The growth and reproduction of bacteria. Mechanisms and speed of reproduction.
Phases the microbial growth in liquid nutrient medium under stationary conditions.
Colonies. Features of their formation in different types of bacteria. Nutrient media (simple, special, differential-diagnostic, elective, selective).
Requirements of nutrient media.
Principles and methods of isolation of pure cultures of aerobic and anaerobic bacteria.
Methods of creating anaerobiosis.
Stages of isolation of pure cultures of bacteria, their identification. Antibiotics.
Definition of antibiotic, requirements for antibiotics.
Microbial antagonism, its mechanisms.
Classification of antibiotics by chemical structure, origin, methods of production, mechanism, spectrum of antimicrobial action.
Methods of studying antibiotic sensitivity of bacteria (method of serial dilutions, diffusion in agar).
Bacterial genetics
Organization of genetic material in bacterial cells: the bacterial chromosome (nucleoid), plasmids, transposons, insertion elements.
Difference between the genome of prokaryotic and eukaryotic cells, panatierre, and phenotype. Types of variability in bacteria.
Modification variability, its mechanisms and forms of manifestation in bacteria.
Genotypic variability. Mutations in bacteria and their varieties. Mechanisms: deletions, translocation, inversion, duplication, inertia.
Genetic recombination. Transformation, transduction and conjugation. Microbiological foundations of genetic engineering and biotechnology.
Pathogenicity factors. Non-specific factors of human body protection (cellular and humoral).
Classification of staphylococci, streptococci. Morphology, cultural properties, biological signs of staphylococci, streptococci. Toxins and enzymes of pathogenicity, methods of their determination.
Diseases caused by staphylococci, streptococci.. Methods of microbiological diagnostics. Specific prevention and specific therapy.
Morphology, cultural properties, antigenic structure, toxins of meningococcal, gonococcal, chlamydia, mycoplasma diseases, sources and ways of spreading. Pathogenesis. Methods of microbiological diagnostics. Specific prevention and therapy.
Corynebacterium diphtheriae – morphology, cultural and biochemical properties, lysogeny. Properties of the diphtheria bacilli toxin.
Localization of diphtheria bacteria in the body and features of the pathogenesis of diphtheria. Methods of microbiological diagnostics for diphtheria. Specific features of immunity in diphtheria and methods of its evaluation. Drugs for specific prophylaxis and therapy, their preparation and use.
Modern classification of mycobacteria. Causative agents of human tuberculosis. Morphology, antigenic structure, pathogenicity factors. Sources, ways of transmission and pathogenesis of tuberculosis. Methods of microbiological diagnosis of tuberculosis. The specific features of immunity in tuberculosis. Specific prophylaxis.
The main features of the causative agent of leprosy. Sources, ways of infection, pathogenesis, clinical picture. Methods of laboratory diagnostics.
Actinomycetes, morphology, cultivation, antigenic structure. Pathogenesis of the disease in humans. Methods of laboratory diagnostics of actinomycosis. Taxonomy of fungi. Morphology, physiology, ecology of fungi.
Classification of fungal infections. Superficial, deep, opportunistic. The principle of diagnosis. Treatment, prevention.

4th semester

Modern classification of Enterobacteriaceae family.
Morphological and cultural properties of E. coli. Antigens. Their chemical nature and localization in bacterial cells.
Diseases caused by enteropathogenic Escherichia.
Methods of microbiological diagnostics. Conditionally pathogenic Escherichia, physiological role in the human intestine and sanitary-indicative value. Signs of differentiation of the conditionally-pathogenic from enteropathogenic bacteria.
Current international classification of Shigella.
Morphology, cultural properties and toxin formation. Antigens of Shigella, their chemical composition and basic properties. Sources of infection and ways of transmission, pathogenesis and main symptoms of dysentery.
Methods of microbiological diagnosis of dysentery. Treatment and specific prevention of dysentery.
Pathogens of Typho-paratyphoid diseases and food poisoning.
Morphological, cultural properties, toxin formation, antigenic structure. Pathogenesis and nature of immunity.
Methods of microbiological diagnostics. Specific prevention of Typho-paratyphoid diseases, their treatment.
Causative agents of salmonellosis. Sources and ways of infection.
Pathogenesis. Methods of microbiological diagnosis of salmonellosis.
Classification of causative agents of cholera. Biowares.
Morphological, cultural, biochemical, antigenic properties. Epidemiology. Pathogenesis, clinical picture of cholera.
Methods of microbiological diagnostics. Specific prevention and therapy.
Bonded clostridial anaerobes. Pathogens of gas gangrene, tetanus and botulism, their morphological, cultural properties, toxins and enzymes of pathogenicity.
Mechanism of infection, pathogenesis and clinical picture.
Methods of microbiological diagnostics. Specific therapy and prevention of anaerobic infections.
Causative agents of plague and tularemia.
Morphological, cultural features. Pathogenicity factors. Sources and ways of transmission.
Pathogenesis and clinical picture. Methods of microbiological diagnosis.
Drugs for the treatment and specific prevention.
Morphology, cultural properties, toxin formation, antigenic structure of anthrax sticks.
The source of infection. Way of transmission.
Pathogenesis and clinical picture. Methods of microbiological diagnostics.
Specific prevention and specific therapy of anthrax.
Classification of Brucella.
Morphology, cultural properties, toxin formation, antigenic structure, biochemical activity of brucella.
The source of infection and ways of transmission of brucellosis. Clinical forms.
Methods of microbiological diagnosis of brucellosis. Specific prevention and therapy of brucellosis.
Classification of spirochetes and their role in human pathology.
Biological characteristics of Treponema pallidum and features of its cultivation.
Pathogenesis of the disease and nature of immunity in syphilis.
Microbiological diagnosis of syphilis, a complex of serologic reactions (qualifying and certifying).
Morphological, cultural characteristics of causative agents of epidemic and endemic relapsing fever.
Source of infection, transmission routes.
Pathogenesis and nature of immunity.
Microbiological diagnostics of relapsing fever.
Classification of leptospira and their role in human pathology.
Epidemiology. Pathogenesis and character of immunity in leptospirosis.
Microbiological study of leptospirosis and determination of the species and typical belonging of leptospirosis. Preparations used for the specific prevention of leptospirosis.
Classification of rickettsial diseases. Rickettsia Prowazeki and the Musser – the causative agents of epidemic and endemic typhus, their biological characteristics. Brill-Zinser Disease.
Coxiella burneti – the causative agents of Q-fever. Specific prevention of rickettsiosis.
Conduct experiments with phages on a dense and liquid nutrient medium.
Explain the mechanisms of hereditary and non-hereditary types of variability.
Make experiments on genetic recombination – transformation, transduction, conjugation.
Explain the logic of molecular genetic methods for diagnosis of diseases (method of probes, PCR).
Conduct the experiment on phagocytosis. Determine the activity and completeness of phagocytic reaction.
Detect in the finished smears of pus from a patient with acute gonorrhoea unfinished phagocytosis
Dissect and examine bacteriologically the bodies of the dead mice subjected to experimental infection
Prepare smear prints from the bodies of mice, staining by gram, detect pathogens, draw conclusions
Prepare for the demonstration:
Determine the hemolytic activity of Staphylococcus on blood agar, lecithinase activity of Staphylococcus on the mannitol salt agar;
Evaluate the response of staphylococci plasmacoagulase
Choose and take the relevant material to study in accordance with the properties of the causative agent and pathogenesis of the disease
Prepare a swab and preparations to study with the microscope.
Determine the methods of staining and stain preparation.
Differentiate cocci in the microscopic slide.
Choose the culture media to cultivate, sow, identify the features of the bacteria growth for their primary identification
Allocate a pure culture of typical colonies

Determine morphological, biochemical and antigenic properties of the isolated pure culture of bacteria
Determine the sensitivity of microbial cultures to antibiotics. Select the material for the study according to the localization of lesions in compliance with the rules of aseptic and biological safety
Sow on the appropriate nutrient medium, the characteristic features of the colonies to isolate a pure culture
Prepare smears and preparations for painting and microscopy.
Differentiate Neisseria in the microscopic slide.
Determine the sensitivity of selected cultures of Neisseria to antibiotics
Properly collect the samples for the examination – the swabs (but not strokes) from the walls of the urethra and cervix.
Detect specific antichlamydia, antimycoplasma antibodies in the serum of patients by using ELISA,
Collect the samples of biomaterial for research, taking into account the pathogenesis, clinical manifestations and time of delivery of the material to the bacteriological laboratory
Use selective nutrient media for cultivation of causative agents of diphtheria and whooping cough, describe the characteristic features of colonies to allocate a pure culture, investigate the toxigenicity and perform a test to identify the causative agents of diphtheria and whooping cough.
Prepare and stain preparations for microscopy, choose methods of painting, allowing to identify the characteristic morphological features.
Determine the sensitivity of isolated pure cultures to antibiotics by disco-diffusion method
Prepare the micro specimens from sputum and stain them by Ziehl-Nielsen
Make the scheme of bacteriological method of research for tuberculosis and actinomycosis with identification and differentiation of pathogens
Differentiate pathogenic (nontuberculous) mycobacteria, the causative agents of mycobacteriosis.
Prepare to smear and dye for the detection of specific morphological characteristics (hyphae septate, tight seams spores, microconidia, yeast cells with spores, yeast cells pseudomycelium

4th semester
Make sowing of feces to the Endo and Ploskirev media
Determine the growth of colonies on the media of Endo, Ploskirev and distinguish a pure culture from characteristic colonies
Take into account the results of planting a pure culture on the media of Hissa and nutrient broth
Make the agglutination test with immune diagnostic serum (E.coli and Shigella)
To collect the blood culture, urinoculture and coproculture
To identify the selected clean culture for morphological, biochemical and antigenic characteristics
To interpret the results of serological reactions
Conduct microbiological, immunological diagnosis of cholera
To differentiate pathogenic from nonpathogenic: Vibrio cholera and V.cholerae serovar
To determine the sensitivity of vibrios to bacteriophages
Comply with safety regulations and rules of work with infectious material, which represents a special biological danger
Provide protection of the population in the conditions of the epidemic focus
Proper taking of the test material for laboratory diagnosis and study of the allocation of the causative agents of anaerobic infections;
To make the scheme of bacteriological method of research of gas gangrene, tetanus, botulism;
To identify cultural properties;
To determine the types of exotoxin pathogens of gas gangrene, botulism;
Observe the mode of operation in specialized laboratories in the study of patients and objects for the presence of plague (quarantine infection), representing a special biological danger;
Make the scheme of bacteriological diagnostics of plague and tularemia;
To identify and differentiate a ready sample at the drug culture plague, tolerability from similar microorganisms;
Evaluate the results of serological reactions by determination of antibodies in serum of patients with tularemia;
Evaluate the result of the reaction of thermoprecipitation by Ascoli and make a conclusion about the detection of anthrax antigen in the tested material
Choose nutrient medium for cultivation of the causative agents of anthrax, brucellosis, cultivate, identify the characteristic of the colony, isolate a pure culture;
Differentiate epidemic typhoid fever from endemic and Brill-Zinser disease;
Explain the choice of the studied material for virological and serological research methods.
Make the scheme of laboratory diagnostics of ARVI (influenza, measles, mumps)
Carry out the indication and identification of ARVI viruses in the infected chicken embryo and in cell culture.
Perform serological test with paired sera for the retrospective diagnosis of ARVI.
Explain the choice of the studied material for virological and serological methods of investigation for enterovirus infections.
Make the scheme of laboratory diagnostics of enterovirus infections.
Carry out indication and identification by demonstration materials of enterovirus in cell culture.
Perform a serological test with paired sera for the retrospective diagnosis of enteroviral infections.
Explain the choice of the studied material for the diagnosis of enteral and parenteral hepatitis.
Make the scheme of laboratory diagnostics with indication and identification of pathogens.
Take into account serological reactions of ELISA and RIA for the diagnosis of hepatitis from demonstration materials in the wells of polystyrene panels
Explain the choice of the studied material for the diagnosis of HIV infection and make a scheme of laboratory diagnostics
Explain the choice of the studied material for the diagnosis of arbovirus infections and make a scheme of laboratory diagnostics.
Consider serological tests (HAI) to determine antiparvovirus antibodies in paired sera.
Explain the choice of the studied material for the diagnosis of rabies and make a scheme of laboratory diagnostics
Provide first aid treatment for stray dog bites.
Explain the choice of the studied material for the diagnosis of herpesviral infections and make a scheme of laboratory diagnostics with

Questions to test students' competence "Expertise":

3rd semester

Safety roles for the microbiological laboratory, methods of disinfection of waste material.
Basic skills for working with the material containing pathogenic and conditionally pathogenic microorganisms.
Basic skills for working with modern devices used for sterilization (autoclave, dry-roasting chamber); for creation of anaerobic conditions(anaerostat, desiccator); for cultivation of microorganisms (thermostat).Methods of identification of microorganisms in smears from sputum and pure cultures.
Methods of differentiation of the main groups of studied microorganisms in finished products (by the presence of spores, capsules, inclusions).
The technique of sowing and transplanting microorganisms on nutrient media (liquid and dense) in order to obtain isolated colonies; isolation of pure cultures of aerobic and anaerobic bacteria.
Methods of identification and differentiation of pure cultures to the type of micro-organism taking into account morphological, tinctorial, cultural, biochemical, toxigenic and antigenic properties of infectious agents.
Rules of registration of the Protocol with justification of the made diagnosis.
Methodology of interpretation of microbiological research results and determination of antimicrobial activity of chemotherapeutic preparations; microbiologically reasonable rules of their application.
Preparation technique for cell culture from a chicken embryo.
Interpretation of results of viruse cultivation in chicken embryo and in culture of cells.
Interpretation of results of visible manifestations of virus cultivation in a chicken embryo and in culture of cells.
Interpretation of experimental results with phages to determine the type of microbe.
Interpretation of experimental results on genetic recombinations.
Interpretation of the PCR results.
Assessment of the infectious process
To assess the significance of non-specific factors of body protection
Ways of interpreting the results of microscopic examinations, serologic reactions for testing chlamydia and mycoplasmosis
Selection of drugs used for diagnosis and specific prevention of tuberculosis, actinomycosis
Differentiation methodology of of the main groups of fungi in the finished preparations
Methods for interpretation of the results of mycological, immunological studies

4th semester

Differentiation methods for causative agents of shigellosis and esherichiosis; morphological, biochemical and antigenic characteristics
Justification of the use of eubiotics in the treatment of intestinal infections
The main methods of sterilization, disinfection and antiseptic treatment of tools and equipment in particularly dangerous infections
Methodology of interpretation of results for microbiological and immunological research, determination of antimicrobial activity of medicinal preparations and their choice for treatment of patients
Methods of selection of anticholeric immunobiological preparations for adequate prevention of cholera rapid diagnosis of plague; allergic breakdown in tularemia; serological method of diagnosis of tularemia and essential ingredients
Method used to determine the contamination of raw materials (wool, fur, fur) with anthrax sticks;
Evaluation of the results of serological reactions for the detection of antibodies in the serum of patients with brucellosis;
Performance of Hedelson reaction;
Interpretation of serological test results for testing syphilis (microprecipitation reaction, immobilization test, RIF (direct and indirect variants), and ELISA as diagnostic tests).Wasserman reaction;reaction of microprecipitation with cardiolipin antigen; the PCR reaction in the diagnosis of syphilis;
Rickettsia agglutination reaction (RAR);
Interpretation of the results of serological reactions.
Selection of drugs for the diagnosis, treatment and specific prevention of ARVI.
Selection of drugs for the diagnosis, treatment and specific prevention of measles and mumps.
Interpretation of the results of visible manifestations of enterovirus in cell culture.
Interpretation of the results of serological reactions in the diagnosis of enterovirus infections, hepatitis A and E.
Selection of drugs for diagnosis, treatment and specific prevention of enterovirus infections, hepatitis A and E.
Interpretation of the results of serological reactions in the diagnosis of hepatitis B, C, D, HIV infection.
Selection of drugs for the diagnosis, treatment and specific prevention of hepatitis B, C, D, HIV infections.
Interpretation of results of microbiological diagnostics of rabies.
Selection of products for diagnostics and specific prophylaxis of rabies.
Selection of drugs for the diagnosis, treatment and specific prevention of herpesviral infections.
Interpretation of the results of microbiological diagnosis of smallpox.
The skills for working with a particularly dangerous infection and quarantine infections.
Selection of drugs for the diagnosis and specific prevention of smallpox.
Interpretation of results for microbiological diagnostics of slow virus diseases.
Interpretation of results for microbiological diagnostics of virus-induced tumors

5.2. Course Papers Themes

The course paper is not provided by the curriculum

5.3. Assessment Fund

EXAMPLES OF TEST TASKS
1.The shape of the bacterial cell is determined by the structure:
1.Cytoplasmic membrane 2.Capsid 3.Capsules 4.Disputes 5.Cell wall
2.Indication of viruses in laboratory animals:
1.Color sample 2.The formation of plaques 3.The characteristic clinic and the formation of intracellular inclusions 4.PCR 5.IFT
3.The presence of the cell wall determined by:
1.Luminescent microscopy 2. "Crushed drop" Method 3. " Thick drop" Method
4.The ultracentrifuge forces 5.Plasmolysis
4.Selective media are:
1.Blood agar 2.Nutrient agar 3.Mannitol-salt agar 4.Nutrient broth 5.Chocolate agar
5.Pathogenicity is the potential ability of microbes:
1.To shape the immune system 2.To be lyzed by phages 3.To ferment the carbohydrates 4.To cause infection 5.To split proteins
6.Immuno-biological preparations for the creation of active artificial immunity:
1.Immunoglobulin 2.Hyperimmune serum 3.Vaccine 4.Adjuvants 5.Interferon
7.Meningococci are characterized by:
1.Mobility 2.Sporulation 3.Gram-positive colouring 4.Intracellular arrangement
5.Anaerobic type of respiration

The causative agents of visceral deep mycoses (histoplasmosis, coccidioidomycosis, crytococcosis), morphological and biological properties, diagnosis, treatment and prevention.
The role of E. coli in the pathology of children of the first year of their life.
The role of Proteus and klebsiell in human pathology.
Especially dangerous (OOI) and quarantine infections: characteristics, properties of microbes – criteria for the selection of pathogens highly dangerous infections, principles of diagnostics.
Modern classification of rickettsiosis disease.
The virus of atypical pneumonia, role in human pathology. Laboratory diagnostics, therapy and prevention.
Viruses of hand foot and mouth disease. Pathogenesis. Laboratory diagnostics, therapy and prevention.
Principles of therapy and prevention of HIV infection and AIDS. Challenges in the development of drugs for the treatment and prevention. Congenital HIV infection.
Ebola virus. Pathogenesis. Laboratory diagnostics. Therapy and prevention.
HTLV – human T-lymphotropic viruses. Pathogenesis. Laboratory diagnostics. Therapy and prevention.
Toxoplasma. Views. Pathogenesis. Diagnostics. Therapy and prevention. Teratogenic effect of microbes on foetus.
The malaria Plasmodium. Types. Development cycle. Pathogenesis. Diagnostics. Therapy and prevention.
Leishmanias. Types. Pathogenesis. Diagnostics. Therapy and prevention.
Lamblias. Pathogenesis. Diagnostics. Therapy and prevention.
Amoebae. Types. Pathogenesis. Diagnostics. Therapy and prevention.
Trichomonas. Types. Pathogenesis. Diagnostics. Therapy and prevention.
Dysbacteriosis. Factors influencing its formation. Diagnostics. Treatment and prevention.
Opportunistic infection: etiological factor, mechanism of disease development, diagnostics, principles of treatment and prevention.
Childhood viral infections. Features of antiviral immunity. Challenges in the development of drugs for antiviral therapy.

5.4. List of Assessment Tools

Students recitation
Interview
Test
Case studies
Module
Reference paper
Report with presentation
Grading system in Appendix №1

6. COURSE (MODULE) METHODOLOGICAL AND INFORMATIONAL SUPPORT

6.1. Recommended Reading

1. Textbook of microbiology. Ananthanarayan and Paniker's. New Delhi, India. 2009.
2. Essential Immunology. Ivan M. Roitt and Peter J.Delves. 12th edition. 522p. 2011.
3. Textbook of Immunology. Arvind Kumar. 309p. 2013. New Delhi. India.
4. How the Immune system works. Lauren Sompayrac. 136p. 2012.
5. Clinical immunology, allergy. Under the editorship of G. Lolora Jr. et all., M., 2000.
6. A.Royt., J.Brostoff, D. Mayl. Immunology. 2008.
7. Abbas AK et al. Cellular and Molecular Immunology, 2nd edition. Philadelphia : Saunders.
8. Chapel H. and M. Hanney 1993. Essentials of Clinical Immunology, 5th edition. London: Blackwell Science.
9. Hudson L. and F.C. Hay. 1989. Practical Immunology, 3rd edition. Oxford: Blackwell.
10. Roitt I.M. and O. Delves ed. 1992. Encyclopedia of Immunology. London: Academic Press.
11. Rose N.R. et al. 1986. Manual of Clinical Immunology. 3rd edition. Washington DC: American Society for Microbiology.
12. Textbook of Microbiology Baveja C.P. New Delhi. India. 2006.
13. Koonin EV, Senkevich TG, Dolja VV. The ancient Virus World and evolution of cells. *Biol. Direct.* 2006;1:29.
14. "virus, n." OED Online. Oxford University Press, March 2015. Web. 23 March 2015.
15. Temin HM, Baltimore D. RNA-directed DNA synthesis and RNA tumor viruses. *Adv. Virus Res.*. 1972 [Retrieved 16 September 2008];17:129–86.

6.3. List of Information and Education Technologies

6.3.1 Competence-based Educational Technologies

6.3.1.1	Traditional educational technologies: lectures, practical classes, laboratory works
6.3.1.2	Lecturing involves the use of multimedia
6.3.1.3	Equipments. Practical training with the use of tables, stands, visual aids
6.3.1.4	Innovative educational technologies: role-playing games, specific analysis
6.3.1.5	situations, preparation of reports by students with presentations on given topics.
6.3.1.6	Information and educational technology: computers used by students
6.3.1.7	technology and Internet resources. Educational videos.

6.3.2 List of information reference systems and software

6.3.2.1 http://www.medlinks.ru/ - MedLinks.ru

6.3.2.2 http://elibrary.ru/defaultx.asp - Scientific electronic library

6.3.2.3 https://www.ncbi.nlm.nih.gov/pubmed/ - US National library of medicine

6.3.2.4 http://rmic.med.kg/ru/ - Republic medico-information center Bishkek city

7. COURSE (MODULE) LOGISTICS

7.1	Logistics discipline microbiology, virology
7.2	There are 5 classrooms and 2 rooms for teachers of microbiology, virology has
7.3	training room equipment:
7.4	1. Furniture and stationary equipment
7.5	- class board
7.6	- Table and chair for the teacher;
7.7	- Tables and chairs for students;
7.8	- General desktop to work with reagents;
7.9	- bookcase;
7.10	- Cabinet for reagents;
7.11	- Cabinets for tools and equipment.
7.12	2. Teaching visual aids
7.13	- Posters, slides, photographs;
7.14	- Sample colonies of bacteria, fungi on Petri dishes;
7.15	- Slides of bacteria, fungi, protozoa;
7.16	- Sample referral form for microbiological studies, recording the results of the survey, etc.;
7.17	- Photos depicting lesions from infectious agents;
7.18	- Posters and other graphic materials.
7.19	3. Equipment and devices
7.20	- Autoclave;

7.21	- Distillation (D-1) (4.5 liters per hour) Electric;
7.22	- Microscopes with immersion system;
7.23	-Refrigerator;
7.24	- Dry Heat cupboard;
7.25	- Thermostat for the cultivation of microorganisms.

8. Course (Module)Proficiency Methodical Guidelines (For Student) (MODULE)

1. TIPS ON PLANNING AND ORGANIZING TIME NEEDED TO STUDY DISCIPLINES.
It is recommended to organize the time required for the study of the discipline as follows:
The study of lecture notes for the practical class – 15-20 minutes.
The study of the theoretical material in the textbook and the outline – 1 hour per week.
Preparation for practical training-2 hours. -3 hours 20 minutes weekly
2. INDividual WORK FOR STUDYING DISCIPLINE.
For better understanding the study material and learning the following sequence of actions is recommended:
-To prepare for the practical class, the student needs to familiarize with the methodological development of upcoming lesson (placed on the stand of the Department)- Repeat the necessary material from the disciplines preceding the study of normal physiology.
-Find answers to questions for self-training in lecture notes in the main and additional literature.
- do written homework In the workbook (drafting of outline, tables, protocol of practical work, drawing charts, graphs)
3. PREPARATION FOR TESTS Use the lecture material and read the basic and additional literature.
4. PREPARING FOR WORKSHOPS AND INTERVIEWS
Look through the list of questions. Repeat the studied to the "memorization" of the material, it is very important to understand the subjects studied.
5. PREPARATION FOR MIDPOINT ASSESSMENT
Revise the theoretical material according to the list of exam question. Be able to make diagrams, graphs and perform calculations of some physiological parameters'. Use methods of assessing main indicators of the activities of the human body systems.
6.PREPARATION REPORT Main steps in preparing the report for the session:
* select the theme (see paragraph 5.3.);
•consult the teacher;
* write the report outline;
* work with literature, collec material t;
* write the text of the report and draft the presentation;
* prepare the report and submit it to the teacher before the beginning of the class.
* present, the report and answer questions.

7.GUIDELINES FOR THE PREPARATION OF PRESENTATIONS

Presentation structure. The first slide should contain the title of the presentation and the names of its authors, the logo of the KRSU, the name of the discipline, course, group. The second slide should contain the plan of the presentation.

Presentation must be completed with the conclusions obtained during the work. In the last slide sources used (including Internet resources) are listed Contrast ratio. Slides should have a high contrast.

Keep in mind that the computer display colors look much brighter than those on the screen in the hall. When projecting to a large screen, especially if the room is a little dark, all the colors fade dramatically. Therefore, the most expressive slides have dark background(dark blue or black) with white or yellow letters. Blue letters on a blue background look great on computer but merge on the big screen. Black letters on the blue or red field are almost invisible. Text slides. In slides with text it is recommended to formulate abstracts as succinctly as possible and divide them into separate item. Each paragraph should contain a maximum of five to eight words (without excuse). Slides should not be overwhelmed. The size of the letters. You should use 28 or larger fonts. The text in smaller letters, is lost on the screen, its accessibility to the audience is sharply reduced.

Remember: 75% of the adult population has visual defects, and most short-sighted people not wearing glasses. it is better to present Digital material in the form of graphs and diagrams. bars and piece harts are especially good. They are easy to do in Excel, and then move to PowerPoint by selecting one of the slide templates, which provides graphics. You only need to remember, that on a large screen he color becomes pale. Therefore, at the moment of performance you may find that the yellow graph disappeared without a trace, and the pink and lilac segments merged into one. Volume and course of presentation. The optimal size of the presentation is 8 – 20 slides. A greater number of slides leads to the fact that the audience gets used to the change of symbols and ceases to concentrate on them. The slides should pay attention to most important information, and details to present in the form of comments in verbal form. Please note that the rate of change of slides should be about the same during the entire presentation. A presentation wins a lot if it consists not only of text slides.

•For variety and to attract the attention of listeners, it is useful to use several types of slides including such, where the text is given in two columns, pictures are combined with the text, etc.

* Schemes look good, in addition, they help listeners to structure the material.* Enliven the presentation of photos, portraits of famous people and brief information about their biography.

* Cartoons and funny pictures are always a success. Perceiving the new is a great job, so if you give audience not only knowledge, but also positive emotions, it will repay you with sincere sympathies and (very likely)applauses

* Colorful presentations are easy to create by applying ready-made presentation templates.

•Special effects for the audience, as spices for dinner. Bouncing letters and the occasional phrase –it's a great way to cheer the audience up. However, it is necessary to know the limit. The same applies to sound effects. Ringing breaking glass or the screeching of brakes causes unpleasant associations. Before you apply them, think, as far as it is justified. A negative reflex should not work against you.

Appendix №1

SCALE OF FRONTAL SURVEY EVALUATION (current control)

	Indicator name	Mark in%
1.	Understanding the problems and adequacy of the interpretation	0-20
2.	Logicality and consistency of oral statements	0-30
3.	The ability to extract the essence of the question from the topic	0-20
4.	Confidence of response	0-15
5.	Reasonable use of medical terminology	0-15
	Total points	0-100

SCALE OF EVALUATION OF THE SITUATIONAL TASK (current control)

	Indicator name	Mark in%
1.	Correctness of sampling of the test material in accordance with the presumptive diagnosis	0-10
2.	Correctness of the choice of the algorithm of actions	0-15
3.	Correctness and completeness of the interpretation of the results	0-40
4.	Correctness of the choice of additional diagnostic methods	0-20
5.	Completeness and correctness of the response with accompanying drawings	0-15
	Score points	0-100

SCALE OF ASSESSMENT OF THE TEST (mid-term assessment)

1. 5 closed questions in one test task.
2. The tasks include answers, one is correct and the other's are wrong.
3. The student must remember: in each assignment with the choice of one correct answer, one of the answers is correct
4. For each correct answer - 1 point.
5. The overall score is defined as the sum of the points scored. The mark is expressed in%.

SCALE OF ESTIMATION OF THE ABSTRACT (mid-term assessment)

	Indicator name	Mark in%
1.	The introduction clearly articulates the thesis corresponding to the topic of the essay. The task is to interest the researcher. The division of the text into the introduction, the main part and the conclusion is allotted. In the main part, the thesis advanced is coherent, and fully proved. The conclusion contains conclusions that follow logically from the content of the main part. Correctly, appropriately and sufficiently used terms. All the requirements for the task are fulfilled. While defending the essay, a complete understanding of the problem is demonstrated. To express one's thoughts, a simplistic-primitive language is not used.	85 – 100
2.	The introduction clearly articulates the thesis, corresponding to the topic of the essay, to a certain extent the task has been accomplished to interest the researcher. In the main part, it is logical, coherent, but not enough to prove the thesis advanced. The conclusion contains conclusions that follow logically from the content of the main part. Special terms are used. The protection of the essay demonstrates an understanding of the problem. To express their thoughts, the simplified-primitive chaos is not used.	75-84
3.	In the introduction, the thesis is formulated vaguely, does not quite correspond to the theme of the abstract. In the main part, the proposed thesis is proved insufficiently logical, unconvincing, inconsistent. Conclusions in the conclusion do not fully correspond to the content of the main part. Special terms are not always appropriate.	60 - 74

	While defending the essay, an incomplete understanding of the problem is demonstrated and the language of the work as a whole does not correspond to the student's course of study.	
4.	In the introduction, the thesis is missing or does not correspond to the topic of the essay. The division of the text into the introduction, the main part and the conclusion is, but in the main part there is no logically consistent disclosure of the topic. The conclusions do not correspond to the main part. There is no coherence in the presentation of the material. While defending the essay, a complete misunderstanding of the problem is demonstrated. The language of work can be estimated as primitive.	40 - 59
5.	The work done does not correspond to the topic.	40

SCALE OF ASSESSMENT OF THE REPORT WITH PRESENTATION (mid-term assessment)

		No answer 0%	Minimum answer 1-59%	The stated, open answer 60-69 %	complete answer 70-84%	exemplary, perfect response 85-100%
1.	Disclosure of the topic		The topic is not disclosed. There are no conclusions.	The topic is not fully disclosed. The conclusions are not made or are not substantiated.	The topic is revealed. An analysis was conducted without using additional literature. Not all conclusions are made or justified.	The topic is fully disclosed. Analysis was carried out using additional literature. The conclusions are made.
2.	Performance		Presented May information is not logically connected. Professional terms are not used.	Presented May information is systematized and not consistent. Used 1-2 profession national terms.	Presented May information is systematized and consistent. Used more than 2 professions national terms.	Presented May information is systematized and logically linked. Used more than 5 professions terms.
3.	Decor		Digital tools like Power Point are not used. There are many errors in the information provided.	Digital tools like PowerPoint are used partially. There are (3-4) errors in the information provided.	Digital tools like PowerPoint are used partially. There are (no more than 2) errors in the information provided	Digital tools like PowerPoint are used partially. There are no errors in the information provided.
4.	Answers on questions		No answers for the questions	Just answers for simple questions	Full form of answers	Answers to the questions are exhaustive with examples and explanations.
	Final grade	1	2	3	4	5

SCALE of ASSESSMENT THEORETICAL ASSIGNMENT (midterm – Colloquium)

	Indicator name	Mark in%
1.	1 question	0-100
2.	2 question	0-100
3.	3 question	0-100
4.	4 question	0-100
	Total points	0-100

Arithmetic mean - the sum of points/4
Estimated every question of the ticket:
"85-100%»
* deep and lasting learning of the topic or section;
* complete, consistent, competent and logical responses;
* demonstration of students ' knowledge in the scope of the program and further recommended literature;
* reproduction of educational material with the required degree of accuracy.

"75-84%»
• the presence of minor errors corrected after confidently studying additional and probing questions;
* demonstration of students ' knowledge in the scope of the program;
* clear presentation of the training material.

"60-74%»
* presence of insignificant mistakes in the answer which are not corrected by trained;
* demonstration of insufficient knowledge on the passed program to students;
* a structured, non-structured presentation of the training material in response.

"less than 60%»
* ignorance of the topic or section material;
• when you reply there is a serious error.

ASSESSMENT SCALE of results of midpoint assessment (exam)

During the semester, the work in practical classes (formative control), the delivery of control points (midterm control) is evaluated by the teacher, leading classes, and points are recorded in a sheet, available for viewing. The maximum number of points -100. For each control point, the student must score at least a minimum number of points. The final score is determined by summing the semester and exam scores.

The exam is conducted in oral, written, test form. A student must score at least 20 points in order to obtain a valid score in the exam.

Score scale to determine final grades:
85 - 100 points - " excellent»,
70 - 84 points - "good»,
60 - 69 points - "satisfactory»,
59 and less points - "unsatisfactory".

THE SCALE OF THE COMPETENCE ASSESSMENT RESULTS OF LEARNING

	No answer 0%	Minimum answer 1-59%	The stated, open answer60-69 %	Complete answer 70-84%	Exemplary, a worthy response 85-100%
Knowledge					
I level	Answer is not provided	Does not have a clear idea of the existence of microorganisms, their diversity	Knows the basic provisions on the presence of macro-and micro-organisms	Understands the specifics of the subject of Microbiology, the size and shape of microbes	There is an approach to the study of the development of the world from simple to complex
II level	Answer is not provided	Poorly oriented in the answer to the question, has a weak General training, is unable to describe the relationship between the cause (microbe) and the result (the	Knows, that microbe can cause disease,– cannot explain and appoint adequate therapy	Knows the main differences between microbes belonging to different kingdoms, the existence of microbes with different degrees of pathogenicity, tactics of treating the patient,	Able to present a cause - and-effect relationship - the development of the disease depends on the properties of the microbe, the state of macroorganism and environmental

		development of infectious disease)		the need for laboratory tests, on the basis of which prescribe etiotropic therapy	conditions, and for adequate treatment it is necessary to identify the microbe and study its properties, including the sensitivity to bactericidal drugs
III level	Answer is not provided	Admits mistakes, is not able to detect the relationship between the pathogenic properties of microbes and clinical manifestations	Able to distinguish the distinctive signs of different microbes, but finds it difficult to explain what causes the clinical symptoms of different diseases, never heard about nosocomial diseases	Knows the main differences of pathogens, pathogenesis and applied methods of diagnosis, including nosocomial infections, mass poisoning	Has a technique and analyzes the relationship between the properties of microbes, pathogenesis, clinic, diagnostic methods, therapeutic agents and preventive measures
Skills					
I level	Not able	Uneducated in sanitary and hygienic matters. Can redraw from the table without thinking about the differences between different cell types	Able to find the answer in the textbook, Internet	Knows about simple, ways of ensuring a healthy lifestyle. Able to provide a response, in part using notes	Knows well about prevention of infection. Can describe in detail and draw the required objects independently on the basis of home preparation
II level	Not able	Not able to evaluate the results of diagnostics	Knows the problem, but the solution based on inaccurate knowledge of subjects	Able to identify the main issue but is experiencing difficulties in the communication of meaning, confuses the signs of differentiation of the germ for a more accurate diagnosis, is able to choose specific drugs for the diagnosis, treatment and prevention	Capable to make indication and identification of microbes on morphological, biochemical, cultural biological properties, is familiar with the principles of receiving and appointing empirical and specific preparations
III level	Not able	Not able to evaluate the results of diagnostics	Knows the problem, but the solution based on inaccurate knowledge of subjects studied	Able to identify the main issue but is experiencing difficulties in the communication of meaning, confuses the signs of differentiation of the germ for a more accurate diagnosis, is able to obtain specific drugs for the diagnosis, treatment and prevention	Capable of indication and identification of microbes on morphological, biochemical, cultural biological properties, familiar with the principles of obtaining and appointment of empirical and specific drugs
Expertise:					
I level	Not own	Not able to demonstrate sequence, wholeness and completeness of	Able to identify the main laws of development, but not the relationship. Has fragmentary data	Has the basic skills to use the source of information, familiar with the laws of nature spiral, unity	Able to assess the diversity of the existing world, has a discussion with classmates, and

		thought	on evolution	and struggle of opposites, can give examples, knows the structure of DNA	teacher about the source of life-the protein molecule
II level	Not own	Not able to organize the acquired knowledge, unable to distinguish pathogenic and conditionally pathogenic microorganisms	Knows the methods of search and systematization of knowledge, but does not demonstrate the skills of interpreting the results of research, has vague ideas about the methods of decontamination	Knows the methodology and technique of microbiological research and methods of disinfection of infectious material	Sets the answer clearly, convincingly, and consistently, explaining cause and effect, knows the methods and techniques of Microbiology, methods of sterilization
III level	Not own	Little experience	At least General understanding of the problem, but ill-versed in the methodologies applied for the Express-diagnostics	Clearly and convincingly expresses thoughts,possesses a sense of the task, solves complex problems, based on a good theoretical training, but little practice	Able to quickly navigate in solving complex problems in a limited time, clearly articulates the problem and solves the parallel issues of diagnosis, treatment, prevention
final mark	1	2	3	4	5

SCALE of assessment of the QUALITY of the summary (formative assessment)

№	Name of the indicator	Mark in %
1.	The contents of the abstract should correspond to the control task	0-30
2.	Completeness and the quality of themes disclosure	30-50
3.	Independence of work and use of recommended and reference literature	0-30
	Total points	0-100

SCALE of ESSAY EVALUATION (midterm)

№	Name of the indicator	Mark in %
Form		0-10
1.	Division of the text into introduction, main body and conclusion	0-5
2.	A logical and understandable transition from one part to another, as well as within parts	0-5
Content		0-50
1.	The relevance of the research topic	0-10
2.	Matching content to a topic	0-10
3.	In-depth study of the material	0-15
4.	Availability of conclusions relevant to the topic and content of the main body	0-15
execution		0-25
1.	Title page	0-5
3.	The abstract text is written according to methodical instructions	0-10
4.	Correctness and completeness of the use of literature use	0-10
Thesis presentation		0-15
1.	Literacy of presentation and terminology of the material	0-5
2.	The quality of posts and answers to questions during the presentation of the abstract	0-5
3.	The implementation of the rules	0-5
	Total points	0-100

Appendix №2

The flow sheet of discipline

Microbiology and Virology
2 course
3 semester
4 credit unit
Reporting-exam

Title of module discipline according to WPD	Type of control	Forms of control	Minimal credit points	Maximal credit points	Week of control
Module №1 Morphology of microbes					
Section 1. Morphology of the bacteria	Formative assessment	Frontal survey, Activity in class, SRS-drawing up of the summary Attendance*	4	6	5
	Midterm **Examination**	Theoretical task, Tests, Case problem	5	10	
Module №2 physiology of microbes					
Section 2. Physiology of bacteria General virusology Genetics of microorganism	Current control	Frontal survey, Activity in class, SRS-drawing up of the summary Attendance*	7	12	11
	Midterm Colloquium №1	Theoretical task, Tests, Case problem	10	15	
Module №3 Infectious process; Medical bacteriology:					
Section 3. Infectious process **Medical bacteriology:** Coccoid and airborne infections	Current control	Frontal survey, Activity in class, SRS-drawing up of the summary Attendance*	7	14	18
	Midterm **Colloquium №2**	Theoretical task, Tests, Case problem	7	13	
TOTAL			40	70	
		*Attendance: for each missed and not fulfilled occupation or a lecture 1 point is removed			
Midpoint assessment: Album design, Development of the thematic table, Development of video materials, The protection of the abstract, Presentation report			20	30	
Summative assessment			60	100	

Appendix 2

The flow sheet of discipline

Microbiology and Virology
2 course
4 semester
3 credit unit
Reporting-exam

Title of module according to WPD	Type of control	Forms of control	minimal credit points	maximal credit points	week of control
Module №. 4 Medical bacteriology					
Section 6. Private medical bacteriology: Intestinal infection	Formative assessment	Frontal survey, Activity in class, SRS-drawing up of the summary Attendance*	4	9	19 - 20
	Midterm **Examination**	Theoretical task, Tests, Case problem	5	10	21
Section 6. Anaerobic, zoonotic, spirochetosis rickettsiosis infections	Current control	Frontal survey, Activity in class, SRS-drawing up of the summary Attendance*	7	12	22 - 26
	Midterm **Module 3**	Theoretical task, Tests, Case problem	10	15	27
Module № 5 Medical Virology					
Section 7. Medical Virology	Current control	Frontal survey, Activity in class, SRS-drawing up of the summary Attendance*	6	8	28 - 34
	Midterm **Module 4**	Theoretical task, Tests, Case problem	8	16	35
TOTAL			40	70	
		*Attendance: for each missed and not fulfilled occupation or a lecture 1 point is removed			
Intermediate control: Report of a presentation at the conference, Participation in the competition "the World of microbes», Eksamen			20	30	36
Summative assessment			60	100	