

## CATALOGUE OF ELECTIVE DISCIPLINES MASTER'S LEVEL

«7M015 Training of teachers in natural science subjects» (BIOLOGY)

Cycle of disciplines	Name of disciplines and their main sections	Work-tank (ECTS)
<b>CD 1</b>	<b>CYCLE OF CORE DISCIPLINES (CD)</b>	
<b>M-4</b>	<b>Theoretical biology</b>	5
<b>1</b>	The laws of theoretical biology (GN Chernov), the system of the organic world, re-formed evolution, basic biological concepts, axioms of theoretical biology, information theory, the law of information conditioning of biological phenomena, or Waddington's law, methodological foundations of theoretical biology.	
<b>2</b>	<b>Actual problems of biology</b>	5
	Biology problems in the XXI century. Achievements and promising areas of cytology, physiology, genetics, evolutionary theory and the study of biodiversity, ecology and rational use of biological resources, nature protection. Problems and tasks of modern molecular biology and biochemistry	
<b>3</b>	<b>Assessment of the state of vegetation in the conditions of modern nature management</b>	5
	Comparative assessment of various plant communities under the conditions of modern nature management, using progressive aerial photography methods, which allows us to establish the dynamics of dominants and subdominants at the level of association and larger taxonomic units. Predict the level of degradation of plant communities, as well as changes in the bioecological composition of the community	
	<b>Selected chapters of chronobiology</b>	
	Complex temporal organization of the studied indicator of a living system, regardless of its level of organization, biorhythms, rhythms of different frequencies modulating each other; due to age-related changes, diseases, treatment, recovery, etc.; areas of noise - chaotic changes inaccessible to the description of any regularities by modern mathematical methods	
	<b>Actual methods of biology</b>	
	Acquaintance with a variety of research methods in various fields of biology, conducting educational educational research from goal setting to conclusions with the application of the necessary requirements for the preparation of a scientific research report, familiarity with general research methods in biology	
	<b>Bioecological composition of vegetation in the conditions of modern nature management</b>	
	Bioecological composition of various communities and dynamics of productivity, projective cover of plants. The degree of degradation of the vegetation cover, in the conditions of modern nature management. Forecasting the level of degradation of vegetation cover using modern aerial photography methods.	
<b>MD 2</b>	<b>CYCLE OF MAJOR DISCIPLINES (MD)</b>	
<b>M-7</b>	<b>Radiation genetics</b>	5
<b>1</b>	Methods and history of the formation of radiation genetics. Genetic effects of ionizing radiation. General theory of radiation mutagenesis. Basic laws of the effect of radiation on the mutation process. Dependence of the frequency of mutations on the radiation dose. Radiation-induced genome instability.	

<b>2</b>	<b>Modern research of intracellular processes</b>	<b>5</b>
	There are several systems for regulating cellular processes: genetic, energetic, trophic, hormonal. Their joint activity leads to fast, ensuring the maintenance of homeostasis and an optimal level of functions in a volatile external environment when performing a hereditary program	
<b>3</b>	<b>Ecophysiology of plants</b>	<b>5</b>
	Specific features of a plant cell, its spatio-temporal organization. Photosynthesis and the production process of plants in ecosystems. Physiological and ecological bases of fertilizers application. The influence of environmental factors on the interaction of the links of the biogeochemical nitrogen cycle. Ecological and physiological classifications of plants. Plant physiology and problems of global ecology	
<b>4</b>	<b>Physiology of cognitive functions</b>	
	Cognitive functions: perception; Attention; gnosis; memory; speech; praxis. Reflection theory. Speech form of reflection of reality. Cognitive development. Cognitive learning. Theories of thinking. Critical thinking. Reflection. Behavioral reactions of the body. Functional states in the structure of behavior	
	<b>Radiobiology</b>	
	Classification, properties and sources of radiation registration of radiation and measurement units. Radiosensitivity is the relative biological effectiveness of ionizing radiation. Molecular radiobiology cellular effects of ionizing radiation. Application of radiation sources in biology.	
	<b>Regulation of cellular processes</b>	
	The mechanisms occurring in the cell and the patterns of individual development of organisms. Structural and functional basis of the life of organisms, including humans and animals. Knowledge of the mechanisms that ensure the normal ontogenetic development of a person allows future biologists to understand the deviations manifested in the form of congenital defects	
	<b>Mechanisms of plant adaptation</b>	
	Specific features of a plant cell, its spatio-temporal organization. Photosynthesis and the production process of plants in ecosystems. Physiological and ecological bases of fertilizers application. The influence of environmental factors on the interaction of the links of the biogeochemical nitrogen cycle. Plant physiology and problems of global ecology	
	<b>The morphology and physiology of the brain</b>	
	Phylo- and embryogenesis of the nervous system. The structure of the central nervous system. The functional significance of various parts of the spinal cord and brain. Peripheral nervous system. Autonomic nervous system. Coordination of the body's activity. Functional systems	