

MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN  
KARAGANDA UNIVERSITY NAMED AFTER ACADEMICIAN E.A. BUKETOV

«AGREED»

Executive Director  
of the OLE «Coalition for a «Green Economy»  
and the development of G-Global»

A.M. Sulcimenov

« 03 » 03 2023

«AGREED»

Chairman of the Management Board  
of the OLE «Association of Ecological  
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Finance Director  
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« 03 » 03 2023

«APPROVED»

Chairman of the Management Board –  
Rector of the Karaganda University  
named after academician Y.A. Buketov

N.G. Dulatbekov

« 20 » 05 2023

EDUCATIONAL PROGRAM

«7M05202 – *Environmental analytics and bioeconomics*»

Level: Master's Degree

Karaganda, 2023

The educational program in the specialty "7M05202 - Ecoanalytics and Bioeconomics " was developed on the basis of:

- Law of the Republic of Kazakhstan dated July 27, 2007 No. 319-III "On Education" (with amendments and additions as of 03/27/2023),
- Order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 No. 2. Registered with the Ministry of Justice of the Republic of Kazakhstan on July 27, 2022 No. 28916. "On the approval of the state mandatory standards of higher and postgraduate education"
- On the approval of the Concept of Development of Higher Education and Science in the Republic of Kazakhstan for 2023-2029, approved by the Decree of the Government of the Republic of Kazakhstan dated March 28, 2023 No. 248.
- On approval of the Rules for the organization of the educational process on credit technology of education in organizations of higher and (or) postgraduate education Order of the Minister of Education and Science of the Republic of Kazakhstan dated April 20, 2011 No. 152. Registered with the Ministry of Justice of the Republic of Kazakhstan on May 27, 2011 No. 6976 (with amendments and additions dated 04/05/2023)
- The National Qualifications Framework of March 16, 2016 by the Republican Tripartite Commission on Social Partnership and Regulation of Social and Labor Relations.
- Classifier of training areas with higher and postgraduate education dated October 13, 2018 No. 569 (as amended by the Order of the Minister of Education and Science of the Republic of Kazakhstan dated 06/05/2020 No. 234)

Educational program in the specialty  
«7M05202 - Ecoanalytics and Bioeconomics »

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## 1. Passport of the educational program

1. Code and name of the educational program: "7M05202 - Ecoanalytics and Bioeconomics".
2. Code and classification of the field of education, areas of training: field of education - 7M05 Natural sciences, mathematics and statistics; field of training 7M052 Environment
3. Group of educational programs: M087 Environmental protection technology
4. Amount of credits: 120
5. Form of study: full-time
6. Language of instruction: Kazakh, Russian
7. Degree: Master of Science in the educational program "7M05202 - Ecoanalytics and Bioeconomics".
8. Type of EP: innovative
9. ISCED level: 7
10. Level according to NFK: 7
11. Level according to SQF: 7
12. Distinguishing features of the EP
13. Number of the appendix to the license for the direction of personnel training: № KZ83LAA00018495 date of issue 28.07.2020, Appendix 016
14. Name of accreditation body and period of accreditation of EP: ???
15. The aim of the program is to train specialists in demand in the labor market, who are able to economically justify and effectively implement green standards and technologies, environmental mechanisms and principles of sustainable development in the activities of organizations and enterprises of all forms of ownership, who are ready to organize the ecological renovation of production systems, circular consumption of resources and ecoprojects, to make the transition from brown economy to bioeconomy, and who have skills of analytical and managerial work.
16. Qualification characteristics of a graduate
  - a) List of positions for graduates: eco-analyst, chief economist-analyst, expert in labor protection, industrial and environmental safety, environmental expert, eco-project manager, recycling technologist, sustainable development specialist, urban moderator, chief specialist in environmental organizations, head of different departments in state management structures, head of enterprises of different ownership forms and industry, researcher in research institutes, teacher
  - b) The sphere and objects of professional activity of graduates:

The scope of professional activity of graduates on the educational program "7M05202 - Ecoanalytics and Bioeconomics" is: state bodies of republican and local administration (Ministry of Agriculture of the Republic of Kazakhstan, in particular: Committee for Land Resources Management, Committee for State Inspection in Agroindustrial Complex, Ministry of Industry and Infrastructure Development of the Republic of Kazakhstan, including the Committee for Construction and Housing and Communal Services, Ministry of Environment, Geology and Natural Resources of the Republic of Kazakhstan, including the Committee for Environmental Regulation and Control), Control and supervisory organizations, scientific, consulting and design organizations, research laboratories, environmental protection organizations, environmental structures in enterprises, enterprises with a full-time environmental analyst position, construction companies institutions and organizations of all forms of ownership, international organizations for sustainable development, public organizations for the protection of nature.

Master of Natural Sciences in the specialty "7M05202 - Ecoanalytics and Bioeconomics" can carry out environmental analytical, research, organizational and managerial (administrative) and educational (pedagogical) activities in the following areas: ecological monitoring, ecotoxicological assessment of environmental pollution, biological environmental technology, environmental expertise of various types of design analysis, environmental projects, development of prospective and current plans for the implementation of environmental protection measures, organization of environmentally responsible production, control and analysis of resource efficiency and environmental consequences of all types of economic activity, organization of cyclic technologies, environmental risk assessment, forecasting of development and assessment of consequences of accidents and emergencies, analysis and regulation of environmental load, activities in the field of green investments and responsible financing, eco-philic business.

The objects of professional activity of masters in the educational program "7M05202 - Ecoanalytics and Bioeconomics" are: economic, natural, anthropogenic, natural-economic, environmental-economic, production, social, public territorial systems and structures at global, national, regional and local levels, as well as

state planning, control, monitoring, examination of the environmental components of all forms of economic activity; education, public education and health, demographics, and the environment.

c) Types of professional activity of the graduate:

- Organizational and technological activities.

A master in this direction has the skills to organize ecophilic production, qualified work in the development, implementation and application of resource-saving management technology in a particular organization, including a comprehensive analysis and control of proper compliance with management technology, participates in the creation of scientific and methodological and organizational and technological base of management, participates in the creation of the scientific-methodological and organizational-technological basis of management, develops together with other specialists and applies the most effective methods, rules and processes of planning, investment, innovation and environmental management, conduct of economic activities of organizations and enterprises; analyzes, evaluates, and interprets the results and substantiates conclusions; takes an active part in the process of organizing production, resource provision of the production process, organizing marketing management, logistics, in the development of measures of rational use of natural resources and environmental protection; organizes the waste management system

- Production and management activities. Production and management activities are the prerogative of masters in this area of training, since the educational process requires them to thoroughly study all issues related to the management process, including: green development management; creation of an effective environmental management system; analysis of the effectiveness of management decisions in the field of bioeconomy, implementation of environmental monitoring of the development of the natural-production ecosystem, management of the implementation of global programs of the green course for the development of the world economy in the regions and the activities of branches of international environmental organizations.

- Project activity. Project activities of masters in this specialty are carried out in two main areas: organizational design and feasibility study of eco-projects. Organizational design includes the development of organizational structures for managing eco-projects, substantiation of the expected technical and economic results of their implementation and adaptation. Feasibility study of eco-projects involves the preparation and implementation of design calculations, development of special documentation (feasibility study, business plan, etc.) in relation to the organization of a new enterprise, technical re-equipment, reconstruction of an existing enterprise, as well as monitoring the compliance of developed projects to environmental standards.

- Research activities. Research activities of masters in this area of training are carried out both within the framework of research programs of higher educational institutions, and as part of the relevant research groups of research institutes, enterprises and organizations. A special place is given to international programs of scientific cooperation in the field of bioeconomics, organization and management of green development.

- Educational (pedagogical) activity. The educational (pedagogical) activity of graduates of this profile consists in professional activities (environmental pedagogy, environmental education and upbringing) in general educational institutions, educational institutions of primary vocational, secondary vocational education.

d) Functions of professional activity of the graduate:

- participation in the development of state programs for the development of sectors of the national economy and ecology;

- organization, planning and coordination of enterprise management activities and formation of its market strategy;

- development of measures to improve the organization of the activities of all departments, including: planning, pro-forecasting, cost management and material and technical supply, logistics, sales

- Ensuring the implementation of production programs, projects, the company's development strategy;

- calculations of emissions of harmful substances into the environment and their economic evaluation;

- preparation of a feasibility study for the installation of new filtration equipment or replacement of the equipment with a more technologically advanced one

- environmental audit;

- Development of environmental management systems for enterprises and production facilities;

- Planning management, implementation of work on the examination of design, pre-project documentation in terms of its compliance with international standards;

- Economic analysis and interpretation of financial, accounting and other information contained in the accounts of business entities and the use of this information for management decisions;

- Identification and diagnosis of environmental problems

- Analytical calculations on the basis of standard methods and current normative-legal base on fixed assets, stock management, cost management; determination of economic efficiency of the enterprise;

- economic substantiation and implementation of innovations in the field of sustainable production;
- control over all types of economic-organizational and managerial activities;

## 17. Graduate Model

## Formulation of competency-based learning outcomes

Form 2

Type of competencies	Learning Outcome Code	Learning outcome (according to Bloom's taxonomy)
1. Softskills	PO 1	Forms own scientific ideas and hypotheses, argues for them, and chooses the best methodology for theoretical and applied research
	PO 2	Develops educational and methodological materials, selects adequate methods of training and education for different pedagogical situations
	PO 3	Establishes interpersonal contacts, convinces the partners of the expediency of the initiatives, organizes and unites the team, creates a favorable psychological climate
	PO 4	Demonstrates the required amount of knowledge of a foreign language for communication on a general and professional level, skills to express thoughts in interpersonal, business and professional way
2.: Digital skills	PO 5	Develops, implements and commercializes scientific, scientific, technical and innovative projects of the green using information processing techniques and modern digital software products
	PO 6	Processes static data and works with graphics, tests statistical hypotheses on optimization, applies basic methods of statistical analysis: t-test, correlation, regression, variance and regression analysis, etc, visualizes data and creates interactive analytical dashboards for studying the ecological renovation of national and global economies and green development management
3.: Hardskills	PO 7	Summarizes the main directions of biomonitoring of ecosystems, defines methods of monitoring and forecasting changes in the state of the environment
	PO 8	Draws up analytical reports on the state of resource efficiency and environmental consequences (waste and pollution) in a particular type of economic activity, calculates and substantiates economic indicators of cyclic technologies for a particular type of economic activity
	PO 9	Observes the principles of quantitative assessment of environmental risk, presents modern methods of forecasting the development and assessment of the consequences of accidents and emergencies, prevention of environmental pollution and elimination of the consequences of accidents and disasters
	PO 10	Develops programs to develop the technological and economic basis for a sustainable integrated energy system, justifies modern technologies for efficient alternative energy production, regulates the load on the environment, assesses and calculates the impact of harmful effects and quality indicators of environmental components
	PO 11	Develops a strategy for biotic urbanized spaces
	PO 12	Summarizes the main anthropogenic-conditioned negative processes in various environmental objects and ecosystems, Principles and methods of protection of flora and fauna, preservation of their biodiversity and productivity, organizes and controls the system of waste management at a particular site
	PO 13	Adheres to the principles of green investment and responsible financing and conducts economic assessments of eco-technologies
	PO 14	Observes trends in the development of a "green" economy, conducts activities to implement the principles of sustainable development, justifies the use of methods for assessing the technogenic impact on the environment

**Definition of discipline modules in accordance with the learning outcomes**

Learning Outcome Code	Module name	Discipline name	Scope (ECTS)
LO 1	Philosophical and historical aspects of social and humanitarian knowledge	History and philosophy of science	4
LO 2		Higher School pedagogy	4
LO2, LO 3		Psychology of management	4
		Pedagogical practice	4
LO3, LO 4	Professional languages	Foreign language (professional)	4
LO1, LO 3,LO 4		Research communication	5
LO1, LO 3,LO 4		English for STEM Program	
LO5, LO 6,LO 14	Issues of modern science and technology	Commercialization of the results of scientific and scientific and technical activities	5
		Innovation in Ecoanalytics and Bioeconomics	
LO6, LO 10		Green development management.	5
	Ecological renovation of the national and global economy		
LO7, LO 9	Environmental analytical control	Biomonitoring and biotesting of the environment	4
LO 8		Circular Economy: Advanced Level	6
LO7, LO 9		Biosystems Risk Assessment	4
LO 10, LO 11	Environmental engineering	Sustainable Energy Technology (in English)	5
LO7, LO 9,LO 10, LO 11		Environmental regulation and standards (in English)	
LO 11, LO 12, LO 13		Current trends in environmental protection	5
LO10, LO 11, LO 13		Biological and chemical waste processing	
LO 5, LO8, LO14		Methods of economic evaluation of eco-technologies and green projects.	5
LO 5, LO 8, LO12		Green investments and responsible financing	
LO9, LO10, LO 13		Sustainable development of the environment	5
LO5, LO10,LO12		Teaching Techniques in Economic	
LO 8, LO 12, LO 14		Strategic analysis and planning of eco-enterprise activities	5
		Innovative ecophilic business models	
	Research work	Research practice	14
		Research work of a master student, including an internship and a master's thesis	24
	Final examination	Design and defense of a master's thesis	8



Cycle of major disciplines																	
Elective component																	
D5	Research communication	Purpose of the discipline: The study of the specifics of scientific communication, necessary and sufficient for the perception, analysis and evaluation of research texts, the development of a high level of linguistic and sociocultural competence Objectives: - To study information about scientific communication, specifics of scientific discourse; - To get acquainted with the specifics of different forms and types of scientific communication	5	+		+	+										
	English for STEM Program	Purpose: Formation of language competencies for academic and professional interaction within the framework of global trends and practices of STEM technologies Tasks: - mastery of English terms and description of processes in the field of natural sciences, technology, engineering and mathematics; - Formation of competence in the necessary skills of professional communication in a foreign language; - Improvement of writing competences	5	+		+	+										
D6	Commercialization of the results of scientific and scientific and technical activities	Purpose: formation of skills for practical solution of issues of commercialization of innovations, improvement of competencies in the field of organization of innovative business and implementation of the results obtained in production. Tasks: - mastering technologies for the commercialization of innovations using technical means of information processing and digital programs; - development of a business plan and tender documentation for a commercialization project.	5					+	+								+
	Innovation in Ecoanalytics and Bioeconomics	Purpose of the discipline: to form a holistic view of innovation in the green economy, diagnosis and analysis of economic innovation. Objectives: - formation of knowledge about the development of the innovation process, the concepts of innovation; - the study of the basic provisions of innovation in international practice; - studying the identification of innovations in green economy, creation and introduction of innovations to the market and evaluation of their diffusion.	5					+	+								+
D7	Green development management	Purpose of the discipline: to form a modern view of the scientific and conceptual foundations of green development management, the context of sustainable development;	5						+					+			

		<p>Objectives:</p> <ul style="list-style-type: none"> <li>- assimilation of the basic principles of green development and mechanisms of their implementation;</li> <li>- studying the best foreign practices of green economy development;</li> <li>- definition of prerequisites and key directions of green development of national economy in the Republic of Kazakhstan</li> </ul>																
	Ecological renovation of the national and global economy	<p>Purpose of the discipline: to develop ideas about the organizational, legal and economic mechanisms of ecological renovation of the national and world economy.</p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>- studying the economic patterns of post-industrial technologies and saving resources using statistical hypotheses for optimization and methods of statistical analysis;</li> <li>- Studying economic laws of post-industrial technologies and resource saving;</li> <li>- Acquaintance with global programs of green development of world economy and activity of international nature protection organizations</li> </ul>	5						+			+						
<p>Cycle of major disciplines University component</p>																		
D8	Biomonitoring and biotesting of the environment	<p>Purpose of the discipline: To study the methodological foundations of biological monitoring of the environment and modern methods of biotesting of natural and anthropogenic-transformed ecosystems.</p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>- Justification of the role of assessing the state of biota using biotic characteristics;</li> <li>- To master the methods, techniques, methods of collection, processing and analysis of laboratory and field biomonitoring studies;</li> <li>- Acquaintance with the main approaches of biotesting</li> </ul>	4							+		+						
D9	Circular Economy: Advanced Level	<p>Purpose of the discipline: : To form a system of ideas about the principles, structure, advantages and disadvantages of circular economy and methods of its economic stimulation</p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>- To analyze the level of cyclicity and economic evaluation of the possibilities of a closed cycle for a particular company;</li> <li>- Development of a system of economic instruments to stimulate resource-efficient behavior of economic entities</li> </ul>	6								+							
D10	Biosystems Risk Assessment	<p>Purpose of the discipline: To form a system of knowledge and methodological approaches in the analysis and assessment of environmental risk of anthropogenic impacts on biological systems.</p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>- To familiarize with the main directions and activities on the issues of reducing environmental risks from</li> </ul>	4							+		+						



	technologies and green projects	evaluation of eco-technologies and green projects. Objectives: -familiarization with risk assessment methods for eco-technologies and green projects using technical means of information processing and modern digital software products; - getting acquainted with the methods of risk assessment; - studying the theoretical foundations of business planning of eco-technologies and green projects															
	Green investments and responsible financing	Purpose of the discipline: To become familiar with the factors, risks, mechanisms and infrastructure of green investments and responsible financing. Objectives: - To study the structure, instruments and dynamics of green and socially responsible financing in the world; - acquaintance with legislative and institutional fixation of instruments and measures in the field of green financing; - familiarization with the portfolios of "green" projects of international financial organizations	5				+			+				+			
D14	Sustainable development of the environment.	Purpose of the discipline: The study of the main anthropogenic processes in environmental and ecological objects to ensure sustainable development. Objectives: - To familiarize with the factors of transition to environmentally sustainable development and the formation of a green economy; - To master the basic measures to prevent pollution and other types of anthropogenic impact on the environment	5								+	+			+		
	Teaching Techniques in Economics	Training of a specialist who knows the structure, content, features of the subject and methodology of economic sciences; who has mastered the skills and abilities of analysis, synthesis, scientific abstraction, etc. Course content: the place of teaching methods in the system of sciences and its subject, methods of preparation and lecturing on economic disciplines, methods of preparation and conducting seminars in economic disciplines, methods of organizing independent work of students in economic disciplines, methods of using visibility, technical means and new technologies.gii in the teaching of economic disciplines, the specifics of the methodology of teaching economic disciplines in distance learning systems.	5				+					+		+			

D15	Strategic analysis and planning of eco-enterprise activities.	<p>Purpose of the discipline: To form a system of theoretical, methodological and practical skills in the strategic management of eco-enterprises</p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>- To master strategic analysis as a method of evaluating and constructing an eco-enterprise action plan</li> <li>- Justify the role of natural resources and environmental factors in strategic planning</li> </ul>	5								+				+		+	
	Innovative ecophilic business models	<p>Purpose of the discipline: To form a system of knowledge about the innovative eco-functional potential of a business model as the basis for the creation of a competitive advantage of the company in a post-industrial economy</p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>- Analysis of business ecosystem and development of possible variants of its transformation;</li> <li>- Mastering the methods of genesis of ecophilic business models: adaptation of templates, construction and structural modeling</li> </ul>	5								+				+		+	

**Alignment of planned learning outcomes with the methods of teaching and assessment within the module**

<b>Learning outcomes</b>	<b>Planned learning outcomes for the module</b>	<b>Training methods</b>	<b>Assessment methods</b>
PO1	Forms own scientific ideas and hypotheses, argues for them, and chooses the best methodology for theoretical and applied research	Interactive lecture Making mind maps Preparing and conducting a questionnaire	Test, Filling out multivariate questionnaires Preparing a presentation with the justification of their own scientific idea and hypothesis, the choice of optimal methodology for the dissertation research
PO2	Develops educational and methodological materials, selects appropriate methods of training and education for different pedagogical situations	Lecture Case Methods Preparing and conducting a questionnaire	Colloquium, Control Exercise, Test, Development of educational and methodological materials in the field of environmental pedagogy, environmental training and education
PO3	Establishes interpersonal contacts, convinces partners of the advisability of initiatives, organizes and unites the team, creates a favorable psychological climate	Lecture project-based learning Mapping Role Playing	Presentations Test, Drawing a psychological portrait of an environmentally responsible person
PO4	Demonstrates the required amount of foreign language skills for general and professional communication, interpersonal, business, and professional expression skills	Lecture Discussion The method of developing cooperation	Test, Filling out multivariate questionnaires Writing a terminological dictionary in the field of STEM in a foreign language Roundtable discussion in a foreign language on the topic of bioeconomics
PO5	Develops, implements and commercializes scientific, scientific-technical and innovative projects of green economy using technical means of information processing and modern digital software products	Lecture Flipped Class The method of evolving cooperation	Essay Writing Test, Preparation of materials for participation in competitions for funded research and innovation projects in the field of ecoanalysis and bioeconomics
PO 6	Processes static data and works with graphics, tests statistical hypotheses on optimization, applies basic methods of statistical analysis: t-test, correlation, regression, variance and regression analysis, etc., visualizes data, creates interactive analytical panels in the study of ecological renovation of national and global economy and green development management	Lecture Debate on the Green Deal Trainings Preparing and conducting a questionnaire	student portfolio Test, project preparation Context task Case study solution SWOT-analysis of green development management in Kazakhstan
PO7	Summarizes the main directions of biomonitoring of ecosystems, identifies methods of monitoring and forecasting changes in the environment	Lecture Brainstorming Laboratory works Analysis of sources of hazardous pollution of the ecosystem in the region of Kazakhstan and forecasting its sustainability.	Quick survey ("flyover") Test, Independent work Laboratory practice Analysis of the sources of hazardous pollution of the ecosystem in the region of Kazakhstan and making a forecast of its sustainability
PO8	Draws up analytical reports on the state of resource efficiency and environmental consequences in a particular type of economic activity, calculates and substantiates economic indicators of cyclic technologies for a particular type of economic activity	Lecture Abstracting Bibliography The method of developing cooperation Project work	Test, Problem solving Writing an article Kotantest
PO9	Observes the principles of quantitative assessment of environmental	Lecture	Test,

	risk, presents modern methods of forecasting the development and assessment of the consequences of accidents and emergencies, prevention of environmental pollution and elimination of the consequences of accidents and disasters	Diagramming Research work of students Preparing and conducting a questionnaire	Independent work Task solution Laboratory workshop
PO10	Develops programs to develop the technological and economic basis for a sustainable integrated energy system, justifies modern technologies for efficient alternative energy production, regulates the load on the environment, assesses and calculates the impact of harmful influences	Lecture Take notes Discussion Observation Preparing and conducting a questionnaire	Test, Presentation Project defense Context task
PO11	Summarizes the main anthropogenic-caused negative processes in various environmental objects and ecosystems, the principles and methods of protecting flora and fauna, preserving their biodiversity and productivity, organizes and controls the waste management system at a particular facility	Lecture Thesis Educational laboratory experiment study tour	Test, Problem solving Laboratory workshop Kotatotest
PO12	Complies with the principles of green investment and responsible financing and conducts an economic assessment of eco-technologies using technical means of information processing and modern software products	Lecture Drawing up a matrix of ideas Case Study business game Building analytical models in SmartPLS and STATA programs	Test, Independent work Article writing Context task
PO13	Complies with the development trends of the "green" economy, takes measures to implement the principles of sustainable development, justifies the use of methods for assessing the anthropogenic impact on the environment	Lecture Peer review "Round table" Observation	Test, Problem solving Presentation preparation Katanotest Making a geo-information model of the natural-production complex of the regional or inter-branch level
PO14	Develops plans for the activities of the enterprise, taking into account eco-compatible criteria, creates innovative business models of an ecophilic profile	Lecture Moot Debate Case execution Method of developing cooperation	Test, Project Protection Context task Presentation of the innovative business model of the eco-field profile

## Criteria for assessing the achievability of learning outcomes

Codes of LO	Criteria
LO 1	<b>Knows:</b> the main epistemological models, the nature of transformations of the concept of rationality; forms and methods of scientific, scientific and extra-scientific cognition, modern approaches to socio-humanitarian and natural science knowledge and their commensurability
	<b>Can:</b> formulate and solve problems that arise in the course of research activities and require in-depth professional knowledge; choose the necessary research methods, modify existing and develop new methods based on the tasks of a specific study; analyze and comprehend the realities of modern theory and practice based on the methodology of socio-humanitarian and natural science knowledge
	<b>Owens:</b> skills of conducting independent research and scientific and pedagogical activities that require a broad multidisciplinary education; the ability to apply methodological and methodological knowledge in conducting scientific research, pedagogical and educational work; writing scientific articles, theses, speeches at conferences, symposiums, round tables, discussions and debates
LO 2	<b>Knows:</b> the main provisions of the content of higher education, modern didactic concepts in higher education; features of the design and organization of the pedagogical process at the university, modern educational technologies; fundamentals of pedagogical skills and pedagogical techniques, management in education, management of the process of formation and development of the personality of students
	<b>Can:</b> formulate and solve problems arising in the pedagogical process and requiring in-depth pedagogical knowledge; analyze and comprehend the realities of modern theory and practice of higher education; diagnose and advise students taking into account the profile of future professional activity
	<b>Owens:</b> skills of conducting independent research and scientific and pedagogical activities that require a broad multidisciplinary education; the ability to apply methodological and methodological knowledge in conducting scientific research, educational and educational work
LO 3	<b>Knows:</b> the main provisions and features of the activity of a practical psychologist in the field of management activities; methods and techniques for improving the effectiveness of the organization
	<b>Can:</b> formulate and solve problems arising in management activities, apply knowledge in the field of theory and practice of organizing potential opportunities in the organizational sphere
	<b>Owens:</b> skills of working with participants of the conflicting parties, the organizational system, providing them with psychological assistance in the management sphere; communication skills for solving problems in the field of management psychology
LO 4	<b>Knows:</b> foreign language to the extent necessary to obtain professional information from foreign sources and elementary communication at the general and professional level; general, business and professional vocabulary of a foreign language to the extent necessary for communication, reading and translation (with a dictionary) of foreign-language texts of professional orientation; basic grammatical structures of literary and spoken language
	<b>Can:</b> use a foreign language in interpersonal communication and professional activity; freely and adequately express their thoughts in conversation and understand the interlocutor's speech in a foreign language; conduct written communication in a foreign language, compose business letters; apply methods and means of cognition for intellectual development, improving cultural level, professional competence
	<b>Owens:</b> skills of expressing their thoughts and opinions in interpersonal, business and professional communication in a foreign language; various skills of speech activity (reading, writing, speaking, listening) in a foreign language
LO 5	<b>Knows:</b> a system of relations between market institutions and mechanisms of social regulation and stimulation of the development of science, education, high technologies, nanotechnology; functions and tasks of managing the processes of commercialization of the results of scientific and scientific-technical activities
	<b>Can:</b> formulate the process of commercialization of scientific and scientific-technical research in order to determine the problem points of turning scientific results into an intellectual product
	<b>Owens:</b> the skills of implementing a set of organizational, technical and economic measures to address the issues of commercialization of

	the results of scientific and scientific-technical activities
LO 6	<b>Knows:</b> the essence of the concepts of "green development" and "green growth", the main directions of transition to green growth; tools and mechanisms for managing green development; the best advanced foreign practices of using green technologies and developing the principles of green development; general patterns of post-industrial technologies, resource conservation, energy conservation and energy efficiency
	<b>Can:</b> identify and substantiate the political, legal, economic, social and environmental prerequisites for green development; characterize possible benefits and negative consequences; develop effective measures to implement the principles of green economic development and ensure green growth; analyze information on the financing of environmental programs and the activities of international organizations to coordinate international environmental conservation
	<b>Owns:</b> skills of independent development of new knowledge in the field of green development; substantiation of the basic principles and mechanisms of green development management; application of modern methods for the analysis of the main parameters of green development of the national economy
LO 7	<b>Knows:</b> methodological foundations of biological monitoring of the state of the environment
	<b>Can:</b> to assess the state of biota using biotic characteristics, prospects for the development and use of biological monitoring
	<b>Owns:</b> methods, techniques of collection, processing and analysis of laboratory and field research in the field of biomonitoring
LO 8	<b>Knows:</b> theoretical foundations of circular economy, general and special provisions of various concepts, international framework documents in the field of green and circular economy; methodology of a systematic approach in the study of open complex systems "man-nature", institutional theory in the formation of circular economy; economic-mathematical and econometric research methods to assess the level of circularity of the economy and a particular type of activity
	<b>Can:</b> analyze statistical data in the field of scientific and technological progress and innovative development, including patent databases characterizing the level of resource efficiency and environmental friendliness of the country's economy in the current and long-term period; conduct comparative studies of data on the circular economy (waste - recycling, environmental pollution, the level of recycling of consumer goods) in international statistical databases and Kazakhstan; substantiate proposals to stimulate the spread of business models that reduce pollution and rationalize consumption by minimizing the use of non-reproducible natural resources
	<b>Owns:</b> skills in the application of software methods for analyzing specific situations and business models from the standpoint of circular economy, the development of provisions of the regulatory framework for the administration and stimulation of the cyclical economy, the use of economic and mathematical methods to substantiate innovative projects of a resource-saving nature
LO 9	<b>Knows:</b> the main directions and measures for reducing environmental risks from environmental pollution
	<b>Can:</b> to analyze and assess the environmental risk of man-made impacts on biological systems
	<b>Owns:</b> methods of quantitative assessment of the impact of man-made systems on the environment and humans
LO 10	<b>Knows:</b> modern global and regional environmental problems, advanced experience of energy-saving technologies, regulatory documentation on design, environmental protection, rational use of natural resources, environmental safety
	<b>Can:</b> prepare scientific and technical projects and reports in the field of environmental regulation and standards, the use of renewable energy sources
	<b>Owns:</b> methods of drawing up schemes of installations for the use of renewable energy sources, an environmental impact management system and environmental quality control
LO 11	<b>Knows:</b> modern trends and trends in the development of environmental protection activities, anthropogenic-caused negative processes in various environmental objects and methods of their protection
	<b>Can:</b> to carry out analytical and research work in the field of waste management and methods of their prevention, to apply resource-saving technologies for assessment in the framework of environmental measures
	<b>Owns:</b> environmental policy in the field of environmental protection, methods of control and ensuring the effectiveness of the use of low-waste technologies in production

<b>LO 12</b>	<b>Knows:</b> methodological foundations, approaches and methods of economic assessment of eco-technologies and green projects; basic principles of project management in relation to the tasks of ecological economics; approaches to the development and regulation of "green" financing based on international experience; opportunities of the public sector in promoting the development of the market of "green" financing; organizational structure, methods of financing, resource provision, geographical and sectoral placement of green investments
	<b>Can:</b> collect and analyze the information necessary for the economic assessment of green projects; apply various approaches and methods of economic assessment; identify and evaluate sources and schemes of financing green projects; justify the economic efficiency of reorientation of investment flows from projects and sectors of the economy contributing to environmental pollution in "green" projects and sectors of the economy, as well as in the restoration environmental protection; apply international standards for the issuance and circulation of "green" bonds
	<b>Owens:</b> skills of using knowledge for the purpose of making informed management decisions; analyzing the effectiveness and risk of green projects; calculating the financial indicators of a green project, discounting cash flows; forming comparable non-financial information acceptable for disclosure on projects implemented within the framework of responsible financing
<b>LO 13</b>	<b>Knows:</b> anthropogenic-caused negative processes in various environmental objects, the concept of a green green economy and ecology at the present stage, environmental priorities for sustainable development
	<b>Can:</b> substantiate approaches to solving and managing environmental problems in the context of sustainable development, analyze and evaluate environmental management strategies
	<b>Owens:</b> innovative energy- and resource-saving technologies for the restoration and rehabilitation of disturbed territories
<b>LO 14</b>	<b>Knows:</b> conceptual foundations of strategic analysis of enterprise development taking into account regulatory and legal criteria; theoretical foundations of risk management and technologies for predicting, neutralizing and compensating environmental risks of the enterprise; international standards of environmental management and environmental risk management techniques; content and interrelation of the main elements of the strategic analysis and planning process; technologies and procedures of environmental audit, environmental expertise, environmental insurance; fundamentals of occupational safety and health at the enterprise and in the context of environmental standards; theoretical concepts of the company's competitiveness, the typology of innovations and their role in creating competitive advantages of the company, ecophilic production, national innovation systems and their role in promoting ecophilic production
	<b>Can:</b> analyze and evaluate business development strategies, methods of their development; apply economic and mathematical methods and econometric models to assess and predict development; create innovative ecophilic business models using the business model navigator
	<b>Owens:</b> skills to systematize economic, technological and marketing information, generalization and results of the analytical stage, application of methods of design and recombination of the model of ecophilic productions, products, services

**Graduate Attributes**

- High professionalism in economics and business
- Emotional intelligence
- Adaptability to global challenges
- Leadership
- Entrepreneurial thinking
- Global citizenship
- Understanding the importance of principles and culture of academic integrity

**Model of a graduate of an educational program**

Types of competencies	Competency description
1. Softskills	Ability to think abstractly, analyze, synthesize Ability to improve and develop his intellectual and cultural level Willingness to act in unusual situations, bear social and ethical responsibility for decisions made Ability to independently acquire and use in practice new knowledge and skills, including new areas of knowledge, not directly related to the field of activity Ability to independently master new methods of research, to change the scientific and scientific-production profile of his professional activity
2. Digital skills:	Ability to develop scientific and innovative projects within the green economy and effectively commercialize them in accordance with current legislation Ability to justify the political, legal, economic, social and environmental prerequisites of green development of national and world economy and apply in practice its principles and methods
3. Hardskills	Ability to carry out biological monitoring of the state of the environment by modern methods of biotesting of natural and anthropogenically transformed ecosystems Analyzes the level of resource efficiency, ecological consequences of economic and life-supporting processes in the economy, assesses the economic benefits of an individual firm from the implementation of circular economy Analyzes and evaluates the state of the natural environment, the main factors of environmental crisis situations and the level of technogenic load to ensure environmental safety, is able to make prompt and competent decisions on environmental risk management, systematic minimization of technogenic impact and risks of incidents and accidents Able to summarize advanced achievements and current trends of development in the field of ecology and green energy, analyze and apply developments in clean and efficient energy within the framework of sustainable development goals, develop norms and standards for environmental impact assessment Ability to analyze and assess the state of the environment in urbanized areas Analyzes modern trends and tendencies of development of environmental protection activities, is able to apply modern methods of waste management, forecast environmental risks in waste management, develops measures to protect the environment and ensure environmental safety Ability to identify green investments and responsible financing and conduct economic evaluation of eco-technologies

Ability to justify technical and motivational measures to formulate environmental policy and save resources, analyze approaches to solving and managing environmental problems in the context of sustainable development  
Ability to carry out strategic analysis to design a development plan for an eco-enterprise, justify the innovation potential of a business model based on ecophilic design principles

**Compliers:**

Working Group Members:

Head of the Department of Economics and International Business, PhD, Associate Professor,

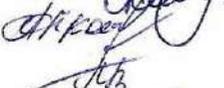
Head of the Department of Physiology, Candidate of Biological Sciences, assistant professor

Ph.D. in Economics, Professor

Candidate of Economics, Associate Professor

Candidate of Biological Sciences, Professor

Graduate student

 Zh.M.Zhartay  
 G.Zh. Mukasheva  
 T.P. Pritvorova  
 M.K. Asanova  
 A.M. Aitkulov  
 Zh.S. Ashirbekova

**Note:**

The educational program was reviewed and recommended at the faculty council from 15.03.2023 Protocol № 8

The educational program was considered at the meeting of the SMC and recommended for approval from 28.04.2023 Protocol № 5

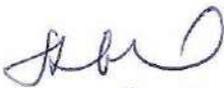
The educational program was reviewed and approved at a meeting of the Academic Council from 30.05.2023 Protocol № 12

Member of the Board, Vice-Rector for Academic Affairs

Acting Director of the Academic Work Department

Dean of the economic faculty

Dean of the Faculty of Biology and Geography

  T.Z.Zhusipbek  
 S.A.Smailova  
Zh.S. Khussainova  
S.A. Talzhanov

## EDUCATIONAL PROGRAM DEVELOPMENT PLAN

### 7M06102 – ECOLOGICAL ANALYTICS AND BIOECONOMY

The purpose of the Plan is to contribute to improving the quality of the conditions for the implementation of the educational program, taking into account the current requirements of the labor market and the achievements of modern science.

#### Target indicators:

№	Indicators	Unit of measurement	2022-2023 (in fact)	2023-2024 (plan)	2024-2025 (plan)	2025-2026 (plan)
<b>1</b>	<b>Human resources development</b>					
1.1	Increase in the number of teachers with academic degrees	Number of people	19	-1	-1	+1
1.2	Advanced training in the teaching profile	Number of people	15	-1	-1	+1
1.3	Involvement of practitioners in teaching	Number of people	7	-1	-1	-1
<b>2</b>	<b>Promotion of the EP in the ratings</b>					
2.1	IQAA	Position	-	3	2	1
2.2	IAAR	Position	6	5	4	3
2.3	Atameken	Position	-	-	-	-
<b>3.</b>	<b>Development of educational and scientific-methodical literature, electronic resources</b>					
3.1	Textbooks	Number	-	1	1	2
3.2	Training manuals	Number	2	3	4	5
3.3	Methodological recommendations/instructions	Number	1	1	2	2
3.4	Electronic textbook	Number	2	3	4	5
3.5	Video/audio lectures	Number	1	1	2	2
<b>4.</b>	<b>Development of educational and laboratory facilities</b>	Number				
4.1	Purchase of software products	Number	1	2	2	2
4.2	Purchase of equipment	Number	2	2	3	3
<b>5.</b>	<b>Updating the content of the EP</b>					
5.1	Updating the learning outcomes and the list of disciplines taking into account the requirements of the labor market, scientific achievements, professional standards	Year			-	
5.2	Introduction to the EP of academic disciplines in foreign languages*	Year		-		
5.3	Introduction of new teaching methods	Year			-	

Head of the Department of Economics and International Business



Zh. Zhartay