

MINISTRY OF EDUCATION AND SCIENCE OF THE KYRGYZ REPUBLIC

Government-run Educational Institution of Higher Professional Education  
Kyrgyz-Russian Slavic University named after B.N. Yeltsin



**MICROBIOLOGY, VIROLOGY**  
Course Outline (Module)

Assigned to the department of Microbiology and virology  
Academic Curriculum 31050150\_25\_1LDi.pli.xml  
560001 - KR General Medicine  
(For foreign students)  
Qualification: Medical  
Mode of Study Intramural specialist  
Total Credit Value 6 credit points

The program was compiled: Sen. Lec. Koshokova E.A., the Head of Department, doctor of medical sciences, professor Sadybakasova G.K.

Discipline hours distribute in the semesters

Course Hours Scheduling (per semester)						
Semester Academic Year	2 (2.1)		3 (2.2)		Total	
Weeks	18		18			
Type of training	AC	CO	AC	CO	AC	CO
Lectures	18	18	18	18	36	36
Practical Session	54	54	54	54	108	108
Including interactive Session	0.3	0.3			0.3	0.3
Total In-class Session			0.5	0.5	0.5	0.5
Total aud.	72	72	72	72*	144	144
Face-to-face Learning	72.3	72.3	72.5	72.5	144.8	144.8
Individual Work	35.7	35.7	18	18	53.7	53.7
Hours for control			17.5	17.5	17.5	17.5
<b>Total</b>	<b>108</b>	<b>108</b>	<b>108</b>	<b>108</b>	<b>216</b>	<b>216</b>

<b>1. COURSE OUTLINE OBJECTIVES</b>	
1.1	The objectives of mastering the discipline "Microbiology, Virology" is to obtain knowledge about pathogenic and opportunistic microorganisms for humans; about their structure, physiology, genetics, ecology; about the role of microorganisms in the etiology and pathogenesis of infectious diseases; about immunity as a state of a macroorganism in which an infectious process develops and its changes under various influences of environmental factors; about methods of microbiological diagnostics, specific prophylaxis and therapy of infectious diseases.
<b>2. PLACE OF THE COURSE IN THE EDUCATIONAL PROGRAM</b>	
<b>Educational Program Units:</b> Б1.О	
<b>2.1 Students' Preliminary Training Requirements:</b>	
2.1.1	Biochemistry
2.1.2	Histology, embryology, cytology
2.1.3	normal physiology
2.1.4	Anatomy
2.1.5	Biology
2.1.6	Latin language
2.1.7	Immunology
<b>2.2 Course Units and Practical Sessions imposing the prior Proficiency:</b>	
2.2.1	General surgery
2.2.2	Hygiene
2.2.3	obstetrics and gynecology
2.2.4	Occupational diseases
2.2.5	Faculty Pediatrics
2.2.6	Epidemiology
2.2.7	Urology
2.2.8	Pediatric surgery
2.2.9	infectious diseases
2.2.10	Ophthalmology
2.2.11	Dentistry
2.2.12	Dermatovenereology
2.2.13	Infectious diseases in children
2.2.14	Otorhinolaryngology
2.2.15	Hospital Pediatrics
2.2.16	Phthisiology
2.2.17	Outpatient and emergency pediatrics
<b>3. STUDENTS' COMPETENCIES FORMED AS A RESULT OF MASTERING THE DISCIPLINE (MODULE)</b>	
<b>PC-1: Able and ready to implement a set of measures aimed at maintaining and strengthening health and including the formation of a healthy lifestyle, prevention of the occurrence and (or) spread of diseases, their early diagnosis, identification of the causes and conditions for their occurrence and development, as well as aimed at eliminating harmful effects on human health of environmental factors.</b>	
<b>Know:</b>	
Level 1	World order, the existence of the microworld, forms of symbiosis of different organisms, the influence of environmental factors on macroorganism, the role of microorganisms in the development of human
Level 2	Features of the formation of the processes of symbiosis of the human body with microbes, the role of the resident microflora of the body in the development of opportunistic diseases; the role of individual representatives of the microbial world in the etiology and pathogenesis of the most common human infectious diseases, their sensitivity to antimicrobial drugs Features of the formation of the processes of symbiosis of the human body with microbes, the role of the resident microflora of the body in the development of opportunistic diseases; the role of individual representatives of the microbial world in the etiology and pathogenesis of the most common human infectious diseases, their sensitivity to antimicrobial drugs
Level 3	Pathogenic and virulent properties of microbes and their role in the pathogenesis of an infectious disease. The role of opportunistic microflora in human pathology and in the development of nosocomial and iatrogenic diseases.

<b>Ability:</b>	
Level 1	Solve typical tasks for the formation of a healthy lifestyle (such as: wash hands before eating, brush your teeth, follow the rules of personal hygiene, etc.), draw and distinguish between prokaryotes and
Level 2	To substantiate, from a microbiological standpoint, the choice of material and methods of microbiological research in the diagnosis, differentiation and identification of pathogens of infectious and opportunistic diseases, as well as the tactics of prescribing specific drugs for treatment and prevention
Level 3	Take material (sputum, pus, blood, smear from plaque, gum pocket, from the root of the tongue, pharynx, etc.) for bacteriological, virological, serological examination; isolate a pure culture of the infectious agent, differentiate and identify
<b>Skills:</b>	
Level 1	Information about the unified laws of the development of living beings of the macro- and microworld, the unified structure of the carrier of genetic information, about variability and evolution
Level 2	Basic skills in working with material containing pathogenic and opportunistic microorganisms and methods of decontamination
Level 3	Knowledge to solve complex problems in emergency situations (during an outbreak of infection, food poisoning, an epidemic, a particularly dangerous infection, the use of bacteriological weapons) in order to quickly localize the infection, organize quarantine measures, decontaminate infected material, and carry out preventive procedures Grading scale in APPENDIX No. 1
<b>The student should know as a result of mastering the discipline:</b>	
<b>3.1 Know:</b>	
3.1.1	Know (i.e. reproduce and explain educational material with the required degree of scientific accuracy and completeness): The main stages in the development of microbiology. Communication of science with other disciplines, tasks and methods of research, the principle of taxonomy of microorganisms. The structure and shape of a microbial cell with the function of various formations, their chemical composition, physiology, biochemistry of bacteria, features of nutrition, respiration, growth, reproduction. Distribution and role of microbes in the environment. Influence of environmental factors on microorganisms. Morphology, ultrastructure, classification and nature of viruses. Features of replication of DNA and RNA genomic viruses, their cultivation, antigens, production and use of phages. Nature of prions and features of prion diseases. Features of the genetics of bacteria and viruses. The role of mutations, recombinations in the evolution of bacteria. Extrachromosomal factors of heredity. The concept of genetic engineering, practical application. Sources and methods for obtaining antibiotics, their classification by structure, spectrum and mechanism of action. Features of genetic control of pathogenicity and antibiotic resistance of microbes, mechanisms of resistance development. Complications in antibiotic therapy, methods for determining the sensitivity of microbes to antibiotics. Features of the formation of the processes of symbiosis of the human body with microbes, the role of the resident microflora of the body in the development of opportunistic diseases.
3.1.2	The mechanism and factors of the development of the infectious process. Pathogenicity and virulence of microbes. The role of conditionally pathogenic microflora in human pathology, the development of nosocomial infections. Formation of immunity, its types, mechanisms and factors: immunocompetent cells, their interaction in cellular and humoral immunity. Antigens of microbes and viruses, their properties, types. Mechanisms of interaction between antigens and antibodies. Mechanisms of development of allergy of immediate and delayed types, forms of manifestation, and preventive measures. The role of individual representatives of the microbial world in the etiology and pathogenesis of major human infectious diseases. Methods of microbiological diagnostics. How to take material (sputum, pus, blood, urine, feces, swab from the throat, hands, environmental objects, etc.) for bacteriological, virological and serological studies in children. The use of basic antibacterial, antiviral and specific drugs. Vaccines, their types; immune diagnostic and therapeutic preparations. Principles of their obtaining and application.
<b>3.2 Ability:</b>	
3.2.1	Be able to (i.e. solve typical problems based on the reproduction of standard solution algorithms): Observe the rules of the sanitary-hygienic and anti-epidemic regime in the bacteriological laboratory.
3.2.2	Justify from microbiological positions the choice of material for research in the diagnosis of infectious and opportunistic diseases. Observe safety precautions and rules for working with material that poses a biological hazard. Prepare preparations for microscopy from the test material (pus, sputum, blood, etc.) and a pure culture of microbes. Stain smears with simple and complex methods (according to Gram, Ziehl-Nielsen, Neisser, Gims, Romanovsky-Giems, etc.). Set up and work with phase-contrast, luminescent and dark-field microscopes. Prepare basic nutrient media for the cultivation of microorganisms. Inoculate the test material on liquid and solid nutrient media. Select a pure culture of microbes - aerobes and obligate anaerobes. To identify the isolated pure culture of bacteria by morphological, tinctorial, cultural, biochemical and antigenic properties. Determine phage sensitivity and phage type of bacterial culture. To study the sensitivity of bacteria to antibiotics. Work with laboratory animals: fix, infect in various ways, take blood, perform an autopsy of the corpse of an animal,

3.2.3	Imprints of organs, blood cultures. To cultivate obligate intracellular parasites, prepare a cell culture (primary trypsinized single-layer from chicken embryos and transplanted). Infect cell culture and chick embryo. Carry out the indication and identification of viruses in cell culture and on the chick embryo. Use the acquired knowledge to determine the tactics of antibacterial, antiviral and immunotropic therapy; apply the principles of emergency prevention and antitoxic therapy of patients.
<b>3.3</b>	<b>Skills:</b>
3.3.1	The student can demonstrate the ability to solve complex problems based on the acquired knowledge, skills and abilities, with their application in atypical situations, i.e. owns: The main methods of sterilization, disinfection and antiseptic treatment of instruments and equipment in order to avoid infection of the doctor and patient. The skills of making a preliminary diagnosis based on the results of a laboratory microbiological examination of the adult population and adolescents. The methodology for interpreting the results of microbiological research, determining the antimicrobial activity of antibiotic drugs and microbiologically substantiated rules for their use for the treatment of patients. Basic skills of working with material containing pathogenic and opportunistic microorganisms. Methods of selection of antimicrobial and immunobiological drugs for adequate prevention and treatment of infectious diseases. Basic skills in working with modern devices used to diagnose infectious diseases.