

MINISTRY OF SCIENCES AND HIGHER EDUCATION OF THE REPUBLIC OF  
KAZAKHSTAN  
M.AUEZOV SOUTH KAZAKHSTAN UNIVERSITY

«APPROVED»  
Chairman of the board -  
Rector \_\_\_\_\_  
Doctor of historical sciences,  
Academician, Kozhamzharova D.P.  
«\_\_\_\_\_» \_\_\_\_\_ 2023

**Educational program**

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**6B05110- «Biology»**

Registration number	6B05100009
Code and classification of the field of education	6B05 - Natural sciences, mathematics and statistics
Code and classification of training areas	6B051- Biological and related sciences
Group of educational programs	B050 - Biological and related sciences
Type of EP	acting
ISCE level	6
NQF level	6
SQF of education level	6
Language of learning	Kazakh, Russian
The complexity of EP	240 credits
Distinctive features of EP	-
Partner University (JEP) -	-
University partner (DDEP) -	-

Developers:

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Saparymbet G.B.	Director of the Shymkent Arboretum Park named after A.Askarov	
Sikhimbayev A.E.	Director of the NGO " BIOS"	
Pernebaev J.D.	Director of "ECOCENTRE-CONSULTING" LLP	

The EP was considered in the direction of training «Natural sciences, mathematics and statistics» at a meeting of the academic committee, Minutes № \_\_\_\_ «\_\_\_\_» \_\_\_\_\_ 20\_\_ y.

Chairman of the Committee \_\_\_\_\_ Madiyarov N.K.

The EP was considered and recommended for approval at Educational-methodical meeting of M. Auezov SKU, Minutes № \_\_\_\_ «\_\_\_\_» \_\_\_\_\_ 20\_\_ y.

Chairman EMM \_\_\_\_\_ Abisheva R.Zh.

The EP was approved by the decision of the Academic Council of the University

Minutes № \_\_\_\_ «\_\_\_\_» \_\_\_\_\_ 20\_\_ y.

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## 1. CONCEPT OF THE PROGRAM

<b>University Mission</b>	Generation of new competencies, training of a leader who translates research and entrepreneurial thinking and culture
<b>University Values</b>	<ul style="list-style-type: none"> <li>• Openness—open to change, innovation and cooperation.</li> <li>• Creativity – generates ideas, develops them and turns them into values.</li> <li>• Academic freedom – free to choose, develop and act.</li> <li>• Partnership – creates trust and support in a relationship where everyone wins.</li> <li>• Social responsibility – ready to fulfill obligations, make decisions and be responsible for their results.</li> </ul>
<b>Graduate Model</b>	<ul style="list-style-type: none"> <li>• Deep subject knowledge, their application and continuous expansion in professional activity.</li> <li>• Information and digital literacy and mobility in rapidly changing conditions.</li> <li>• Research skills, creativity and emotional intelligence.</li> <li>• Entrepreneurship, independence and responsibility for their activities and well-being.</li> <li>• Global and national citizenship, tolerance to cultures and languages.</li> </ul>
<b>The uniqueness of the educational program</b>	<ul style="list-style-type: none"> <li>• Orientation to the regional labor market and social order through the formation of professional competencies of the graduate, adjusted to the requirements of stakeholders</li> <li>• Practical orientation and emphasis on the development of critical thinking and entrepreneurship, the formation of a wide range of skills that will allow to be functionally literate and competitive in any life situation and be in demand in the labor market</li> </ul>
<b>Academic Integrity and Ethics Policy</b>	<p>The University has taken measures to maintain academic integrity and academic freedom, protection from any kind of intolerance and discrimination:</p> <ul style="list-style-type: none"> <li>• Rules of academic integrity (Minutes of the Academic Council No. 3 dated 30.10.2018);</li> <li>• Anti-Corruption Standard (Order No. 373 n/k dated 27.12.2019).</li> <li>• Code of Ethics (Protocol of the Academic Council No. 8 dated 31.01.2020).</li> </ul>
<b>Regulatory and legal framework for the development of EP</b>	<ol style="list-style-type: none"> <li>1. Law of the Republic of Kazakhstan "On Education";</li> <li>2. Standard rules of activity of educational organizations implementing educational programs of higher and (or) postgraduate education, approved by Order of the Ministry of Education and Science of the Republic of Kazakhstan dated October 30, 2018 No. 595 with amendments and additions dated December 29, 2021 No. 614</li> <li>3. State mandatory standards of higher and postgraduate education, approved by the Higher of the Ministry of Education and Science of the Republic of Kazakhstan dated July 20, 2022 No. 2;</li> <li>4. Order of the Ministry of Education and Science of the Republic of Kazakhstan dated January 19, 2023 No.21 On Amendments to the Order of the Ministry of Education and Science of the Republic of Kazakhstan dated July 20, 2022 No.2 "On Approval of State mandatory standards of higher and postgraduate education".</li> <li>5. Rules for organizing the educational process on credit technology of education, approved by order of the Ministry of Education and Science of the Republic of Kazakhstan dated April 20, 2011 No. 152;</li> <li>6. Qualification directory of positions of managers, specialists and other employees, approved by order of the Minister of Labor and Social Protection of the Population of the Republic of Kazakhstan dated December 30, 2020 No. 553.</li> <li>7. Guidelines for the use of ECTS.</li> <li>8. Guidelines for the development of educational programs for higher and postgraduate education, Appendix 1 to the order of the Director of the Center for</li> </ol>

	the Bologna Process and Academic Mobility No.45 o/d dated June 30, 2021
<b>Organization of the educational process</b>	<ul style="list-style-type: none"> <li>• Implementation of the principles of the Bologna Process</li> <li>• Student-centered learning</li> <li>• Availability</li> <li>• Inclusivity</li> </ul>
<b>Quality assurance of the Educational program</b>	<ul style="list-style-type: none"> <li>• Internal quality assurance system</li> <li>• Involvement of stakeholders in the development of the Educational Program and its evaluation</li> <li>• Systematic monitoring</li> <li>• Actualization of the content (updating)</li> </ul>
<b>Requirements for applicants</b>	It is established according to the Model Rules for admission to training in educational organizations, implementing educational programs of higher and postgraduate education, Order of the Ministry of Education and Science of the Republic of Kazakhstan No. 600 dated 31.10.2018
<b>Conditions for the implementation of educational programs (EP) for persons with disabilities and special educational needs(SSN)</b>	<p>For students with SEN (special educational needs) and persons with disabilities (PSI), tactile PVC tiles, specially equipped toilets, a mnemonic diagram, and shower bars have been installed in educational buildings and student dormitories. Special parking spaces have been created. Crawler lift installed. There are desks for people with limited mobility (PLM), signs indicating the direction of movement, ramps. In the educational buildings (main building, building No. 8) there are 2 rooms with six working places adapted for users with disorders of the musculoskeletal system (DMS).For visually impaired users, the SARA™ CE Machine (2 pcs.) is available for scanning and reading books. The library website is adapted for the visually impaired. There is a special NVDA audio program with a service. The JIC website <a href="http://lib.ukgu.kz/">http://lib.ukgu.kz/</a> is open 24/7.</p> <p>An individual differentiated approach is provided for all types of classes and in the organization of the educational process.</p>

## 2. PASSPORT of the Educational program

<b>Purpose of the EP</b>	Training of personnel with theoretical and practical knowledge in various fields of biology, able to apply, evaluate and analyze the current state of development of biological science, formulate and make effective decisions in their professional activities.
<b>Tasks of the EP</b>	<ul style="list-style-type: none"> <li>- formation of socially responsible behavior in society, understanding the importance of professional ethical standards and following these standards;</li> <li>- providing basic undergraduate training to enable them to continue their studies throughout their lives, to adapt successfully to changing conditions throughout their professional careers;</li> <li>- providing conditions for the acquisition of a high General intellectual level of development, mastering competent and developed speech, culture of thinking and skills of scientific organization of labor in the field of biological Sciences and systems of various levels of organization, biological environmental technologies, educational organizations (secondary and specialized schools, colleges and lyceums); business structures that provide educational services;</li> <li>- creation of conditions for intellectual, physical, spiritual, aesthetic development to ensure the possibility of their employment in the specialty or continuing education at subsequent levels of education.</li> </ul>
<b>Harmonization of EP</b>	<ul style="list-style-type: none"> <li>• 6th level of the National Qualifications Framework of the Republic of Kazakhstan;</li> </ul>

	<ul style="list-style-type: none"> <li>• Dublin descriptors of the 6th level of qualification;</li> <li>• 1 cycle of a Framework for Qualification of the European Higher Education Area);</li> <li>• 6<sup>th</sup> Level of European Qualification Framework for Life long Learning).</li> </ul>
<b>Connection of the EP with the professional sphere</b>	Professional standard "Specialist in Aquatic Bioresources and Aquaculture", approved by Order of the Ministry of Labor and Social Protection of the Russian Federation No. 714n dated October 8, 2020 (registered by the Ministry of Justice of the Russian Federation on November 11, 2020, registration number No. 60840). Branch Qualification Framework (ORC) "Forestry and Wildlife" (Project), Nursultan 2019.
<b>Name of the degree awarded</b>	After the successful completion of this EP, the graduate is awarded bachelor of Natural Sciences in the educational program 6B05110 – "Biology".
<b>List of qualifications and positions</b>	- research activity: junior researcher, laboratory engineer, employee of research institutions, hydrobiologist, ichthyologist, microbiologist; ornithologist; - organizational and managerial activities;
<b>Field of professional activity</b>	The sphere of professional activity is the field of biological Sciences: botany, Zoology, human anatomy and physiology, biochemistry, Biophysics, Microbiology, etc.; biological systems of different levels of organization, biological environmental technologies.
<b>Objects of professional activity</b>	The objects of professional activity of graduates are research organizations, secondary schools, lyceums, gymnasiums, youth stations, colleges, national parks, reserves, as well as other institutions that require higher professional education in accordance with the legislation of the Republic of Kazakhstan.
<b>Subjects of professional activity</b>	The subjects of professional activity of the bachelor in the specialty are the processes in biological systems of different levels of organization, the identification of patterns in the formation and functioning of microorganisms, plant and animal objects; biological environmental technologies.
<b>Types of professional activity</b>	Bachelor of specialty 6B05110–Biology can perform the following types of professional activity: - organizational and technological; - production and management; - design; - research; - environmental; - other activities that allow the use of basic training in the specialty
<b>Learning outcomes</b>	<p><b>LO1</b> Communicate freely in the professional environment and society in Kazakh, Russian and English with an understanding of the principles and culture of academic integrity.</p> <p><b>LO2</b> Demonstrate natural-scientific, socio-cultural, professional development based on the formation of ideological, civic, spiritual and social responsibility, methods of scientific and experimental research.</p> <p><b>LO3</b> To have information and computer literacy, ability of generalization, analysis and perception of information, goal setting and choice of ways of its achievement.</p> <p><b>LO4</b> Perform field, laboratory, biological research using modern equipment.</p> <p><b>LO5</b> Determine the features of the functioning of living systems, the levels of their organization, the basic concepts, methods and prospects for the development of biology, possess methods of observation, description, identification and classification of biological objects.</p> <p><b>LO6</b> Formulate and solve modern scientific and practical problems, apply</p>

	<p>modern methodological achievements and promising directions for the development of the main biological branches.</p> <p><b>LO7</b> Conduct scientific research in the field of experimental and applied biology with the help of modern equipment and information technology.</p> <p><b>LO8</b> To determine the features of the structure, morphology, physiology, reproduction, distribution area and ecology of representatives of the main biological taxa, the principles of system organization, differentiation and integration of body functions.</p> <p><b>LO9</b> Apply legal documents in the field of environmental protection and biodiversity conservation, ways of their restoration and rational measures for their effective use.</p> <p><b>LO10</b> Use various information resources, ready-made software and methodological complexes, computer and multimedia technologies, digital educational resources in professional activities.</p> <p><b>LO11</b> To use research, practical and learning skills necessary for self-education in the professional field.</p> <p><b>LO12</b> Effectively work individually and as a team member, correctly defend their point of view, adjust their actions and use various methods.</p>
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### 3. COMPETENCES OF THE GRADUATE OF EP

<b>SOFTSKILLS.</b> Behavioral skills and personality qualities	
SS1. Competence in managing one's own literacy	<p>SS1.1. The ability of self-learn, self-develop and constantly update their knowledge within the chosen trajectory and in an interdisciplinary environment.</p> <p>SS1.2. The ability to express thoughts, feelings, facts and opinions in the professional field.</p> <p>SS1.3. The ability for mobility in the modern world and critical thinking.</p>
SS 2. Language competence	<p>SS2.1. The ability to build communication programs in the state, Russian and foreign languages.</p> <p>SS2.2. The ability for interpersonal social and professional communication in the conditions of intercultural communication.</p>
SS 3. Mathematical Competence and Competence in the field of Science	<p>SS3.1. The ability and willingness to apply the educational potential, experience and personal qualities acquired during the study of mathematical, natural science, technical disciplines at the university to solve professional problems.</p>
SS 4. Digital competence, technological literacy	<p>SS4.1. The ability to demonstrate and develop information literacy through the mastery and use of modern information and communication technologies in all areas of their lives and professional activities.</p> <p>SS4.2. The ability to use various types of information and communication technologies: Internet resources, cloud and mobile services for searching, storing, protecting and disseminating information.</p>
SS 5. Personal, social and academic competencies	<p>SS5.1. The ability for physical self-improvement and focus on a healthy lifestyle to ensure full-fledged social and professional activities through the methods and means of physical culture.</p> <p>SS5.2. The ability to social and cultural development based on the manifestation of citizenship and morality.</p> <p>SS5.3. The ability to build a personal educational trajectory throughout life for self-development, career growth and professional success.</p> <p>SS5.4. The ability to successfully interact in a variety of socio-cultural contexts during study, work, home and leisure.</p>
SS 6.	<p>SS6.1. The ability to be creative and entrepreneurial in a variety of</p>

Entrepreneurial competence	environments. SS6.2. The ability to work in a mode of uncertainty and rapidly changing task conditions, make decisions, all ocateresources and manage your time. SS6.3. The ability to work with consumerrequests.
SS 7. Cultural awareness and ability to express yourself	SS7. - the ability to know and understand the traditions and culture of the peoples of Kazakhstan, is tolerant to the traditions and culture of other peoples of the world, is aware of the installation of tolerant behavior; is not subject to prejudice, has high spiritual qualities, is formed as an intelligent person.
<b>PROFESSIONAL COMPETENCIES (HARDSKILLS).</b>	
Theoretical knowledge and practical skills specific to this field	PC1 - Demonstrate fundamental biological knowledge in botany, Zoology, human anatomy, Cytology, histology, human and animal physiology, genetics, molecular biology, Microbiology and Virology, ecology; know the manifestations of the fundamental properties of the body - heredity and variability at all levels of the organization of life (molecular, cellular, organizational and population);
	PC2 - demonstrate knowledge of the functioning of living systems, their levels of organization, basic concepts, methods and prospects of biology, use methods of observation, description, identification and classification of biological objects;
	PC3 - to know the features of morphology, physiology, reproduction, geographical distribution and ecology of representatives of the main taxa, the principles of systemic organization, differentiation and integration of body functions;
	PC4 - to use biological and pedagogical methods in professional activities, to master the methodology of teaching biology, to engage in educational activities among the population in order to improve the level of biological and environmental literacy of society;
	PC5 - to apply modern experimental methods of work in research work of pupils in field and laboratory conditions; to have skills of processing of results of field and experimental researches; to be able to organize and carry out extracurricular forms of work with school students; to systematize and apply modern technologies and interactive methods of training.

### 3.1 Matrix of correlation of the results of training in the OP as a whole with the competencies being formed

	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12
SS 1	+	+									+	
SS 2	+	+										
SS 3		+										
SS 4			+							+		
SS 5		+									+	
SS 6		+									+	+
SS 7		+										
PC1							+					
PC2						+	+					
PC3					+			+				
PC4				+		+			+	+	+	
PC5			+				+			+		

**4. MATRIX OF THE INFLUENCE OF DISCIPLINES ON THE FORMATION OF LEARNING OUTCOMES AND INFORMATION ON LABOR INTENSITY**

№	The name of the module	CYCLE	UC/CC	Component name	Short description of the discipline	Number of credits	The generated RO (codes)													
							L01	L02	L03	L04	L05	L06	L07	L08	L09	L010	L011	L012		
	Fundamentals of Public Sciences	GED	CC	History of Kazakhstan	<p><b>Purpose:</b> The formation of an objective idea of the history of Kazakhstan based on a deep understanding and scientific analysis of the main stages, patterns and originality of the historical development of Kazakhstan.</p> <p><b>Content:</b> Ancient people and the formation of nomadic civilization. Turkic civilization and the great steppe. Kazakh Khanate. Kazakhstan in the era of modern times. Kazakhstan as part of the Soviet administrative-command system. Declaration of Independence of Kazakhstan. State system, socio-political development, foreign policy and international relations of the Republic of Kazakhstan. Methods and techniques of historical description for the analysis of the causes and consequences of events in the history of Kazakhstan.</p>	5		✓												
		GED	CC	Philosophy	<p><b>Purpose:</b> The formation of a holistic idea among students about philosophy as a special form of knowledge of the world, about its main sections, problems and methods of studying them in the context of future professional activity. And also the formation of philosophical reflection, introspection and moral self-regulation among students.</p> <p><b>Content:</b> Emergence of a culture of thinking. Subject and method of philosophy. Fundamentals of philosophical understanding of the world: questions of consciousness, spirit and language. Being. Ontology and metaphysics. Cognition and creativity. Education, science, technology and technology. Human philosophy and the world of values. Ethics.</p>	5		✓												

					Philosophy of values. The subject of aesthetics as a field of philosophical knowledge. Philosophy of freedom. Philosophy of art. Society and culture. Philosophy of history. Philosophy of religion. "Mangilik El" and "Modernization of Public Consciousness" are a new Kazakhstan philosophy.													
Module of Socio-political Knowledge	GED	CC	Sociology and Polyology	<p><b>The goal</b> of forming knowledge about social and political activities, explaining social and political processes and phenomena.</p> <p><b>Content:</b> Consideration of the system of socio-ethical values of the society. Ways to use social, political, cultural, psychological institutions, features of youth policy in the modernization of Kazakhstani society and solve conflict situations in society and professional environment based on them. To study the methods of analysis and interpretation of political institutions and processes, ideas about politics, power, state and civil society, to understand and use the methods and methods of sociological, comparative analysis, to understand the meaning and content of the political situation in the modern world. Analysis and classification of the main political institutions.</p>	4		✓											
	GED	CC	Cultural Studies and Psychology	<p><b>Purpose:</b> The formation of scientific knowledge of history, modern trends, current problems and methods for the development of culture and psychology, the skills of a systematic analysis of psychological phenomena.</p> <p><b>Content:</b> Morphology, language, semiotics, anatomy of culture. Culture of nomads, proto-Turks, Turks. Medieval culture of Central Asia. Kazakh culture at the turn of the XVIII - XIX centuries, XX century. Cultural policy of Kazakhstan. State Program "Cultural Heritage". National consciousness, motivation. Emotions, intellect. The will of man, the psychology of self-regulation. Individual typological features. Values, interests, norms are the spiritual basis. The meaning of life, professional self-determination, health.</p>	4		✓											

					Communication of the individual and groups. Socio-psychological conflict. Models of behavior in conflict.													
		GED	HsC	Ecosystem and Law	<p><b>Purpose:</b> Formation of integrated knowledge in the field of economics, law, anti-corruption culture, ecology and life safety, entrepreneurship, scientific research methods.</p> <p><b>Content:</b> Fundamentals of safe human-nature interaction, ecosystem and biosphere productivity. The entrepreneurial activity of society in conditions of limited resources, increasing the competitiveness of business and the national economy. Regulation of relations in the field of ecology and human life safety. Knowledge and compliance of Kazakhstan's law, obligations and guarantees of subjects, state regulation of public relations to ensure social progress. Application of scientific research methods.</p>	5		✓	✓									
	Communication and Physical Training Module	GED	CC	Kazakh (Russian) Language	<p><b>Purpose:</b> Formation of communicative competence using the Kazakh (Russian) language in the socio-cultural, professional and public life, improvement of the ability to write academic texts.</p> <p><b>Content:</b> Levels A1, A2, B1, B2-1, B2-2 (B2, C1 Russian language ) are presented in the form of cognitive-linguocultural complexes, consisting of spheres, themes, sub-themes and typical situations of communication of the international standard: social, social - cultural, educational and professional, modeled by forms: oral and written communication, written speech works, listening. Demonstration of understanding of the language material in the texts on the educational program, knowledge of terminology and development of critical thinking.</p>	10	✓											
		GED	CC	Foreign Language	<p><b>Purpose:</b> Formation of students' intercultural and communicative competence in the process of foreign language education at a sufficient level A2 and a level of basic sufficiency B1. Student reaches B2level of common European competence if the</p>	10	✓											

				<p>language level at the start is higher than B1 level of common European competence.</p> <p><b>Content:</b> Levels A1, A2, B1, B2 are presented in the form of cognitive-linguocultural complexes, consisting of spheres, themes, sub-themes and typical situations of international standard's communication: social, social - cultural, educational and professional, modeled by forms: oral and written communication, written speech works, listening. Demonstration of language material's understanding in texts on educational program, knowledge of terminology and critical thinking development.</p>															
		GED	CC	Information and Communication Technologies	<p><b>Purpose:</b> Formation of the ability to critically evaluate and analyze processes, methods of searching, storing and processing information, methods of collecting and transmitting information through digital technologies. Development of new "digital" thinking, acquisition of knowledge and skills in the use of modern information and communication technologies in various activities.</p> <p><b>Content:</b> Introduction and architecture of computer systems. Software. Operating systems. Human-computer interaction. Database systems. Data analysis. Data management. Networks and Telecommunications. Cybersecurity. Internet technologies. Cloud and Mobile technologies. Multimedia technologies. Smart technology. E-technologies. Electronic business. Electronic government.</p>	5													
		GED	CC	Physical Training	<p><b>Purpose:</b> The formation of social and personal competencies and the ability to purposefully use the means and methods of physical culture that ensure the preservation and strengthening of health in preparation for professional activity; to the persistent transfer of physical exertion, neuropsychic stresses and adverse factors in future work.</p> <p><b>Content:</b> Implementation of physical culture and health and training programs. A complex of general</p>	8													

				development and special exercises. Sports (gymnastics, sports and outdoor games, athletics, etc.). Control and self-control during classes, insurance and self-insurance. Refereeing competitions, Means of professionally applied physical training. Modern health-improving systems: the breathing system according to A. Strelnikova, K.Buteyko, K.Dinaiki, joint gymnastics according to Bubnovsky.														
<b>Cycle of basic disciplines//University component</b>																		
Communication and Physical Training	BD	HsC	Professional Kazakh (Russian) Language	<p><b>Purpose:</b> To provide professionally oriented language training of a specialist who is able to competently construct communication in professionally significant situations and speak the language norms for special purposes.</p> <p><b>Content:</b> Professional language and its components. Professional terminology as the main feature of scientific style. Scientific vocabulary and scientific constructions in educational-professional and scientific-professional spheres. Algorithm of work on the analysis and production of scientific texts on specialty. Producing scientific and professional texts. Basics of business communication and documentation within the framework of future professional activity.</p>	3													
	BD	HsC	Professionally Oriented Foreign Language	<p><b>Purpose:</b> To read and translate texts related to the profession in English, establish communication on professional topics, understand and use language material in oral and written speech.</p> <p><b>Content:</b> The place of the English language in the study of biology. Characteristics and levels of living organisms. The structure of the bacterium. Features of the simplest. Structure and diversity of animals. The plant world. The relationship between the environment and living organisms. The evolutionary development of life.</p>	3													
General	BD	HsC	Physics	<p><b>Purpose:</b> Formation of the basics of the natural-scientific worldview, an integrated approach to the</p>	4		✓						✓					

Mathematical and Natural Sciences				<p>concepts and laws of physics, mastering the methods of scientific thinking; familiarization with the basic laws and principles of physics.</p> <p><b>Content:</b> Limits of application of existing physical laws to biological phenomena and features of development of processes in whole organisms at all levels of organization from macromolecules to ecosystems. Consideration of some problems of chemistry and physics of macromolecules, molecular biophysics and bioenergy.</p>														
	BD	HsC	Chemistry	<p><b>Purpose:</b> To provide knowledge on the theoretical foundations of inorganic chemistry in order to increase professional creativity, to improve skills and abilities in order to be able to conduct experiments.</p> <p><b>Content:</b> Classification of complex substances depending on their functional state. Equivalent. Atomic structure. The law of the period of chemical elements (HEPZ). Chemical bond. Solutions. Electrolytic dissociation. Thermodynamics. Chemical kinetics. Chemical equilibrium. Oxidative reduction reaction. Hydrolysis of salts. Electrolysis.</p>	5		✓											
	BD	HsC	Higher Mathematics	<p><b>Purpose:</b> Formation of skills for the application of elements of probability theory in the educational, professional and socio-personal sphere; mastering matrix, differential and integral calculations for solving problems used in professional activities.</p> <p><b>Content:</b> The system of determinants and linear equations. Matrices and rank of the Matrix. Solving a system of Linear Equations by Kramer, matrix methods. Vectors and applying operations to them. Find the scalar, vector, and mixed product of vectors. Curves of the 2nd order: Ellipse, Hyperbola, parabola. Methods for calculating the integral.</p>	5		✓											
<b>Cycle of basic disciplines// Component of choice</b>																		
Socio-ethnic Development	BD	EC	Abai Studies	<p><b>Purpose:</b> Based on the creativity of A.Kunanbayev, the preservation of the «national code» and in the project «Kazakhstan»</p> <p><b>Content:</b> Historical overview of the history of</p>	3		✓											

				<p>Kazakhstan and Kazakh literature of the XIX-XX centuries. Studies of Abai's legacy of the XX-XXI century. Chronology of Abai's creativity. Abai is a great poet, ethnographer, founder of Kazakh written literature. Abai is the compiler of the code of laws «The Position of Karamola», social significance. Abai is a thinker, religious scholar, philosopher. The role of Abai in education and science, the concept of a «Holistic person». «Words of Edification» by Abai, an epic novel by M. Aueyzova «The Way of Abai». K. Tokayev «Abai and Kazakhstan in the XXI century», role, significance.</p>															
BD	EC	Muhtar Studies	<p><b>Purpose:</b> Formation of a historical, literary idea of M. Auezov's work in the context of literary history, patriotism and cultural and spiritual position. Development of artistic thinking, skills of independent research activity.</p> <p><b>Content:</b> The life and creative path of M. Auezov Semipalatinsk, Tashkent, St. Petersburg periods. M. Auezov's activity in the magazines «Sholpan», «Abai». M. Auezov's journalism. An artistic review of the short stories "Korgansyzydyn kuni", "Kyr suretteri", "Okagan azamat", "Kokserek", the play Enlik-Kebek and the stories "Kili Zaman", "Karash-Karash" okigasy", the monograph "Abai Kunanbayev", the epic novel "Abai Zholy".</p>																
BD	EC	Actual Problems and Modernization of Public Consciousness	<p><b>Purpose:</b> The restoration of spirituality, deformed during the periods of tsarist and Soviet reality, the formation of a creative personality based on the modernization of the public consciousness of young people.</p> <p><b>Content:</b> Spiritual modernization: origin and background. Modern national identity. Pragmatism and competitiveness. National identity and national code. Experience and prospects of evolutionary development. The triumph of knowledge and openness of consciousness. Alphabet Reform: Experience and Priorities. Fatherland is the basis of</p>																

					the state. Education through nationwide sacred places and history. Modern Kazakh culture is the cornerstone of spiritual revival. New humanitarian education and the future national intelligentsia. Abai Kunanbaev and Kazakh society.														
		BD	EC	Service to Society	<p><b>Purpose:</b> The formation of socially significant skills and competencies in students based on the assimilation of academic programs, carrying out socially useful activities related to the disciplines studied at the university.</p> <p><b>Content:</b> The concept and meaning of Service learning, the history of the formation and development of the concept of Service Learning. Key components of Service Learning, socially useful activities in the children's and youth environment, organization of volunteer movement in the world and Kazakhstan practice, profile orientation of Service Learning. International practice of learning through socially useful activities. General principles and methodology for the development of social projects. Methods of analysis of implemented social projects.</p>														
				Foundations of Anticorruption Culture	<p><b>Purpose:</b> Formation of an anti-corruption worldview, strong moral foundations of a personality, civic position, stable skills of anti-corruption behavior.</p> <p><b>Content:</b> Overcoming legal nihilism, formation of the basics of students' legal culture in the field of anti-corruption legislation. Formation of a conscious perception/attitude towards corruption. Moral rejection of corrupt behaviour, corrupt morality and ethics. Development of skills necessary to fight corruption. Development of anti-corruption standards of conduct. Anticorruption propaganda, dissemination of lawfulness and respect for the law. Activities aimed at understanding the nature of corruption, awareness of social damage caused by its manifestation, ability to defend one's position with arguments, seeking ways to overcome manifestation of corruption.</p>														

5	Structural Biology	BD	EC	Zoology	<p><b>Purpose:</b> Knowledge of the diversity of animals, features of construction, life activities, adaptability to the environment, distribution patterns and their effective use, teaching ways to preserve reserves in nature.</p> <p><b>Content:</b> Representatives of the main types and classes of animals. Their morphology, physiology, ecology, Ethology. Reproduction, Development, significance. Phylogeny. Taxa, Systematics and evolution of invertebrate and vertebrate animals, the place and role of animals in ecological systems, the importance of them in medical and professional farming.</p>	6													
		BD	EC	Zoosystematics	<p><b>Purpose:</b> Formation of knowledge about descriptions of the history of animal taxonomy from K.Linnaeus to the present, the study of the characteristics of taxonomic series (categories), the theory of zoological classification, methods of identification and analysis of taxa, types of diagnostic keys, their effectiveness and disadvantages.</p> <p><b>Content:</b> The place of zoo systematics in the biological system (theoretical and applied). Tasks of systematization. Concepts of types: typological, biological, morphological. Zoological nomenclature. Classification of species. Identification and analysis of taxa.</p>														
		BD	EC	Zoogeography	<p><b>Purpose:</b> Formation of knowledge about the role of biological diversity as a leading factor in the stability of living systems and the biosphere; about modern theories in the field of zoogeography; about the mechanisms of formation of habitats and fauna; about the principles of faunal zoning of land and ocean.</p> <p><b>Content:</b> Systematization of concepts about animals and the world system. Fundamentals of patterns and methods of zoogeography research, formation of an image of ecological thinking, patterns of faunal formation under the influence of natural phenomena.</p>	4													



				<p>research methods and professional image of the future biologist.</p> <p><b>Content:</b> Types of profession. The need, orientation, reasons for choosing a profession as a specialist. Stages of professional formation of a person. Methods of studying the biologist-specialist model, professionogram, psychogram, qualities that ensure the professional activity of a biologist. Main research directions of the biologist.</p>														
	BD	EC	Fundamentals of Academic Writing	<p><b>Purpose:</b> To master general rules and methods based on the technique of cognition and its individual approaches, professional reading, academic writing and oral presentation skills.</p> <p><b>Content:</b> Academic reading and writing skills, language and structure of scientific and professional texts. Synopsis, abstracts reviews, writing theses, familiarizing yourself with the results of scientific analysis, reading scientific and professional texts. Development of skills for entering scientific and professional discussions and presentation of professionally oriented projects. Skills of independent work.</p>														✓
	BD	EC	Systematics of Plants	<p><b>Purpose:</b> Deepening knowledge about biodiversity, systematic groups, life forms, ecology and evolution of the plant world.</p> <p><b>Content:</b> System of plants. Theoretical and practical significance of plant classification. Taxa. Prokaryotes. Eukaryotes. Bacteria. Viruses. Department of algae. Department of mushrooms. Mushrooms of the lower and higher stages. Sections of lichens, Creamies, mosses, Rhinophytes, Plowworms, centipedes, Ferns. Department of Open-seeded plants. Class of conifers. Department of indoor seed (flowering) plants. Life forms, ecological groups of plants.</p>	6													✓
	BD	EC	Geography of Plants	<p><b>Purpose:</b> Formation of knowledge about the patterns of plant distribution, habitat, community structure, classification of diversity.</p>														✓

				<b>Content:</b> Geographical distribution of vegetation types. Flora. Boundaries, geomorphological structure of the flora territory. Geographical distribution of plant formation species. The main stages of the historical development of the plant world. The specifics of the flora zones of the Earth, the history of their formation, comparative floristics, methods of floristic and geographic-botanical research, classification of flora and principles of floral zoning.													
	BD	EC	Biology of Individual Development	<b>Purpose:</b> To form an idea of the laws of the biology of individual development, species characteristics of humans and animals, living conditions, reproduction and postnatal development, morphology and physiology of gametes, the main stages of fetal development. <b>Content:</b> Individual development of the body. Pre-germ development gametogenesis. Spermatogenesis, making a general description of oogenesis. Fertilization, addition of gametes. Fragmentation, gastrulation, neurulation. Knowledge of the development of the nervous system of amphibians, embryonic development of birds. Explanation of postembryonic development and aging processes.	4						✓		✓				
	BD	EC	Cell Biology	<b>Purpose:</b> To form ideas about the structure and classification of the main types of plant and animal cells. <b>Content:</b> Fundamentals of cellular theory. The chemical composition of the cell. General characteristics and functions of cytoplasm, hyaloplasm. Plasma membrane. The cell nucleus. The vacuolar system of the cell. Mitochondria and plastids. The musculoskeletal system of the cell. Cell reproduction. The life cycle of cells. Mitosis. Amitosis. Meiosis, stages and varieties of meiosis. Differentiation and pathology of cells.							✓						
	BD	EC	Cytology and Histology	<b>Purpose:</b> To form the Basic Laws of Cell structure, concepts about the structure, function, and structure of tissue systems.	5						✓		✓				

				<p><b>Content:</b> Cell morphology, composition, cell organelles and their functions, the main biological processes occurring in the cell. Master the knowledge of cell theory, the nuclear apparatus of the cell, the structure and function of the cytoplasm, the features of the structure and function of cells of plant, animal and human tissues, and Master Modern cytological methods of studying cells and tissues.</p>														
		BD	EC	<p>Histology and Embryology Fundamentals</p>	<p><b>Purpose:</b> To form knowledge about the structural organization, functions and relationships of life processes at the level of cells, tissues and organs, to reveal the laws of their development.</p> <p><b>Content:</b> History of the development of histology and Embryology. Patterns of origin and evolution of tissues, classification. Human embryology. The fetal stage of embryonic development. Theoretical foundations of modern histochemical methods, basic techniques for the preparation of histological drugs. Obtaining the material, fixing it, washing, dehydration and studying the filling of histological material, getting used to working under a microscope.</p>						✓		✓					
		BD		<p>Educational practice</p>	<p><b>Purpose:</b> The formation of theoretical knowledge and skills of practical work with living objects on fundamental biological disciplines and Environmental Protection, effective use, training in the preparation of various collections and herbariums.</p> <p><b>Content:</b> Application of various methods of collection, field observation and research; fixation of different groups of organisms; main taxa and species in the area of practice; use of means of collection of organisms, preparation of fixing fluids; storage of insect collections and herbarization of plants; creation of labels, use of determinants.</p>	1				✓		✓	✓					
		BD	EC	<p>Microbiology</p>	<p><b>Purpose:</b> To familiarize with the diversity of the world of microorganisms, features of their morphology, physiology and metabolism, to</p>	5								✓				

Biological Sciences on Objects of Research			<p>determine the practical role of microorganisms in the field of Environmental Protection, medicine and biotechnology.</p> <p><b>Content:</b> Current Directions, trends, research methods of microbiology. Culture Media. Morphology of prokaryotes, types of differentiation. Ultra-structure, physiology of prokaryotes. Methods of isolation and culture of microorganisms. Classification of prokaryotes. Morphology of eukaryotic microorganisms. Metabolism, respiration and genetics of microorganisms. The influence of environmental factors on microorganisms. Specificity, structure of viruses.</p>														
	BD	EC	Systematics of Microorganisms	<p><b>Purpose:</b> Formation of an idea about the peculiarities of vital activity, the organization of prokaryotic and eukaryotic microorganisms and their position in the general system of the organic world.</p> <p><b>Content:</b> Features of prokaryotic and eukaryotic microorganisms. Culture Media for the cultivation of microorganisms. Methods of microbiological disinfection. Morphology of bacteria. Morphology of actinomycetes. Bacterial cell structure. Chemical structure, nutrition of microorganisms. Phylogenetic and phenotypic Systematics. Classification of prokaryotes. Energy and biosiithetic processes. Breathing. Microorganisms and the environment.</p>					✓								
	BD	EC	Genetics	<p><b>Purpose:</b> Formation of systematized knowledge about the laws of heredity and variability, teaching the basics of selection, genetic engineering, methods of analysis of Molecular Genetics.</p> <p><b>Content:</b> The main laws of heredity. Methods of studying heredity and variability. Cytological basis of inheritance, gametogenesis. Heredity in mono - and polyribd hybridization. The interaction of genes. Gender genetics. Chromosomal theory of heredity. Variability. Human Genetics. The issues of medical genetics, heredity of human blood groups and population genetics are considered.</p>	5				✓	✓							



				glands. The urinary system. Senses-esthesiology.														
		BD	EC	Theory of Evolution	<p><b>Purpose:</b> To form a scientific understanding of the origin of life on earth and its historical development, the foundations of evolutionary doctrine.</p> <p><b>Content:</b> The history of the development of evolutionary doctrine. The formation and development of evolutionary ideas in the period before the Darwin era. The evolutionary concept of J. B.Lamarck. Darwin's evolutionary theory. Formation of a synthetic theory of evolution. Evidence of evolution and methods of its study. The doctrine of microevolution. Population is the elementary structure of evolution. Evolutionary progress. Anthropogenesis.</p>	4						✓						
		BD	EC	Main Theories of Biological Evolutions	<p><b>Purpose:</b> To analyze the problems from the origin of life to the origin of man, to supplement the concepts and concepts of the laws of development of living nature.</p> <p><b>Content:</b> Organic evolution is an objective process methods of studying evolution. Life is a special form of movement of matter. Evolutionary change is a necessary condition for life on earth. The next stages of biochemical evolution. Evidence of evolution and methods of its study. The struggle of transformism and creationism, preformism and epigenesis. Formation of evolutionary biology.</p>							✓						
		BD	EC	Molecular Biology	<p><b>Purpose:</b> Molecular interpretation of the structure of living organisms.</p> <p><b>Content:</b> Cells and genomes. Common properties of terrestrial cells. Chemical components of the cell. Features of the construction of a water molecule. The importance of enzymes in metabolism. The importance of activated transporters in the biosynthesis of molecules. NADN and NADF are important electron carriers. The shape, structure and function of proteins. Mechanisms of DNA replication. Chromosomal DNA. The development of genomes. The appearance of genomic changes.</p>	4						✓						

				Violation of the mechanisms of copying and correcting DNA.														
		BD	EC	Molecular Biology With the Fundamentals of Genetics	<p><b>Purpose:</b> Formation of modern knowledge about the basic molecular genetic and cellular mechanisms of the vital activity of organisms, their application in clinical practice.</p> <p><b>Content:</b> The structure and significance of nucleic acids. The main ways of transmitting genetic information. DNA biosynthesis. Genetic recombination. Anabolism. Stages of protein biosynthesis. The genetic code. The genetic apparatus of the cell. Human karyotype. Violation of genetic homeostasis and manifestation in human pathology. Gene, genomic, chromosomal mutations. Mutagenesis. Mutagenic factors</p>							✓	✓					
	Structure and Principles of Functioning of Organisms	BD	EC	Human and Animal Physiology	<p><b>Purpose:</b> Formation of knowledge about the main functions, physiological features and life of organs, cells, cellular structures of the human and animal body.</p> <p><b>Content:</b> The history of the formation of physiology as a science, research methods of human and animal physiology, properties and types of excitable tissues and muscle in general, nervous tissues, physiology of individual sections of the autonomic and central nervous systems. Synapses, their types and physiological properties. Physiology of analyzers, endocrine glands, blood, heart, blood vessels, respiratory, digestive system. respiratory, digestive system.</p>	4									✓			
		BD	EC	Physiology of Higher Nervous Activity	<p><b>Purpose:</b> The formation of knowledge about the physiology and General Laws of the higher nervous system inherent in the body and the function and features of the higher nervous system.</p> <p><b>Content:</b> The reflex theory of I. P. Pavlov. Formation of reflexes. Dominant phenomenon. Reflex mechanism of activity of the nervous system. Functional areas of the cerebral cortex. Asymmetry of the large cerebral hemispheres. Types of higher</p>										✓			

				nervous activity. Signal systems I and II. Physiological mechanisms of memory. Classification of types of attention. Emotions. Consciousness and thinking. Types of higher nervous activity.															
		BD	EC	Biochemistry	<p><b>Purpose:</b> Formation of students' knowledge about the structure and properties of chemical compounds that make up living organisms, the basic laws of biochemical processes and mechanisms of regulation of metabolism and skills of working on devices and equipment used in biochemical laboratories.</p> <p><b>Content:</b> Introduction to biochemistry. Squirrels. Enzymes. Nucleic acids. Ribonucleic acids (RNA). Carbohydrates. Lipids. Vitamins. Bioenergetics. Carbohydrate metabolism. The exchange of proteins and amino acids. Lipid metabolism. Exchange of nucleic acids.</p>	4													
		BD	EC	Biochemical Functions of living organism	<p><b>Purpose:</b> Formation of theoretical knowledge related to biochemical processes of living organisms, their vital activity; biochemical processes occurring in the body: nutrition, respiration, reproduction and death.</p> <p><b>Content:</b> Energy processes in a living organism. Theories of biological oxidation. Respiratory chain. Intermediate exchange. Carbohydrate metabolism. Lipid metabolism. Metabolism of proteins and amino acids. Structure and functions of the cell membrane. Nucleic acids. The relationship of carbohydrate, lipid and protein metabolism.</p>														
		BD	EC	Mycology	<p><b>Purpose:</b> To form the morphology of fungi, their species composition, systemic groups, biology, ecology, phylogeny, distribution in nature and concepts in human life.</p> <p><b>Content:</b> General description of the mushroom section. Filament changes. Mushroom-millet nutrition. The influence of the external environment on the development of the fungus. Reproduction of fungi. Classification of fungi. Mucus, myxomycetes. Real mushrooms. Class plasmodiophora. Class of chitridimycetes. Oomycetes. Zygomycetes.</p>	4													

					Ascomycetes (pocket mushrooms). Basidiomycetes. Class of immature fungi (deuteromycetes).															
		BD	EC	Lichenology	<p><b>Purpose:</b> Formation of knowledge about the morphology and anatomy of lichens, systematics of lichens, metabolic processes, ecology and importance in biogeocenosis with ecological groups.</p> <p><b>Content:</b> General characteristics of lichens. Classification of lichens. Morphological structure of lichens. Lichen algae (photobiont or phytobiont). Lichen mushrooms (mycobionts). Anatomical structure of lichen. Reproduction of lichens. Metabolism in lichens. The concept of symbiotrophism. The importance of lichens in nature. Their habitat.</p>															
	Module of Acquisition of new Professional Competencies	BD	EC	Subjects on the Additional Educational Program	Study additional educational program Minor (Minor) – a set of disciplines and (or) modules and other types of educational work, determined by the student for study in order to form additional competencies.	12														
<b>Cycle of profile disciplines</b>																				
<b>University Component/ Optional component</b>																				
		PD	EC	Plants Physiology	<p><b>Purpose:</b> Formation of knowledge about the Basic Laws of the vital activity of a plant organism and their application in managing the productivity of agricultural and cultivated plants.</p> <p><b>Content:</b> The relationship of construction and activity of plant structures. Water regime of plants. Photosynthesis. The light and dark phase of photosynthesis. Photosynthetic phosphorylation. The Calvin cycle. Plant respiration. Anaerobic and aerobic stages. Glycolysis. Krebs cycle. Substrate phosphorylation. Mineral nutrition of plants. Growth and development of plants. Phytohormones. Plant movements. Plant resistance.</p>	5														



				<p><b>Content:</b> Independently perform laboratory tests to solve research and production problems using modern equipment and metering devices; organize research and production work using regulatory documents. Contributes to the practical testing and strengthening of students' theoretical knowledge gained from higher educational institutions, as well as improving the relationship of educational institutions with production</p>															
Biodiversity of the Plant and Animal World	PD	EC	Bioresources of Kazakhstan	<p><b>Purpose:</b> To acquaint students with the study of Bioresources of Kazakhstan, their effective use, the diversity of plants and animals, the stages of the history of research, methods of obtaining raw materials and ways of their use.</p> <p><b>Content:</b> Concepts of biological resources. Stages of research of raw plants of Kazakhstan. Resource science research approaches and development of raw plants. Effective use and protection of useful plants in the natural flora of Kazakhstan. Resource zoning in Kazakhstan and the prospects of resource research work. The main water Bioresources of Kazakhstan.</p>	4														
	PD	EC	Ecology of Populations and Communities	<p><b>Purpose:</b> To study the laws of the main interaction in the system of Population - community – man-made environment and to form an environmental approach to solving environmental problems.</p> <p><b>Content:</b> Modern concepts of concepts, strategies and practical tasks of sustainable development in different states and the Republic of Kazakhstan. A comprehensive, objective and creative approach to the discussion of complex and complex issues of Ecology, Environmental Protection and sustainable development.</p>															
	PD	EC	Flora and Fauna of the World	<p><b>Purpose:</b> The formation of scientific ideas about the flora and fauna of the world, the expansion of knowledge about the diversity of species and the main representatives of the animal and plant world.</p> <p><b>Content:</b> Patterns of distribution of plants and animals of the globe. Characteristics of endemic</p>	4														

				plants. Features of plants and animals characteristic of the steppes. Plants and animals, desert zone. Types of mountain plants and animals. Diversity of flora and fauna of tundra, taiga.														
	PD	EC	Comparative Floristry	<p><b>Purpose:</b> Formation of theoretical and practical knowledge in comparative floristics, instilling skills and skills of independent work with plant objects, development of interest in conducting scientific research in the field of floristics.</p> <p><b>Content:</b> Knowledge of comparative features of plants distributed on Earth. Identification of the causes of the spread of plants and animals to different regions. Creation of a phytocenosis of the Association of plant species distributed throughout the Earth. The influence of external factors on plants distributed in forest, steppe, semi-desert, mountainous regions. Ecological groups of plants. Types and comparative features of medicinal plants.</p>								✓						✓
	PD	EC	Biological Ecology	<p><b>Purpose:</b> Formation of knowledge about the laws of life of Biological and social ecosystems, protection of the habitat, global and local environmental problems.</p> <p><b>Content:</b> Climatic regionality and types of ecosystems. The organism, the conditions of its existence. Influence of limiting factors on organisms. The impact of anthropogenic factors on the environment. Bioecology of populations, communities. Laws of Organization of ecosystems. Environmental succession. Environmental monitoring. Sustainable development of the biosphere. Ways to preserve plant and animal populations.</p>	4								✓					
	PD	EC	Ecological Problems of the RK	<p><b>Purpose:</b> Formation of concepts of Environmental Protection Legislation of the Republic of Kazakhstan to solve environmental and environmental problems. Problems of Ecology and environmental protection in Kazakhstan. Problems of climate change in the Republic of Kazakhstan. Atmospheric pollutants,</p>														✓

				radiation situation. General patterns of forest damage and protection measures. Measures for the effective protection of types of Natural Resources. The demographic situation of Kazakhstan and the concept of sustainable development.															
Biological Sciences by Levels of Organization and Properties of Living Matter	PD	EC	Parasitology	<p><b>Purpose:</b> The formation of knowledge on the stages of formation and development of Parasitological science, biology, ecology, structure, life cycle, ways of occurrence and distribution.</p> <p><b>Content:</b> Basic concepts and terms of Parasitology; features of life cycles, their intermediate hosts, ways of transmission, methods of preventing parasitic invasions, measures to prevent natural focal diseases. Features of approaches to assessing parasitological situations. Discussion skills and arguments in the discussion of parasitological safety.</p>	5														
	PD	EC	Helmentology	<p><b>Purpose:</b> Formation of the basics of competence necessary to perform research, field, laboratory work using modern equipment in the field of helminthology.</p> <p><b>Content:</b> The main morphological, biological, environmental features of trematodes, Cestodes, Nematodes, acanthocephalans and their larvae; methods for diagnosing widespread helminthiasis. Distinguish the structure of helminths and their larvae according to preparations and schematic drawings; determine the stages of development of helminths in the final, Intermediate, Secondary host.</p>															
	PD	EC	Ornithology	<p><b>Purpose:</b> To form knowledge about the peculiarities of life and reproduction of birds, distribution, Systematics, the importance of birds living on the territory of Kazakhstan.</p> <p><b>Content:</b> The class of birds as a numerous group of terrestrial vertebrates, the features of their structure, Organization, principles of systematization and determination of their role in natural biocenoses. Origin and evolution. Anatomical and environmental</p>	4														

				features. The main groups of birds living in Kazakhstan. Ornithofauna, biodiversity of rare and protected species.															
		PD	EC	Ichthyology	<p><b>Purpose:</b> To acquire in-depth knowledge about the features of fish species; to form knowledge about the structure, Life, distribution, Systematics, evolution of fish.</p> <p><b>Content:</b> Biological specificity and body structure of the fish class. Cartilaginous fish. Group of bony fish, reproduction. The main ecological groups of fish. Sea, Freshwater Fish. Fish nutrition. Reproduction of fish. Commercial importance of fish. Fish farming. Fish farming. Types of fish used in public places. Nutritional value of fish. Factors influencing the chemical composition of fish.</p>														
	Applied Scientific Biology	PD	EC	Organization and Planning of Scientific Research on Biology	<p><b>Purpose:</b> Formation of skills in organizing and planning research work, analyzing the methods of conducting research, summarizing the results obtained, preparing articles, developing reports.</p> <p><b>Content:</b> Branches of science. Types of scientific research. The choice of the direction of scientific research and the stages of research work. Levels of methods of scientific knowledge. Requirements for the implementation of abstract works. Requirements for the implementation of term paper. Structure of the thesis design of the thesis. Preparing the project for Public Protection. Artistic development of scientific research work.</p>	4						✓	✓						
		PD	EC	Biological Experiment	<p><b>Purpose:</b> Knowledge of the methodology and methods of scientific research, requirements for the rules for planning and conducting laboratory experiments, analysis and conclusion of results and creative thinking, the formation of independent research skills.</p> <p><b>Content:</b> Science and scientific research. Basic concepts of research work. Stages of research work. Individual and special methods of scientific research. Experimental research methods. Primary data</p>							✓	✓						

				processing. Statistical processing of experimental results. The specifics of the experimental method, types of experiments, the main stages of preparation and conduct of the experiment.														
		PD	EC	Applied Biology With the Fundamentals of Soil Science	<p><b>Purpose:</b> The formation of knowledge about the achievements of the fields of Applied Biology, the structure, composition of soils, methods of fertilization and theoretical, methodological foundations of plant cultivation, ways of application in practice.</p> <p><b>Content:</b> The importance of the course fundamentals of Applied Biology and soil science, its relationship with other sciences. Soil formation factors. Soil structure, morphological features, physical and physico-mechanical properties of soils. Crop rotation. Weeds fight them. Fertilizer classification. Classification, classification, agricultural technology of agricultural crops. Animal husbandry. Rabbit breeding. Valuable fur animals, poultry farming.</p>	5						✓	✓					
		PD	EC	Cropping with the Fundamentals of Soil Science	<p><b>Purpose:</b> The formation of skills in the professional application of knowledge about the importance of crop production, features of modern plant cultivation and soil types, the importance of soil in nature, the laws of distribution on earth.</p> <p><b>Content:</b> The importance of crop production in agricultural production. The history of the origin of cultivated crops. Works of N. I. Vavilov. Grain families. The main legumes. Oilseeds. The main directions of selection work, achievements. The concept of soil and its fertility. The importance of soil in agricultural production.</p>									✓				
		PD	EC	Landscape Design	<p><b>Purpose:</b> Formation of opportunities for the use of climate, relief, Bioresources of the terrain, landscape features and patterns of various zones and belts of territorial nature in the directions of landscape design.</p> <p><b>Content:</b> Basic principles of landscape design. Wood and shrubs used in landscaping and landscape design.</p>	4								✓				

					Agrotechnical preparation of the territory. Landscape design directions, objects of design activity; features, applications. Principles of landscape organization: Environmental, functionality, aesthetics. The development of garden design. Sustainable and landscape styles of Landscape Architecture.															
		PD	EC	Decorative Plants of Kazakhstan	<p><b>Purpose:</b> Formation of knowledge on the protection and effective use of species composition, morphology, bioecological features, Bioresources of Natural ornamental plants of Kazakhstan.</p> <p><b>Content:</b> Diversity of ornamental plants; morphology, bioecological features; features of growth and development of ornamental plants in different climatic zones; methods of planting ornamental plants; knowledge of the types of ornamental plants grown on public facilities, their cultivation, storage and processing.</p>															
		PD	EC	Nature Reservetion in Kazakhstan	<p><b>Purpose:</b> Formation of ideas about the main types of specially protected natural territories in Kazakhstan and the peculiarities of their functioning.</p> <p><b>Content:</b> Protection of flora and fauna in Kazakhstan. Types of specially protected natural areas. Monitoring the natural state of the environment. Basic principles and conditions in the field of specially protected areas. The main legislation of the Republic of Kazakhstan in the field of specially protected natural areas.</p>	4														
		PD	EC	Forest Studies and Forestry	<p><b>Purpose:</b> To form the theoretical foundations of Forestry Management at the present stage, based on the provisions and requirements of the current forest legislation.</p> <p><b>Content:</b> Elements that make up the forest. Forestry is a branch of the economy. Research, renewal of forests; forest care, wood preparation, its cutting and regulation; cultivation of seedlings in nurseries; irrigation; protection of forests from fires, pests and various diseases; measures to regulate forest use in order to meet the needs of the national economy for</p>															

				wood and forest products.																
		PD	EC	Medicinal Plants of Kazakhstan	<p><b>Purpose:</b> Formation of knowledge on the protection and effective use of species composition, morphology, bioecological features, Bioresources of medicinal plants growing on the territory of Kazakhstan.</p> <p><b>Content:</b> General characteristics of Medicinal Plants; history of the use of plant raw materials for medicinal purposes; protection of medicinal plant resources; technology of harvesting medicinal plants; dependence of medicinal properties of medicinal plants on their chemical composition. Morphological, environmental and economic characteristics of the main representatives of medicinal plants.</p>	4														
		PD	EC	Urban Flora of Turkestan Region	<p><b>Purpose:</b> To form an idea of the stages of formation and development of the flora of the City, purpose, features, order of location, cultural and social significance.</p> <p><b>Content:</b> Urbanized environment of Turkestan region. Protection and optimization of urban flora. Typical woody and herbaceous (annual and perennial) plants well adapted to growing in urban systems. Soil cover, basic laws of flora formation, changes in physico-chemical and biological indicators, cultural and social significance.</p>															
		PD		Industrial Practice II	<p><b>Purpose:</b> Consolidation of key competencies in students, the formation of practical skills and professional experience in the specialty of training.</p> <p><b>Content:</b> Formation of the ability to work in a research group, professional adaptation, mastering new research methods and technologies, feeling responsible for the quality of the work performed, mastering the methods of plant physiology and biochemistry and methods for correctly assessing errors during the experiment.</p>	6														✓
	Module of Final	PD		Pre-degree or Industrial Practice	<p><b>Purpose:</b> To deepen and consolidate the theoretical knowledge gained in a higher educational institution,</p>	10						✓	✓							✓

	Certification			<p>to control and analyze the knowledge gained in practice, to process data, to be able to reveal the relevance of the thesis, to prepare students for the defense of the thesis before the state Certification Commission.</p> <p><b>Content:</b> Requirements for the content and design of qualification work (WRC); ability to formulate, solve the goals and objectives of scientific research; planning and conducting laboratory and field experiments; analysis, systematization and summing up the results; skills in working with Internet resources.</p>												
			<p>Writing and Defence of Thesis, a Graduate work, or Preparing and Passing a Comprehensive Exam</p>	<p><b>Purpose:</b> Systematize theoretical knowledge and practical skills, apply them in solving scientific and production problems; explain the student's readiness for independent work at the level of science, as well as his professional competence. The use of academic writing skills in the design of a diploma project.</p> <p><b>Content:</b> General provisions of the diploma work. Selection and approval of the topic of the work. Scientific supervision of the preparation of the thesis. The procedure for forming the content (plan) of the diploma work, selection and study of information sources. Collection and processing of experience material. Basic requirements for the content and design of the diploma work. Registration of the final version of the diploma work, Protection of the diploma work, general provisions of the state final certification.</p>	8						✓			✓		

## 5. SUMMARY TABLE REFLECTING THE VOLUME OF LOANS DISBURSED BY MODULES OF THE EDUCATIONAL PROGRAM

Training course	Semester	Number of modules to be mastered	Number of subjects studied			Number of credits KZ					Total hours	Total credits KZ	number	
			GC	UC	CC	Theoretical training	Physical culture	Educational practice	Manufacturing practice	Final certification			exam	differentiated credit
1	1	4	5	1	1	30	2				900	30	6	1
	2	3	4		2	28	2	2			900	30	5	2
2	3	4	3	2	3	30	2				900	30	6	2
	4	5	1	2	3	26	2		4		900	30	6	1
3	5	3			6	30					900	30	6	-
	6	4			2	24			6		900	30	4	-
4	7	2			4	20					600	20	4	1
	8	3			4	20					600	20	4	1
	9	1							8	12	600	20		
total		10	8	5	25	208	8	2	18	12	7200	240	41	8

## 6. LEARNING STRATEGIES AND METHODS, MONITORING AND EVALUATION

<b>Learning strategies</b>	<p><b>Student-centered learning:</b> The student is the center of teaching/learning and an active participant in the learning and decision-making process.</p> <p><b>Practice-oriented learning:</b> focusing on the development of practical skills.</p>
<b>Teaching methods</b>	<p>Conducting lectures, seminars, various types of practices:</p> <ul style="list-style-type: none"> <li>• application of innovative technologies;</li> <li>• problem-based learning;</li> <li>• case study;</li> <li>• work in a group and creative groups;</li> <li>• discussions and dialogues, intellectual games, olympiads, quizzes;</li> <li>• reflection methods, projects, benchmarking;</li> <li>• Bloom's taxonomies;</li> <li>• presentations;</li> <li>• rational and creative use of information sources:</li> <li>• multimedia training programs;</li> <li>• electronic textbooks;</li> <li>• digital resources. Организация самостоятельной работы студентов, индивидуальные консультации.</li> </ul>
<b>Monitoring and evaluation of the achievability of learning outcomes</b>	<p><b>Current control</b> on each topic of the discipline, control of knowledge in classroom and extracurricular classes (according to syllabus). Assessment forms:</p> <ul style="list-style-type: none"> <li>• survey in the classroom;</li> <li>• testing on the topics of the discipline;</li> <li>• control works;</li> </ul>

	<ul style="list-style-type: none"> <li>• protection of independent work;</li> <li>• discussions;</li> <li>• trainings;</li> <li>• colloquiums;</li> <li>• essays, etc.</li> </ul> <p><b>Boundary control</b> at least twice during one academic period within the framework of one academic discipline.</p> <p><b>Intermediate certification</b> is carried out in accordance with the working curriculum, academic calendar.</p> <p>Forms of conducting:</p> <ul style="list-style-type: none"> <li>• exam in the form of testing;</li> <li>• oral examination;</li> <li>• written exam;</li> <li>• combined exam;</li> <li>• project protection;</li> <li>• protection of practice reports.</li> </ul> <p><b>Final state certification.</b></p>
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### EDUCATIONAL AND RESOURCE SUPPORT OF THE EP

<b>Educational Information Center</b>	<p>The structure of the Educational Information Center includes 6 subscriptions, 16 reading rooms, 2 electronic resource centers (ERC). The basis of the network infrastructure of the Educational and Information Center is 180 computers with Internet access, 110 workstations, 6 interactive whiteboards, 2 video doubles, 1 video conferencing system, 3 A-4 format scanners, JIC software - AIBS "IRBIS-64" under MS Windows (basic set of 6 modules), stand-alone server for uninterrupted operation in the IRBIS system.</p> <p>The library fund is reflected in the electronic catalog available to users on the site <a href="http://lib.ukgu.kz">http://lib.ukgu.kz</a> on-line 24 hours 7 days a week.</p> <p>The metadata bases of the iron generation: "Almamater", "Proceedings of SKSU scientists", "Electronic archive" have been created. Online access from any device 24/7 via the external link <a href="http://articles.ukgu.kz/ru/ppp">http://articles.ukgu.kz/ru/ppp</a>.</p> <p>Catalogs are processed electronically. EC consists of 9 databases: "Books", "Articles", "Periodicals", "Proceeding soft teaching staff of SKSU", "Rare Books", "Electronic Fund", "SKGU in Print", "Readers" and "SKU".</p> <p>The EIC provides its users with 3 options for accessing its own electronic information resources: from the "Electronic Catalog" terminals in the catalog hall and in the EIC subdivisions; through the information network of the university for faculties and departments; remotely on the library website <a href="http://lib.ukgu.kz/">http://lib.ukgu.kz/</a>.</p> <p>Open access to international and republic resources: "Springer Link", "Polpred", "Web of Science", "EBSCO", "Epigraph", to electronic versions of scientific journals in the public domain, "Zan", "RMEB", "Adebiet", Digital library "Aknurpress", "Smart-kitar", "Kitar.kz", etc.</p> <p>For people with special needs and disabilities, the library website has been adapted to the work of visually impaired users.</p>
<b>Material and technical base</b>	<p>The department has the following classrooms with a total area of 342 m<sup>2</sup>. Arboretum named after A. Askarov, Shymkent</p>

## APPROVAL SHEET

On the Educational program 6B05110 –«Biology»

Director of DAA \_\_\_\_\_ A.S.Naukenova

Director of DASc \_\_\_\_\_ U.B.Nazarbek

Director of DE&C \_\_\_\_\_ T.S.Bazhirov