MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION

PENZA STATE UNIVERSITY

MEDICAL INSTITUTE

APPROVED
director of Medical Institute
_____ A.N. Mitroshin
(Signature) (Last name, Initials)
«05» 03 2016

SUBJECT'S SYLLABUS

C1.1.14 Biology

Specialty: 31.05.01 General Medicine

Graduate's qualification (degree): Medical doctor

Study format: full-time

Penza, 2016

1. Subject mastering goals

The goal of mastering the academic discipline of Biology is learning biology, as a holistic discipline, which in a logical sequence examines the fundamental properties of the living on the main due to the evolutionary levels of organization of biological systems to prepare students for genetics, parasitology which is the theoretical basis of preventive medicine to the extent necessary to discharge the duties of a doctor.

Tasks of the discipline "Biology" are: to give an overview of the natural areas of the origin and evolution of life, human ontogenesis, the laws of genetics, cell biology, natural areas of inheritance and fundamentals of genetics, evolution, aspects of human biology and the phenomenon of parasites.

2. The place of the discipline in the structure of the profession

The discipline of "Biology" refers to the base of the block C1 of the discipline. The original knowledge necessary for studying of discipline "Biology" includes knowledge of Latin language, anatomy, chemistry, physiology, organic chemistry, ecology, histology. The discipline of "Biology" is the basis for the study of such fields of knowledge as histology, anatomy, physiology, micro-biology, biochemistry, hygiene, epidemiology, virology, immunology, ecology.

3. Student competences developed as a result of subject (module) mastering

The process of discipline is aimed at formation of elements of the following competencies in accordance with the FSESHEi of this specialty:

Competence code	The name of the competence	The structural elements of the competence (as a result of mastering discipline student must know to be able to own)
PC-1	ability and willingness to implement complex measures aimed to retain and promote the health and incorporating a healthy lifestyle, prevent and (or) distribution of diseases, their early diagnosis, the identification of the causes and conditions of their emergence and development, as well as to eliminate the harmful effects on human health of environmental factors of its habitat.	Knowledge: the biosphere and ecology, the phenomenon of parasitism and bioecological disease prevention for the prevention of infectious, parasitic and noninfectional diseases.
		Skills: to diagnose the causative agents of parasitic diseases of man in the drug, slide, photograph, conduct sanitary-educational work on hygiene issues.
		Working abilities: biomedical concepts, preventive technologies for the prevention of infectious, parasitic and noninfectious diseases, as well as to carry out sanitary-educational work on health issues among the population.
PC-6	ability to determine the patient's major disease States, symptoms, syndromes, diseases, nosological forms in accordance with the International statistical classification of diseases and related health X edition	Knowledge: the general laws of the origin and evolution of life; anthropogenesis and ontogenesis of a person; the laws of genetics, its importance for medicine; the laws of heredity and variation in individual development as the basis for the understanding of the pathogenesis and etiology on and investigation of multifactorial diseases to
		Skills: work with magnifying devices (microscopes)
		Working abilities: performing statistical processing of experimental data.

4. The structure and the content of the subject "Biology"

4.1. The structure of the discipline

The total complexity of discipline is 7 educational credits, 252 hours.

№	Name sections and topics of the discipline (modules)	Semester	Weeks of the semester	Kinds of study, including independent work of students and labor (hours)									Form ongoing monitoring of progress (by week of the semester)							
				Class work				Individual work												
				Total	Lecture	Practical exercises	Laboratory studies	Total	Preparing for classroom work	Essay, essays, etc.	Course work (project)	Exam Preparation	The interview	Colloquium	Check the test	Verifying work	Checking abstract	Check skills	Checking essays and other creative works	Credit
1.	**Section 1. Introduction to biology course**	**1**	**1-2**	**8**	**2**	**6**		**4,5**	**4,5**				**1-2**					**1-2**		
1.1.	Topic 1.1. Biology is the science about living nature. Characteristics of living organisms. Biology in the medical sciences.	1	1	4	2	2		1,5	1,5				1					1		
1.2.	Topic 1.2. Optical devices. The microscope.	1	1-2	2		2		1,5	1,5				1-2					1-2		
1.3	Topic 1.3. Rules of preparation of temporary preparations.	1	2	2		2		1,5	1,5				2					2		
2.	**Section 2. The structure of the cell**	**1**	**3-6**	**14**	**4**	**10**		**7,5**	**7,5**				**3-6**							

2.1.	Topic 2.1. The structure and functions of prokaryotic cells	1	3	4	2	2		1,5	1,5				3							
2.2.	Topic 2.2. Structural components of a eukaryotic cell	1	3-4	2		2		1,5	1,5				3-4							
2.3.	Topic 2.3. Mechanisms of penetration of substances into the cell	1	4	2		2		1,5	1,5				4							
2.4.	Topic 2.4. Osmotic properties of cells	1	5	4	2	2		1,5	1,5				5							
2.5.	Topic 2.5. Energy metabolism	1	5-6	2		2		1.5	1.5				5-6							
3.	**Section 3. Molecular basis of heredity**	**1**	**6-11**	**22**	**6**	**16**		**12**	**12**				**6-11**		**9**			**6-11**		
3.1.	Topic 3.1. Hereditary apparatus of cells	1	6	4		2		1.5	1.5				6					6		
3.2.	Topic 3.2. Some hereditary syndromes. Karyotypic analysis	1	7	2		2		1.5	1.5				7					7		
3.3.	Topic 3.3. The life cycle of cells. Mitotic cycle.	1	7-8	2		2		1.5	1.5				8					7-8		
3.4.	Topic 3.4. Features of spermatogenesis and oogenesis in humans. Meiosis.	1	8	2		2		1.5	1.5				8					8		
3.5.	Final lesson №1	1	9	2		2		1.5	1.5				9					9		
3.6.	Topic 3.6. The structure and function of nucleic acids. The protein biosynthesis. Genetic code.	1	9-10	4	2	2		1.5	1.5				9-10					9-10		
3.7.	Problem solution	1	10	2		2		1.5	1.5						8-13			10		
4.	**Section 4. The role of genetic and environmental factors in shaping the phenotype**	**1**	**11-17**	**28**	**7**	**21**		**17**	**17**				**11-17**		**15-16**			**11-16**		
4.1.	Topic 4.1. Basic terms and	1	11	4	2	2		1,5	1,5				11		-					

	concepts of genetics. The stages of development of genetics, genetics techniques.																			
4.2.	Topic 4.2. The basic patterns of inheritance of characters open G. Mendel.	1	11-12	2	-	2		1,5	1,5				11		-			-		
4.3.	Topic 4.3. The interaction of allelic genes. Multiple alleles. The interaction of nonallelic genes.	1	12	2		2		1,5	1,5				11-12					11-12		
4.4.	Topic 4.4. Linked inheritance of characters. The Law of Morgan. The chromosomal theory of heredity.	1	13	2		2		1,5	1,5				13					13		
4.5.	Topic 4.5. Di - and polyhybrid analysis. Genetic maps of chromosomes. The major system of histocompatibility	1	13-14	5	3	2		1,5	1,5				13-14					13-14		
4.6.	Topic 4.6. Monogenic sex linked inheritance Genetics of sex.	1	14	2		2		1,5	1.5				14					14		
4.7.	Topic 4.7. Polygenic inheritance traits. Additive polygene with a threshold of accumulation	1	15	5	3	2		1,5	1,5				15					15		
4.8.	Final lesson №2	1	15-16	2		2		1,5	1,5				15-16					15-16		
4.9.	Problem solution	1	16	2		2		1,5	1,5				16					16		
4.10	Credit	1	17	3		3		3,5	3,5				17							17
5.	**Section 5. Methods of studying human genetics**	**2**	**1-3**	**10**	**2**	**8**		**6.4**	**6.4**				**1-3**					**1-3**		
5.1	Topic 5.1. Man as a subject of genetic studies. Clinical-genealogical method	2	1	4	2	2		1,6	1,6				2					2		

5.2	Topic 5.2. Cytogenetics, cytogenetic, biochemical methods used in human genetics.	2	1-2	2		2		1,6	1,6				1-2					1-2		
5.3	Topic 5.3. Invasive and non-invasive methods of prenatal diagnosis	2	2	2		2		1,6	1,6				2					2		
5.4	Topic 5.4. The polymerase chain reaction. Sequencing. The types and significance.	2	2-3	2		2		1,6	1,6				2-3					2-3		
6.	**Section 6. Genetics of human populations**	**2**	**3-4**	**6**	**2**	**4**		**3.2**	**3.2**				**3-4**							
6.1	Topic 6.1. Population-statistical method. The law of Hardy-Weinberg.	2	3-4	4	2	2		1,6	1,6				3-4							
6.2	A genetic polymorphism. Types and biological meaning.	2	4	2		2		1,6	1,6				4							
7.	**Section 7. The anthropogenesis**	**2**	**5**	**4**	**2**	**2**		**1.6**	**1.6**				**6**							
7.1	Topic 7.1. Stages of anthropogenesis	2	5	2	2	2		1,6	1,6				6							
8.	**Section 8. The peculiarities of ontogenesis in humans**	**2**	**5-7**	**8**	**2**	**6**		**4.8**	**4.8**				**5-7**							
8.1	Topic 8.1. Phases, periods and stages of ontogenesis	2	5-6	2		2		1,6	1,6				5-6							
8.2	Topic 8.2. Basic concepts in biology of individual development. Mechanisms of ontogenesis	2	6	4	2	2		1,6	1,6				6							
8.3	Topic 8.2. Final lesson №3	2	7	2		2		1,6	1,6				7		7					
9.	**Section 9. Medical Parasitology**	**2**	**7-17**	**40**	**9**	**31**		**24**	**24**				**7-17**		**7-17**			**7-17**		
9.1.	Topic 9.1. Fundamentals of medical Parasitology. Relationships	2	7-8	4	2	2		1,6	1,6				7-8					7-8		

	in the system parasite-host.																			
9.2	Topic 9.2. Medical protozoology. Sarcodines, flagellate.	2	8	2		2		1,6	1,6				8					8		
9.3	Topic 9.3. Medical protozoology. Ciliates, sporozoa	2	9	2		2		1,6	1,6				9					9		
9.4	Topic 9.4. Medical protozoology. Protozoa – facultative human parasites.	2	9-10	2		2		1,6	1,6				9-10					9-10		
9.5	Topic 9.5. Medical helminthology. A type of flatworm. Class Trematodes.	2	10	4	2	2		1,6	1,6				10					10		
9.6	Topic 9.6. Medical helminthology. A type of flatworm. Class Cestodes. Tapeworms life cycle associated with the aquatic environment.	2	11	2		2		1,6	1,6				11					11		
9.7.	Topic 9.7. Medical helminthology. A type of flatworm. Class Cestodes. Tapeworms completing their life cycle in human body.	2	11-12	2		2		1,6	1,6				11-12					11-12		
9.8.	Topic 9.8. Medical helminthology: Nematodes. Intestinal nematodes.	2	12	2		2		1,6	1,6				12					12		
9.9.	Topic 9.9. Medical helminthology: Nematodes. Tissue nematodes.	2	13	4	2	2		1,6	1,6				13					13		
9.10.	Topic 9.10. Medical helminthology: Nematodes. Filaria.	2	13-14	2		2		1,6	1,6				13-14					13-14		
9.11	Topic 9.11. Medical arachnoentomology. The Class Arachnida. The order Ticks.	2	14	2		2		1,6	1,6				14					14		
9.12.	Topic 9.12. Medical arachnoentomology. Class	2	15	2		2		1,6	1,6				15					15		

	Arachnida. Class Insects.																			
9.13.	Topic 9.13. Final lesson №4	2	15-16	5	3	2		1,6	1,6				15-16		15-16			15-16		
9.14.	Topic 9.14. Problem solution	2	16	2		2		1,6	1,6				17					17		
9.15.	Repetition of the studied material	2	17	3		3		1,6	1,6				17							
	Credit	1	1-17																	17
	Exam Preparation	2	1-17					36				36								
	Total labor, hours			136	34	102		116	80			36	Interim certification							
													form		semester					
													credit		*1*					
													the exam		*2*					

4.2. The content of the discipline

1. Introduction to biology course. Biology - the science of living systems, the regularities and mechanisms of their emergence, existence and development. The subject of biology. Biological sciences, their objectives, objects of study. Methods of biology. Biosocial nature of man. The importance of biological inheritance and social organization of human medicine. The importance of biology as a basic discipline in the training of doctors.

2. The structure of the cell. Cell theory as a proof of the unity of all life, in its main application, the current state. Types of cellular organization. Structural and functional organization of pro- and eukaryotic cells. The flow of information, energy and substances in the cell. The regularities of the existence of a cell in time. The life cycle of cells, and its variants. The main content and significance in the life span of the cell.

3. Molecular basis of heredity. The gene and its properties. The gene as a functional unit of inhereitance. Features of the organization of genes of pro- and eukaryotes. The genetic code as a way of recording investigative information. Cistron. Stages of realization of genetic information (transcription and after it processes, translation and posttranslational processes). Structure and types of RNA. The role of RNA in the process of realization of genetic information. Features of the expression of genetic information in Pro - and eukaryotes. The relationship between gene and trait. The gene as the unit of variability. Genetic mu. and their classification. The reasons and mechanisms of occurrence of gene mutations. The effects of genetic Muta-tions. Allele of the gene. Change of the nucleotide sequence of the gene as the mechanism of occurrence of multiple allomorphism. The conversion of genes. The biological significance of the genetic level of organization to the investigative material.

4. The role of genetic and environmental factors in shaping the phenotype. The history of the development of genetics. The concept of "genotype" and " phenotype ". Genotype - balanced system of interacting genes. Genetic balance of the gene dosage. Normal dose of balance for the formation of the phenotype. Violation of gene dosage in the chromosomal and genomic mutations. Compensation of breach of gene dosage. Allelic and pallel-wide genes. Interaction of genes in the genotype: the allelic (dominance, incomplete dominance, codominance, the complementation of allelic exclusion) and nonallelic (epistasis, polygenic complementarity, the effect of the provisions of the modifying act). Types of monogenic inheritance. Homo-and heterozygous organisms, the concept of hemizygosity. Features autosomal, X - linked and holandric types of inheritance. Group cohesion, crossing Over as the mechanism for determining violations of clutch genes. Patterns of inheritance extra-nuclear genes. Plasmid . Phenotypic variability and its types. The first and second order . Modifications and their characteristics. Simple and complex signs. Reaction norm of the trait. Expressivity and penetrance of the trait. The sex inheritance. Types of sex determination (progeny, epigamic, syngamy). Primary and secondary sexual characteristics. The role of genotype and environment in the development of gender. The value of environmental and genotypic factors in the formation of pathologically ismenio the phenotype of the person.

5. Methods of studying human genetics. Characteristics of a person as an object of genetic studies. Methods of studying human genetics: genealogical, cytogenetic, biochemical, cytogenetics, population statistics, genetics of somatic cells, methods of studying DNA. Maps of the chromosomes (physical, chemical and genetic). Principles of mapping of chromosomes. Prenatal diagnosis of hereditary diseases. Methods of prenatal diagnostics and their capabilities. The medical and genetic consultation, its medical value. The types and atani counseling. Monogenic, chromosomal and multifactorial human diseases, mechanisms of their emergence and manifestation. Hereditary disease nontraditional inheritance (mitochondrial disease, disease, imprinting, disease expansion trinucleotide repeats). Common approaches to the treatment of hereditary human diseases.

6. Genetics of human populations. Population - elementary unit of evolution. The main characteristics of the population both ecological and genetic system: a population range, the

number of individuals and its dynamics, sexual and age structures, morphological and ecological unity. The gene pool of natural populations, genetic heterogeneity, genetic unity, a dynamic equilibrium. Frequency of alleles and genotypes, the law of hardy-Weinberg equilibrium. The elementary evolutionary material . Mutations of different types. Genetic combinatorics. Elementary evolutionary phenomenon - a change in genetic characteristics in the population. Elementary evolutionary factors. Mutational process and its importance in evolution. Population waves. Periodic and aperiodic changes in population number. Genetic-automatic processes (genetic drift). The population waves change the genetic structure of the population. Insulation, its forms and significance in evolution. Natural selection as the driving and guiding force of evolution. His field of action, basic object, the point of application, unit, efficiency, speed. Form of natural selection: stabilizing, directional, disruptive. A creative role of natural selection in evolution. Genetic polymorphism and genetic diversity of natural populations. Forms of polymorphism. Genetic load and its evolutionary significance. The adaptive nature of the evolutionary process. Mechanisms of adaptations, classification, relative. Biological feasibility. The result of microevolution. Definition, framework and criteria. Genetic unity, integrity. Ways and means of speciation.

Population structure of humanity. Demographic characteristics and its importance in the genetic evaluation of populations. The role of marriage in the distribution of alleles in the population. The use of the laws of hardy-Weinberg equilibrium in the characterization of the genetic structure of human population. Peculiarities of the action of elementary evolutionary factors in human populations. Mutational process and the genetic combinatorics in the formation of genetic heterogeneity of populations and the uniqueness of individuals. The danger of induced mutagenesis. Mutational load, its biological essence and biological significance. Wave number change of the gene pool of population, migration, intermarriage, hybrid populations as gene flow between populations. Territorial and social form of isolation in human populations. The genetic drift. Dem. Isolate. Assortative similarity and marriage. Characteristics of gene pools of isolates. Distribution and frequency of hereditary diseases in different populations. The specificity of the action of natural selection in human populations. Selection against Homo - and heterozygotes. Adaptation and balanced polymorphism and their role in maintaining the adaptive capacity of human populations. Genetic polymorphism is the basis of intra - and interpopulation variability of a person, Importance of genetic polymorphism in predisposition to diseases, to reactions to allergens, medications, food, etc. the Value of genetic diversity in the future of mankind.

7. The anthropogenesis. Charles Darwin on the origin of man from animals. Evidence of the origin of man from animals. Vestigial organs in humans. Atavism. The similarities and differences of humans and animals. Engels on the role of labour in the descent of man. Driving forces of anthropogenesis. The role of social (work, social life, speech, education) and biological (genetic variation, struggle for existence, natural selection) factors in human evolution. The main directions of human evolution (ancient, ancient and fossil people of modern type). Fossils of human ancestors. Finds of material culture of human ancestors. The human race, their origin and unity. Unscientific, reactionary nature of racism and social Darwinism. The leading role of the laws of social life in the social progress of mankind. The ratio of social and biological in human nature. The formation of man's relationship with nature in the process of its historical development. Labour activity of man as a powerful factor of impact on the environment.

8. The peculiarities of ontogenesis in humans. Ontogeny as a process of realizing the hereditary information in certain environmental conditions. The main stages of ontogenesis. The ratio of the individual and evolutionary development. The types of ontogenetic development. The periodization of ontogenesis. Phenomenology of ontogenesis. The progenesis. Evolutionary transformations of morphological and biochemical characteristics of the eggs of chordates. Presumptuous beginnings and their fate. Fertilization is the initial stage in the development of a new organism. Phases of fertilization. Characteristics and importance of the main stages of embryonic development. Crushing how the process of formation of a multicellular embryo. Types of crushing. The relationship of the structure of egg-type crushing. Gastrulation as the

process of formation of a multicellular embryo. Types of gastrulation. Primary organogenesis (neurulation) as the process of formation of complex of axial organs of chordates. Differentiation of embryonic leaves. The formation of organs and tissues. Provisory organs of chordates. Group Anamnia and Amniota. The formation, structure, features of functioning and evolution of provisory organs and embryonic membranes. Amnion, chorion or serosa, allantois, yolk, placenta. Types of the placenta, its importance. The violation of the processes of development and the reduction of the embryonic membranes in humans. Features of embryonic development of mammals and man. Post-embryonic period of ontogenesis and its periodization in humans. Basic processes: growth, formation of the definitive structures, sexual maturation, reproduction, aging. Aging as a natural stage of ontogenesis. Signs of aging at the molecular-genetic, cellular, tissue, organ and organism level. The influence of genetic factors, environment and lifestyle on the aging process. Hypotheses of aging. Death as a biological phenomenon. Social and biological determinants of health and mortality in human populations.

Basic concepts in developmental biology (hypothesis of preformism and epigenesis) the Formation of modern ideas about the nature of ontogenetic change. Factors controlling the development of human and animals at different stages of ontogenesis. Genetic regulation of development, peculiarities of molecular-genetic processes at different stages of ontogeny (genetic determinism of development, differential gene activity, puberty, aging). Differentiation, growth, morphogenesis - the main content and the result of the formation of the phenotype. Basic cellular processes in ontogenesis (proliferation, migration, cellular condensations, selective cell sorting, differentiation, programmed cell death, adhesion). Cell-cell interaction (contact and distant) at different stages of ontogenesis. The interaction of the rudiments and tissues. Embryonic induction and its types. Experiments by G. Speman to study the phenomenon of embryonic induction. Humoral regulation of development, mechanisms and levels of hormonal regulation. Mosaic and regulatory development. Embryonic regulation. Determination of parts of the developing embryo. The change of the potentials of the elements of the embryo in the process of development, sewer development. Morphogenesis as a multi-level dynamic process. The concept of morphogenesis (the concept of physiological gradients, positional information, morphogenetic-ing fields). Environmental factors regulating the development in the early stages of ontogenesis. Critical periods in human ontogenesis. Anomalies and malformations. The classification of malformations. The value of violations of private and integrative mechanisms of ontogenesis in the formation of congenital malformations. Teratogenesis, carcinogenesis.

9. Medical Parasitology. Forms of biological relationships in nature. Parasitism as an ecological phenomenon, its characteristics as a form of interspecific interactions. Classification of parasitism and parasites. The distribution of parasites in nature. Path of origin ecto - and endoparasitism. Relationships in the system parasite-host on the level of separate individuals. Adaptation to a parasitic way of life. The action of the parasite on the host. The development cycles of parasites, the alternating generations in the development cycles of parasites. Main, reservoir and intermediate hosts. Genetic and non-genetic factors determining the susceptibility of the host to the parasite. The protective actions of the host against parasitic infestation. Relationships in the system parasite-host population levels. The specificity of the parasite against the host. Parasitic natural focal vector-borne diseases and retransmission their criteria. Components natural focus: pathogen-specific carrier, the reservoir, the area with a few ecosystems, landscape and climatic conditions. Vector-borne diseases of obligate and facultative, anthroponoses, zoonoses and anthroponosis). Ways of infection of parasitic diseases (nutritional, inoculation, contamination, georally, contact, aspirating, etc.). Ecological principles for the fight against parasitic diseases. The evolution of parasites and parasitism under the influence of anthropogenic factor. General medical protozoology. General and medical helminthology. General medical arachno-entomology.

5. Educational technologies

Educational technology means a systematic collection and order of functioning of all personal, instrumental and methodological means used to achieve goals. Teaching discipline "Biology" is performed with the following types of educational technologies:

- multimedia presentation as a form of presentation of the training material (for each section of the discipline);
- the electronic textbook – Atlas of medical parasitology (section 9);
- computer testing (sections 2,3,4,5,9). digital educational resources;
- individual consultations of the teacher in the performance of tasks in practical classes and group counseling before testing for each section of the discipline.

5.1. Active learning methods

Lecture-visualization is a visual form of presenting lecture material by means of TSO or audiovideocenter.

1 semester

- Gametogenesis person.
- Genetic apparatus of human cells. Some hereditary syndromes.

2nd semester

- Man as a subject of genetic studies. Clinical-genealogical method.
- Fundamentals of medical Parasitology. Relationships in the system parasite-host.
- Medical helminthology. Flatworms. Class Trematodes.
- Medical helminthology. Flatworms. Class Cestodes.
- Medical arachno-entomoses. Class Arachnida.

The case-study method or a method of concrete situations: a method of active problem-situation analysis, based on learning by solving specific problems – situations.

1 semester

- Some hereditary syndromes. Karyotypic analysis.
- Polygenic inheritance of characters.
- Variability. The types of variability. Examples in humans.

2nd semester

- Clinical-genealogical method. Pedigree drawing.
- Population-statistical method. The Law of Hardy-Weinberg equilibrium.

The decision of situational problems allows revealing the level of knowledge of the material and develops students' skills of using knowledge in a particular situation.

2nd semester

- Medical protozoology. Sarcodines, Flagellates.
- Medical protozoology. Ciliates, Sporozoa.
- Medical protozoology. Protozoa – facultative human parasites.
- Medical helminthology. A type of flatworm. Class Trematodes. Flukes with one intermediate host.
- Medical helminthology. A type of flatworm. Class Trematodes. Flukes with two intermediate hosts.
- Medical helminthology. A type of flatworm. Class Cestodes. Tapeworms associated with aquatic environment.
- Medical helminthology. A type of flatworm. Class Cestodes. Tapeworms completing the entire life cycle in the human body.
- Medical helminthology. A type of round worms. Intestinal nematodes.
- Medical helminthology. A type of round worms. Tissue nematodes.
- Medical helminthology. A type of round worms. Filaria.
- Medical arachnoentomology. The Class Arachnida. The order Ticks.
- Medical arachnoentomology. The Class Arachnida. The Class Insect.

Students, who study on their own trajectory according of the individual subject's syllabus, have following possibilities: provision of out-of-class work with students, including in the electronic educational environment using appropriate software equipment , distance learning forms, the possibilities of Internet resources, individual consultations, etc.

6. Educational and methodological support for the students' independent work. Evaluating tools for the current control of the progress, intermediate assessment of the learning results.

6.1. Plan of extraclass activities for students

№	Topic	The type of independent work	Assignment	Recommended reading	The number of hours
1st semester					
1	Biology - the science about nature. Characteristics of living things. Biology in the medical Sciences.	Preparation for the practical lesson	To study the topics in textbooks and tutorials	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1,5
1-2	Device optical devices. The microscope	Preparation for the practical lesson	To study the topics in textbooks and tutorials	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1,5
2	Rules of preparation of temporary preparations	Preparation for the practical lesson	To study the topics in textbooks and tutorials	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1,5
3	The structure and functions of prokaryotic cells	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by	1,5

			respond to test tasks on the topic of this section	O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	
3-4	Structural components of a prokaryotic cell	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1,5
4	Mechanisms of penetration of substances into the cell	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1,5
4-5	Osmotic properties of cells	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1,5
5	Energetic metabolism	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5

6	Hereditary apparatus of cells	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5
6-7	Some hereditary syndromes. Karyotypic analysis	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5
7	The life cycle of cells	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5
7-8	The mitotic cycle	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5

8	Gametogenesis	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5
8-9	Features of spermatogenesis and oogenesis in humans. Meiosis.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5
9	The structure and function of nucleic acids. The protein biosynthesis. Genetic code.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5
9-10	Final lesson №1	Preparation for the final lesson	Study material of the topic section on textbooks and tutorials.	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5

11-12	Basic terms and concepts of genetics. The stages of development of genetics, genetics techniques. The basic patterns of inheritance of characters open G. Mendel.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5
12	The interaction of allelic genes. Multiple alleles. The interaction of nonallelic genes.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5

12-13	Linked inheritance of characters. The Law Of Morgan. The chromosomal theory of heredity.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5
13	Di - and polyhybrid analysis. Genetic maps of chromosomes. The major system of histocompatibility.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5
13-14	Monogenic inheritance of traits linked with sex. Genetics of sex.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5
14	Polygenic inheritance traits. Additive polygene with a threshold of accumulation	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5
14-15	Variability. The types of variability. Examples in humans.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5

15	Final lesson №2	Preparation for the final lesson	To study the topics in textbooks and tutorials.	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	1.5
15-16	Standings (Credit)	Preparation for the Standings (Credit)	To study the topics in textbooks and tutorials.	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил.	3.5
2nd semester					
1	Human as a subject of genetic studies. Clinical-genealogical method.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
1-2	Cytogenetics, cytogenetic, biochemical methods used in human genetics.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
2	Invasive and non-invasive methods of prenatal diagnosis	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6

2-3	The polymerase chain reaction. Sequencing. The types and significance.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
4-5	Population-statistical method. The Law Of Hardy-Weinberg Equilibrium.	Preparation for the practical lesson	Study material of the topic section on textbooks and tutorials.	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
5	A genetic polymorphism. The types and value.	Preparation for the practical lesson	Study material of the topic section on textbooks and tutorials.	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
5-6	Stages of humans anthropogenesis	Preparation for the practical lesson	Study material of the topic section on textbooks and tutorials.	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
7	Phases, periods and stages of ontogenesis.	Preparation for the practical lesson	Study material of the topic section on textbooks and tutorials.	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6

8	Basic concepts in biology of individual development. Mechanisms of ontogenesis	Preparation for the practical lesson	Study material of the topic section on textbooks and tutorials.	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
8-9	Final lesson № 3	Preparation for the final lesson	Study material of the topic section on textbooks and tutorials.	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
10	Fundamentals of medical Parasitology. Relationships in the system parasite-host.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
10-11	Medical protozoology. Sarkodie, flagellate.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
11	Medical protozoology. Ciliates, sporozoa.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6

11-12	Medical protozoology. Protozoa – facultative human parasites	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
12	Medical helminthology. A type of flatworm. Class flukes. Flukes with one intermediate host.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
12-13	Medical helminthology. A type of flatworm. Class flukes. Flukes with two intermediate hosts.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
13	Medical helminthology. A type of flatworm. The class of tapeworms. Tapeworms life cycle which is associated with the aquatic environment.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6

13-14	Medical helminthology. A type of flatworm. The class of tapeworms. Tapeworms whose life cycle is not associated with the aquatic environment.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
14	Medical helminthology. A type of flatworm. The class of tapeworms. Tapeworms passing in the human body the entire life cycle.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
14-15	Medical helminthology. A type of round worms. Intestinal nematodes.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
15	Medical helminthology. A type of round worms. Tissue nematodes.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N.	1.6

			of this section	Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	
15-16	Medical helminthology. A type of round worms. Filaria.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
16	Medical arachnoentomoses. The Class Arachnida. The order Ticks.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
16-17	Medical arachnoentomoses. The Class Arachnida. The Insect Class.	Preparation for the practical lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6
17	Final lesson №4	Preparation for the final lesson	To study the topics in textbooks and tutorials. To respond to test tasks on the topic of this section	1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p. 2. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 736 c.: ил.	1.6

6.2. Methodical instructions on organization of extraclass activities of students

Preparation of the support notes. This is a kind of out-of-class independent work of the student to create a brief information structure, summarizing and capturing the essence of the material lectures, the topics of the textbook. The basic abstract is to highlight the main objects of study, give them a brief character-stick, using symbols to reflect the relationship with other elements.

The main purpose of the support notes is to facilitate memorization. Students use a variety of basic concepts, terminology, signs (symbols) reference signals. The the support notes is the best form of preparation for response and in the process of responding. Preparation of the support outline to the topics especially effective with students who are faced with large amounts of information in preparation for class and not having the skills to identify the main, have difficulties with her memory. Basic abstract can be represented by a system of interlocking geometric shapes containing blocks of concentrated information in the form of the logical steps of the stairs; the figure with additional elements, etc. tasked with supporting summary on the subject can be both mandatory and optional.

Supporting notes can be checked in the polling process on the quality of student's answer, it costwise and the efficiency of its use when answering other students.

Performing test tasks. Before running tests, you should carefully study the theoretical material and answer the questions available in the textbook. When running the tests it should be borne in mind that the questions are of the following types:

1. Alternative question. You must select one correct answer from among the offered.
2. Multialternative question. You must choose multiple correct answers from among the proposed governmental.
3. Question on mapping. To establish correspondence between the two columns of answers.
4. The chronological question. In this case, you must arrange the answers in correct order.
5. Simple question. The answer is to be entered independently.

6.3. The materials for the current and intermediate control of students ' knowledge

Control of mastering of competences

№	Type of control	Controlled topics (sections)	Competence, the components of which are controlled
1	Colloquium (interview)	Section 1-9	PC-1; PC-6
2	Grading tests	Section 2,3,4,5,9	PC-1; PC-6
3	To check the practical skills	Section 1,3,4,5,9	PC-1; PC-6

An example of the test

1. The order of operations when installing a light microscope in the operating position:

a) to bring under the tube lens of a large zoom
b) rotating micromint, put the lens under the hole of the stage at a distance of 1.5 - 2 cm,
c) raise the condenser
d) open the aperture
e) to illuminate the field of vision, looking eye in the eyepiece.

2. The main forms of life depending on the extent of its structural organization:

a) precellular,
b) cellular,

c) fungi,
d) cyanobacteria,

3. Precellular forms of life:
a) viruses,
b) bacteriophages
c) bacteria,
d) fungi,

4. Viruses exhibit the properties of a living being:
a) only outside the host cell,
b) only in a living cell,
c), both outside and inside the host cell,
d) in the environment

5. The founders of the cell theory:
a) R. Hooke,
b) M. Schleiden
c) T. Schwann,
d) V. Leeuwenhoek.

6. The main provisions of the cellular theory of M. Schleiden and T. more just like:
a) a cell can only arise from preexisting cells
b) the cell is the structural and functional basis of all living beings,
c) a multicellular organism consists of relatively independent units (cells) that are in close dependence from each other.

7. Main points of modern cell theory:
a) cell - basic unit of living things,
b) the cells of different organisms are homologous in their structure,
c) the reproduction of cells occurs by dividing the original cells,
d) multicellular organisms is a complex system of cells combined into tissues and organs, which are interconnected humoral and nervous mechanisms of regulation,

8. Depending on the organization of genetic material and evolutionary origin, all cells are divided into:
a) prokaryotic
b) eukaryotic,
c) animals
d) vegetable.

9. Structured nucleus is present in:
a) eukaryotic,
b) prokaryotic
c) archaea
d) cyanobacteria

10. Organisms consisting of prokaryotic cells are called:
a) prokaryotes,
b) eukaryotes,
c) nuclear,
d) phages,

.

11. The first primitive eukaryotes appeared on Earth:
a) 5 billion years ago,
b) 2,5 - 3 billion years ago
c) 3 - 3.5 billion years ago
d) 4 - 4.2 billion years ago.

12. Modern prokaryotes include:
a) brown algae,
b) viruses,
c) archaebacteria,
d) eubacteria (true bacteria)
e) fungi
f) blue-green algae,
g) simple.

13. The eukaryotes include:
a) viruses,
b) plants,
c) animals
d) fungi,
e) bacteria.

14. The first prokaryotes on Earth were:
a) heterotrophs,
b) autotrophs,
c) anaerobes,
d) aerobic organism.

15. In the food chains of prokaryotes are mainly:
a) producers,
b) decomposers,
c) consumers I,
d) consumers II order,

16. The life cycle of a cell:
a) the period of division;
b) preparation for division;
c) the period of existence of the cell from the moment of her birth (by dividing parent cell) to the next division or death.
d) the period of cytokinesis;

17. Types of division of eukaryotic cells:
a) amicos;
b) mitosis;
c) meiosis.
d) gametogenesis;

18. Due to the type of somatic cell division is the reproduction of cells?
a) meiosis;
b) mitosis;
c) amitiza.

d) andreproductive;

19. How many daughter cells are formed from one mother cell as a result of mitosis?
a) two;
b) four;
c) six.
d) one;

20. Biological significance of mitosis:
a) equalizes the number of chromosomes in the daughter cells;
b) daughter cells genetically identical to each other and the parent cell;
c) ensure the transmission of genetic information at the cellular level all multicellular organization that reproduce sexually and asexually, and at the organism level, those who propagated asexually;
d) is the basis of growth, development, regeneration

Criteria for the assessment test

"Excellent" ("5") – 91% or more correct answers to test items.
"Good" ("4") – 85-90% correct answers to test items.
"Satisfactory" ("3") – 71-84% of correct answers to test items.
"Unsatisfactory" ("2") – 70% or less correct answers to the test tasks.

Questions for the final classes

Introduction to biology course

1. The subject of biology. Biological sciences, their objectives, objects of study. Methods of biology.
2. The definition of life at the present stage of scientific development.
3. The fundamental properties of living matter.
4. Levels of organization of living matter.
5. Types of microscopy.

The structure of the cell

1. The concept of pro- and eukaryotic cells. Features of their structure in a comparative perspective. Examples
2. The structure of the cytoplasmic membrane. The types of proteins, lipids and carbohydrates included in the membrane, their importance in the formation of the function membrane.
3. The transport function. Types and mechanisms of transport of substances. Examples.
4. The structure and function of the endoplasmic reticulum. The value for cell activity. Examples
5. The structure and functions of Golgi complex. The structural features of different types of cells. The value for cell activity. The functioning of bordered of bubbles and their role. Examples

Molecular basis of heredity

1. The concept of groups of chromosomes during karyotyping Modern methods of karyotype. The principles of sorting of chromosomes by flow-cytometry
2. The concept of genomic and chromosomal mutations. The types of genomic mutations (polyploidy, aneuploidy).
3. The genetic code, concept, structure. Properties of genetic code. Examples

4. Describe the mechanisms that ensure genetic stability of eukaryotic cells. Significance of mitosis.

5. Biological significance of meiosis. Features and significance of each stage.

The role of genetic and environmental factors in shaping the phenotype

1. Evidence for the role of environmental factors in the development of gender.
2. The realization of hereditary information in an individual development.
3. Monogenic inheritance of characters. Autosomal and sex-linked inheritance.
4. The simultaneous inheritance of many traits. Independent and linked inheritance.
5. Inheritance of characters, caused by the interaction of nonallelic genes.

Methods of studying human genetics

1. Twin method. The principle, purpose, indications for use of the method.
2. Biochemical genetics techniques. Elements of the pathogenesis of enzymopathies. Examples. Treatment.
3. Immunogenetic methods genetics.
4. Genetics techniques used for prenatal pathology.
5. Methods of prenatal diagnostics of hereditary diseases.

Genetics of human populations

1. The Law of Hardy-Weinberg Equilibrium. Mathematical expression of the conditions of work.
2. Population structure of humanity and the specificity of the action of natural selection in human populations.
3. The concept of multifactorial diseases. Examples.
4. Polymorphism — definition, types, examples. Biochemical, genetic and morphological polymorphism.
5. The basic action of evolutionary factors in human populations.

The anthropogenesis.

1. Characteristics of the main stages of anthropogenesis.
2. Intraspecific differentiation of humanity.
3. Race and reagent.
4. Adaptive ecological types of man.
5. The origin of adaptive ecological types.

The peculiarities of ontogenesis in humans.

1. The ontogenesis. Early embryonic period. The biological significance of the processes taking place in the first minutes after fertilization.
2. The ontogenesis. Blastulae, mechanism, biological significance of the processes of blastulation.
3. Early stages of ontogenesis. Biological significance and mechanism of the processes of gastrulation.
4. Describe the meaning and function of provisional organs. The mechanism and significance of the formation of the passive immunity of the fetus.
5. Describe the process of organogenesis. Value.

Medical parasitology

1. Entamoeba. Epidemiology, morphology, life cycle, clinical manifestations, diagnosis, treatment, prevention.
2. Plasmodium. Epidemiology, morphology, life cycle, clinical manifestations, diagnosis, treatment, prevention.

3. Schistosoma (Bilharzia). Epidemiology, morphology, life cycle, clinical manifestations, diagnosis, treatment, prevention. 4. Paragonimus. Epidemiology, morphology, life cycle, clinical manifestations, diagnosis, treatment, prevention.

5. Ascaris lumbricoides. Epidemiology, morphology, life cycle, clinical manifestations, diagnosis, treatment, prevention.

The criteria for the evaluation of the interview for final classes

"Excellent" (5) – the answer is complete, competent, and logical; the answers to additional questions are clear and brief.

"Good" (4) – the lack of a coherent answer with a single error in the particulars; answers to additional questions are correct, not clear.

"Satisfactory" (3) – the answer is competent enough, incomplete, with errors in details; answers to the additional questions are not clear, with errors in the particulars.

"Unsatisfactory" (2) – the answer of an illiterate, incomplete, misspell; answers to supplementary questions are wrong.

Sample questions for practical skills

Introduction to biology course

1. Observe a preparation of "Frog blood "at low and high magnification and make a sketch.

2. To prepare a temporary slide of cotton fiber, observe at low and high magnification and make a sketch. Show air bubbles.

3. To prepare a temporary slide of "Cross hair" observe at low and high magnification and make a sketch. Show air bubbles.

Molecular basis of heredity

1. Differentiate eukaryotic chromosomes according to their morphology.
2. Diagrammatically depict the position of genes in chromosomes.
3. To make a diagram of DNA structure indicating chemical bonds.
4. To analyze the nucleotide composition of DNA fragments.
5. To map replication, indicating the sequence of events and functions of enzymes replication in pro - and eukaryotes.

The role of genetic and environmental factors in shaping the phenotype

1. The use of patterns of inheritance allelic genes of autosomes to determine the probability for the appearance of the descendants with a specific symptom.

2. The use of patterns of inheritance of genes the sex chromosomes to determine the probability for the appearance of descendants with a particular sign or signs.

3. The use of patterns of inheritance genes are non-allelic and non-linked characteristics, controls-roemich their action, to determine the genotypes and phenotypes of offspring genotypes and phenotypes of the parents.

4. The use of patterns of inheritance genes are non-allelic and non-linked characteristics, controls-roemich their action, to determine the genotypes and phenotypes of parents genotypes and phenotypes of the offspring.

5. The use of patterns of inheritance of non-linked non-allelic genes to determine the likelihood of children with certain characteristics.

Methods of studying human genetics

1. To make a genealogical scheme, and to perform it.

2. Using the twin study method to determine the contribution of genotype and environment in the development of the symptom.

3. To differentiate human chromosome.

4. To determine anomalies of the mutant chromosomes in the human karyotype.

5. To evaluate the PCR results by electrophoresis.

Medical Parasitology

1. Describe the animal – human parasite class representatives on the basis of major morphological and physiological traits and peculiarities of development cycles.

2. To identify representatives type Simple according to the morphological characteristics at all stages of development.

3. To identify larval stages of trematodes.

4. To identify the eggs of helminths (liver Fluke, lentetsa wide, schistosomes, taeniid, pinworm, roundworm, whipworm) according to the morphological characteristics.

5. To identify the morphological characteristics of arachnids at different stages of development.

Criteria for the assessment of practical skills

"**Excellent**" ("5") – 91% or more correct answers to the job.

"**Good**" ("4") – 85-90% correct answers on the assignments.

"**Satisfactory**" ("3") – 71-84% of correct answers to the job.

"**Unsatisfactory**" ("2") – 70% or less correct answers on the assignments.

Example questions for the credit

Introduction to biology course

1. The subject of biology. Biological Sciences, their objectives, objects of study. Methods of biology.

2. Biology is the theoretical basis of medicine. Research methods and stages of development of biology. Classification biological Sciences.

3. The cellular level of life organization. The origin and evolution of cells. Principles of structural-functional organization of Pro - and eukaryotic cells.

4. Properties and characteristics of living things. It qualitatively different from the inanimate. To define what life is.

5. The essence of life. Levels of organization of living nature. Methods of scientific knowledge.

The structure of the cell

1. Organelles of special purpose. Their structure and function.

2. The structure of the cytoplasmic membrane. The types of proteins, lipids and carbohydrates included in the composition of the membranes, their importance in the formation of the function membrane. The surface unit cell and its structure.

3. The transport function. Types and mechanisms of transport of substances. Examples.

4. Receptor function of the cytoplasmic membrane of the cell.

5. The chemical composition of the cell, its physico-chemical status and osmotic properties of the protoplasm of the cells.

Molecular basis of heredity

1. The concept of RNA. RNA transport. Features of the structure. Functions, molecular mechanisms and importance in the realization of genetic information.

2. The concept of m-RNA. Structure. Mechanisms of formation. The functions and importance in the implementation of the genetic-tion information.

3. Translation. Molecular mechanisms of the process of elongation of polypeptide chain. The role of the peptidyl-transferase. Mechanisms of formation of peptide bonds.

4. Translation. The termination stage of protein synthesis. Molecular mechanisms, role factors release.

5. Features of organization and expression differences of genetic information in prokaryotes and eukaryotes. The mechanism of inhibition of protein synthesis processes. Use in medicine. Examples.

The role of genetic and environmental factors in shaping the phenotype

1. The genotype, genome, phenotype. Factors that determine the development of the phenotype. Interaction of alleles in the determination of characteristics: dominance, intermediate expression, codominance.

2. The first and second Mendel's laws. The hypothesis of purity of gametes. Mendels characteristics of a person. Examples. Autosomal-dominant and autosomal-recessive types of inheritance.

3. The third law of Mendel. Cytological basis of the universality of Mendel's laws. Mendels characteristics of a person.

4. Allelic genes. Definition. Forms of interaction. Examples. The mechanism of occurrence. The theory of multiple alleles. Genetic-physiological characteristics of ABO blood system .

5. Group incompatibility. Inheritance of the RH factor. Rhesus-conflict, common symptoms, characteristics.

Evaluation criteria of the interview in the credit

"Excellent" (5) – the answer is complete, competent, and logical; the answers to additional questions are clear and brief.

"Good" (4) – the lack of a coherent answer with a single error in the particulars; answers to additional questions are correct, not clear.

"Satisfactory" (3) – the answer is competent enough, incomplete, with errors in details; answers to the additional questions are not clear, with errors in the particulars.

"Unsatisfactory" (2) – the answer of an illiterate, incomplete, misspell; answers to supplementary questions are wrong.

Sample questions for the exam

Introduction to biology course

1. The subject of biology. Biological Sciences, their objectives, objects of study. Methods of biology.

2. Biology - the science of nature. Characteristics of living organisms. Biology in the medical sciences.

3. The definition of life at the present stage of scientific development.

4. The fundamental properties of living matter.

5. Levels of organization of living matter.

The structure of the cell

1. The concept of pro - and eukaryotic cells. Features of their structure in a comparative perspective. Examples.

2. The structure of the plasma membrane. The types of proteins, lipids and carbohydrates included in the membrane, their importance in the formation of the function membrane.

3. The structure and working mechanisms of electron transport chain of mitochondria. Chemiosmotic theory of Mitchell. The value for cell activity.

4. The structure and function of the endoplasmic reticulum. The value for cell activity. Examples.

5. The structure and functions of Golgi complex. The structural features of different types of cells. The value for cell activity. The functioning of bordered of bubbles and their role. Examples.

Molecular basis of heredity

1. The concept of groups of chromosomes during karyotyping. Modern methods of karyotype. The principles of sorting of chromosomes by flow-cytometry.

2. The concept of genomic and chromosomal mutations. The types of genomic mutations (polyploidy, aneuploidy).

3. The genetic code, concept, structure. Properties of genetic code. Examples

4. The concept of nuclear and extra-nuclear hereditary material of cells.

5. Levels of compaction of DNA. The importance of this phenomenon.

The role of genetic and environmental factors in shaping the phenotype

1. Multifactorial diseases (MFD), the concept of predisposition, the ratio of nasleduje bridges, the prediction (based on frequency of occurrence in the population, empirical), the value of the degree genus-tion in predicting MFZ, marker signs, microprismatic.

2. The concept of the band clutch, linked inheritance, examples. Genetic map of chromosomes, the concept, principles compilation.

3. Multiple alleles, inheritance of blood group system ABO. The principles for determining blood group system ABO.

4. Molecular mechanisms of recombination. Crossing over, definition, examples

5. The mechanisms of X-linked recessive inheritance. Examples.

Methods of studying human genetics

1. Clinical-genealogical method - the concept, the method, purpose, use evidence, examples.

2. Twin method. The principle, purpose, indications for use of the method.

3. Biochemical genetics techniques. Elements of the pathogenesis of enzymopathies. Examples. Treatment.

4. Genetics techniques used for prenatal pathology.

5. Methods of prenatal diagnostics of hereditary diseases.

Genetics of human populations

1. The Law Of Hardy - Weinberg Equilibrium. Mathematical expression of the conditions of work.

2. Population structure of humanity and the specificity of the action of natural selection in human populations.

3. The concept of multifactorial diseases. Examples.

4. Polymorphism — definition, types, examples. Biochemical, genetic and morphological polymorphism.

5. The basic action of evolutionary factors in human populations

The anthropogenesis.

1. Characteristics of the main stages of anthropogenesis.

2. Intraspecific differentiation of humanity.

3. Race and reagent.

4. Adaptive ecological types of man.

5. The origin of adaptive ecological types.

The peculiarities of ontogenesis in humans.

1. The ontogenesis. Early embryonic period. The biological significance of the processes taking place in the first minutes after fertilization.
2. The ontogenesis. Blastulae, mechanism, biological significance of the processes of blastulation.
3. Early stages of ontogenesis. Biological significance and mechanism of the processes of gastrulation.
4. Periods of ontogenesis and characteristics of each period.
5. Stages of the embryonic period of ontogenesis. Characteristics of each stage.

Medical Parasitology

1. Hymenolepis nana. Epidemiology, morphology, life cycle, clinical manifestations, diagnosis, treatment, prevention.
2. Spirometra (Diphyllobothrium) erinacei europaei. Epidemiology, morphology, life cycle, clinical manifestations, diagnosis, treatment, prevention.
3. Dipylidium caninum. Epidemiology, morphology, life cycle, clinical manifestations, diagnosis, treatment, prevention.
4. Enterobius (Oxyuris) vermicularis. Epidemiology, morphology, life cycle, clinical manifestations, diagnosis, treatment, prevention.
5. Ascaris lumbricoides. Epidemiology, morphology, life cycle, clinical manifestations, diagnosis, treatment, prevention.

Evaluation criteria of the interview in the exam

"Excellent" (5) – the answer is complete, competent, and logical; the answers to additional questions are clear and brief.

"Good" (4) – the lack of a coherent answer with a single error in the particulars; answers to additional questions are correct, not clear.

"Satisfactory" (3) – the answer is competent enough, incomplete, with errors in details; answers to the additional questions are not clear, with errors in the particulars.

"Unsatisfactory" (2) – the answer of an illiterate, incomplete, misspell; answers to supplementary questions are wrong.

Examples of situational tasks

Task 1

In the infectious department of the hospital a patient was delivered, who worked as a surveyor-cartographer in the felled areas of forest. He was diagnosed spring-summer encephalitis.

1. What the tick is a carrier of the pathogen of spring-summer encephalitis?
2. What are the morphological and physiological characteristics of the tick?
3. What are the peculiarities of nutrition and the development cycle of the parasite?
4. In what ways is transmission of the pathogen and what is their essence?
5. What are the measures of personal and public prevention in the prevention of disease?

Task 2

Patient complains of severe itching of the abdomen and between fingers. When inspecting the skin in these places discovered thin dark stripes.

1. What disease can be suspected in a patient?
2. How can we explain the presence of the skin thin dark bands?
3. Describe the main morphological features of the causative agent.

4. Can the patient be the source of infection of others and in what way?
5. If the patient needs treatment or possible cures?

Evaluation criteria and decision of situational tasks

"***Excellent***" – the answer is complete, competent, logical; demonstrates strong knowledge of issues related to the specific clinical situation with the examples of different parasitic diseases on the discipline (knowledge of Latin names of parasites, knowledge of morphology, epidemiology, pathogenic action, clinical picture, diagnosis and modern methods of treatment of major parasitic diseases), the ability to interpret at the level of the integrity of the organism, knowledge of the key patterns;

"***Well***" – the answer is logical enough with a single error in the particulars; . demonstrates solid property issues related to the specific clinical situation with the examples of various parasitic diseases in the discipline (knowledge of Latin names of parasites, knowledge of morphology, epidemiology, pathogenic action, clinical picture, diagnosis and modern methods of treatment of major parasitic diseases);

"***Satisfactory***" – the answer is not enough competent, incomplete, with errors in details; demonstrates the uncertain ownership issues related to specific clinical situations related to the specific clinical situation with the examples of different parasitic diseases on the discipline (knowledge of Latin names of parasites, knowledge of morphology, epidemiology, pathogenic action, clinical picture, diagnosis and modern methods of treatment of major parasitic diseases);

"***Unsatisfactory***" – the answer illiterate, incomplete, misspelt; no possession issues related to specific clinical situations;.

7. Educational, methodological and informational support of the discipline

a) primary literature:

1. Romanenko O.V. Medical biology: The study guide of the practical classes course / O.V. Romanenko, O.V. Golovchenko, M.G. Kravchuk, V.M. Grinkevych; Edited by O.V. Romanenko. – K.: Medicine, 2008. – 304 p.

2. Мяндина Г.И. Медицинская паразитология [Электронный ресурс]: Учебное пособие для студентов медицинского факультета специальностей «Лечебное дело» и «Стоматология» (Medical parasitology. Textbook for the first year students of Medical Faculty in specialities “Medicine” and “Stomatology”)/ Мяндина Г.И.— Электрон. текстовые данные.— М.: Российский университет дружбы народов, 2013.— 256 c.— Режим доступа: http://www.bibliocomplectator.ru/book/?id=22193.

3. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.1. - 736 c.: ил. http://www.studmedlib.ru/ru/book/ISBN9785970430293.html

4. Biology: Textbook in 2 volumes / Edited by V.N. Yarygin. - M .; GEOTAR-Media, 2014. - T.2. - 560 c.: ил. http://www.studmedlib.ru/ru/book/ISBN9785970430309.html

b) additional literature:

1. Biology, medical biology, genetics and parasitology: a textbook for universitites / A.P.Pehov. M.; GEOTAR-Media, 2014. - http://www.studmedlib.ru/book/ISBN9785970430729.html

c) software and Internet resources

1. MIT OpenCourseWare. Free Online Course Materials -http://ocw.mit.edu/index.htm

2.Free video lectures, Free Animations, Free Lecture Notes, Free Online Tests, Free Lecture Presentations-http://www.learnerstv.com/index.php

3. The Visible Human Project -Images & Animations - http://www.nlm.nih.gov/research/visible/animations.html

4. Microsoft Windows (DreamSpark/Microsoft Imagine Standart); reg. number 00037FFE-BACF8FD7, contract NoСД-130712001 of 12.07.2013.

5. Kaspersky Anti-Virus 2016-2017, reg. number KL4863RAUFQ, contract No ХП-567116 of 29.08.2016.

6. Open source software: LibreOffice; Google Chrome; Adobe Reader; 7zip.

8. Material and technical support for the discipline

№	The name of the special rooms and areas for independent work	Equipment of special rooms and areas for independent work
1	Audience 15-108, 15 building 1 floor	Desk – 15 pcs. Chairs – 30 pcs. Board training – 1 pcs. Demonstration table.
2	Audience 15-103, 15 building 1 floor	Desk – 15 pcs. Chairs – 30 pcs. Board training – 1 pcs. Demonstration table.
3	Audience 15-115, 15 building 1 floor	Lab table – 6 pcs. Chairs – 18 pcs. Board student – 1 pcs. Microscopes – 6 pcs. Demonstration table.
4	Audience 15-106, 15 building 1 floor	Lab table – 6 pcs. Chairs – 18 pcs. Board student – 1 pcs. Microscopes – 6 pcs. Demonstration table.

The work program of the discipline "Biology" was composed in compliance with requirements of FSES HE and academic plan of the course 31.05.01 – General Medicine.

The program was compiled by:
Associated professor of the Department of General Biology and Biochemistry _____
D.A. Saldaev

It is prohibited to reproduce the said program in any form without the prior written permission of the department that developed the program.

The program has been approved at a meeting of the Department of General Biology and Biochemistry

Report № 8 from « 4 » 03 2016

Head of department of General Biology and Biochemistry _____ /G. A. Karpova/

The program has been approved by the Dean of the Medical Faculty of PSU _____
/I. Ya. Moiseeva/

The program has been approved by the methodological committee of Medical Institute

Report № 7 from « 5 » 03 2016

Chair of the methodological committee of Medical Institute _____ /O.V. Kalmin/

Сведения о переутверждении программы на очередной учебный год и регистрации изменений

Учебный год	Решение кафедры (№ протокола, дата, подпись зав. кафедрой)	Внесенные изменения	Номера листов (страниц)		
			заменен-ных	новых	аннулиро-ванных
2016-2017 Уч. год	Протокол № 1 от 02.09.16	Переутверждена без изменений на новый учебный год			
2016-2017 Уч. год	Протокол № 12 от 29.05.17	Изменена квалификация выпускников	1		
2017-2018 Уч. год	Протокол № 1 от 31.08.17	Добавлено в п.5 описание применения образовательных технологий к обучающимся с ограниченными возможностями здоровья и инвалидам	12		
2017-2018 Уч. год	Протокол № 1 от 31.08.17	Переутверждена на новый учебный год			
2018-2019 Уч. год	Протокол № 1 от 31.08.18	Переутверждена без изменений на новый учебный год			
2019-2020 Уч. год	Протокол № 17 от 24.06.2019	Переутверждена без изменений на новый учебный год			