

**MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE REPUBLIC OF KAZAKHSTAN  
KAZAKH NATIONAL PEDAGOGICAL UNIVERSITY NAMED AFTER ABAI**



**We train teachers who are able to anticipate the needs of modern education, based on advanced methods, national heritage and global approaches. We are increasing the prestige of the teaching profession and becoming a driver of human capital development.**

**EDUCATIONAL PROGRAM**

**7M01513 Biology**

**Department of Biology**

## Data on disciplines

№	Name of discipline	Short description of discipline	Cycle	Component	Credits
1	Foreign language (professional)	Mastering a foreign language at the level C1, C2 (language specialties), LSP communication in monologue and dialogical forms (report, presentation, conversation, discussion). Studying the grammar of a scientific style in oral, written forms. Listening to informational and professional messages. Writing of scientific articles, reports, projects, etc. Work with dictionaries, reference literature. Bilingual translation skills.	BD	UC	4
2	Higher School Pedagogy	Aim: To study the patterns of development, training and education of students and the formation on this basis of basic knowledge and skills of scientific research, practical application in real pedagogical activity. Content: Higher school pedagogy as a field of scientific knowledge and academic discipline. Methodology of pedagogical science. The modern paradigm of higher education. History and modernity of higher professional education in Kazakhstan. Professional and communicative competence of a high school teacher. Holistic pedagogical process at the university. Didactics of higher education. The content of higher professional education. Methods and forms of organization of education at the university. New educational technologies. Organization of independent work of students in the conditions of credit technology. Theory of scientific activity of higher school. NIRS. Theory of education at the university. Competencies: readiness for teaching and independent formulation of didactic goals.	BD	UC	4
3	History and philosophy of science	Aim: To form a worldview based on a deep understanding of the history and philosophy of scientific knowledge as part of universal culture. Content. Philosophy of science. Science in culture, civilization. The emergence and development of science. The structure of scientific knowledge. Scientific revolutions. Scientific rationality. Features of modern science. Science as a social institution Natural Sciences. History of social sciences and humanities. Organization of scientific activity. The evolution of knowledge. Ethical aspects of modern science. Communication technologies, information processes in modern science. Actual problems of natural and social sciences and humanities. Competencies: the ability to improve and develop the intellectual and general cultural level, to manage knowledge in a new information society.	BD	UC	4
4	Psychology of management	Management psychology is a section of psychology about the laws of managerial activity. Analysis of psychological conditions, features of managerial activity. Diagnostics and forecasting of the state and changes of the management subsystem; formation of the program of activity of subordinates; organization of decision execution. Managerial needs and abilities of the manager.	BD	UC	4
5	Actual methods of biology	Purpose: to study materials on modern research methods in biology, its sections and related disciplines Contents: familiarization with various research methods in various fields of biology, conducting educational and scientific research from setting goals to conclusions with the application of the necessary requirements for the design of a scientific research report, familiarity with general research methods in biology	BD	EC	5
6	Actual problems of biology	Problems of biology in the 21 century. Modern problems of biology. Achievements and perspective directions of cytology, physiology, genetics, evolutionary theory and the study of biodiversity, ecology and rational use of biological resources, nature conservation. Problems of modern molecular biology and biochemistry	BD	EC	5
7	Organization and planning of scientific research	Purpose: training of undergraduates to acquire methodological knowledge in the field of organization and planning of scientific research Content: Methodological principles and methods of scientific research. Structure and content of the	BD	EC	5

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		stages of the research process. Methods of preparing a master's thesis. Competence: skills programming the sequence of complex research			
8	Planning and organization of scientific research in natural sciences	Purpose: training undergraduates in mastering methodological knowledge in the field of organization and planning of scientific and methodological research and the formation of practical knowledge and skills in the content of natural sciences Contents: basic concepts and principles of experiment planning, correlation and regression methods for analyzing experimental data, drawing up a multivariate experiment plan	BD	EC	5
9	Selected chapters of chronobiology	Purpose: getting knowledge about the temporary organization of a living system Contents: complex temporal organization of the studied indicator of the living system, biorhythms, rhythms of different frequencies that modulate each other; caused by age-related changes, diseases, treatment Competence: knowledge of modern problems of biological rhythms in nature	BD	EC	5
10	Theoretical biology	Purpose: to study the basic biological concepts, axioms of theoretical biology Contents: The laws of theoretical biology, the system of the organic world, re-formed evolution, basic biological concepts, axioms of theoretical biology, information theory, methodological foundations of theoretical biology Competence: knowledge in the field of theory and practice of argumentation	BD	EC	5
11	Academic writing	Purpose: mastering the skills of creating academic texts. Content: Skills of written presentation of research results. Types of design of academic texts. Concepts, functions and genres of academic texts. Competencies: to formulate the skills of writing and formatting scientific articles, dissertations and presentation of empirical research data.	PD	UC	5
12	Methods of teaching biology in high school	Purpose: to study professional knowledge and skills in the field of biological education Content: Features of the content of biological education in higher education. Academic policy of the higher education institutions of Kazakhstan. Forms of higher education. Competence: ability and skills to teach biology subjects in higher education	PD	UC	5
13	Pedagogical monitoring in biology education	Purpose: to diagnose the dynamics of the educational process and its results Content: The essence of pedagogical monitoring in the modern system of biological education. Types of pedagogical monitoring of students' educational achievements in biology. Competence: determining the optimal combination of various forms, types and methods of monitoring	PD	UC	5
14	Ecophysiology of plants	Purpose: to form a holistic view of the existence of plants in various environmental conditions Content: Specific features of the plant cell, its spatial and temporal organization. Photosynthesis and production process of plants in ecosystems. Competence: integration and generalization of knowledge in various sections of plant ecophysiology	PD	EC	5
15	Mechanisms of plant adaptation	Purpose: to expand the understanding of the features of plant functioning under stress conditions Content: Specific features of the plant cell, its spatial and temporal organization. Photosynthesis and production process of plants in ecosystems. Competence: acquisition of skills of practical use of the main methods of plants	PD	EC	5
16	Modern research of intracellular processes	Purpose: to study current data on cell proliferation and their significance in biology Content: there are several systems for regulating cellular processes: genetic, energy, trophic, and hormonal. Their joint activity leads to rapid Competence: to be able to explain modern ideas about the structural and functional organization of a gene	PD	EC	5
17	Physiology of cognitive functions	Purpose: to study morpho-functional patterns of the Central nervous system Content: cognitive functions: perception;	PD	EC	5

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		attention; gnosis; memory; speech. The theory of reflection. Speech is a form of reflection of reality. Cognitive development. Competencies: an interdisciplinary approach to assessing cognitive functions in solving educational and professional tasks			
18	Radiation genetics	Purpose: to obtain basic knowledge about the biological effects of radiation and the risks at the cellular level for humans Contents: Genetic effects of ionizing radiation. General theory of radiation mutagenesis. The main regularities of radiation action on the mutation Competence: knowledge of modern problems of biologists, readiness to suggest	PD	EC	5
19	Radiobiology	Purpose: to create a complete picture of the effect of ionizing radiation on various levels of living Contents: classification, properties and sources of radiation registration of radiation of measurement. Radiosensitivity relative biological efficiency of ionizing radiation. Competence: to use the basic laws of natural science disciplines in professional activities	PD	EC	5
20	Regulation of cellular processes	Purpose: to obtain theoretical knowledge about the mechanisms of cell activity Contents: mechanisms occurring in the cell and patterns of individual development of organisms. Knowledge of the mechanisms that ensure normal ontogenetic development of a person allows future biologists Competence: to know the types of cells and stages of life	PD	EC	5
21	STEAM technologies and modeling in biology	Goal:Familiarization of students with classical and modern methods of mathematical modeling and application of STEM technologies in biological research. Content:Overview of software products for applied modeling Software products for applied modeling. Construction of applied models. Working with images of biological objects. Principles of working with image visualization programs (Gimp, Axiovision, Zoombrowser). Working with databases	PD	EC	5
22	The morphology and physiology of the brain	Purpose: to study the integrative activity of the Central nervous system Contents: phylo-and embryogenesis of the nervous system. Functional significance of various parts of the spinal cord and brain. Coordination of the body's activity. Competence: readiness to use knowledge of modern problems of brain morphology and physiology	PD	EC	5