Confirm
Dean of Forestry,
Wildlife and Environment Faculty
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For students in the direction of preparation 6B052 "Environment"
Brief description of the elective disciplines of the educational program

№	Name of EP	Discipline cycle	Name of the discipline	Number of loans	Trimester	Summary of discipline (topic names)	Learning outcomes of discipline	Prerequisites	Post requisites
	Бакалавриат								
1.	«Agroecology»	BD	Ecological aspects of natural science	5	3,4	A systematic approach to the study of biological, chemical, physical ecology. Objects of the material world and fundamental interactions. Science and its methodology. The origin of scientific knowledge: a materialistic and idealistic worldview. He studies the basic principles of the evolution of life. Human evolution: skilled person, upright person, intelligent person, modern person. Biological patterns and their functioning and sustainable development. Types of terrestrial and aquatic ecosystems. Chemical ecology: the dual role of the chemical industry in the nature – production system. Chemical ecology and environmental problems. Chemical ecology of the atmosphere, hydrosphere, lithosphere. Biogeochemical cycles of the most important elements. Chemistry of pollutants in the environment and methods for their separation, purification and control.	Know: to assess the possible changes in nature or their consequences from the standpoint of the need to ensure and maintain a healthy ecological environment within the boundaries of a particular geographical system. To analyze environmental objects and methods of protecting the environment from pollution. Able to argue the introduction of new technological processes in accordance with environmental safety requirements. Recognize the social significance of their future profession, have a high motivation to carry out professional activities. Master: analyze natural science methods in human areas of activity, problems using theoretical and practical knowledge; Demonstrate knowledge and understanding in the field of study, including elements of the most advanced knowledge in the field	School Biology Course	Landscape ecology and ecosystems
2.		BD	Generalchemistry	5	5	The chemical basis for the conversion of pollutants in the environment. Introduction to environmental chemistry. The relationship of environmental chemistry with other scientific disciplines. The chemical basis of environmental interactions. Chemical environmental factor. Ecological properties of chemical elements and their compounds. General characteristics of pollutants. The concept of maximum permissible concentration (MPC). Characterization of s-elements, p-elements, d-elements and	Have an idea of the volume of emissions of pollutants of anthropogenic origin; predicting possible changes in the biosphere under the influence of human activities. To know and understand the content of chemical elements in nature; basic characteristics of the atmosphere, hydrosphere and lithosphere; the spread of	School chemistry, General ecology	Ecological Monitoring, Ecologicalal, Hygie

						f-elements. Heavy metals are toxicants in the environment. Release into the environment, forms of existence, transformation in aquatic ecosystems. Toxic effect on living organisms. Major organic pollutants. General characteristics. The relationship of the toxic properties of organic substances and their composition and structure. Hydrocarbons and halogen derivatives. Amines. Nitro compounds. Persistent organic pollutants. Sources of organic pollutants in the environment. Toxic effect. Ecological chemistry and atmospheric problems. Chemistry of the upper atmosphere and the problems of their pollution. Chemistry of the lower atmosphere and its pollution. Ecological chemistry and hydrosphere problems. The chemical composition of natural waters. Problems of water treatment and water treatment. Chemical pollution of natural waters. The main classes of pollutants. Ecological chemistry and problems of the lithosphere. Chemistry of soil composition. The main soil pollutants. Pollution analysis methods and environmental monitoring. Modern analytical methods for determining elements in environmental objects. Environmental monitoring. Priority controlled environmental parameters. Ecological monitoring of the state of the environment. The concept and structure of the monitoring system, the principles of its functioning. The main tasks of environmental and analytical monitoring.	chemical pollutants in the biosphere; the effect of chemical pollutants on all living things. To be able to distinguish between natural and man-made sources of chemical pollution; evaluate the effect of chemical pollutants on the biosphere and its components; to take and prepare samples for analysis to perform quantitative chemical analysis in natural objects. To gain practical skills in the selection and preparation of samples for analysis; performing quantitative chemical analysis in natural objects.		ne Rationing and Expertise in Agriculture
3.		BD	Livestock processing technology	5	5	Livestock production technology. Horse breeding production technology. Camel production technology. Technology of production of sheep and goats. Pig production technology. Technology for the production of poultry products. Technology for the production of beekeeping, fish farming and rabbit farming.	To know and understand the biological characteristics and economically useful traits of agricultural animals; breeding and feeding methods for agricultural animals; technological parameters of the content of agricultural animals; methods of keeping and rational feeding of agricultural animals; reproduction methods of agricultural animals; be able to draw up a plan for breeding and breeding work with agricultural animals; own methods of selection and selection of agricultural animals; compile reports on livestock, products and feed accounting; analyze the milk and meat productivity of the herd; plan the production of milk and beef; own technological methods for the production of milk, meat, wool, eggs. To own technologies for the production of milk and dairy products, meat and meat products and eggs and egg products.	General Ecology	Methods of processing and recycling agricultural waste

4.		BD	Sustainability and Agroecosystem Management	5	7	Own methods of analyzing ecological processes in agroecosystems, setting specific tasks and priorities for protecting the environment and society, knowledge on the laws of development of the biosphere and the conditions of anthropogenic and technogenic impact on nature and the agricultural sector; To be able to analyze the processes occurring in the components of the biosphere, agricultural sector and use the methods of detection and quantification of the main pollutants in the environment, to develop environmental measures for sustainable development and management of agroecosystems.	Sustainable development and management of agroecosystems, the nature and specificity of methods for analysis, assessment and prediction of pollution in the agricultural sector. Features of the organization of monitoring of different hierarchical levels. Methodology for organizing the collection of environmental information for a comprehensive assessment of pollution in the agricultural sector. Determination of the degree of anthropogenic and technogenic impact on the environment. Determining the quality of the natural environment at the local, regional and global levels. Interpretation of information data using modern information systems for predicting environmental pollution with the goal of sustainable development and management of agroecosystems, rational nature management and environmental safety.	General Ecology	Pregraduation practice
5.		BD	Geoecology	5	9	Theoretical and methodological foundations of geoecology, environmental properties of the environment and anthropogenesis of the region; ecosystem productivity and dynamics, degree of ecological sustainability of ecosystems. Geoecological zoning, patterns of geoecological differentiation of the region. Achieving high quality information on geo-ecological systems. The final stages of environmental education, knowledge of the geoecological state and patterns of spatial differentiation of natural and technical geosystems, assessment of the prospects for the development of regional geoecological situations	As a result of studying the discipline, the student should know: the basics of geoecology, the features of regional geoecology, the spatial organization of natural and technical geosystems, the possibility of human adaptation to the conditions of existence in destabilized geosystems, the geoecological principles of design. To be able to: assess the geo-ecological situation, use the basic methods of geo-ecological assessments of the state parameters of natural-technical geosystems, acquire practical skills to solve regional geo-ecological problems in the socio-economic, political and legal fields.	General ecology, General chemistry	Environmental monitoring, Ecological, hygienic regulation and expertise in agriculture

6.		BD	Ecological safety of agricultural products	5	8	Various pollutants of environmental objects (water, air and soil) and their impact on agricultural products. Features of the organization of environmental monitoring of different hierarchical levels. Methodology for organizing the collection of information for a comprehensive assessment of agricultural pollution. Assessment of the degree of anthropogenic impact on agricultural territories. Interpretation of information data and organization of forecasting pollution of agricultural land territories to ensure food and environmental safety.	To study the theoretical aspects and identify the nature of the pollution of agricultural land located near the agricultural sector. Own methods of analysis of the assessment of environmental objects (water, air, soil) of agricultural land located near the agricultural sector. To be able to analyze the processes occurring in the components of the biosphere. Use methods for the detection and quantification of major agricultural pollutants. To be able to practically apply knowledge on agroecological monitoring to assess the quality of the natural environment to predict changes in environmental sustainability to anthropogenic and technogenic effects..	General ecology, General chemistry	Ecological monitoring, Ecological, Hygienic Rationing and Expertise in Agriculture
7.		BD	Integrated water resources management	5	8	The composition and structure of the hydrosphere. The value of the hydrosphere. The value of the oceans. Fresh water distribution. The formation of the chemical composition of natural waters. The state of water use by sectors of the economy in the world and Kazakhstan. Problems of anthropogenic pollution of the hydrosphere. Use and protection of water resources of the Republic of Kazakhstan. Prospects for sustainable water supply. Water quality and water uses. Classification of water treatment methods. The legal basis for the use of water resources of the Republic of Kazakhstan. Tasks and principles of water legislation of the Republic of Kazakhstan.	Know: the importance and functions of the hydrosphere, the distribution of fresh water on Earth, the chemical composition and structure of natural waters, the problems and sources of anthropogenic pollution of water resources, international water quality standards, the principles of environmental monitoring of surface waters in the Republic of Kazakhstan, methods of treating natural and waste waters and types of treatment facilities, the legislative framework for the protection and rational use of water resources, standards for the quality of natural waters, effective methods for treating industrial and waste water to comply with established of established environmental standards. To be able to: draw conclusions about the state and methods of protecting water resources, operate on acquired knowledge and apply them in the process of professional activity, determine substances that pollute natural waters. Own: methods for determining the composition and properties of natural and wastewater, rules for standardizing water quality and water consumption	General Ecology, Green Economy and Climate Change	Organic farming, Economy of nature using
8.		BD	Ecological methods of	5	9	Introduction to environmental analysis methods. Methods of controlling the degree of environmental pollution. Methods for	To have an idea of each the features of each method, the intricacies of the	General	Environment

			analysis in the agricultural sector			determining the quality of agricultural and industrial products. Modern physicochemical methods. General characteristics of environmental analysis methods in the agricultural sector. Optical analysis methods. Absorption spectroscopy. Refractometric and polarimetric methods of analysis. Emission spectral analysis. Conductometry. Potentiometry Coulometry Polarography. Chromatography.	operation of modern devices, for which it is necessary to know the device structure and the principles of their operation. To know and understand the basics of qualitative and quantitative analysis, natural and human impacts on the environment of the agricultural sector. To be able to conduct laboratory experiments with environmental objects, for which you need to master the instrumental methods of analysis. To acquire practical skills in the preparation of solutions of acids, salts and alkalis, the selection and preparation of samples for analysis; perform quantitative chemical analysis.	ecology, General chemistry	al monitoring, Ecological, hygienic rationing and expertise in agriculture
9.		BD	GIS technology in agriculture	5	10	Introduction to GIS technology. GIS and agriculture. The basics of cartography. Maps and agroecology. Volumes and variety of cartographic products. Large-scale and small-scale maps. Thematic cartographic materials. Remote shooting. Modern directions of ecological and geographical research for the agricultural sector. Agroecotourism and cartographic training.	As a result of studying the discipline, students should know the features and specifics of the main cartographic projections and distortions characteristic of small-scale ecological and geographical maps. Features of the creation and use of environmental maps. To be able to apply methods of studying and using ecological-geographical maps. Perform basic cartometric and graphical work on cards. Build and analyze plans, profiles, cartographic grids and maps using various construction methods. Own methods of processing, analysis and synthesis of field and laboratory environmental information and use theoretical knowledge in practice.	General ecology	Ecological, hygienic rationing and expertise in agriculture, Methods of processing and recycling agricultural waste
10.		BD	Protection and rational use in biological resources of rural areas	5	8	The phenomenon of biodiversity, species richness and factors of its formation. The concept of biodiversity and its interpretation. Modern views on biological diversity. Convention on Biological Diversity. Modern areas of research on the assessment, conservation of biological diversity. The concept of a systematic approach to the study of the organization of living. Levels of biological systems: species - population - ecosystem - biome. The idea of the interconnectedness and interaction of living systems at different levels. Genetic diversity. View as a universal biodiversity unit. Species diversity. Ecosystem diversity. Aspects of biodiversity conservation. Tasks in the field of biodiversity	As a result, the student must: know: - about the terminological apparatus and the basic concepts of discipline; - theoretical and methodological foundations of resource science; - main groups, types of agricultural resources (economically useful plants, mushrooms, animals); - synanthropic plant bioresources of Kazakhstan;	General ecology, Ecology of plants, animals and micro organi	Economy of nature using, Environmental Laws and Documentat

						conservation. The concept of agrobiodiversity. Cartagena Protocol on Biosafety. Nagoya Protocol. Man-made biodiversity. Ex situ and in situ conservation. Centers of origin of crops. Food Security and Agrobiodiversity of Kazakhstan. Sustainable agrobiodiversity under climate change. Strengthening human and technical capacity to preserve valuable agrobiodiversity. Monitoring as a system for obtaining information on the state of biodiversity in all its manifestations in order to assess its change. Biodiversity monitoring as part of environmental monitoring. Key Trends in Biodiversity.	- measures for the conservation and rational use of agricultural resources of Kazakhstan; be able to: - correctly apply the basic terms and concepts; assess the status and dynamics of biodiversity, predict changes in diversity under the influence of natural and man-made factors; - determine and justify operating standards for various groups of plant and animal resources, measures for environmental optimization of sustainable use of natural resources; - apply modern experimental methods of working with agrobiological objects in the field and laboratory conditions. own: - independently determine the types of agricultural resources of the area: - carry out the counting of plants and animals of agricultural significance. - methods of analysis and assessment of biodiversity at different levels of the organization of the biosphere; methods for monitoring and protecting biodiversity; own methods of search and exchange of information in global and local computer networks.	sms	ion in Agriculture
11.		BD	Ecology of plants, animals and microorganisms	7	6	The history of the study of ecologists of plants, animals and microorganisms. The main methods for studying the ecology of plants, animals and microorganisms. Ecological classifications of organisms. Life form of plants, animals and microorganisms. General issues of the stability of organisms. Some patterns of environmental factors. The body's defensive reaction against stressors. Light as an environmental factor. Lighting mode. Quantitative and qualitative characteristics of lighting accepted by organisms. Ecological groups of plants in relation to light. Anatomical and morphological characteristics of plants in relation to light. The influence of light on the structure, growth, development, photosynthesis, transpiration of plants. Ecological groups of animals in relation to light. Photoperiodism and its environmental significance. Heat as an environmental factor. The temperature regime of the habitat. The effect of temperature on the vital functions (growth, development, photosynthesis, respiration, transpiration) of plants. Ecological plant groups according to Ellenberg. The effect of temperature on the livelihoods of animals.	The student must know: - the place and role of the ecology of plants, animals and microorganisms, as a science; - resistance to exposure to plants, animals and microorganisms to the effects of adverse factors; - temperature, light, air, water, soil, biotic and anthropogenic factors as an environmental factor affecting plants, animals and microorganisms; - Features and patterns of distribution of plants, animals and microorganisms; - the use and diversity of resources of the plant, animal world and microorganisms. be able to: - understand the mechanisms of the influence of environmental factors on	General ecology	Ecological biogeography

						Ecological groups of animals in relation to temperature. Poikilothermic and homeothermic organisms. Adaptation of plants, animals and microorganisms to extreme temperatures. The rules of K. Bergman and D. Allen. Water as an environmental factor. The main properties of the aquatic environment. Morphological, anatomical and physiological adaptation of plants to water deficiency. Ecological groups of plants in relation to humidity. The environmental significance of transpiration. Factors affecting transpiration. Ecological groups, adaptive features of aquatic organisms. Air as an environmental factor. Environmental values of oxygen and carbon dioxide. The effect of pollution on plants. Assessment of pollution by vegetation. Anemophilia, anemochoria, draining by the wind, mechanical injuries. Methods of movement of animals in the air and in the soil. Soil as an environmental factor. The main properties and ecological significance of the soil. Ecological groups of plants in relation to soil pH. Salinization of the soil. Psammophytes and lithophytes. Methods of movement of soil organisms. The spread of microorganisms. The importance of microorganisms in ecosystems. Biological rhythms of organisms. Inner and outer loops. Daily, seasonal rhythms and rhythms of ebb and flow. Biotic environmental factors. The relationship of organisms in the biocenosis. Ecological niche. Gause principle. Ecological succession. Anthropogenic environmental factors. Anthropogenic habitat change. Features of agrocenoses and ruderal communities.	plants, animals and microorganisms; - understand the processes of interaction of organisms with each other; - determine the necessary resources and conditions for the comfortable functioning of living organisms; - collect, process and interpret using modern technologies the data necessary for understanding the discipline being studied. own: - methods of searching for information in the field of ecology of plants, animals and microorganisms; - skills of a meaningful discussion of the problems that are reflected in this discipline; - the skills of students to form ideas about the processes of interaction of organisms with each other and with the environment; - skills of using theoretical and practical knowledge on the ecology of plants, animals and microorganisms in professional activities.		
12.		PD	Rational nature management in agriculture	5	8	Types of nature management. Resource, sectoral and territorial use of natural resources, the basics of resource use of natural resources: the natural resource and ecological-economic potential of the Earth. Principles of environmental management. The natural environment of human society and its natural potential. The concept of natural capital as a set of natural values, its relative limitations. Natural limitations of development strategies. Global environmental problems in the socio-economic aspect. Criteria for assessing the state and sustainability of natural and natural-technogenic systems. The role of natural factors in the formation of national wealth. Natural resource potential of the territory and its use. Specially protected natural areas. Resources: climatic, mineral, water, land, forest, biological. Land resources, features of the use of land for various purposes, agricultural land. Water resources and water use. Prospects for rational water use. State system for monitoring natural resources, cadastres. Methodology for monitoring and compiling a cadastre of land resources. State monitoring of water bodies. Sectors of the economy as nature users. Features of nature management in the sectors of mining and industrial, productive nature management and land use. Features of agricultural nature management, water consumption of crops. Features of commercial,	As a result, the student must: know: - provisions of the concept of sustainable environmental and economic development; problems associated with changes in the state of the environment and using the natural resource potential of the territory; - nature management in various sectors of the economy and related environmental problems; the composition of environmental waste and methods for their disposal; methods of wastewater treatment and protection of atmospheric air from pollution, used abroad and in our country, be able to: - freely use scientific and reference literature; - use regulatory literature in the field of environmental management.	General ecology, Ecology of plants, animals and micro organisms	Economy of nature using, Environmental Laws and Documentation in Agriculture

						recreational, urban nature management. Features of environmental management in the transport industry. Environmental reporting in enterprises. Ecological passport. Classification of environmental waste. Criteria for classifying waste as hazard class. The scale of waste generation and accumulation. General concept of the economic mechanism of environmental management and its tools. Economic instruments for environmental protection and nature management. The problem of the correlation of economic and policy instruments in environmental management and its solution in the countries of the world. Eco-restructuring and environmental modernization of production. International relations in the field of environmental management and environmental protection. The participation of countries in global environmental programs.	- calculate the concentration of pollutants at the border of the sanitary protection zone of the enterprise and the volume of maximum permissible emissions; own: - skills of compiling an environmental passport of the enterprise		
13.		PD	Fundamentals of agribusiness and entrepreneurship	5	11	Organizational and economic foundations of the peasant farm or FH farm, joint-stock company, cooperatives, LLP. Organization and regulation of labor in the enterprise. Organization of remuneration. Organization of production in the main sectors of crop production. Organization of the production and use of feed. Organization of cattle breeding. Organization of the machine-tractor fleet. Organization of processing agricultural products. Organization of product sales. State support for the agro-industrial complex. Entrepreneurship: concept, essence, basic types and organizational forms. Resource potential of an organization (firm). Rationing and remuneration. Costs and financial performance of the organization (company). Economic efficiency of the organization (company) and entrepreneurial projects. Marketing and organization management. State support for entrepreneurship and its infrastructure. Business Financing. Business planning in the system of entrepreneurial activity. Risks in entrepreneurial activity. Organization of business transactions. Responsibility of business entities. Risks in entrepreneurial activity. Entrepreneurial secret and ways to protect it. Termination of business.	On the basics of agribusiness, have an idea: the production technology of the main types of agricultural products; Means of mechanization of the main technological processes; methods of economic research, analysis approaches; regulatory framework for planning; supply and demand; competitiveness; financial security of the enterprise. know: the theoretical foundations and patterns of organization of production and enterprise management, the principles and methods of rational organization of production and management processes in the enterprise; be able to: carry out the design of the organization and production management system and organize the work of production teams; have skills: analysis of the state of development of agriculture, industries and enterprises; formulate conclusions and predict the development prospects of business entities in a market environment; identify socially significant problems in the development of agriculture; economic feasibility of effective projects. The purpose of studying the discipline "Economics of Entrepreneurship" is the formation of a complex of knowledge, skills, competencies required by a modern entrepreneur. As a result of studying the discipline,	General ecology	Pre-graduation practice

							the student must: have an idea: about the theoretical and methodological foundations of entrepreneurship; on the process of organizing entrepreneurial activities and evaluating its effectiveness; on state mechanisms for regulating and supporting the development of entrepreneurship. know: the mechanism of functioning of organizations (firms) of various legal forms; culture of contractual relations, entrepreneurial code of ethics; psychology of entrepreneurship, elements of business communication; reasons, factors and conditions for termination of business. be able to: organize a business and manage it; make decisions in the process of functioning of entrepreneurial activity, conclude agreements, make decisions on the organization and functioning of entrepreneurial activity; calculate the level of risk, assess the business activities, own: skills in applying various techniques and tools in a business management system; personnel assessment methods; risk management methods; methods for assessing the effectiveness of entrepreneurial activity.		
14.		PD	Economy of nature using	5	11	Introduction to environmental economics. Natural science and economic foundations of environmental economics. General characteristics of the natural resource potential of the Republic of Kazakhstan. The main environmental problems of the Republic of Kazakhstan. The content of existing economic mechanisms for environmental management. Problems and prospects of development of the environmental management system of the Republic of Kazakhstan. Environmental protection in the Republic of Kazakhstan. Natural resource potential of the Republic of Kazakhstan. Fuel and energy and mineral resources of the Republic of Kazakhstan. Effective ways of rational use of natural conditions and resources. Environmental protection and economics. Consideration of environmental, socio-economic consequences of the interaction of nature and society.	Have an idea of the negative effects caused by industrial enterprises. Ecologization of technological industrial enterprises, the use of knowledge gained in their activities. Assess the environmental status of industrial sites. Use the basic methods of environmental assessments of the state parameters of natural-technical systems. Carry out calculations and predict changes in environmental sustainability to anthropogenic impact. Ecology as a theoretical basis for nature conservation and rational nature management. To be able to analyze the processes occurring in the components of the biosphere; identify, identify and anticipate the negative impact caused by industrial enterprises; greening technological industrial enterprises.	General ecology	Methods of processing and recycling agricultural waste, Pre-graduation practice

							Fundamentals of nature management and environmental protection, methods of economic assessment of natural resources, basic concepts and categories of environmental economics. Comprehensive economic assessment of natural resources, taking into account environmental protection. Effective management of natural resources and the use of income from the primary sector of the Republic of Kazakhstan. The use of an integrated approach in the study of economic problems of environmental management.		

The catalog of elective disciplines was approved by the Council protocol of the Faculty of Forestry, Wildlife and Environment № 15

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