MINISTRY OF EDUCATION AND SCIENCE OF RUSSIA
Federal State Budgetary Educational Institution
of higher education
«I.N. Ulianov Chuvash State University»
(FSBEI of HE «I.N. Ulianov Chuvash State University»)

Medical Faculty

Department of Medical Biology with a course of Microbiology and Virology

«APPROVE»
Vice-rector for Academic Affairs
_____ I.E. Poverinov
«_13_» _04_ 2022

Working programs of the discipline (module)
«Биология / Biology»

Direction of training / specialty 31.05.03 Стоматология / Dentistry
Graduate's qualification Врач-стоматолог / Dental Practitioner

Direction (profile) / specialization «Dentistry»

Form of training – очная / intramural
Course – 1
Term – 1, 2
Total academic hours/credit points – 252/7
The year of beginning the training - 2022

Cheboksary - 2022

The fundamental document for compiling the working program of the discipline (module) Федеральный государственный образовательный стандарт высшего образования - специалитет по специальности 31.05.03 Стоматология (приказ Минобрнауки России от 12.08.2020 г. № 984)

Approved by:
Docent, Candidate of Biological Sciences N.V. Smirnova

The working program was approved at the meeting of the Department of Medical Biology with a course of Microbiology and Virology,
22.03.2022, protocol № 7
Acting Head of the department N.V. Smirnova

Approved by
Dean of the Medical Faculty V.N. Diomidova
Acting Head of the Educational and Methodological Department E.A. Shirmanova

1. The purpose and objectives of training in the discipline (module)

The purpose of the discipline - The formation of systemic fundamental knowledge, skills and abilities in general biological laws, which are of the greatest interest for practical healthcare, preparing students for a systematic perception of general medical, social and clinical disciplines, forming their natural-science worldview and biological thinking, necessary for the subsequent practical activities of a doctor.

The objectives of the discipline - The acquisition by students of knowledge in the field of organization and functioning of living systems and the general properties of living things;

acquire knowledge in the patterns and features of the transmission and changes in hereditary traits and properties in generations and their role in human hereditary pathology;

understand the patterns of the process of embryogenesis, including human embryonic development;

to study the features of developmental biology and medical significance of human parasites;

to study the general laws of the evolution of living systems, the main directions of the evolution of systems and organs, the general laws of the development of the biosphere and the role of man as the main environmental factor at different stages of anthropogenesis;

teaching students the most important methods of microscopy, methods of preparing and staining temporary micropreparations for analyzing the structure and identifying cells, types of chromosomes and chromatin, division phases (mitosis and meiosis), embryonic stages of vertebrate development, identification of pathogens of parasitic diseases;

teaching students to apply the laws of inheritance to determine the likelihood of the appearance of normal and pathological traits in the phenotype and predict human hereditary diseases as a result of solving genetic problems;

acquisition by students of knowledge on carrying out diagnostic and preventive measures aimed at preventing the occurrence of infectious and parasitic diseases;

teaching students to choose the optimal schemes for identifying homologous and similar structures on macropreparations in organ systems of vertebrates and substantiating the genetic etiology of hereditary diseases and ontophylogenetic malformations (circulatory, genitourinary, nervous, etc. systems);

teaching students the general patterns, directions and factors of evolution to explain the adaptive nature of the evolutionary process;

teaching the laws of population ecology, the processes of development and functioning of ecosystems and the biosphere as a whole for planning a strategy for human existence in the biosphere, as well as for organizing preventive measures and medical care for the population.

2. The place of practical training in the structure of the educational program of higher education

The discipline «Биология / Biology» относится к обязательной части учебного плана refers to the mandatory part in the curriculum of the educational program of higher education (hereinafter referred to as the EP of HE) in the field of training / specialty 31.05.03 Стоматология, direction (profile) / specialization of the program «Dentistry».

Previous academic disciplines (modules) and (or) practices that form the knowledge, skills and abilities necessary for training in the discipline (module):

Латинский язык / The Latin Language

Knowledge, skills and abilities formed as a result of training in a discipline (module) are necessary when teaching in the following disciplines (modules) and (or) practices:

Микробиология, вирусология / Microbiology, Virology

Иммунология / Immunology
Гигиена / Hygiene

3. Planned learning outcomes in the discipline (module), correlated with the planned learning outcomes

Planned learning outcomes in the discipline (module), correlated with the planned learning outcomes

Code and name of the competence	Code and name of the competence achievement	Descriptors for the indicator of competence achievement (learning)
ОПК-8 Способен использовать основные физико-химические, математические и естественнонаучные понятия и методы при решении профессиональных задач / He/she is able to use the basic physical-chemical, mathematical and natural science concepts and methods in solving professional problems	ОПК-8.1 Владеет знаниями об основных физико-химических, математических и естественнонаучных понятиях и методах / He/she is aware of the basic physical-chemical, mathematical and natural science concepts and methods	Basic ideas about the diversity of biological objects, understanding the importance of biodiversity for the sustainability of the biosphere. Principles of structural and functional organization of biological objects and mechanisms of homeostatic regulation. Basic concepts and problems of the biosphere and ecology, the phenomenon of parasitism. Use methods of observation, description, identification, classification of biological objects. Medico-biological conceptual apparatus. The main biological methods of analysis and assessment of the state of living systems.
ОПК-8 Способен использовать основные физико-химические, математические и естественнонаучные понятия и методы при решении профессиональных задач / He/she is able to use the basic physical-chemical, mathematical and natural science concepts and methods in solving professional problems	ОПК-8.2 Способен анализировать процессы описываемые основными физико-химическими, математическими и естественнонаучными понятими и методами / He/she is able to analyze the processes described by the basic physicochemical, mathematical and natural science concepts and methods	Principles of cellular organization of biological objects, biophysical and biochemical bases, membrane processes and molecular mechanisms of vital activity. Basic ideas about the main patterns and modern achievements of genetics, about genomics, proteomics. Understand the role of the evolutionary idea in the biological worldview. Modern ideas about the foundations of evolutionary theory, about micro- and macroevolution, about the phenomenon of parasitism. Apply modern experimental methods of working with biological objects in laboratory conditions, skills of working with

		modern equipment. Compare, analyze, summarize the information received, come to a logical, biologically significant scientific conclusion. Methods of working with biological objects and methods of communication by people to obtain the information necessary in accordance with the goal.
ОПК-8 Способен использовать основные физико-химические, математические и естественнонаучные понятия и методы при решении профессиональных задач / He/she is able to use the basic physical-chemical, mathematical and natural science concepts and methods in solving professional problems	ОПК-8.3 Способен принимать решения на основе физико-химических, математических и естественнонаучных понятиях и методах / He/she is able to make decisions based on physicochemical, mathematical and natural science concepts and methods	Basic ideas about the patterns of reproduction and individual development of biological objects. Basic ideas about the basics of human biology, propaedeutics and health protection and use them in practice. The laws of genetics, its significance for medicine, patterns of heredity and variability in individual development as the basis for understanding the pathogenesis and etiology of human hereditary and multifactorial diseases. Modern ideas about the basics of biotechnology and genetic engineering. Principles of monitoring, assessment of the state of the natural environment and wildlife protection. Apply basic ideas about the basics of general, systemic and applied ecology, the principles of optimal nature management and nature protection. Apply in practice the principles of bioethics, understand the social and environmental consequences of their professional activities. Participate in the planning and implementation of relevant activities. Organize work in accordance with the requirements of safety and labor protection. Medico-biological conceptual apparatus. The legal basis for research work and the legislation of the Russian Federation in the field of nature protection and nature management. Business communication skills in the

		professional field, know the rules of business communication, have teamwork skills.
ОПК-9 Способен оценивать морфофункциональные, физиологические состояния и патологические процессы в организме человека для решения профессиональных задач / He/she is able to evaluate morphofunctional, physiological states and pathological processes in the human body to solve professional problems	ОПК-9.1 Способен распознавать морфофункциональные, физиологические состояния и патологические процессы в организме человека / He/she is able to recognize morphofunctional, physiological states and pathological processes in the human body	General laws of the origin and development of life, anthropogenesis and ontogenesis of man. The laws of genetics, its significance for medicine, patterns of heredity and variability in individual development as the basis for understanding the pathogenesis and etiology of human hereditary and multifactorial diseases. Causes of the formation of hereditary pathology (dysmorphia) of the orofacial region. Basic concepts and problems of the biosphere and ecology, the phenomenon of parasitism and bioecological diseases. Use methods of observation, description, identification, classification, biological objects. Collect data on the presence / absence of any trait among relatives, draw up a pedigree, analyze the features of the distribution of a trait in a series of generations. Conduct a survey for the presence of parasitic diseases. By external signs, identify an adult helminth, a blood -sucking insect. the main biological methods of analysis and assessment of the state of living systems. Knowledge and skills to collect data on the transmission of a trait in a series of generations, a graphic representation of a pedigree. The method of analyzing the features of the distribution of a trait in a series of generations. Skills in making temporary preparations for light microscopy. Methods of collecting information to detect the presence/absence of parasitic diseases.

ОПК-9 Способен оценивать морфофункциональные, физиологические состояния и патологические процессы в организме человека для решения профессиональных задач / He/she is able to evaluate morphofunctional, physiological states and pathological processes in the human body to solve professional problems	ОПК-9.2 Способен анализировать морфофункциональные, физиологические состояния и патологические процессы в организме человека / He/she is able to analyze morphofunctional, physiological states and pathological processes in the human body	Principles of cellular organization of biological objects, biophysical and biochemical bases, membrane processes and molecular mechanisms of vital activity. The main morphofunctional features of a growing organism in different age periods. Constitutional and chronological features. The role of endocrine organs in these processes. Variety of parasitic organisms, differences in their life cycles, mechanisms and ways of penetration into the human body, the main symptoms of infections, invasions, infestations. The main morphofunctional features and the time of manifestation of genes. chromosomal, multifactorial, diseases and diseases with an established etiological sign. On the contribution of the external environment to the timing of manifestation and the strength of the manifestation of pathological conditions. Signs of various anomalies in the development of teeth and dentition. Apply modern experimental methods of working with biological objects in field and laboratory conditions, skills of working with modern equipment. Analyze the information obtained in the process of collecting an anamnesis of visual examination and laboratory research in order to make a possible presumptive diagnosis. Distinguish between normal and pathological. Own the algorithm of symptomatic, semiotic and laboratory diagnostics in solving professional problems. Methods of observation, description, identification, classification
ОПК-9 Способен оценивать морфофункциональные, физиологические состояния и	ОПК-9.3 Способен диагностировать морфофункциональные, физиологические состояния и	Basic ideas about the basics of human biology, health protection and use them in practice. Features of ontogenetic development, patterns of heredity and

патологические процессы в организме человека для решения профессиональных задач / He/she is able to evaluate morphofunctional, physiological states and pathological processes in the human body to solve professional problems	патологические процессы организма человека / He/she is able to diagnose morphofunctional, physiological states and pathological processes in the human body	variability in individual development as the basis for understanding the pathogenesis and etiology of human hereditary, multifactorial and parasitic diseases. To be able to systematize and group the information obtained during the collection of anamnesis, visual examination and laboratory research in order to make a presumptive diagnosis. Apply in practice the principles of bioethics, understand the social and environmental consequences of their professional activities. The legal basis for research work and the legislation of the Russian Federation in the field of nature protection and nature management. The skills of recognizing the norm and pathology in solving professional problems.

4. Structure, scope and content of the discipline (module)

Educational activities in the discipline (module) are carried out:

- in the form of students' face-to-face work with the teaching staff of the organization and (or) persons involved by the organization to implement the educational programs on other terms (hereinafter - contact work);

- in the form of students' independent work.

Face-to-face work can be classroom-based, extramural, as well as it can be conducted in an electronic information and educational environment (EIEE).

Learning sessions in the discipline (module) and interim assessment of students are conducted in the form of face-to-face work and in the form of students' independent work.

During learning sessions in the discipline (module) face-to-face work includes: lecture -type classes, seminar-type classes and (or) group consultations, and (or) individual work of students with the teaching staff of the organization and (or) persons involved by the organization to implement the educational programs on other terms (including individual consultations).

Legend:

Lec – lectures, Lab – laboratory work, Pr – practical classes, ICW – individual face-to -face work, IW – independent work.

4.1. Content of the discipline (module)

Section name	The section's content	Formed competences	Competence achievement indicator
Chapter 1. Biology of the cell. Medical protistology.	Working with a microscope. Microscopy technique.	ОПК-8, ОПК-9	ОПК-8.1, ОПК-8.2, ОПК-8.3, ОПК-9.1, ОПК-

			9.2, ОПК-9.3
Chapter 1. Biology of the cell. Medical protistology.	Subkingdom Protozoa. Phylum Sarcomastigophora. Class Sarcodina.	ОПК-8, ОПК-9	ОПК-8.1, ОПК-8.2, ОПК-8.3, ОПК-9.1, ОПК-9.2, ОПК-9.3
	Subkingdom Protozoa. Phylum Sarcomastigophora. Class Mastigophora.		
	Phylum Apicomplexa. Class Sporozoa. Phylum Ciliophora.		
	Colloquium on the topic "Cytology. Medical Protistology".		
Chapter 2. Medical parasitology.	Phylum Flatworms. Class Flukes 1.		
	Phylum Flatworms. Class Flukes 2.		
	Phylum Flatworms. Class Tapeworms I.		
	Phylum Flatworms. Class Tapeworms II.		
	Phylum Roundworms. Class Nematodes 1.		
	Phylum Roundworms. Class Nematodes 2.		
	Helmintoovoscopy.		
	Colloquium on the topic "Medical parasitology".		
	Phylum Arthropods. Class Arachnids. Order Ticks.		ОПК-8.1, ОПК-8.2, ОПК-8.3, ОПК-9.1, ОПК-

			9.2, ОПК-9.3
Chapter 2. Medical parasitology.	Class Insects. Order of lice, fleas, dipterans.	ОПК-8, ОПК-9	ОПК-8.1, ОПК-8.2, ОПК-8.3, ОПК-9.1, ОПК-9.2, ОПК-9.3
	Colloquium on the topic "Medical significance of arthropods".		
Chapter 3. Developmental biology, homeostasis, regeneration	Reproduction. Life and mitotic cycles of the cell.		
	Reproduction. Meiosis. Gametogenesis.		
	Ontogenesis. General patterns of embryonic development.		
	Postembryonic development. Theories of Aging		
	Colloquium on Developmental Biology and Homeostasis.		
Chapter 4. Fundamentals of General and Medical Genetics	Patterns of inheritance. Independent inheritance and interaction of genes.		
	The main forms of interaction of non-allelic genes.		
	Inheritance of sex, signs and diseases linked to sex.		
	Inheritance of blood groups. Molecular genetics.		
	Variability, its types and mechanisms.		
	The doctrine of the population.		ОПК-8.1, ОПК-8.2, ОПК-8.3, ОПК-9.1, ОПК-

			9.2, ОПК-9.3
Chapter 4. Fundamentals of General and Medical Genetics	Colloquium on the topic "Anthropogenetics".	ОПК-8, ОПК-9	ОПК-8.1, ОПК-8.2, ОПК-8.3, ОПК-9.1, ОПК-9.2, ОПК-9.3
Chapter 5. Evolution of the organic world. Phylogeny of vertebrate organs	Phylogeny of the circulatory system. Philembryogenesis. Developmental defects.		
	Phylogeny of the dental system.		
Chapter 6. Biosphere and ecology. Poisonous animals and plants. Anthropogenesis.	Evolutionary doctrine. Anthropogenesis. Adaptive types, acclimatization.		
	Biosphere and ecology.		

4.2. Scope of the discipline and types of academic work

Forms of control and types of academic work		Labor intensity of the discipline (module)		
		1	2	total
1. Face-to-face work:		48	64,3	112,3
In-class learning in total, including:		48	64	112
Лекционные занятия (Лек)		16	16	32
Лабораторные занятия (Лаб)		32	48	80
Индивидуальная контактная работа (ИКР)			0,3	0,3
2. Independent work of the student:		60	43,7	103,7
3. Intermediate certification (exam) (экзамен)			Эк	
Total:	academic hours	108	144	252
	credit units	3	4	7

№ item	The section's (theme's) name	Face-to face work, including in the electronic information and educational environment, academic hours				IW, academic hours	Total, academic hours
		Lect.	Pr.	Lab.	ICW		
	Chapter 1. Biology of the cell. Medical protistology.						
1	Working with a microscope. Microscopy technique.			2		2	4
2	Subkingdom Protozoa. Phylum Sarcomastigophora. Class Sarcodina.	2		2		4	8
3	Subkingdom Protozoa. Phylum Sarcomastigophora. Class Mastigophora.			2		4	6
4	Phylum Apicomplexa. Class Sporozoa. Phylum Ciliophora.	2		2		4	8
5	Colloquium on the topic "Cytology. Medical Protistology".			2		4	6
	Chapter 2. Medical parasitology.						
6	Phylum Flatworms. Class Flukes 1.	2		2		5	9
7	Phylum Flatworms. Class Flukes 2.			2		4	6
8	Phylum Flatworms. Class Tapeworms I.	2		2		5	9
9	Phylum Flatworms. Class Tapeworms II.			2		4	6
10	Phylum Roundworms. Class Nematodes 1.	2		2		4	8
11	Phylum Roundworms. Class Nematodes 2.			2		4	6
12	Helmintoovoscopy.	2		2		4	8
13	Colloquium on the topic "Medical parasitology".			2		4	6
14	Phylum Arthropods. Class Arachnids. Order Ticks.	2		2		3	7
15	Class Insects. Order of lice, fleas, dipterans.	2		2		3	7
16	Colloquium on the topic "Medical significance of arthropods".			2		2	4
	Chapter 3. Developmental biology, homeostasis, regeneration						

17	Reproduction. Life and mitotic cycles of the cell.	2		3		2,5	7,5
18	Reproduction. Meiosis. Gametogenesis.	2		3		3	8
19	Ontogenesis. General patterns of embryonic development.	2		3		2,5	7,5
20	Postembryonic development. Theories of Aging	2		3		2,7	7,7
21	Colloquium on Developmental Biology and Homeostasis.			3			3
	Chapter 4. Fundamentals of General and Medical Genetics						
22	Patterns of inheritance. Independent inheritance and interaction of genes.			3		3	6
23	The main forms of interaction of non-allelic genes.	2		3		3	8
24	Inheritance of sex, signs and diseases linked to sex.	2		3		4	9
25	Inheritance of blood groups. Molecular genetics.	2		3		4	9
26	Variability, its types and mechanisms.			3		4	7
27	The doctrine of the population.	2		3		3	8
28	Colloquium on the topic "Anthropogenetics".			3			3
	Chapter 5. Evolution of the organic world. Phylogeny of vertebrate organs						
29	Phylogeny of the circulatory system. Philembryogenesis. Developmental defects.			3		3	6
30	Phylogeny of the dental system.			3		3	6
	Chapter 6. Biosphere and ecology. Poisonous animals and plants. Anthropogenesis.						
31	Evolutionary doctrine. Anthropogenesis. Adaptive types, acclimatization.			3		3	6
32	Biosphere and ecology.			3	0,3	3	6,3
Total academic hours		32		80	0,3	103,7	252

4.3. Summary of the discipline (module), structured by sections (topics)

Раздел 1. Chapter 1. Biology of the cell. Medical protistology.

Тема 1. Working with a microscope. Microscopy technique.

Лабораторное занятие. Working with a microscope. Microscopy technique.

Тема 2. Subkingdom Protozoa. Phylum Sarcomastigophora. Class Sarcodina.

Лекционное занятие. Subkingdom Protozoa. Phylum Sarcomastigophora. Class Sarcodina.

Лабораторное занятие. Subkingdom Protozoa. Phylum Sarcomastigophora. Class Sarcodina.

Тема 3. Subkingdom Protozoa. Phylum Sarcomastigophora. Class Mastigophora.

Лабораторное занятие. Subkingdom Protozoa. Phylum Sarcomastigophora. Class Mastigophora.

Тема 4. Phylum Apicomplexa. Class Sporozoa. Phylum Ciliophora.

Лекционное занятие. Phylum Apicomplexa. Class Sporozoa. Phylum Ciliophora.

Лабораторное занятие. Phylum Apicomplexa. Class Sporozoa. Phylum Ciliophora.

Тема 5. Colloquium on the topic "Cytology. Medical Protistology".

Лабораторное занятие. Colloquium on the topic "Cytology. Medical Protistology".

Раздел 2. Chapter 2. Medical parasitology.

Тема 6. Phylum Flatworms. Class Flukes 1.

Лекционное занятие. Phylum Flatworms. Class Flukes 1.

Лабораторное занятие. Phylum Flatworms. Class Flukes 1.

Тема 7. Phylum Flatworms. Class Flukes 2.

Лабораторное занятие. Phylum Flatworms. Class Flukes 2.

Тема 8. Phylum Flatworms. Class Tapeworms I.

Лекционное занятие. Phylum Flatworms. Class Tapeworms I.

Лабораторное занятие. Phylum Flatworms. Class Tapeworms I.

Тема 9. Phylum Flatworms. Class Tapeworms II.

Лабораторное занятие. Phylum Flatworms. Class Tapeworms II.

Тема 10. Phylum Roundworms. Class Nematodes 1.

Лекционное занятие. Phylum Roundworms. Class Nematodes 1.

Лабораторное занятие. Phylum Roundworms. Class Nematodes 1.

Тема 11. Phylum Roundworms. Class Nematodes 2.

Лабораторное занятие. Phylum Roundworms. Class Nematodes 2.

Тема 12. Helmintoovoscopy.

Лекционное занятие. Helmintoovoscopy.

Лабораторное занятие. Helmintoovoscopy.

Тема 13. Colloquium on the topic "Medical parasitology".

Лабораторное занятие. Colloquium on the topic "Medical parasitology".

Тема 14. Phylum Arthropods. Class Arachnids. Order Ticks.

Лекционное занятие. Phylum Arthropods. Class Arachnids. Order Ticks.

Лабораторное занятие. Phylum Arthropods. Class Arachnids. Order Ticks.

Тема 15. Class Insects. Order of lice, fleas, dipterans.

Лекционное занятие. Class Insects. Order of lice, fleas, dipterans.

Лабораторное занятие. Class Insects. Order of lice, fleas, dipterans.

Тема 16. Colloquium on the topic "Medical significance of arthropods".

Лабораторное занятие. Colloquium on the topic "Medical significance of arthropods".

Раздел 3. Chapter 3. Developmental biology, homeostasis, regeneration

Тема 17. Reproduction. Life and mitotic cycles of the cell.

Лекционное занятие. Reproduction. Life and mitotic cycles of the cell.

Лабораторное занятие. Reproduction. Life and mitotic cycles of the cell.

Тема 18. Reproduction. Meiosis. Gametogenesis.

Лекционное занятие. Reproduction. Meiosis. Gametogenesis.

Лабораторное занятие. Reproduction. Meiosis. Gametogenesis.

Тема 19. Ontogenesis. General patterns of embryonic development.

Лекционное занятие. Ontogenesis. General patterns of embryonic development.

Лабораторное занятие. Ontogenesis. General patterns of embryonic development.

Тема 20. Postembryonic development. Theories of Aging

Лекционное занятие. Postembryonic development. Theories of Aging

Лабораторное занятие. Postembryonic development. Theories of Aging

Тема 21. Colloquium on Developmental Biology and Homeostasis.

Лабораторное занятие. Colloquium on Developmental Biology and Homeostasis.

Раздел 4. Chapter 4. Fundamentals of General and Medical Genetics

Тема 22. Patterns of inheritance. Independent inheritance and interaction of genes.

Лабораторное занятие. Patterns of inheritance. Independent inheritance and interaction of genes.

Тема 23. The main forms of interaction of non-allelic genes.

Лекционное занятие. The main forms of interaction of non-allelic genes.

Лабораторное занятие. The main forms of interaction of non-allelic genes.

Тема 24. Inheritance of sex, signs and diseases linked to sex.

Лекционное занятие. Inheritance of sex, signs and diseases linked to sex.

Лабораторное занятие. Inheritance of sex, signs and diseases linked to sex.

Тема 25. Inheritance of blood groups. Molecular genetics.

Лекционное занятие. Inheritance of blood groups. Molecular genetics.

Лабораторное занятие. Inheritance of blood groups. Molecular genetics.

Тема 26. Variability, its types and mechanisms.

Лабораторное занятие. Variability, its types and mechanisms.

Тема 27. The doctrine of the population.

Лекционное занятие. The doctrine of the population.

Лабораторное занятие. The doctrine of the population.

Тема 28. Colloquium on the topic "Anthropogenetics".

Лабораторное занятие. Colloquium on the topic "Anthropogenetics".

Раздел 5. Chapter 5. Evolution of the organic world. Phylogeny of vertebrate organs
Тема 29. Phylogeny of the circulatory system. Philembryogenesis. Developmental defects.

Лабораторное занятие. Phylogeny of the circulatory system. Philembryogenesis. Developmental defects.

Тема 30. Phylogeny of the dental system.

Лабораторное занятие. Phylogeny of the dental system.

Раздел 6. Chapter 6. Biosphere and ecology. Poisonous animals and plants. Anthropogenesis.

Тема 31. Evolutionary doctrine. Anthropogenesis. Adaptive types, acclimatization.

Лабораторное занятие. Evolutionary doctrine. Anthropogenesis. Adaptive types, acclimatization.

Тема 32. Biosphere and ecology.

Лабораторное занятие. Biosphere and ecology.

5. Educational technologies

To implement the competence-based approach in the study of the discipline (module), extensive use of active and interactive methods of conducting classes in the educational process is provided:

At the Department of Medical Biology, the following educational technologies are used in the learning process during lectures and practical exercises:

- lectures - an interactive form of conducting a lesson is also used to present new material, namely, analysis of forecasting models, discussion of current research works on the mathematical foundations of forecasting theory;

-laboratory classes in the classroom using light microscopes, micropreparations, macropreparations, dummies, tabular material;

- the use of multimedia tools (projectors, televisions) - to improve the quality of perception of the studied material;

- controlled homework (extracurricular independent work) - to encourage students to work independently;

- checking and evaluating the knowledge, skills and abilities of students in solving situational problems;

- colloquia on the material of the section - for intermediate certification and assessment of the degree of assimilation by students of the material covered;

- stimulation (and motivation (expansion of knowledge in the study of etiological factors in the development of pathological processes) to attract to research work;

The final assessment of knowledge is carried out in the form of an exam (test or tickets).

6. Forms of control and types of evaluation materials for the discipline (module)

Intermediate attestation - evaluation of intermediate and final results of training in the discipline (module).

6.1. Sample list of questions for the credit test

Not provided

6.2. Sample list of questions for the examination

1. Substratum of life and levels of organization of life. properties of the living.
2. The structure of the cell. main organelles.
3. Parasitism and its criteria. Classification of parasites and their examples.
4. The mechanism of action of the parasite on the host organism and its consequences.
5. Transmissible and natural focal diseases. Examples.
6. Mechanisms and ways of parasite penetration into the host organism.
7. Relationships between organisms: symbiosis, antibiosis, neutralism. Forms of symbiosis and antibiosis.
8. Dysenteric amoeba. Systematic position, morphology, development cycle. Laboratory diagnostics, prevention.
9. Intestinal and oral amoeba. Their systematic position, morphology, development cycle. Laboratory diagnostics, prevention.
10. Giardia. Systematic position, morphology, development cycle. Laboratory diagnostics, prevention.
11. Trichomonas. Systematic position, morphology, development cycle. Laboratory diagnostics, prevention.
12. Trypanosoma. Systematic position, morphology, development cycle. Laboratory diagnostics, prevention.
13. Malarial Plasmodium. Systematic position, morphology, development cycle.

Laboratory diagnostics, prevention.

14. Toxoplasma. Systematic position, morphology, development cycle. Diagnostics, prevention.

15. Liver fluke. Systematic position, morphology, development cycle. Laboratory diagnostics, prevention.

16. Pulmonary fluke. Systematic position, morphology, development cycle. Laboratory diagnostics, prevention.

17. Cat fluke. Systematic position, morphology, development cycle. Laboratory diagnostics, prevention.

18. Lanceolate fluke. Systematic position, morphology, development cycle. Laboratory diagnostics, prevention.

19. Pork tapeworm. Systematic position, morphology, development cycle. Laboratory diagnostics, prevention. The concept of cysticercosis.

20. Bull tapeworm. Systematic position, morphology, development cycle. Laboratory diagnostics.

21. Dwarf tapeworm. Systematic position, morphology, development cycle. Laboratory diagnostics, prevention.

22. Echinococcus. Systematic position, morphology, development cycle. Diagnostics, prevention.

23. Ascaris human. Systematic position, morphology, development cycle. Laboratory diagnostics, prevention.

24. Pinworm for children. Systematic position, morphology, development cycle. Laboratory diagnostics, prevention.

25. Trichinella. Systematic position, morphology, development cycle. Laboratory diagnostics, prevention.

26. Ixodid ticks. systematic position. Morphology, development, medical significance).

27. Argas ticks. systematic position. Morphology, development, medical significance.

28. Acne gland and scabies itch. Their systematic position, morphology, development, medical significance.

29. Mosquitoes. systematic position. Morphology, development, medical significance. Differences between common and malarial mosquitoes.

30. Lice and fleas. systematic position. Morphology, development, medical significance.

31. Methods of asexual and sexual reproduction of organisms. Examples.

32. Parthenogenesis and sexual process. Similarities and differences between the sexual process of prokaryotes and eukaryotes.

33. Sexual dimorphism and its hormonal conditioning. The role of sexual selection in fixing secondary sexual characteristics.

34. Ovogenesis. The structure of female germ cells.

35. Spermatogenesis. The structure of male germ cells.

36. Fertilization. Phases and forms of fertilization. Concept of IVF.

37. Embryogenesis. Stages and methods of crushing.

38. Gastrulation. Methods of gastrulation.

39. Organogenesis. The concept of axial organs and the sequence of their laying.

40. Histogenesis. Derivatives of ectoderm, endoderm, mesoderm and mesenchyme.

41. Dangerous periods of embryogenesis. The concept of teratogenic factors and their classification.

42. Methods of postembryonic development and their examples. Postnatal period of human development.

43. Hormones of the endocrine glands, affecting the growth and development of the body.

44. Stress. phases of its development. Hormones stress - reactions.

45. Hypotheses of body aging.

46. Evolution of the dentition.

47. Interaction of allelic genes.

48. Interaction of non-allelic genes. Complementarity and Its Examples.

49. Epistasis: dominant and recessive. Examples.

50. Polymeria: cumulative and non-cumulative. Examples.

51. Pleiotropy. Penetrance. Examples.

52. The effect of position, genocopy, phenocopy and their significance in medicine.

53. Mechanisms of inheritance of sex. The concept of homo- and heterogametic sex. Sex-linked traits. Examples.

54. Systems for determining blood groups of the human body. The concept of the Rh factor and Rh conflict.

55. Chromosomal diseases associated with non-disjunction of sex chromosomes.

56. Chromosomal diseases associated with non-disjunction of autosomes. Causes and consequences of their occurrence.

57. Genetic diseases. Their classification, causes and consequences.

58. Phenotypic variability. reaction rate. Variation series and variation curve. The average value of the variation series.

59. Genotypic variability. Forms, Causes and Effects.

60. Populations. Properties and criteria of populations. ideal populations. Hardy–Weinberg law.

61. Environmental factors. Adaptations of organisms to environmental factors. Ecological groups of people and their adaptive features. Laws of Allen, Gloger and Bergman.

62. Chronobiology. The concept of synchronization and desynchronization of rhythms. The role of external and internal factors in maintaining daily and seasonal biorhythms of the human body.

63. The main stages of anthropogenesis. The most ancient, ancient and modern people and their ecological and homophysiological characteristics.

64. Hypotheses of the origin of man. Similarities and differences between humans and animals.

6.3. Suggested themes of term papers (projects)

Not provided

6.4. Suggested themes of term projects

Not provided

6.5. Suggested topics of calculation and graphic works

Not provided

7. Educational, methodological, informational and software support of the discipline (module)

The electronic catalog and electronic information resources provided by the scientific library of the FSBEI of HE "I. N. Ulianov Chuvash State University" are available at the link http://library.chuvsu.ru/

7.1. Regulatory documents, standards and rules

Не предусмотрено.

7.2. Recommended basic educational and methodological literature

№ item	Name
1	

7.3. Recommended supplementary educational and methodological literature

№ item	Name
1	

7.4. List of resources of the "Internet" information and telecommunication network

№ item	Name	Link to the resource
1	Научная библиотека ЧувГУ	library.chuvsu.ru
2	Электронно-библиотечная система IPRBooks	www.iprbookshop.ru
3	Электронная библиотечная система «Юрайт»: электронная библиотека для вузов и ссузов	www.biblio-online.ru
4	ЭБС «Издательство «Лань»	e.lanbook.com/
5	Консультант студента. Электронная библиотека медицинского вуза.	www.studmedlib.ru/

7.5. Software, professional databases, information and reference systems, electronic educational resources and electronic library systems

Software, professional databases, information and reference systems provided by the Informatization Department of the FSBEI of HE "I.N. Ulianov Chuvash State University" are available for download at the link http://ui.chuvsu.ru //. The Unified Register of Russian programs for electronic computers and databases, including freely distributed ones, is available at the link reestr.minsvyaz.ru/reestr /.

7.5.1. Licensed and freely distributed software

Microsoft Windows operating System and/or Unix-like operating system and/or mobile operating system;

Office software packages:

Microsoft Office and/or LibreOffice

and (or) OpenOffice and (or) analogues;

Browsers, including Yandex.Browser.

List of software:

7.5.2. Lists of professional databases and (or) information reference systems and (or) electronic library systems and (or) electronic educational resources

8. Material and technical support of the discipline

Classrooms for lecture-type classes in the discipline are equipped with a teacher's automated workplace consisting of: a personal computer/laptop, multimedia equipment with a screen and (or) SMART interactive whiteboard/SMART TV.

The premises for students' independent work are equipped with computer equipment

enabling to connect to the Internet and provide access to the electronic information and educational environment of the FSBEI of HE "I.N. Ulianov Chuvash State University".

№ item	Lesson type	Brief description and characteristics of the composition of installations, measuring and diagnostic equipment, computer equipment and experimental automation tools
1	ИКР	Учебная аудитория для занятий семинарского типа, текущего контроля и промежуточной аттестации. Оборудование: учебная доска, учебная мебель, мультимедийное оборудование (проектор, экран, компьютер), монокулярные микроскопы, микроскоп МИКМЕД-5
2	Лаб	Учебная аудитория для занятий семинарского типа, текущего контроля и промежуточной аттестации. Оборудование: учебная доска, учебная мебель, мультимедийное оборудование (проектор, экран, компьютер), монокулярные микроскопы, микроскоп МИКМЕД-5
3	Лек	Учебные аудитории для занятий лекционного типа, семинарского типа. Оборудование: учебная доска, учебная мебель, мультимедийное оборудование (проектор, экран, персональный компьютер или ноутбук с необходимым программным обеспечением для тематических иллюстраций и демонстраций, соответствующих программе дисциплины)
4	Ср	Учебная аудитория для занятий семинарского типа, текущего контроля и промежуточной аттестации. Оборудование: учебная доска, учебная мебель, мультимедийное оборудование (проектор, экран, компьютер), монокулярные микроскопы, микроскоп МИКМЕД-5
5	Экзамен	Учебная аудитория для занятий семинарского типа, текущего контроля и промежуточной аттестации. Оборудование: учебная доска, учебная мебель, мультимедийное оборудование (проектор, экран, компьютер), монокулярные микроскопы, микроскоп МИКМЕД-5

9. Means of adapting the discipline teaching to the needs of persons with physical conditions

If necessary, persons with physical conditions can be offered one of the following options for perceiving information, taking into account their individual psychophysical characteristics:

1) using e-learning and distance learning technologies.

2) using special equipment (enginery) and software in accordance with the students' health restrictions in the Training Centers for Persons with Disabilities and Physical Conditions (hereinafter referred to as special needs) available at the university.

In the course of training, if necessary, the following conditions are provided for persons with visual, hearing and musculoskeletal disorders:

- for persons with visual impairments: educational and methodological materials in printed form in enlarged font; in the form of an electronic document; in the form of an audio file (conversion of educational materials into audio format); in printed form in Braille; individual consultations involving a tactile interpreter; individual assignments and consultations.
- for people with hearing impairments: educational and methodological materials in printed form; in the form of an electronic document; video materials with subtitles; individual consultations involving a sign language interpreter; individual assignments and consultations.
- for persons with disorders of the musculoskeletal system: educational and methodological materials in printed form; in the form of an electronic document; in the form of an audio file; individual assignments and consultations.

10. Guidelines for students to perform independent work

The purpose of the student's independent work (IW) is to consolidate the theoretical knowledge gained and to acquire practical skills in using and performing research of algorithms and data structures when designing application software programs. IW includes independent study of educational issues, preparation for laboratory classes, performing calculation and graphic work, preparation for a test and an exam.

The list of questions and tasks for independent work to prepare for laboratory classes is given in the corresponding methodological instructive regulations in the description of each laboratory work.

The list of questions and tasks for independent work to carry out calculation and graphic work is given in the relevant methodological instructive regulations.

Independent work of students is an integral part of the educational process. The purpose of independent work is to prepare a modern competent specialist and develop abilities and skills for continuous self-education and professional improvement.

Realization of this goal involves the solution of the following tasks:

- high-quality development of theoretical material in the discipline under study, deepening and expanding theoretical knowledge with a view to their application at the level of interdisciplinary connections;
- systematization and consolidation of the received theoretical knowledge and practical skills;
- formation of skills for the search and use of normative, legal, reference and special literature, as well as other sources of information;
- development of cognitive abilities and activity, creative initiative, independence,

responsibility and organization;

- formation of independent thinking, abilities for self-development, self-education, self-improvement and self-realization;

Independent work is determined by the specifics of the discipline and the methodology of its teaching, the time provided by the curriculum, as well as the level of study at which the discipline is studied. The main forms of organization of independent work of students are: classroom independent work under the guidance and supervision of a teacher (at lectures, practical classes and consultations); extracurricular independent work under the guidance and supervision of a teacher (at consultations, during research work), extracurricular independent work without the direct participation of a teacher (preparation for classroom studies, olympiads, conferences, performing tests, working with electronic information resources, preparing for exams and offsets). Independent work of students is provided by these methodological recommendations.

Out-of-class independent work is the planned educational, educational-research, research work of students, performed outside the classroom on the instructions and with the methodological guidance of the teacher, but without his direct participation. The purpose of independent work of students is to form systemic fundamental knowledge, skills and abilities in general biological laws, which are of the greatest interest for practical healthcare, to prepare students for a systemic perception of general medical, social and clinical disciplines and to form in them a natural-science worldview and the logic of biological thinking, necessary for the further practical activity of the doctor. Independent work of students is aimed at solving the following problems:

- the acquisition by students of knowledge in the field of organization and functioning of living systems and the general properties of living things; general patterns of transmission and changes in hereditary traits and properties in generations and their role in human hereditary pathology; patterns of the process of embryogenesis, including human embryonic development; developmental biology and medical significance of human parasites; general patterns of evolution of living systems; the main directions of the evolution of systems and organs; general patterns of development of the biosphere and the role of man as a creative environmental factor at different stages of anthropogenesis;

- teaching students the most important methods of microscopy, methods of preparing and staining temporary micropreparations for analyzing the structure and identifying cells, types of chromosomes and chromatin, division phases (mitosis and meiosis), embryonic stages of development of vertebrates, identification of pathogens of parasitic diseases;

- teaching students to apply the laws of inheritance to determine the probability of the appearance of normal and pathological traits in the genotype and their manifestation in the phenotype and predict human hereditary diseases as a result of solving genetic problems.

11. Methodological instructive regulations for students studying the discipline (module)

The discipline "Biology" allows you to form a readiness to use the basic physical, chemical, mathematical and other natural science concepts and methods in solving professional problems. Therefore, students should rely mainly on the knowledge and skills gained in lectures and laboratory classes. This provides the necessary basis for further in- depth study of other disciplines. However, this knowledge needs to be activated.

Forms of independent work of students, provided for by the discipline:

• Preparation for laboratory classes;
• Independent study of educational issues;
• Preparation for the colloquium;
• Exam preparation.

For self-preparation for laboratory classes, studying educational issues, preparing for

a colloquium and exam, the following sources can be recommended:

- lecture notes and laboratory materials;
- educational literature of the relevant profile.

At the beginning of the course, the teacher informs students about the forms, types and content of independent work, explains the requirements for the results of independent work, as well as the forms and methods of control and evaluation criteria.

11.1. Methodological instructive regulations for preparing for seminar-type classes

Не предусмотрено.

11.2. Methodological instructive regulations for preparing for an examination

For self-preparation for the exam, the following sources can be recommended:

- lecture notes and laboratory materials;
- educational literature of the relevant profile.

11.3. Methodological instructive regulations for preparing for a test

Не предусмотрено.

11.4. Methodological instructive regulations for performing computational and graphical

Не предусмотрено.

11.5. Methodological instructive regulations for performing a control work

Не предусмотрено.

11.6. Methodological instructive regulations for performing a course work (project)

Не предусмотрено.

List of additions and changes

The name and details (if any) of the document attached to the Working Program of the discipline (module) containing the text of updates	Department's decision		Full name of department head:
	Date	Protocol №	