Sustainable development courses

№	Name of discipline	Short description of discipline
1	Acquaintance with Nature and Ecology	Purpose: Teaching the basics of knowledge about nature and ecology, and the methodology for the formation of biological and environmental knowledge of preschool children. Content: Fundamentals of knowledge about nature-forming components and their environmental problems and ecology. Acquaintance of preschoolers with nature, education of environmentalists and the formation of environmental knowledge. Modern environmental problems, state policy in the field of environmental development, structure, properties of plants, animals; components of inanimate nature, the formation of skills to solve modern environmental problems.
2	Ecology of Flora and Fauna	Purpose: Formation of knowledge about the main forms of relationships between plants and animals in biocenosis, about the regularities of the influence of environmental factors on plant and animal organisms. Content: History of ecological development of plants and animals as a science. The level of structure of various plants and animals (phytocenosis, population, biogeocenosis) found in nature. Laws of their adaptation to environmental conditions. Factors of the external environment, their classification. Basic concepts, concepts and ecological problems . Anthropogenic factors influencing the relationship of plants and animals with each other and with the environment.
3	Ecosophy and Foundations of Nature	Purpose: Formation of knowledge about ethno-ecological content, functions of ecosophy teaching. Content: Concept of content, functions of ecosophy teaching in the aspect of ethno-ecological content. The formation of the national code through the concepts of holiness and sacredness as a result of sensory perception of myths, legends, narratives and taboos about natural phenomena. The teaching of ecosophy. Ecosophy - education through the sacred essence of nature. Information about the characteristics of animals and plants in the form of legends. Providing information about living nature in the form of sacred myths and legends that enrich the creative abilities, needs, intelligence, creative talent of the child. Teaching the perception of organicity, harmony of nature, the need to care for living nature.
4	Geoecology and nature conservation	Purpose: formation of knowledge on the preservation or restoration of a favorable ecological state of natural and anthropogenic geosystems by studying the background of the environment, spatial ecology. Contents: Subject, goal and objectives, research methods and general structure of geoecology. Geoecology in the system of earth sciences. Theoretical and methodological foundations of geoecology. Human activity and the geosphere of the earth. Geoecological zoning of Kazakhstan. Regional environmental issues
5	Environmental problems of the Republic of Kazakhstan	Purpose: formation of knowledge about the environmental and environmental legislation of the Republic of Kazakhstan for solving environmental and environmental issues. Contents: Problems of ecology and environmental protection in Kazakhstan. Problems of climate change in the Republic of Kazakhstan at the present time. Atmospheric pollutants, radiation environment. General patterns and protective measures for forest damage. Measures for the effective protection of types of natural resources. Demographic situation and the concept of sustainable development of Kazakhstan
6	Geographical basic of	Purpose: formation of knowledge and ideas about modern trends in the

	sustainable development of Kazakhstan	sustainability of Kazakhstan. Contents: The concept of sustainable development of the world community, adopted as the basis for the development of modern society. The concept of the transition of the Republic of Kazakhstan to sustainable development. Geographical bases of sustainable development. Demographic crisis and sustainable development. Regional aspects of sustainable development. The role of the institutional factor in sustainable development. International aspects of sustainable development. Global changes on the globe.
7	Environmental problems of Physical Geography	Purpose: Formation of ideas about the theoretical and methodological foundations of the environmental conditions of environmental problems and the structure of physical geography in the system of Earth sciences. Contents: Human activity and the geosphere of the earth. Atmosphere, hydrosphere, lithosphere and biosphere, main sources of pollution, ways of solution and restoration. Regional environmental problems, changes in geosystems and their main characteristics. Regional environmental problems, general situation, radioactive contamination and sustainable development
8	Environmental technologies in urban planning	Concepts about ecological building technologies. Tasks and principles of ecological construction. Construction Materials. Ecological technologies and materials. Ecologization of industrial production. Classification of eco-technologies in construction according to various criteria. Ecological building materials and their production. Standards and environmental requirements in the construction of buildings. Ecological construction technologies. Ecovillages. Basic concepts and definitions. Ecovillage classification
9	Landscape organization of urban spaces	Purpose: Obtaining the skills of designing landscapes with a complex functional organization that meets modern requirements, with all the necessary infrastructure and taking into account the peculiarities of the urban planning situation of their placement. Content: the implementation of landscapes in a specific theme and style. Ethno style in urban space. Brief information about the stylistic features of various landscape areas. Principles, means, techniques and methods of organizing the spatial composition of the landscape, currently used.
10	Ecological Problems of the RK	The purpose of the discipline: formation of concepts about environmental protection legislation of the Republic of Kazakhstan to solve environmental and environmental problems. Content: problems of Ecology and environmental protection in Kazakhstan. Problems of climate change in the Republic of Kazakhstan. Atmospheric pollutants, 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.
11	Biological Ecology	The purpose of the discipline: the formation of knowledge about the laws of life of Biological and social ecosystems, the protection of the habitat, world and local environmental problems. Content: 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.
12	Resource-Saving Technologies in	Purpose: To study the basics of the organization of construction production, organizational and technological reliability of construction

	Construction	production management systems and automation of the management system in construction. Content: Methods of organization of construction production, organization of design and surveys, calendar and network planning systems.Managementin construction, the basics of in-line planning of construction facilities for industrial and residential-civil purposes.General principles of construction plans design.Organization of the operation of a fleet of construction machinery and transport in construction. Providing the construction of industrial and residential-civil facilities with material and technical resources. Construction quality management.Commissioning of buildings and structures.
13	Safety Regulations and Environmental Protection in Agriculture	Purpose: To master the rules of technical safety and environmental protection in the maintenance of agricultural machinery and equipment. Content: Preparation of agricultural machinery for work; the procedure for strict compliance with the requirements for specialists. Safety regulations in livestock buildings and warehouses. Sanitary and hygienic measures, environmental protection and safety measures at gas stations. Innovative technologies and equipment to maintain an optimal microclimate in livestock buildings.
14	Social Ecology in Mass media	The purpose of the discipline: analysis of materials covering environmental problems on the pages of the Kazakh press. Assimilation of unknown data and information about ecology by studying the discipline. The content of the discipline: forms a system of various works on ecology to preserve the stability of the biosphere, carries out work on the training of environmentally competent journalists.
15	Transport Ecology	Purpose: Formation of future specialists of the system of knowledge, allowing a creative and scientifically based approach to the processes of the impact of technical facilities on the environment. Contents: The impact of transport, transport facilities (car, road) and technologies on the environment. Physical and chemical processes in the impact of transport on the environment. Assessment of the environmental safety of motor vehicles, road transport complex and motor transport enterprises. Measures to reduce the negative impact of transport on the ecosystem as a whole.
16	Bases of Radiation Safety	Purpose: theoretical and practical training of students on radiation safety issues, ensuring of safe work with sources of ionizing radiation, their dosimetry and control. Basis of dosimetry of ionizing radiation, radiation safety. Content: General concepts of radioactivity. Dosimetry of ionizing radiation. Interaction of radioactive radiation with biological objects. Methods and devices for radiation monitoring. Protection against ionizing radiation. Ensuring radiation safety in case of working with sources of ionizing radiation.
17	Theoretical Bases and Pattems of Environmental Protection	Purpose: providing professional activities with basic knowledge, mastering the basic laws of engineering environmental protection, the characteristics of environmental pollution and the main methods of its protection. Content: General principles of intensification of technological processes of environmental protection. Protection from energy influences. Chemical processes of environmental gas emissions and liquid emissions. Hydromechanical clearing processes. Physical and chemical processes of environmental protection. Biochemical processes of environmental protection.
18	Environmental Engineering	Purpose: to form in students a systematic understanding of the

		theoretical foundations for the creation of resource-saving technologies, environmentally friendly industrial production, the implementation of engineering and environmental solutions for environmental management and environmental protection. Content: Design of technological processes for the purification of industrial emissions. Purification of gases in dry mechanical dust collectors. Filtration of gas through porous partitions. Purification of gases in electrostatic sedimentation tanks. Purification of gases in wet dust collectors. Hydromechanical methods of wastewater treatment.
19	Methods and Means of Control and Monitoring of Environment	Objective: to gain theoretical and practical knowledge about environmental and natural resources monitoring. Contents: Classification of measuring and control instruments. Types of methods and means of measurement and control. Standardization of metrological characteristics and accuracy classes of monitoring and measuring instruments, measurement errors and measuring devices. Verification of control and measurement tools. Requirements for the selection of exemplary measuring instruments for accuracy. Types of verifications. Carrying out and registration of the verification process.
20	Radiation Exposure of Animal	Purpose: Studying the issues of protection of animals and their offspring from the harmful effects of ionizing radiation on their health, issues of productivity, quality, safety of products obtained from them. Contents: Carrying out veterinary anti-radiation measures. Radiation safety of products of animal origin Radiometric and radiochemical examination of objects of veterinary supervision. Organization and introduction of animal husbandry in the territory contaminated with radionuclides and technology for processing livestock products.
21	Ecology of Water Resources	Purpose: to teach the skills of integrated ecological thinking and analysis of environmental problems of the aquatic environment, the formation of an ecological worldview, skills and abilities for professional activity from the standpoint of protection and rational use of water resources. Content: The concept of the ecology of water resources. Evaluates the concept of environmental problems of water resources. Sources of water pollution. Identification of the main pollutants entering the watercourses of reservoirs and basins. Knowledge of standards and criteria for assessing the quality of natural water; formation of water protection measures, technical and economic analysis and management of the water management complex, organization and enforcement of water legislation. Identifies the problems of the water ecology of the country and offers solutions.
22	Landscape-Ecological Melioration	Purpose: formation of knowledge about the structure of natural-territorial complexes, their activities, dynamics and evolution, acquaintance with natural and natural-anthropogenic landscapes, consideration of issues of landscape zoning of territories. Content: Considers the concept of economic use of natural landscapes. Classification of landscape lands. Theoretical substantiation of geoecology in the study of the relationship between society and nature; clarification of the object and subject of research; formation and unification of basic geological concepts and terms. Study of the scale and intensity of the impact of industrial and agricultural production on the structure of ranked geosystems; identification of the functional dependence of environmental changes under anthropogenic influence.
23	Innovative Water Treatment Technologies	Purpose: to instill knowledge in the field of innovative technologies of water treatment and wastewater treatment, which are characterized by

		lower energy consumption, high purification effect and allow to extract valuable components from wastewater. Content: Studies membrane methods of water purification. Technology of desalination and demineralization of water by reverse osmosis. Discussion of desalination of the Caspian Sea water by membrane methods. Nanofiltration of water. Removal of metal ions and surfactants from wastewater by membrane methods. Electrodialysis of water. Discussion on the intensification of membrane water purification processes. Disinfection of water with ozone, ultraviolet rays, ultrasound and sodium hypochlorite. Discussion on the comparison of the cost-effectiveness of disinfection methods. Artificial enrichment of groundwater reserves.
24	Protection of agricultural cultures against wreckers and diseases	Purpose: formation of students of the system of theoretical and practical knowledge on chemical and biological protection of agricultural plants against pests, diseases and weeds; use of modern chemical and biological means of protection, resistant varieties that effectively protect agricultural crops, maintain a satisfactory phytosanitary state of crops. Content: Studies the features of the structure and development of pests and diseases, relationships with the environment, harmfulness and types of damage to agricultural plants, including an economic assessment of crop losses. Knowledge of methods of integrated plant protection against the elimination or reduction of crop losses, caused by pests, spores of diseases inhabiting the soil. Forms skills of integrated protection of plants from pests and diseases, taking into account the established economic thresholds of harmfulness.
25	Ecological Bases Chemicalixation of Agriculture	Purpose:the formation of theoretical knowledge and practical skills in the effective use of chemicals in agriculture, as well as ways to reduce their possible negative impact on the environment Contents: Studies a balanced chemicalization of agriculture, ensuring the production of environmentally friendly products, by which it is proposed to understand products that have a high nutritional value that enhances health, does not contain toxic substances, does not have a carcinogenic, mutagenic or other adverse effect on the body human in the process of its consumption in increasing soil fertility, improving acidic and saline lands, maintaining and improving the nutritional value of feed. Receives skills in the production of environmentally friendly products.
26	Ecological mapping	Purpose: mastering the theoretical foundations and methods of carrying out soil-cartographic works of various scales and their practical use for various production purposes. Content: Studies soil and landscape mapping using GIS technologies, methods for assessing the current ecological state of the territory and agroecological safety of agricultural products. Forms the skills of geographical approaches in the main areas of environmental research using information technologies of various levels; the correctness of the compilation of ecological maps and cartographic methods in ecological and geographical scientific research.
27	Environmental technologies in urban planning	Concepts about ecological building technologies. Tasks and principles of ecological construction. Construction Materials. Ecological technologies and materials. Ecologization of industrial production. Classification of eco-technologies in construction according to various criteria. Ecological building materials and their production. Standards and environmental requirements in the construction of buildings.

		Ecological construction technologies. Ecovillages. Basic concepts and definitions. Ecovillage classification
28	Ecology of Water Resources	Purpose: Formation of ideas about biological processes and phenomena in terrestrial water bodies and their interaction with abiotic components of aquatic ecosystems. Content: training in the skills of integrated ecological thinking and analysis of environmental problems of the aquatic environment, the formation of an ecological worldview, skills and abilities for professional activity from the standpoint of protection and rational use of water resources. knowledge of standards and criteria for assessing the quality of natural waters; organization and monitoring of natural waters, water legislation, formation of technical and economic analysis and management of the water management complex, water protection measures.
29	Landscape Ecology	Purpose: to form knowledge about the structure of natural-territorial complexes,their functioning, dynamics and evolution,to get acquainted with natural and natural-anthropogenic landscapes, to consider the problems of landscape zoning of territories. Content: basic principles, criteria and parameters of environmental assessment of the landscape. Materials related to the selection and rationing of assessment indicators are presented, units of operational territorial analysis. Particular attention is paid to the numerical value. Methods for assessing the state of natural complexes and the degree of anthropogenic impact. Try different methods of environmental assessment of landscapes in practice. The main stages of landscape-Environmental Research and landscape-environmental mapping. Environmental factors in landscapes and general patterns of their impact.
30	Complex use and protection of water resources	To teach students the basic methods of calculation and design of water management systems that use water resources efficiently, to develop measures to reduce unproductive water consumption, as well as to correctly implement water protection measures aimed at protecting water bodies.
31	Purification of Natural and Waste Water	Study of technologies and processes of natural water treatment for drinking water supply and technological needs, as well as wastewater treatment. Determine the main indicators of water quality, select the device and calculate the technological parameters of the process, taking into account the implementation of the tasks of energy and resource conservation.
32	Protection of Water Resources	Purpose: formation of students' ecological outlook and abilities for professional activity from the position of water resources protection. Protection of water resources and rational water use,Measures to protect water bodies,Sources of water pollution and irrational use of water resources,Use of natural waters,Pollution of natural waters,Sanitary protection zones of water supply sources Content: Water in nature and human life. Features of the structure and properties of water. The effect of water on the human body. The problem of pollution of natural waters. Water protection as an integral part of environmental protection. Basic concepts and principles of water protection. Water as a resource. Water needs, water availability of the regions of the world.
33	Recycling and Utilization of Polymer Wastes	The goal is to form a system of knowledge about the possibility and ways of recycling and recycling of polymer waste. Content: Analysis of the state of recycling of polymer materials. Sources of polymer waste. Isolation of polymers from household waste. Methods of

		disposal of polymer waste. Recycling of polymers .Methods of pretreatment of polymer waste. Separation of polymer mixtures into individual components. Features of secondary polymers. Recycling of secondary polymers in the product. The use of recycled polymers. Chemical processing of polymer waste. Extraction of energy from waste plastics. Creation of environmentally friendly polymer materials.
34	Ecology and Environmental Protection of Polymer Enterprises	The goal is the formation of systematic knowledge in the field of ecology of production and use of polymer materials. Contents: Environmental problems related to the functioning of polymer production enterprises. The use of polymer composite materials in industry. Technological and environmental problems in the production of raw materials and ways to solve them. water-soluble polymers, their properties and environmental problems in the field and ways to solve them. Assessment of environmental reliability of polymer materials (PM). Methods of control of low molecular weight substances released from PM Sanitary and chemical analysis of PM in liquid media. Features of sanitary chemical analysis of PM in the air.
35	Environmental Problems of Perfumery and Cosmetics Production	Purpose - to form students" ecological worldview and the ability to use knowledge to solve environmental problems in the production of perfumes and cosmetics. Contents: Ecological principles of rational use of natural resources and nature protection. Characteristics of the production waste of perfumes and cosmetics. Ways of recycling production waste. Principles of creating environmentally friendly perfumes and cosmetics. Fundamentals of environmental management and marketing in the production of perfumes and cosmetics
36	Environmental Problems of Pharmaceutical Production	Purpose - formation of scientific knowledge to reduce the adverse impact of pharmaceutical enterprises on the environment, human health and the organization of environmental protection measures. Contents: Environmental problems in the production of pharmaceuticals. Pharmaceutical enterprises as sources of environmental pollution. Requirements in the field of environmental protection in the placement of pharmaceutical enterprises. Management and pharmaceutical waste. Fundamentals of environmental management and marketing in pharmacy.
37	Eco-Textiles	The purpose: Orientation of students to technological, organizational, and managerial types of professional activity. To carry out an analysis of the environmental situation in textile production, and to apply methods of wastewater treatment of textile enterprises. Contents: Consider the principles of maximum conservation of natural resources, waste-free production, recycling of raw materials.
38	Ecological Problems of Textile Industry	The purpose: Describe the current environmental problems of textile production. Substantiate measures to prevent harmful emissions and environmental pollution by improving technological processes. Contents: Calculate the proportion of dust on the technological process and the principle of operation of the equipment. Substantiate wastewater treatment methods: neutralization, oxidation, reduction and removal of heavy metal ions.
39	Ecological Safety of Textile Production	The purpose: Formation of students with a complex of knowledge and practical skills in the field of environmental safety of textile production. Contents: Review of modern methods of environmental certification of textile products and environmental labeling in the textile industry. Calculate the maximum permissible concentrations of harmful substances contained in the air in textile production. To study

		the process of purification and disposal of industrial wastewater.
40	Ecological Problems of Weaving Production	The purpose: Formation of students with a complex of knowledge and practical skills in the field of environmental problems of weaving production. Contents: Describe the current environmental problems of the textile industry. Substantiate measures to prevent harmful emissions and environmental pollution by improving technological processes. Calculate the proportion of dust on the technological process and the principle of operation of the equipment. Substantiate wastewater treatment methods: neutralization, oxidation, reduction and removal of heavy metal ions.
41	Environment Protection in Oil and Gas Industry	Purpose: formation of students" knowledge in the field of environmental safety and rational use of natural resources in the oil and gas industry Content. Information about legal and organizational questions in the field of environmental protection. The concept of the natural environment, its state and problems, assessments of the impact of oil producing and oil refineries on the environment. Measures to protect the environment during oil production. Environmental safety in the oil and gas sector. Methods of environmental management in the Republic of Kazakhstan
42	Ecology and Protection of the Environment on Oil and Gas Crafts	Information on the impact of the activities of oil and gas industry enterprises on the environment is being studied. Technical supervision, environmental monitoring during oil and gas production on land and at sea. The prevention of environmental pollution during the preparation, transportation and storage of oil and gas is considered. Elimination of oil spills, features of oil pollution of the Caspian waters, the main sources of pollution during offshore oil production.
43	Ecological problem in silicate industry	Forms an ecological worldview and the ability to take scientifically-based decisions to prevent the impact of antropogenic factors on human health, to understand the effect of chemical pollutants on the environment; considers methods for cleaning waste gases, recycling solid waste, the effectiveness of dust collection devices, their design, design features, principles of dust deposition and selection of the necessary dust-removing equipment.
44	Ecological Equipment of Industrial Enterprises	Purpose: Formation of knowledge about the basics of technological processes, equipment and technical means designed to protect the environment. Content: Engineering methods of environmental protection from man-made pollution. Technique of protection of atmospheric air. Devices for dry and wet cleaning of industrial gases. Electrical methods of gas purification. Equipment, technological schemes and installations for wastewater treatment of industrial enterprises. Recycling of solid industrial waste.
45	Principles of Waste-free Industrial Production	Purpose: Formation of knowledge and skills necessary to create modern waste-free and low-waste technologies. Content: Waste–free production is the basis of industrial ecology. Principles of organization of low-waste and waste-free production. Requirements for waste-free production. Methods of development of waste-free technological processes. Use of secondary material resources. The main directions of development of waste-free and low-waste technology in certain industries. Processes and installations for processing industrial waste.
46	Environmental aspects of the production and application of refined petroleum products	The goal is to form knowledge on sources and emissions of pollutants into the atmosphere, hydrosphere, lithosphere during oil refining and consumption of petroleum products, measures to minimize their harmful effects. Contents: Classification, characteristics of pollutants

		emitted into the atmosphere. Methods for reducing emissions of hydrocarbons and their derivatives into the environment. Methods of wastewater treatment. Methods of cleaning oil sludge. Methods of neutralization of residual petroleum products. Environmental pollution by rail and air transport. Pollution of rivers and seas when using water transport. Environmental aspects of oil and gas transportation via trunk pipelines. Rationing of harmful substances that pollute the environment.
47	Environmental safety of oil refining	Purpose - formation of knowledge on forecasting and prevention of the main factors of the negative impact of hydrocarbon systems, environmental culture and professional environmental literacy of the future specialist Content: Current issues of environmental safety management in production and refining. The main factors of the negative impact of hydrocarbon systems. Petroleum hydrocarbon systems and environmental aspects of their production and use. The energy potential of the enterprise and the level of danger. Features of operation of devices with increased fire and explosion hazard. Risk and probability of emergency situations. Classification of destruction zones in case of an accident at an oil refinery; prevention of emergency situations.
48	Environmental problems of electrochemical productions	Considers a system of water use and wastewater treatment in electrochemical production, parts washing schemes, equipment used. It analyzes the conditions for the discharge of wastewater into water bodies, the reagent and electrochemical method of wastewater treatment, the regeneration of precious and non-ferrous metals from spent galvanic solutions. Teaches to independently conduct calculations of rationing the flow rate of soluble and insoluble anodes, to evaluate the effectiveness of wastewater treatment.
49	Environmentally Safe Technologies	Considers the relevance and importance of environmentally friendly (low-waste and non-waste) technologies, the principles of organizing non-waste production: systematic, integrated use of raw materials, the cyclical nature of material flows, environmental safety, combination and intersectoral cooperation of production. It forms skills to evaluate the effectiveness of various methods of industrial waste treatment and the disposal of valuable components.
50	Non-Waste Texhnology	Purpose: Obtaining knowledge necessary for analysis and development of modern non-waste and low-waste chemical technologies. Contents: Technologies of complex processing the chemical waste, the use of solid industrial waste from chemical productions containing nutrients as additives in mineral fertilizer production. Complex resource-saving technology for processing waste from production of phosphorus, wet-process phosphoric acid. Formation of skills to analyze industrial chemical waste, to solve problematic issues of processing technogenic waste.
51	Physico-Chemical Methods of Water Purification	Goal: To study physicochemical regularities of purification of waste and natural water from impurities. Contents: Characteristics of natural and technological water quality indicators, requirements for water quality at chemical enterprises, methods of sewage treatment. Physicochemical bases of ion-exchange method of water desalination, membrane and thermal methods of water purification. Formation of skills of choosing rational water treatment system taking into account the requirements, calculating and analyzing the stages of water preparation.

52	Environmental Problems in Technology of Inorganic Substances	Goal: Study of methods of purification and utilization of solid, liquid and gaseous industrial waste from inorganic substances productions. Contents: Sources of formation of solid and liquid waste. Regulatory documents in the field of environmental protection. Ways to reduce harmful emissions. Methods for cleaning, recovery and disposal of solid industrial waste, sewage and gaseous emissions from chemical enterprises, equipment used. Skills to evaluate the effectiveness of various purification methods.
53	Environmental Technologies at Thermal Power Plants	Purpose: Formation of knowledge and skills necessary for free orientation in the practice of environmental technologies at TPP. Content: Introduction to the ecology of energy. Fuel cycle and its anthropogenic impact on the environment. Features of environmental protection measures at TPP. Capture of solid substances from the flue gases of TPPs. Methods and technologies for cleaning flue gases from sulfur oxides. Dispersal in the atmosphere of power plant emissions. Wastewater TPP and their treatment. Classification of waste water of TPPs. Impact of TPP wastewater (and individual pollutants) on natural water bodies.
54	Environmental Problems of Heat and Power Engineering	Purpose: Formation of knowledge and practical skills necessary for applied research on the prevention of environmental pollution in industrial enterprises in the field of thermal energy, energy problems of environmental protection and rational use of energy resources. Content: Introduction. Classification of industries according to the degree of danger to the environment. Environmental problems of heat power engineering. Characteristics of emissions of thermal power enterprises, their impact on the environment and human health. The impact of emissions on the state of atmospheric air. Impact on the atmosphere when using solid fuels. Impact on the atmosphere when using liquid fuel. Impact on the atmosphere when using natural gas. Protection of atmospheric air from pollution. Ecological technologies of fuel combustion. The main methods of gas purification in the thermal energy industry. Flue gas cleaning from sulfur oxides. Flue gas cleaning from nitrogen oxides. Flue gas cleaning from ash elements. Ash and slag waste. Wastewater from TPPs. Classification of waste water from TPPs. Heat waters. Ash removal water. Washing and oil-contaminated water. Influence of TPP wastewater on natural water bodies.
55	Environmental Expertise and Environmental Impact Assessment	Purpose: Formation of students' concepts of types and types of economic and other activities that affect the environment, taking into account the assessment system for the state of ecosystems and geosystems. Assessment of environmental risks and environmental damage. Contents: The concepts of "Environmental control", "Environmental expertise". Law of the Republic of Kazakhstan on environmental expertise. Goals, objectives, principles, objects, subjects and types of environmental expertise. Physico-chemical, biological, legal and economic bases of environmental regulation. Anthropogenic primary and secondary pollution. Direct and indirect human impact on the natural environment. Classification of pollution and the dynamics of their distribution in the atmosphere, water and soil. Sanitary and hygienic regulation. Methods of integrated expert assessment of the impact of production on the natural and human environment
56	Ecotoxicology	Purpose: Formation in students of the concepts of sources and forms of entry of ecotoxicants into the environment, the patterns of their action

		on the biological system. Contents: Historical aspects of formation and development of domestic ecotoxicology. Chemical substances, forms of manifestation of their direct and indirect toxic effects on the ecosystem. The concept of acute and chronic ecotoxicity. Chemical properties of the most common and dangerous ecotoxicants, their characteristics and mechanism of action. Physical and chemical analysis of determining the content of ecotoxicants in the environment. Assessment and management of environmental risk. Ecological regulation in ecotoxicology.
57	Ecological Chemistry	Purpose: Formation of students' skills in the transformation of chemical compounds in the environment, forecasting the possible consequences of such changes and making decisions taking into account environmental requirements Contents: General information about the basic concepts of the material composition of the environment. Tasks of ecodiagnosis and ecoprophylaxis as the basis for the direction of research in environmental chemistry. Global biogeochemical cycles of biogenic and abiogenic chemical elements. Physical and chemical processes occurring in the environment under the influence of anthropogenic activity. Patterns and factors influencing the processes of distribution of chemicals - pollutants in the environment.
58	Environmental chemistry and monitoring	Purpose: Formation in students of the concepts of monitoring on changes in indicators of chemical sources of environmental impact, environmental measures to ensure self-healing of the natural environment. Contents: Nature management, properties of the natural environment - ecological, economic, cultural, health. Forms of nature management: general and special, their purpose. Target nature of land use, subsoil use, forest use, water use, use of wildlife. License for nature use. Functions of control over the legality of rational activity and regulation of consumption. The role of authorized state bodies. Limits on nature use, environmental restrictions by territory, norms of limits and their distribution by objects
59	Basics of Environmental Auditing	Purpose: Formation of students' concepts of audit - an independent expert review of industrial enterprises or other objects of activity. Contents: Recommendations for the elimination of comments in accordance with the legal framework. Systematic independent evaluation process of the environmental audit object. Collection and objective evaluation of evidence of compliance with certain types of activities. Measures and conditions of the environmental management system. Information on the requirements of legislation. Environmental audit at enterprises, institutions for certain types of their activities. Evaluation of the effectiveness, completeness and validity of measures taken to protect the environment at the objects of environmental audit
60	Chemical Ecology	Purpose: Formation of students" skills in the transformation of chemical compounds in the environment, forecasting the possible consequences of such changes and making decisions taking into account environmental requirements Contents: General information about the basic concepts of the material composition of the environment. Tasks of ecodiagnosis and ecoprophylaxis as the basis for the direction of research in environmental chemistry. Global biogeochemical cycles of biogenic and abiogenic chemical elements. Physical and chemical processes occurring in the environment under the influence of anthropogenic activity. Patterns and factors

		influencing the processes of distribution of chemicals - pollutants in the environment.
61	Radiation Chemistry	Purpose: Formation of knowledge and competencies on the theory of radiation processes occurring in an irradiated environment under the influence of ionizing and electromagnetic radiation on a substance. Contents: The concept of ionization potential, radiation-chemical synthesis and radiation-chemical reactions. Modern ideas about radiation chemistry. Radiation-chemical transformations Characteristics of various types of radiation - X-ray and α, b g-radiation, fluxes of corpuscular particles. Physical processes that occur when an ionizing particle passes through a medium. Internal and external emitters. Isotope sources, radiation circuits, sources of α - and b - radiation, particle accelerators, x-ray tubes. Dosimetric systems in radiation chemistry.
62	Geoecology and nature conservation	Purpose: formation of knowledge on the conservation and restoration of a favorable ecological state of natural and anthropogenic geosystems by studying the background of the environment, spatial ecology. Contents: Subject, goal and objectives, research methods and general structure of geoecology. Geoecology in the system of earth sciences. Theoretical and methodological foundations of geoecology. Human activity and the geosphere of the earth. Geoecological zoning of Kazakhstan. Regional environmental issues
63	Ecology of Animals, Plants and Biogeography	studies the ecology of animals and plants, the problems of systematizing biodiversity. Explores the diversity of living organisms, the comparative characteristics of prokaryotes and eukaryotes.Considers the main stages of development of biogeography, knowledge of the general distribution of organisms to the characteristics of individual biogeographic sections, evaluates the features of the distribution of species, their histories, mapping of the ranges of biological objects.
64	Biological Ecology	Studies main living environments and organisms adapting to them, ecology of individuals, populations, communities and ecosystems, the concept of the noosphere, main provisions of modern ecology, structure and evolution of the biosphere, role of living matter in the biosphere, environmental problems of modernity and solutions.
65	Ecology of Populations and Communities	Studies the ideas about ecological relationships in populations, interconnections in biological systems, about the dynamics and self-regulation of populations and biocenoses, methods of their study and modeling methods. Considers the formation of concepts about environmental communities. Describes the complex relationships of living organisms with each other and with the environment.
66	Ecological Resource Knowledge and of Natural Managemen	Investigates the geo-ecological assessment of the prospects for the use of minerals, the intersectoral nature of environmental resource management. Analyzes the environmental consequences of the location and structure of certain types of natural resources and their complexes. Assesses the environmental impact of industrial waste. Studies the types of economic mechanisms of environmental management, approaches to the economic assessment of natural resources.
67	Soil Science With the Fundamentals of Ecology	Considers soil-forming process and factors of soil formation, soil-forming rocks, relief, biological factors of soil formation: role of flora, fauna and microorganisms. Studies soil profile and its properties, structure of soil profile, genetic horizons of soil, their diagnostics, symbolism, types of structure of soil profile and their relationship with

		soil-ecological conditions.
68	Green technologies for processing domestic wastes	Considers green technologies that can provide the necessary level of economic growth without creating additional environmental risks. Studies the efficient use of natural resources, the conservation and increase of natural capital, the reduction of environmental pollution, the conservation of ecosystems and biodiversity, and the growth of income and employment.
69	Ecological Problems in Agricultural Areas	Analyzes socio-environmental problems of agriculture, environmental aspects of intensification of agriculture, environmental problems of agricultural areas. Applies biological methods of pest control in agriculture; solves environmental problems of agricultural chemization; explores use of biological fertilizers and plant protection products, independently finds ways to solve environmental problems of land resources.
70	Fundamentals of Environmental Regulation and Examination	Considers basics of environmental regulation, mechanisms of environmental regulation, history of the EIA, content and theoretical foundations of environmental regulation and expertise, terms and definitions; arguing principles, criteria and objects of environmental impact assessment. Independently used environmental regulations in the field of ecology. Analyzes principles and structure of environmental impact assessment.
71	Environmental Waste Inventory	Studies state cadasters of natural resources of the Republic of Kazakhstan, ecological inventory of wastes, classification of natural inventories. Analyzes main content of state cadasters and basics of cadastral work. Defines relationship of cadastral work with environmental management and nature protection.
72	Fundamentals of Environmental Law in Environmental Management	Studies the rights and obligations of control officials, the procedure for environmental control, work with regulatory documents, their processing, storage, use in professional activities and transfer, independently distinguishes between types of legal liability for violation of environmental laws.
73	Eco-protective Equipment and Technologies	Considers impact of main technological processes of industry on the environment, protection technology of atmospheric air, water resources, technology of land reclamation. Studies technology of processing, recycling of industrial wastes and municipal solid wastes. Analyzes development and implementation of environmental protection technologies.
74	Physical and Radiation Ecology	Considers history of development of radiation ecology and fundamentals of dosimetry, radioactivity, alpha and beta particles and gamma radiation, atomic structure, neutron radiation and radioactive contamination, formulates principles for protecting the atmosphere, hydrosphere and lithosphere from physical pollution.
75	Soil Science With the Fundamentals of Ecology	Considers soil-forming process and factors of soil formation, soil-forming rocks, relief, biological factors of soil formation: role of flora, fauna and microorganisms. Studies soil profile and its properties, structure of soil profile, genetic horizons of soil, their diagnostics, symbolism, types of structure of soil profile and their relationship with soil-ecological conditions.
76	Ecological Aspects of Natural Science	Purpose: formation of fundamental knowledge in different directions of the modern complex of natural sciences, disclosure of the general methodology of natural sciences. Contents: The process of natural science cognition. Ecological aspects of biology. Biological ecology. Ecological aspects of chemistry. Chemical ecology. Chemistry of

		pollutants in the environment. Ecological aspects of physics. Physical ecology. Technogenic physical pollution and natural background. Fuel and energy resources of the Earth. Energy flows in the biosphere. Energy exchange. Environmental consequences of using traditional energy sources. Global energy-ecological strategy for sustainable development of the XXI century. The G-global project. Low-carbon development and green economy. Global Partnership for Sustainable Development.
77	Ecology and Sustainable Development	Purpose: formation of an ecological worldview, obtaining deep systemic knowledge and ideas about the foundations of sustainable development of society and nature, theoretical and practical knowledge on modern approaches to the rational use of natural resources and environmental protection. Contents: Ecology and problems of modern civilization. Autoecology is the ecology of organisms. Demecology – ecology of populations. Synecology is the ecology of communities. The biosphere and its stability. Evolution of the biosphere. The concept of living matter. Modern biosphere. Global biogeochemical cycles. Ecological crisis and problems of modern civilization. Strategies, goals and principles of sustainable development. Ecoenergy. Global energy-ecological strategy for sustainable development of the XXI century. Water is a strategic resource of the XXI century. Renewable energy sources. Environmental policy of the Republic of Kazakhstan. The concept of sustainable development of the Republic of Kazakhstan.
78	Resource-Saving, Low-waste and Non-waste Technologies	Purpose: to give an idea of the main objects, methods, principles of creating resource-saving, low-waste and non-waste technologies. Contents: Requirements of regulatory and technical documentation, control, product quality. Principles of development of low-waste, waste-free production, cyclical material flows, integrated use of raw materials, environmental safety. Construction of technological schemes of low-waste and non-waste technologies.
79	Social Ecology and Sustanable Development	Purpose: to give an idea of the main objects, methods, principles of creating resource-saving, low-waste and non-waste technologies. Contents: Requirements of regulatory and technical documentation, control, product quality. Principles of development of low-waste, waste-free production, cyclical material flows, integrated use of raw materials, environmental safety. Construction of technological schemes of low-waste and non-waste technologies.
80	Modern Urban Problems and Urboecology	Purpose: Formation of knowledge about the state of the environment in the conditions of urbanization and to assess their consequences for human life. Contents: Features of urban ecosystems. The process of urbanization and its impact on the environment. Sources of urban pollution, noise pollution factors. Rational design and environmentally optimal options for the construction of urban structures. Urban landscapes, changes in the natural and spatial resources of the city.
81	Medical Ecology and Social and Environmental Problems of Mankind	Purpose: To form knowledge about the socio-ecological problems of mankind and their impact on health. Contents: General patterns of adaptation of the human body to changes in the environment. Pathogenetic mechanisms of action of physical, chemical, biological factors on the human body. Environmental problems of nutrition, the impact on the human body of various genetically modified foods. Ecological, social characteristics of a person.
82	Technology of Wastewater Treatment of Industrial	Purpose: formation of fundamental knowledge on wastewater treatment technology. Contents: The quality of wastewater treatment in

	Enterprises	accordance with established standards. Theoretical foundations and principles of operation of technological equipment for wastewater treatment. Calculation of the required degree of wastewater treatment. Visual observations, instrumental examinations and tests. Compliance with the technology in accordance with the current regulatory documentation.
83	Economical and Ecological Evaluation of Enterprises	Purpose: formation of knowledge about the mechanisms of economic and environmental assessment of enterprises. Contents: The essence, classification of external effects (externalities) in economic activity. Calculation of ecological and economic damage from environmental pollution by industrial enterprises. Types of economic assessment of natural resources, selection of criteria for assessing natural resources, methods of establishing taxes, payments for the use of natural resources.
84	Agroecology	Purpose: formation of knowledge about the current state and prospects of development of agro-ecological systems. Contents: Human interaction with the environment in the process of agricultural production, the impact of agriculture on natural complexes. The interaction between the components of agroecosystems, the specifics of the circulation of substances in them, the transfer of energy, the nature of the functioning of agroecosystems under man-made loads. Anthropogenic impacts on the agricultural system.
85	Fundamentals of Energy Ecology and Sustainable Development	Purpose: Formation of knowledge about methods and methods of protection of atmospheric air from technogenic effects. Contents: Aerodisperse systems, changes in the air environment as a result of the activities of industrial enterprises, atmospheric pollution. Types of pollutants, basic cleaning methods and equipment for cleaning gas and dust emissions, air pollution by motor vehicles, the impact of air pollution on human health.
86	Fundamentals of Industrial Ecology	Purpose: Formation of knowledge about the general laws of sustainable development that ensure the diverse work of various natural and social systems. Contents: Fundamentals of energy ecology, historical and socio-ecological prerequisites for the formation of a sustainable development strategy. The relationship between society and nature in different periods of the development of civilization. Stability of biological systems at the level of species populations, communities of organisms and ecosystems.
87	International Legislation in Ecology	Purpose: formation of knowledge about the totality of legislative norms and rights in the field of ecology. Contents: International organizations, the role of international organizations in solving environmental problems of our time, international treaties. The Paris Agreement on Climate Change. Interstate relations on conservation, rational use of international environmental resources and protection of human rights to a favorable environment.
88	Fundamentals of Environmental Regulation and Examination	Purpose: To familiarize with the system of norms and rules of environmental activity, environmental management, rational use of natural resources and environmental expertise. Contents: Fundamentals of environmental regulation, mechanisms of environmental regulation, content and theoretical foundations of environmental regulation and expertise, terms and definitions; principles, criteria and objects of environmental expertise. Environmental standards in the field of ecology.
89	Modeling in Ecology	Purpose: Formation of knowledge about mathematical models used to

		solve scientific, applied problems in ecology. Contents: Brief description, principles of construction of ecological models, elementary mathematical models. Technical calculations using mathematical methods, methods mathematical analysis, statistical modeling in ecology, independently integrates the acquired knowledge for engineering calculations, design, research tasks in the field of mathematical modeling.
90	Geoinformation Systems in Ecology	Purpose: Formationof knowledge about modeling structural integration of GIS with remote sensing technologies, satellite positioning systems, Internet. Contents: Modern computer technologies in the collection, storage, processing, analysis, transmission of geographical information. Assessment of the geoecological study of the work area using modern specialized software. Geoinformation systems, their purpose, application in ecology.
91	Urban Ecohydrology	Purpose: Interaction between water and ecosystems. Contents: Ecological processes occurring within the hydrological cycle. Improving environmental sustainability. Principles of ecohydrology: hydrological, ecological, environmental engineering. Ecosystem degradationusing concepts combin ingterrestrial and aquaticeco systems
92	Environmental Monitoring	Purpose: To form knowledge about environmental monitoring. Contents: The content and structure of environmental monitoring, environmental monitoring objects, classification of monitoring types by obje tsandtrackingmethods. The essence, specific sandproperties of environmental monitoring. Modern method sandmeans of environmental monitoring.
93	Ecological Problems in Agricultural Areas	Purpose: To create knowledge about the impact of human agricultural activity on ecological equilibrium in nature. Contents: Social and environmental problems, environmental aspects of intensification of agricultural areas. Biological methods of controlling pests of agriculture in practice. Environmental problems of agricultural chemistry. Use of biological fertilizers and plant protection agents. Solutions to environmental problems of land resources
94	Soil Science With Fundamentals of Ecology	Purpose: To create knowledge about the soil, its properties, education and ecology. Contents: Soil education process and factors of soil formation, soil-forming rocks, relief, biological factors of soil formation. Soil profile and its properties, structure of soil profile, genetic horizons of soils, their diagnosis, symbolism, types of soil profile structure and their connection with soil-ecological conditions.
95	Ecology of Populations and Communities	Purpose: To develop knowledge about the interaction of living organisms and the natural environment, the principles of the functioning of ecological systems and the biosphere as a whole. Contents: Ideas about ecological relationships in populations, relationships in biological systems, dynamics and self-regulation of populations and biocenoses, methods of studying them and methods of modeling. Formation of concepts about ecological communities. Complex relationships of living organisms with each other and the environment.
96	Bioindication Research Methods in Ecology	Purpose: To develop systematic knowledge in the field of environmental assessment by bioindicative methods. Contents: Environmental foundations of bioindicative research methods. Biological indices and coefficients in comparative bioindicative studies. Patterns of bioindication at different levels of the organization

		of living matter. Features of bioindication of agrocenosis resistance. Bioindication of water quality and water pollution.
97	Ecology of Animals, Plants and Biogeography	Purpose: To develop knowledge, skills and moral responsibility for the conservation of biological diversity and habitats of living organisms. Contents: Ecology of animals and plants, problems of systematization of biodiversity. Stages of development of biogeography, knowledge of the general distribution of organisms to the characteristic of individual biogeographic secretions. Features of species distribution, their stories, mapping of biological sites.
98	Biogeochemistry and Ecotoxicology	Purpose: Formation of concepts of processes of migration and mass exchange of chemical elements between living organisms and the environment. Contents: The origin and evolution of the Earth"s geospheres, the origin and evolution of the lithosphere, hydrosphere and atmosphere, the biogeochemical cycle of elements in various environments of the biosphere. Laws and mechanisms for the interaction of ecotoxicants with the environment and man.
99	Environmental Management and Basics of Green Economy	Purpose: Formation of knowledge about the principles and fundamentals of green technologies, effective and rational use of natural resources in society. Contents: Formation of fundamental knowledge on classes of inorganic compounds, the structure of the atom, elements of chemical thermodynamics and kinetics, the doctrine of solutions and electrolytic dissociation, methods of formation of chemical bonds, OVR, hydrolysis, electrolysis. Skills of working with chemical utensils, reagents and devices for conducting chemical experiments, solving problems are being developed.Rational use, protection, problems of depletion of natural resources of the Republic of Kazakhstan. Principles of rational use of natural resources. The transition to a green economy, the history of the formation of the concept of sustainable development and the green economy in Kazakhstan.
100	Environmental Chemistry	Purpose: Formation of knowledge about the main organic and inorganic pollutants of the environment. Contents: Laws of chemistry, methods, means for studying the composition, structure of matter. The dependence of the properties of substances on their composition and structure. Scientific search for the necessary information about chemicals and processes occurring in the biosphere as a result of environmental pollution.
101	Geoecology and Nature Protection	Purpose: To develop knowledge of environmental laws and laws of natural, natural and anthropogenic geosystems for the purpose of nature protection. Contents: Changes in the geosphere of the Earth under the influence of human activity. Global environmental problems of the Earth, anthropogenic transformations of ecosystems, natural resources of Kazakhstan. Environmental consequences of mining, reduction of natural biological productivity of ecosystems, maps of the danger of anthropogenic desertification of the territory of Kazakhstan.
102	Climate Change and "Green Economy"	Purpose: To form students' understanding of the close relationship between economic activity and climate change, the introduction of a "green" economy. Contents: Climate change and its impact on natural and economic systems, regulatory documents on climate change and the history of the formation of the concept of sustainable development and green economy in Kazakhstan, the main directions of the concept of the transition of the Republic of Kazakhstan to a green economy.
103	Environmental	Purpose: To master the basics of environmental biotechnology with

	Biotechnology	scientific knowledge for the development of environmental engineering in production. Contents: Development of ecological biotechnology. During the biodegradation of organic substances in the environment the role of microorganisms. Agriculture, industrial waste and stagnation biological water treatment by aerobic and anaerobic methods. Technological bioenergy. Non-traditional energy sources. Production of carbohydrates, biogas and ethanol. Modification of photosynthesis processes. Radionuclides and contaminated heavy metals by biotechnological methods cleaning. The future of environmental biotechnology.
104	Ecology of Populations and Communities	Purpose: 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. Content: 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.
105	Ecological Problems of the RK	Purpose: 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, 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.
106	Natural Resources Assessment	Considers general provisions and principles of state technical account and technical inventory of objects of town-planning activity. Studies regulatory framework of technical inventory of objects. Develops abilities to carry out technical inventory of new objects of town-planning activity and current registration of inventory changes of objects captured by primary inventory.
107	Environmental Audit	Purpose: to form an idea about environmental audit, the origins of its formation and basic information for acquiring practical skills in conducting environmental audit. Contents: Emergence and stages of formation, development of the eco-audit system in Kazakhstan and abroad. Foreign and domestic experience in the field of environmental audit. International standards for environmental audit, regulatory framework for environmental audit, assessment of economic damage from environmental violations during environmental audit. Order, procedures and stages of environmental audit.
108	Resource-Saving Technologies in Oil Products Provision	Purpose is the formation of skills for assessing innovative risks during the introduction of new technologies, equipment and systems and for the effective implementation of the process of reducing pollution of natural resources during the operation of gas and oil pipeline transport facilities. Content: Resource-saving technologies in the construction of transport facilities, storage and distribution of gas, oil and petroleum products Reduction of losses of gas, oil and petroleum products in pipeline transport, storage and distribution. Ways to reduce electricity consumption during transportation of gas, oil and petroleum products. Use of secondary energy resources. Assessment of the environmental impact of gas, oil and petroleum products transportation, storage and distribution facilities.

109	Industrial Ecology of Hydrocarbon Systems	Purpose is the formation of skills of management of technological processes of processing of hydrocarbon raw materials, production of organic substances in compliance with the safety of life and environmental cleanliness. Content: Basic concepts of ecology of processing of hydrocarbon systems. Environmental problems of processing of hydrocarbon systems. Environmental monitoring. General principles of the organization of monitoring systems at hydrocarbon processing plants. Production of hydrocarbon systems with improved environmental characteristics, environmental quality management. Industrial and environmental safety in the processing of hydrocarbon systems. Environmental quality management, industrial and environmental safety in the processing of hydrocarbon systems.
110	Rational Ways of Processing Heavy Oils and Oil Residues	Goal: to expand the knowledge of undergraduates on rational methods of processing heavy oils and oil residues to develop new approaches to the processing of heavy oils and oil residues. Content: Problems of self-sufficient processing of crude oil; basic principles of in-depth and deep oil refining. Physico-chemical properties of heavy oil refining products and oil residues. Kinetics, thermodynamics and mechanism of chemical reactions underlying industrial processes of processing heavy oils and oil residues.
111	Innovative Technologies of Oil Refining and Petrochemistry	Goal - deepening the knowledge of undergraduates in the field of innovative technologies of oil refining and petrochemistry, aimed at increasing the depth of oil refining, improving the quality of petroleum products, for the modernization and improvement of oil refining and petrochemistry technologies. Content: Trends in the development of world and Kazakhstan oil refining and petrochemistry. New technologies underlying the production of products that meet international standards. The structure of secondary processes and an increase in the depth of oil refining. Alternative options for the modernization and reconstruction of existing installations that ensure the production of products that meet environmental quality standards.
112	Production of Soot from Gas Raw Materials	Goal: deepening of theoretical and practical knowledge about the processes of soot production from gas raw materials solving practical problems to improve production. Contents: The most important properties of soot. Studies of the process of soot formation. Thermal decomposition of hydrocarbons as a method for producing soot. Laminar and turbulent diffusion gorenje. The interaction of soot with reaction products. Modern technologies for the production of soot. Reception and preparation of raw materials. Furnace production methods. Production of soot by precipitation from a diffusion flame. Production of soot by thermal decomposition without air access. Production of active, low-active and semi-active furnace soot. Modern methods and equipment for capturing soot. Granulation and compaction of soot. Cleaning of industrial waste. The use of soot.
113	Industrial Ecology of Hydrocarbon Systems	Goal: deepening of knowledge about scientific and technical problems of oil refining; world achievements in the field of oil refining technology in the world and in Kazakhstan allowing to carry out a complex of economic, organizational, engineering and technical measures to reduce and store waste, as well as to obtain additional economic effect from obtaining useful products.. Contents: Analysis of environmental problems of processing of hydrocarbon systems, environmental monitoring, production of hydrocarbon systems with improved environmental characteristics, environmental quality

		management, industrial and environmental safety in the processing of hydrocarbon systems. Management of technological processes of processing of hydrocarbon raw materials, production of organic substances in compliance with the safety of life and environmental cleanliness.
114	Design of oil and gas storage facilities and oil and gas pipelines	Purpose:The methods of assessing the structural reliability of the projected oil and gas storage facilities of oil and gas pipelines are studied. Contents: Comparative assessment and justification of the choice of a method for solving the problem of statistical dynamics for determining the probabilistic characteristics of the stress-strain state of oil and gas pipeline sections. The development of a methodology for assessing the structural reliability of transitions of underground sections of oil and gas pipelines through natural and artificial barriers and seismic faults is being studied. Stages of development of regulatory documents for the design of oil and gas storage facilities and oil pipelines.
115	Modern methods of monitoring the development of oil and gas fields	Purpose::Rational methods of development of oil, gas and gas condensate fields, basic methods of control of development of oil and gas fields on land and at sea are studied. Contents: Petrophysical characteristics of rocks in the process of exploitation (development) of hydrocarbon deposits. Typical complexes of field-geophysical methods for monitoring development. Control of the movement of the gas cap and the movement of the oil rim during the operation of oil and gas fields. Monitoring of geophysical data at oil and gas fields.
116	Modern Energy Saving Technologies in Electric Power Industry	Purpose: formation of theoretical knowledge and practical skills in the field of energy conservation, development of skills for undergraduates in analyzing experimental and production data with the formulation of reasoned conclusions and recommendations for improving the analyzed processes, equipment and technologies from the point of view of energy conservation. Contents: trends in the development of issues of saving energy resources and improving the efficiency of using various types of energy at energy facilities, energy surveys of facilities, energy conservation measures, methods of rationing, forecasting and planning of energy consumption, control systems, accounting and management of energy consumption. Calculations with the necessary justifications for measures to save energy resources
117	Environmentally Friendly Technologies in the Electric Power Industry	Purpose: formation of theoretical knowledge and practical skills in the field of development of "green" technologies, reduction of consumption of non-renewable energy resources, reduction of negative environmental impact of energy sector enterprises. Content: issues related to the accelerated improvement of energy efficiency of the economy using intelligent energy systems and other ICTs, the introduction of renewable energy sources, the use of nanotechnology that will allow the creation of materials and coatings with energy-saving qualities and durability.
118	Reliability of Energy Security of Electric Power Systems	Purpose: formation of systematized knowledge about the modern theory of reliability of energy security in power supply systems, methods of calculation, analysis and optimization of their reliability. Contents: a system of basic concepts and criteria for reliability of electrical installations. Models and methods for analyzing the reliability of power generation systems. Taking into account reliability in the design and operation of the power plant. Indicators of the reliability of the power system. Load models of the electric power

		system. Reliability model of a concentrated power system A model of the reliability of the interconnection of power systems.Analysis of the reliability of the electrical network of the power system. Structural model of the network.Accounting for power line failures caused by a common cause and changes in weather conditions.
119	Formation of an Ecosystem for Work of RES	Purpose: to prepare a master's degree capable of solving technical and scientific problems related to the use of renewable energy sources that are safe for the environment on the basis of theoretical knowledge and practical skills. Contents: introduction. Energy of the future. The Kyoto Protocol. Forecasts for the development of energy. The cost of energy units. Energy security. General issues of renewable energy. The use of renewable energy in the Republic of Kazakhstan. Environmental characteristics of renewable energy sources (RES). Fundamentals of environmental safety. The current state of renewable energy. The main provisions of the energy strategy. Environmental problems of traditional energy and non-traditional renewable energy. Environmental and economic aspects of the use of solar and wind energy. Environmental aspects of the use of unconventional and renewable energy sources. Ecological and economic aspects of small hydropower and microelectric power plants, geothermal energy. Environmental aspects of the use of geothermal and bioenergy installations.
120	Scientific Basic for Reconstruction of Silk Road	Objective: characterizes the main approaches and principles of using the urban development potential of the Silk Road and historical monuments for the design of objects of tourist significance and their gradual development. Contents: fundamentals of the location of architectural, archaeological and ecological objects of Southern Kazakhstan at the intersection of the Silk Road routes. Formation of skills to determine the types of agrotouristic settlements with the involvement of representatives of small and medium-sized businesses. Demonstration of skills in the design of architectural objects according to the principles of sustainable development of the transport system along the caravan road.
121	The Features of Architecture of Kazakhstan	Objective: studies the basic design methods for the development and mutual influence of modern architecture, urban planning and architectural heritage. The development of modern architecture, the influence of world architecture, as well as the stylistic varieties of architecture: futurism, deconstructivism, postmodernism, etc., influencing the development of modern architecture. Content. Modern architectural solutions for the development of tourist infrastructure. Demonstration of the skills of using modern architectural modeling systems to create a favorable architectural environment, respecting the cultural values of our ancestors.
122	Geoplastics Design of Artificial Islands for the Development of Tourism Cluster of Kazakhstan	Objective: considers the concept of development of the tourism industry, taking into account the formation of geoplastics of artificial islands. The concept of creating several clusters with the main key places of tourist interest: monuments of history, culture and nature, etc. Historical and modern experience of design and construction in the formation of a tourist cluster in the conditions of the development of innovative processes in the economy of the Republic of Kazakhstan. The formation of architectural complexes for the development of internal cultural and educational, pilgrimage tourism, improving the level of tourist and local history training.

123	New Technologies for Modeling of Architectural Objects	The purpose of the discipline: the application of a three-dimensional and conceptual model of a given architectural space and control automation. The content of the discipline: evaluates the compositions of the author"s interpretation of each of the elements and the entire structure as a whole according to the principle of geometric structuring. Application of knowledge and skills in the field of architecture, including elements of the most advanced knowledge in the technology of architectural design and construction of buildings.
124	Actual problems of natural resource law	The objectives of the discipline are the acquisition and mastery of undergraduates general cultural, general professional and professional competencies in the field of legal regulation of transactions with land, forest, water, natural resources, wildlife and other natural resources. Content. An in-depth study of the legislative norms governing the problems of natural resource law. Knowledge of the system of state and commercial structures aimed at implementing the program of agricultural law, offenses in this area and measures of civil liability for violations; analysis of legal problems arising on the issue of natural resource law, the application of civil law.
125	Issues of ecologization of modern chemistry	Purpose: Formation of theoretical knowledge and practical skills in the use of modern methodological approaches to solve the problems of sustainable development and safe human interaction with the environment Contents: Global environmental problems: climate change, ozone layer destruction, pollution of natural waters with organic substances, etc. Diagnostics and effective chemical-analytical control of environmental objects. Ecotoxicants. Impact assessment methods. additive effect. Synergy and antagonism. Scientific basis for determining the maximum permissible concentrations. Threshold and non-threshold concepts. Ecological Consequences of Environmental Pollution and Problems of Ecotoxicology
126	Systems of Management in Life Safety and Environmental Protection	Purpose: to familiarize undergraduates with industrial safety and its management, as well as environmental protection and the basics of reliability of technical systems. Content: Accounting, analysis and assessment of the state of security in the human-habitat system. Forecasting and planning of activities to achieve the goals of the management of the BDZ. Life safety management. Planning of activities to achieve goals and solve management tasks. Organization, coordination of work and operational management. Activation and promotion of a high level of security.
127	Modern Aspects of Environmental Engineering Systems	Purpose: formation of knowledge of the theoretical foundations of engineering ecology, studying the impact of industry and enterprises, vehicles, development of engineering and technical solutions that ensure environmental safety in the technosphere. Contents: Introduction to Environmental Engineering. Engineering and environmental systems. Industrial ecosystems. Occupational health and safety management system. Technosphere of the earth: functioning, regulation of pollution. Pollution and protection of the atmosphere. Physico-chemical properties of dust, its dispersed composition and classification. Physical impact on the environment.
128	Methods and Methods for Ensuring the Safety and Sustainability of Technical Systems	Purpose: forming the specialist"s ideas about the inseparable unity of effective professional activity and recreation with the requirements for the safety of technology and human security. Content: Methodological approaches to the calculation and design of security systems. Methods of protection against harmful substances, physical fields, information

		flows, biological and psychological hazards. Determination of the probability and causes of an emergency and assessment of their impact on the vital activity of the object. Assessment of the physical stability of the main technological elements of the object. Determination of the stability of the control system. Forecast of the stability of the functioning of the object as a whole.
129	Technical Means of Ensuring Occupational Safety and Environmental Protection	Purpose: formation of engineering and environmental thinking, which allows to understand modern problems of environmental protection and rational use of natural resources and use them in work. Content: Rational use of nature. Environmental pollution and monitoring. Methods of control Devices for monitoring the state of the environment the state of the environment. Gas emissions in industry: pollution assessment, cleaning and neutralization, equipment used. Methods and facilities for disposal, burial and incineration of solid: household and industrial waste. Harmful substances in the air of the working area. Technical means of protection against vibration and noise.
130	Life Safety and Environmental Management	Purpose: to form students" ideas about ensuring national security, the quality of products, services, safety requirements and features of the development, adoption and implementation of quality control caused by emergencies. Contents: Fundamentals of life safety. The place and role of knowledge on the safety of human life in the modern world. Life safety management. Legal and organizational bases. Expertise and control of environmental friendliness and safety. Protection from hazards in the technosphere.
131	Engineering and Environmental Safety of Equipment in Oil and Gas Industry	Purpose: Formation of undergraduates" competencies to ensure the engineering and environmental safety of equipment in the oil and gas industry, which will allow them to develop and implement measures to prevent accidents and minimize environmental impact. Contents: Fundamentals of engineering safety. Fundamentals of principles and approaches to ensuring safety in the oil and gas industry. Environmental Safety. Methods for monitoring and managing environmental risks. Design of safe equipment. Methods for ensuring the safe operation and maintenance of equipment. Emergency management. Familiarization with current laws, regulations and standards related to safety and environmental safety in the oil and gas industry.
132	Calculation and Design of Environmentally safe Equipment in Oil and Gas Industry	Purpose: Formation of undergraduates" competencies in the development of environmentally friendly equipment in the oil and gas industry, which will allow them to apply engineering solutions to minimize the negative impact on the environment. Contents: Environmental aspects in design. Methods for calculating equipment parameters. Mastering the methods of mathematical modeling and calculating the parameters of environmentally friendly equipment, including calculations of strength, stability, energy efficiency and other characteristics. Designing systems for cleaning and capturing emissions. Calculation of waste and emission treatment systems, including the use of filters, sorbents, devices for trapping and neutralizing harmful substances.
133	Engineering and Environmental Safety of Equipment in Chemical Technology	Purpose: Formation of undergraduates" competencies in ensuring the engineering and environmental safety of equipment in chemical technology, which will allow them to develop and implement measures to prevent accidents and minimize the impact on the environment.

		Contents: Fundamentals of engineering safety. Fundamentals of principles and approaches to ensuring safety in chemical technology. Environmental Safety. Methods for monitoring and managing environmental risks. Design of safe equipment. Methods for ensuring the safe operation and maintenance of equipment. Emergency management. Acquaintance with the current laws, regulations and standards related to safety and environmental safety in chemical technology.
134	Calculation and Design of Environmentally Safe Equipment in Chemical Technology	Purpose: Formation of undergraduates" competencies in the development of environmentally friendly equipment in chemical technology, which will allow them to apply engineering solutions to minimize the negative impact on the environment. Contents: Environmental aspects in design. Methods for calculating equipment parameters. Mastering the methods of mathematical modeling and calculating the parameters of environmentally friendly equipment, including calculations of strength, stability, energy efficiency and other characteristics. Designing systems for cleaning and capturing emissions. Calculation of waste and emission treatment systems, including the use of filters, sorbents, devices for trapping and neutralizing harmful substances.
135	Treatment and Use of Domestic Waste Water	Purpose: To study measures for the sanitary protection of water bodies from pollution, to master the methodology for assessing the hygienic and technical efficiency of wastewater treatment. Content: Production control of the MPC epidemic of hazardous substances in wastewater. Monitoring of the MPC of wastewater after purification and the efficiency of purification. Purification and reuse of domestic wastewater. The quality of surface effluents discharged into sewer systems.
136	Recycling of Waste Water Supply and Sewerage Systems	Purpose: Formation of solutions aimed at processing sewage sludge of various composition and origin. Contents: Hazard classes of waste, trends of waste processing in Kazakhstan.Recycling of materials, minimization of adverse environmental impact and reverse circulation of suitable industrial and household waste. Improvement of the ecological situation. Methods of industrial wastewater treatment and waste disposal of industrial wastewater treatment.
137	Methods for Assessment ep of Pollution Level in Enterprise	Purpose: Formation of an integrated system of knowledge in the field of environmental risk management related to production activities and its environmental impacts. Contents: General calculations of discharges of pollutants into the atmosphere, water basin and storage facilities. Establishment of uniform approaches to the regulation of emissions of pollutants into the atmosphere, the water basin. The main unified methods for determining the parameters of fluxes and concentrations of harmful substances in emissions.
138	Industrial Wastewater Treatment and Their Reuse	Purpose: Formation of technologies for the purification of water flows of various origins, focused on the use of modern technological solutions in the field of protection of water bodies and the implementation of modern water supply systems. Content: Modern construction of large cities, small settlements and the construction of various residential, social and commercial facilities. Excessive consumption of energy resources, depletion of natural resources. Changing the environment, landscapes. Overload of the transport system. Negative impact of wastewater. Pollution of reservoirs.
139	Ecology in Construction of	Purpose: Formation of the basic laws of ecology in solving engineering

	Water Management	problems related to the reconstruction of wastewater disposal systems; preparation for scientific, design and production activities in the field of water resources protection Contents: General calculations of discharges of pollutants into the atmosphere, water basin and storage facilities. Establishment of uniform approaches to the regulation of emissions of pollutants into the atmosphere, the water basin. Systems of main water pipes of underground storages, compressor stations (CS). Water distribution stations (VRS). The main unified methods for determining the parameters of fluxes and concentrations of harmful substances in emissions.
140	Engineering and Environmental Safety of Construction Systems	Objective: Forming knowledge and skills in risk and safety assessment in the design, construction, operation and dismantling of building systems and structures. Content: Fundamentals of engineering safety. Risk and safety assessment in construction. Environmental safety systems. Assessment of the impact of building systems and structures on the environment. Safety of structures and materials. Fundamentals of safety of building materials and structures. Organizational measures to ensure safety and environmental compatibility. Organization of safe operation of building systems and structures. Measures to ensure safety in the dismantling and disposal of building systems.
141	Geographical Sciense in the Context of Sustainable Development	The purpose of the discipline: the formation of modern geographical representations in the context of sustainable development in the field of scientific ideology and applied activities on the basis of generalization and revision of theoretical knowledge gained. Content: Natural and cultural heritage in Russian geography. Natural and cultural heritage as a fundamental geographical category. A condition for sustainable, ecologically balanced development. Local history as a means of forming a culture of sustainable development. Global problems within the framework of the concept of sustainable development of geographical science. The concept of sustainable development and the connection of geographical science.
142	Geographic Problems of Environment Management and Forecasting	The purpose of the discipline: to consider the main trends in the development of modern environmental management, to determine the role, place and significance of economic geography in solving problematic issues. Contents: Geographical problems of environmental management and forecasting. Territorial problems of resource management and regions. Environmental problems of the post-industrial world. Global problems of the modern stage of the development of world civilization. The concept of sustainable development of the modern world. Features and sustainable regional development of regional governance.
143	Geodynamic Processes and Natural Disasters	The purpose of the discipline: the formation of undergraduates" knowledge about geodynamic processes, methods of their forecasting and modeling of consequences, the definition of protective measures and methods. Contents: Geodynamic processes and their consequences. Methods of forecasting and modeling geodynamic processes. Preventive protective measures and methods of protection. Natural disasters. Prevention and elimination of consequences of emergency situations. Global threats and emergencies on Earth. Agro-climatic hazards and risks. Methods for determining the intensity of various hazardous processes and measures to reduce the dangers from them.
144	Ecobiosafety in the	Purpose: Deepens knowledge about the problems of environmental pollution in agro-industrial production, its importance in modern

	agricltural and industrial zone	society. . Contents: Biological processing of industrial waste from various industries. Cleaning up contaminated soil. The destructor is the use of microorganisms. Waste water and soil treatment. Application in practice of a complex of modern research methods.
145	Environmental Aspects of Biotechnological Processes	Purpose: Organization of biotechnological methods of leaching, recycling of solid waste and obtaining non-traditional energy sources, practical application of industrial and agricultural waste. Contents: Aerobic and anaerobic processing methods. Biotechnological methods for cleaning objects contaminated with heavy metals and radionuclides. The use of microorganisms in the biodegradation of organic substances of the environment. The relationship of microbiota in the efficiency of obtaining toxicants
146	Resource Saving Economics and Resource Efficiency Assessment	Purpose: formation of a system of knowledge in the field of solving resource saving problems, acquisition of skills in conducting economic calculations and their use to justify a resource saving strategy. Contents: Theoretical foundations for the formation of a resource saving strategy and increasing resource efficiency. Assessment of RK resource potential. Economic resources in economic systems. Resource conservation as a priority area and a factor in sustainable socio-economic development. Regulatory and legal regulation of resource saving. Formation of an organizational and economic mechanism for resource saving and increasing the efficiency of resource potential utilization. International cooperation and experience in the creation and development of resource-saving and environmentally friendly technologies.
147	Green Economy and Modern Problems of Environmental Management	Purpose: formation of theoretical knowledge and practical skills in the field of rational use of natural resources for agricultural purposes and environmental protection. Content: Economic content of green economy and sustainable development. Characteristics of the main segments of the green economy. Challenges and prospects for a green economy. Economic mechanism of environmental protection. Economic assessment of ecosystem services. Economic mechanisms and conditions for the transition to a green economy. Principles of rational nature management. Conditions and possibilities for the transformation of the technogenic type of economic development into a "green" economy. The state and the market are in the transition to a "green" economy.
148	Sustainable Economic Development of the Agro-Industrial Complex of the Republic of Kazakhstan	Purpose: to form an understanding of the need to transition from traditional models of economic development to a sustainable type of development, skills and skills to assess the socio-ecological and economic development of the agro-industrial complex of the Republic of Kazakhstan. Content: The concept and essence of sustainable development. Sustainable development of rural areas and social infrastructure. Methods and approaches to assessing the sustainable development of the agro-industrial complex. Natural-resource potential of agricultural production. Environmentally friendly, resource-saving crop cultivation technologies. Environmental problems of agricultural nature management. Problems of production of environmentally safe agricultural products, application of modern technologies of their production and processing. Current state of the environmental agro-production market.
149	Environmental Economics and Climate Change	Purpose: creating an idea of the current state of the environment, the close relationship between human economic activity and climate

		change, the development of decision-making skills in the field of sustainable development and high-quality economic growth. Content: Dynamics of the state of the environment in the world. Economic assessment of the environment. Economics of environmental problems. Environmental policy instruments. Climate change and its impact on natural and economic systems. "Green" economy and climate change. "Green" economy and sustainable development. Climate policy tools. Kazakhstan: the state of the environment, the role in solving global environmental problems.
150	Environmental Economics and Climate Change	Purpose: to master the basic concepts in the field of environmental economics, the relationship between human economic activity and climate change, and to develop practical skills in making managerial decisions to ensure sustainable economic development Contents: The state of the environment in the world. Sustainable development. Economic assessment of the environment. Environmental policy instruments. Environmental problems. Public resources. Climate change. The economics of damage. International cooperation in the field of countering climate change. Water resources and their management. The state of the environment in Kazakhstan. The environment in the strategies of companies. Green technologies.
151	Principles of waste management in Biotechnological industries	Purpose: The main principles of effective waste management for improving the environment, promoting the recovery, reuse and recycling of material flows from industry and municipalities, which are priority issues in Kazakhstan and the world, are considered. Content: The issues of the structure of production and consumption, the development of project standards for the formation and location of production and waste disposal, the planning, implementation, monitoring and analysis of measures for the management of production and waste disposal are considered.
152	Environmental Aspects of Biotechnological Processes	Purpose: application of biotechnological methods for solving environmental problems associated with technogenic pollution. Content: Classification of air, water and soil pollution. Rules for the protection of natural waters from pollution. Composition and properties of industrial wastewater. Wastewater treatment plants and biotechnological methods. Basic electrochemical, flotation, sorption and membrane methods of water purification. Soil bioremediation and its contamination with radioactive, oil and chemical waste.
153	Ecological management of Biotechnological Production	Purpose: The issues of long-term waste recycling programs in biotechnological industries are considered, taking into account the best European and world practices, technologies and industry features Content: Magistrants learn how to calculate the risks associated with management in biotechnological industries. The issues of regulation are considered as a set of measures to improve the state of the environment, various standards for the protection of natural resources.
154	Current Issues of Specially Protected Natural Areas	Purpose: formation of ideas about the modern problems of specially protected natural areas, including anthropogenic and biospheric aspects. Content: Problems of OOPR. National peculiarities and their connection with the specifics of nature, history, mentality of the population, scientific traditions. Similarities and differences in the organization of protected areas in different countries. Preservation of the diversity of cultural landscapes, natural landscapes, biological species and other natural objects. Legislative and regulatory documents in the field of environmental protection and biodiversity conservation.

155	Nature Reserve RK	Goal.To give an idea of the basic principles and legislation of protection on the basis of scientific analysis of the features of the creation of specially protected natural territories in Kazakhstan and species of rare plants and animals. Content. Protection of flora and fauna in Kazakhstan. Problems of functioning of protected areas from the point of view of the impact of economic activity on the state of protected ecosystems. The problem of preserving unique landscapes, standards of untouched biogeocenoses, species diversity of living organisms (gene pool). Protection of rare and endangered relict and endemic (local) species, providing the necessary conditions for their reproduction. Biosphere reserves. Natural monuments. Nature reserves. National parks. Nature reserves of Kazakhstan
156	Information Biology	Objective: to form a holistic view of information, the specifics of information processes in biological and ecological systems, to gain experience in applying information approaches to the analysis of biological objects, processes and systems. Content: Scientific and informational activity in biology and ecology. Information systems in biology and ecology. information approaches (semantic, biocybernetic, semiotic) to the analysis of biological and ecological processes and systems. Biodiversicology, informational aspects of studying the structure and dynamics of biological diversity. Information indexes. Computer biology. Information technologies for data analysis and documentation of biological and environmental research results
157	Biological Monitoring of Environment	Purpose: formation of knowledge about the system of observations of biological objects, which allows to identify changes in the state of the biosphere under the influence of human activity. Contents: Biological monitoring is a priority method of modern environmental monitoring. Principles of monitoring.General monitoring structure. Classification of types of monitoring. Monitoring of impact factors - physical, chemical, biological factors; monitoring of the state of the biosphere - geographical monitoring (atmosphere, ocean, land surface with rivers and lakes) and biological monitoring. Monitoring of the state of impact factors and the environment; forecasting and assessment of the forecast state. Environmental monitoring programs, their application in monitoring.
158	Biodiversity and Protection of the RK Animal World	Goal. familiarity with the biodiversity of the animal world: systematics, morphology, species composition, reproduction, geographical distribution. Content. Biological diversity and sustainable use of animal resources. Specially protected natural areas and biodiversity. Methods for assessing the state of animal resources and ways to restore them. Methods for assessing the state of animal resources and ways to restore them. Threats to the biodiversity of animal species. Regulatory and legal framework for the conservation of fauna biodiversity both at the regional level and at the level of the republic and the world community.
159	Plant and Animal Resources of the RK, Rational Use, Protection	Goal. To give an idea of the methods of determining the state of plant and animal resources in the Republic of Kazakhstan, ways of their restoration and rational measures for their effective use. Content. The state of plant and animal resources of Kazakhstan, the structure and levels of biodiversity, flora and fauna. Possibilities of protection and rational use of plant and animal resources of the Republic of Kazakhstan. Methods for assessing the state of plant and animal resources and ways to restore them. Sustainable use of animal and

		plant resources. Ecosystem change from human action. Specially protected natural areas and biodiversity.
160	Environmental Problems of Plant and Animal world of Kazakhstan	Purpose: formation of knowledge about environmental problems, diversity of flora and fauna of Kazakhstan and effective ways to solve them. Content: environmental problems of Kazakhstan. Qualified implementation of practical activities for environmental protection and sustainable development in the republic. Normative documents of domestic and foreign policy in the field of protection and use of the natural environment. Biodiversity of plants and animals of Kazakhstan. Biospheric importance of biodiversity conservation. The impact of human activities on biodiversity. Endemic and rare plants, animals of Kazakhstan. Measures to protect them. Preservation of the gene pool of plants and animals of Kazakhstan.
161	Efficient use of Natural and Energy Resources in Oil Refining and Petrochemicals	The goal is to form technological and ecological thinking, rational use of material and energy resources of chemical technology, oil refining and petrochemistry Content: Research and solution of issues of greening of oil refining and petrochemistry processes. Economic and environmental aspects of the catalytic reforming process. Processing and disposal of waste gases of oil refining and petrochemical production. Ecological and economic aspects of the creation of circulating water supply systems for petrochemical production and oil refining. Fundamentals of physico-chemical wastewater treatment from petroleum products. Sources of formation of liquid and solid waste. Analysis of accidents and emergencies in the oil refining industry and hazard assessment. Emergency situations at petrochemical and oil refining facilities.
162	Environmental Issues and Food Products Safety	Purpose: To study the relationship between ecological issues and food safety in order to ensure qualitative and safe food products. Content: The main ecological factors affecting the quality of food products. Assessment of ecological risks. Analysis of biological, chemical and physical safety of food products. Methods for assessing food contamination. Legal framework and international standards in the field of ecology and food safety. Ecological certification and food labeling. Innovations in the field of environmentally responsible production and consumption of food products. Green economy
163	Geographic Problems of Environment Management and Forecasting	It considers geographic problems of environmental management and forecasting, issues of territorial management of resources and the region, environmental problems of the post-industrial world. Global problems of the modern stage of development of world civilizations. The study of the course contributes to the formation of knowledge and competence about geographical bases, issues of management and forecasting of environmental management, about the concept of sustainable development of the modern world. Regional management features and sustainable regional development.
164	Geographical Sciense in Context of Sustainable	The aim of the discipline: formation of modern geographical representations in the context of sustainable development. Content: Natural and cultural heritage as a fundamental geographical category. Modern geography and the context of sustainable development. A condition for sustainable, ecologically balanced development. Global problems within the framework of the concept of sustainable development of geographical science. The concept of sustainable development and the connection of geographical science.
165	Global and Topical	The subject "Global and current problems of sustainable development"

	problems of sustainable development	explores and analyzes the relationship between humanity and the environment within the framework of the concept of "sustainable development". The concept of sustainable development provides for the consideration of global and regional environmental, economic, political and social problems, as well as the solution of current problems.
166	Medical and Ecological Aspects of Sustainable Development	Target:Formation of knowledge of the methodology of medical and environmental assessment of the impact of the negative consequences of environmental pollution on human health and life, the ability to justify risk as an integral criterion for the sustainable development of society, the skills of applying in practice the preparation of medical and environmental sections of programs on the strategy of society's transition to sustainable development. Content:Man in the system of medical and ecological relations with the environment. Philosophical and methodological aspects of the relationship between medical and environmental foundations for the sustainable development of society. Philosophical and methodological problems of interaction between medicine and ecology. Medico-environmental aspects of environmentally safe sustainable development management. Medical and environmental parameters of sustainable development. Formation of risk culture as a condition for environmentally safe sustainable development. Human health in ecological and demographic culture. Health as a social value.
167	Fundamentals of Environmental Law	Target:The study of the concept, subject, method, principles and system of environmental law of the Russian Federation, the main types of its sources, environmental rights and obligations of citizens, types of liability for causing harm to the environment, as well as the acquisition of skills for using the acquired knowledge in the practical activities of business entities and protecting environmental rights. Content:The concept and principles of environmental, environmental and natural resource law.Sources of environmental law. The structure of the legislation of the Russian Federation in the field of environmental protection. Ecological and legal regime of land use. Ecological and legal regime of subsoil use, water use and forest use. Ecological and legal regime for the use of wildlife. Ecological and legal protection of atmospheric air.Environmental rights and obligations. Protection mechanisms. The concept of legal liability for environmental offenses. Types of environmental and legal responsibility.
168	Basis of Law for Environmental Protection	Target:Mastering the norms of environmental law, analyze, draw conclusions and justify your point of view on environmental legal relations and apply legal norms to solve practical situations. Content:Environmental law as an independent branch of law. Environmental and legal protection of individual OS components. Ecological and legal regime of land use. Ecological and legal regime of subsoil use, water use and forest use. Ecological and legal regime for the use of wildlife. Ecological and legal protection of atmospheric air. Ecological rights and obligations of citizens of the Russian Federation. Ecological and legal responsibility.
169	Ecological Safety Tehnology in Industry*	Target:Represent technical and environmental safety, protection of human life, legal norms and economic problems, development of regulatory documents, including in the state language for declaring the level of safety of the components of chemical production and their hazard class as a whole Content:Bbasic concepts and methodological

		principles for the formation of non-waste industries. Basic concepts and methods of organizing low-waste production, requirements for non-waste technological processes and apparatuses, problems of developing highly efficient technological processes, environmental protection processes and technologies. Mathematical modeling of technological processes taking into account the criteria of chemical-technological and environmental factors for performance indicators.
170	Environmental Mapping and GIS	Purpose: obtaining new skills in processing and creating spatial data, including remote sensing data using GIS technology tools and using them to solve environmental problems. Contents: Monitoring and forecasting of the dynamics of changes in the state of observed objects and territories in space and time; Construction of thematic maps of specified territories; Modeling of natural and anthropogenic processes; Early detection of adverse factors. The formation of ecological cartography, methodological developments and approaches, the basic principles of drawing up ecological maps, as well as modern cartographic methods. An example of ecological maps created in a country using GIS, An analysis of the features of compiling ecological maps using modern geoinformation technologies, the type of a computer geodata database, Environmental indicators of the study region Static object and their development in dynamics.
171	International Cooperation in the Field of environmental protection	Target:Formation of an understanding of the legal framework and the basic principles of international cooperation, international conventions and agreements in the field of environmental protection and natural resources. Content:Thebiosphere as a human habitat that does not have state borders. International conferences and protocols within the framework of international cooperation in the field of environmental protection and nature management. International organizations and programs for environmental protection and nature management.Participation of the Russian Federation in international conventions and organizations. Legislation of the Russian Federation regarding international cooperation in the field of environmental protection and rational nature management.
172	Methods for eliminating the accumulated harm of the environment	Target:Formation of research, interpretive and creative skills in the method of designing modern technological systems that ensure efficient and environmentally friendly waste disposal. Content:Classification of technological solutions for the rehabilitation of objects of accumulated harm. Works on reclamation and arrangement of disturbed lands. Examples of obtaining secondary products in the processing of accumulated waste (not by biotechnological means). Biotechnological processing of accumulated organic waste. Thermal methods of elimination of harm to the environment during the accumulation of waste.
173	Environmental damage assessment*	Target:Mastering research and production and technological work in the field of environmental protection and obtaining new methods for assessing, analyzing and studying environmental parameters. Content:The concept of OS harm. Ecological and legal responsibility Legal bases and mechanism of compensation of ecological harm. Features of compensation for environmental damage caused to individual components of the environment: soils, water bodies, biological resources.Calculation of damage caused to the environment due to violation of water legislation. Calculation of damage caused to environmental protection due to violation of land legislation

		Calculation of damage caused to environmental protection due to violation of forest legislation. Features of reclamation of disturbed landscapes depending on the type of pollution (mechanical, chemical, physical, biological).
174	Forensic examination of environmental objects	Target:The study of the subject, tasks, objects, methods and types of forensic environmental expertise, as well as the acquisition of skills in the use of special knowledge in legal proceedings to establish and assess the actual circumstances of the negative anthropogenic impact on the environment. Content:Fundamentals of the use of special environmental knowledge in legal proceedings.The concept, stages and participants of criminal, civil and arbitration processes, proceedings in cases of administrative offenses. The concept of special knowledge, their types and forms of use in the process of legal proceedings.Methodological bases for the production of forensic environmental expertise.Subject, objects and tasks of SE. Methodology of forensic research.Organizational bases of forensic environmental expertise. Subjects of forensic environmental expert activities. Appointment of SE. The process of forensic research, its stages. The structure and content of the expert"s opinion.
175	Environmental toxicants	Target To form a systematic understanding of the main patterns of interaction between living organisms and toxicants, aimed at the rational use of fertilizers and pesticides to reduce and prevent pollution of agroecosystems by toxicants and obtain environmentally friendly agricultural products.Physico-chemical properties of industrial poisons affecting toxicity. Content:Fundamentals of toxicants in the environment. General information about the toxicity of substances. Classification of toxicants. Maximum permissible concentrations. Classification of harmful substances according to the degree of danger. KOVOIO. Chemical disease. Poisoning. First aid for various poisonings. Toxic lesions of individual organs and systems of the body. Toxicological impact of modern production.
176	Environmental regulation	Target:Andinforming about current trends in the development of the environmental regulatory framework and its implementation, the role of environmental regulation as a basis for effective environmental management and the formation of a sustainable economy, developing skills in developing environmental standards and assessing the sustainability of natural complexes. Content:Environmental regulation in the system of nature management. Theoretical foundations of environmental regulation. International cooperation in the field of environmental regulation. Harmonization of environmental standards in the field of impact on the atmosphere. Harmonization of environmental standards in the field of impacts on surface waters. Harmonization of environmental standards in the field of impacts on groundwater. Harmonization of environmental standards in the field of impacts on soil and land resources. Harmonization of environmental standards in the field of waste management. Understanding the best available technologies. Rationing of specific pollutants. Ecological regulation and economics. Ecological regulation and ecological design.
177	Environmental audit	Target:Formationspecialknowledge on the creation and implementation of an environmental audit procedure, taking into account the peculiarities of environmental and legal regulation of this area in the Russian Federation and abroad. Content:Introduction. Basic terms and definitions. Stages of formation and development of the environmental

		audit system. International standards of environmental management system. Environmental Auditing Standards. Types, forms, objects and subjects of environmental audit. General rules, procedure and procedures for environmental auditing. Eco-auditors and eco-audit organizations, groups. Information support of ecological audit. The procedure for accreditation and certification of eco-auditors. General methods of environmental auditing. The concept and essence of pre-insurance environmental audit.
178	Ecological control and monitoring of natural technogenic ecosystems	Target: Formation of creative thinking, integration of fundamental knowledge of the main methods of monitoring with subsequent processing and analysis of research results for making organizational and managerial decisions. Content:Types of environmental monitoring and ways of its implementation. Environmental monitoring. Definition. Main tasks and goals. Feedback and control. Classification. The main tasks of GEMS. National monitoring. Organization and tasks. EGSEM. Regional environmental monitoring. Monitoring of Moscow. Local environmental monitoring. Monitoring the source of pollution. Background monitoring. Main goals. Organization of background monitoring.System of methods of observation and ground support.Ecological and analytical monitoring of the state of environmental components. Mathematical modeling and forecasting of dynamic processes in ecosystems. Mathematical modeling and forecasting of dynamic processes in ecosystems. Topics for self-study.
179	Ecological insurance	Target:Formation of knowledge of the basic provisions of the socio-economic essence and goals of insurance, and development of skills in applying risk management methods, as well as the principles of concluding environmental insurance contracts. Content:Fundamentals of environmental insurance. Eco-insurance methodology in Russia and abroad. Legal bases of eco-insurance in the Russian Federation and abroad. actuarial calculations. Insurance premiums and insurance rates. Methodological approaches to the calculation of tariff rates in environmental insurance. Assessment of the possibility of developing an emergency environmental situation. Pre-insurance assessment of the environmental hazard of the object. analysis of the development of an emergency environmental situation. Development scenarios. Selection of incidents. Event tree. Methodology and tools for environmental insurance. The practice of implementation and prospects for the development of theoretical and methodological aspects of environmental insurance in Russia.
180	Actual Problems of Geoecology and Landscape Ecology	The purpose: The study and solution of theoretical and applied problems of geoecology and landscape science for the purposes of rational nature management, creation and preservation of the optimal environment for the life of human society with minimal changes in the environment. Contents: Explores changes in the Earth"s geospheres under the influence of human activities and emerging geoecological problems. Considers the basic concepts, object, tasks, methods, evolution of views, in solving urgent problems of geoecology, reclamation of agricultural land and protective forest plantations. He studies the theoretical and methodological foundations for solving urgent problems of geoecology and landscape ecology. Systemic nature of topical problems of geoecology and landscape ecology.
181	International Cooperation in the Field of Environmental	The purpose: to give an idea of the legislative framework and the basic principles of international cooperation, international conventions and

	Protection	agreements in the field of environmental protection and natural resources. Contents: Objects of international cooperation in the field of ecology and nature management. Forms and principles of international cooperation in the field of environmental protection. International organizations. Intergovernmental environmental organizations. Non-governmental international organizations. International Union for the Conservation of Nature. International legal organization (MYO). Club of Rome (RK). GREENPEACE.
182	Modern Methods of Distance Reconnaissance in Environmental Research	The purpose: the formation of undergraduates" ideas about the essence and prospects of using remote methods in the study of biological resources and gives practical skills in working with aerospace materials Contents: Considers the issues of using remote methods in solving problems of environmental safety related to assessing the level of ecosystem safety. Remote methods used to assess biodiversity, matter and energy flows, and ecosystem productivity. Remote methods for studying new threats to environmental safety. Directions for the development of remote methods for assessing the environmental safety of territories.
183	Ecological Standardization, Certification and Licensing	The purpose: Studying the basics of environmental standardization, certification and licensing in order to ensure environmental safety Contents: Considers the activities to establish norms, rules and characteristics in order to ensure product safety, State standards of the Republic of Kazakhstan, international standards, and Kazakhstan classifiers of technical and economic standardization. Researches the standards of industries, enterprises, scientific, technical, engineering societies and other public associations, government bodies that carry out standardization, licensing of certain types of activities.
184	Organization of Environmental Audit	The purpose: The study of sets of measures that allow for an accurate assessment of the activities of a business entity in order to confirm its compliance with established standards or identify environmental violations and give recommendations for elimination. Contents: Considers the principles of the Environmental Code of the Republic of Kazakhstan. Regulation of public relations in the field of interaction between man and nature, environmental audit of the activities of enterprises that have an impact on the environment. Discusses and details decisions on the adoption of legal and regulatory documents in the field of environmental monitoring.
185	Environmental Impact Assessment	The purpose: Formation of the knowledge base on the assessment of the impact of economic activity on the environment, the study of the procedure and procedure for assessing the impact on the environment in accordance with the current legislation. Contents: Considers the assessment and stages of environmental impact of industrial enterprises, the procedure for conducting environmental impact assessment. Compares the classification of environmental impact assessment objects in terms of significance and completeness of the assessment. Examines environmental impact assessment documentation. Develops methodological support for environmental impact assessment.
186	Assessment and Management of Environmental Rrisk	The purpose: familiarization of undergraduates with the main factors of environmental risk, assessment and management of environmental risk Contents: Considers the main provisions of the theory of risk, the concept, sources of risk and risk factors. He studies the development of risk at industrial facilities, the basics of risk analysis, assessment and

		management methodology: quantitative risk indicators, acceptable risk, risk comparison, environmental risk management in industry and energy, environmental assessment of projects. Explores the environmental risk assessment and management of major accidents.
187	Modern Methods and Measuring Instruments in Ecology	The purpose: theoretical and practical training of undergraduates in measurement methods, the acquisition of skills in working with instruments for monitoring and measuring parameters, environmental pollution; formation of a system of knowledge, skills and abilities for students to use Contents: Considers methods and means of monitoring and controlling the state of the environment, contact methods for monitoring the environment, remote methods for monitoring the environment, biological methods for monitoring the environment. Analyzes environmental control, modern methods of air pollution control, methods of atomic spectroscopy, reporting on the results of instrumental measurements.
188	Environmental Assessment and Mapping of Localities in South Region	The purpose: to give a holistic view of environmental mapping as a research method and a means of spatial mapping of environmental problems and situations. Contents: Explores the theoretical foundations of environmental mapping and assessment of the South Kazakhstan region, the content and methods of compiling environmental maps, mapping atmospheric problems, mapping land water pollution, mapping physical pollution, mapping pollution of soils and other depositing media, mapping geological and geomorphological pollution, Considers the bioecological aspects of mapping, geographic analysis of pollution.
189	Ecological Safety Tehnology in Industry	The purpose: Formation of undergraduates" knowledge in the organization and development of environmentally friendly technologies in production Contents: Considers the basic concepts and methodological principles of the formation of non-waste industries, the basic concepts and methods of organizing low-waste industries, the requirements for non-waste technological processes and apparatus, the problems of developing highly efficient technological processes, environmental protection processes and technologies. Analyzes mathematical modeling of technological processes, taking into account the criteria of chemical-technological and environmental factors for performance indicators.
190	Ecological control and monitoring of natural technogenic ecosystems	The purpose: forms approaches to production activities that ensure compliance with environmental and resource-saving rules, requirements and norms for any human activity associated with a change in the state of the environment Contents: Goals and objectives of environmental monitoring of natural and technogenic ecosystems. Objects and subjects of monitoring. Organization of observations, sampling and sample preparation in environmental monitoring. Implementation of environmental control. Procedures and operations of the technological cycle of chemical-analytical control of environmental pollution. Chemical and physico-chemical methods of eco-analytical control of natural-technogenic ecosystems.
191	Environmental management	The purpose: To study ways to manage environmental activities in an organization, develop activities and processes to improve environmental performance to ensure environmental safety and a systematic approach to minimizing harmful effects on the environment. Contents: Examines the system of environmental management. Environmental costs of production and ways to reduce them.

		Production costs. Damage from environmental pollution. The environmental component of production costs. Types of environmental standards. Maximum permissible norms of environmental load. Norms of sanitary and protective zones. Administrative methods of environmental management. Waste management system. ISO 14000 standards system.
192	Environmental Monitoring of Harmful Chemical Compounds-Superecotoxicants	The purpose: The study of methods for monitoring the state of the natural environment and the level of its pollution, as well as information support for the management of environmental activities and environmental safety Contents: Considers environmental and analytical monitoring of pollution as part of a unified state system of environmental monitoring. Main tasks and schemes of ecological-analytical monitoring. Normative-technical and methodological support, legal regulation of ecological and analytical monitoring of superecotoxicants. Classification of superecotoxicants: physical and chemical properties and distribution in natural environments. Classification of superecotoxicants according to the degree of danger to the environment. The main sources of superecotoxicants. Methods for the determination of superecotoxicants.
193	Examination and Monitoring of Ecological Nature Management Safety	The purpose: familiarization of undergraduates with the types of environmental activities, the system of norms and rules, regulatory documentation for design, rational use of natural resources, environmental safety. Contents: Explores the tasks of environmental monitoring and expertise, environmental safety of nature management, modern methods of environmental expertise, the procedure for conducting state environmental expertise in an interdisciplinary scientific direction, combining research into the composition, structure, properties, processes, physical and geochemical fields of the Earth"s geospheres as a habitat for humans and other organisms.
194	Modern problems of mathematical modeling and optimization of automation objects	Discusses the problems of mathematical modeling and optimization of automation objects, ecosystems, basic concepts classification of the contents and volume of the outputs of industrial and household crawls, the existing methods for treatment of industrial and domestic emissions.
195	Systems for Standardization of Occupational Safety and Environmental Protection	Purpose: application of general technical and special standardization methods for the formation of system management in the field of occupational safety and environmental protection, legislative and regulatory framework. Content: The main activities of state bodies and enterprises in the field of labor protection and safety, environmental protection. The main objects of standardization of labor safety and environmental protection.General scientific methodology, logic and technology for conducting research work on the examination of regulatory and technical documentation in the field of occupational safety and health.
196	Modern Problems of Environmental Management and Life Safety Management	Purpose: systematization of modern problematic issues of environmental management and life safety in the practice of enterprises and organizations with the solution of methodological and methodological tasks for their improvement. Content: Legal framework and regulatory documents that establish requirements for the health and safety of personnel and environmental protection. Main trends in the development of international systems in the field of environmental management and life safety management. Development, implementation and integration of environmental management and life

		safety management systems in the overall management system of the enterprise.
197	Resource-Saving Technologies in Oil Products Provision	Purpose - formation of skills for assessing innovative risks during the introduction of new technologies, equipment and systems and for the effective implementation of the process of reducing pollution of natural resources during the operation of gas and oil pipeline transport facilities. Content: Resource-saving technologies in the construction of transport facilities, storage and distribution of gas, oil and petroleum products Reduction of losses of gas, oil and petroleum products in pipeline transport, storage and distribution. Ways to reduce electricity consumption during transportation of gas, oil and petroleum products. Use of secondary energy resources. Assessment of the environmental impact of gas, oil and petroleum products transportation, storage and distribution facilities.
198	Industrial Ecology of Hydrocarbon Systems	Purpose - formation of skills of management of technological processes of processing of hydrocarbon raw materials, production of organic substances in compliance with the safety of life and environmental cleanliness. Content: Basic concepts of ecology of processing of hydrocarbon systems. Environmental problems of processing of hydrocarbon systems. Environmental monitoring. General principles of the organization of monitoring systems at hydrocarbon processing plants. Production of hydrocarbon systems with improved environmental characteristics, environmental quality management. Industrial and environmental safety in the processing of hydrocarbon systems. Environmental quality management, industrial and environmental safety in the processing of hydrocarbon systems.
199	Use of Man-made Raw Materials in the Construction Materials Industry	Purpose: Formation of a system of knowledge, skills and abilities for the reasonable selection and use of technogenic raw materials in the construction materials industry. Contents: State, prospects and problems of the use of technogenic mineral raw materials. Technogenic waste as a raw material base for obtaining modern building materials. Types of man-made industrial waste. Classification of technogenic waste by chemical and mineralogical composition. Justification of the choice of technogenic raw materials for the production of building materials and products, depending on the purpose and conditions of their operation. Processes of structure formation during technological processes.
200	Energy-saving Building Materials	Purpose: To develop skills and the ability to find rational solutions when choosing and using materials of various nature to increase energy saving of objects under construction and thermal modernization of existing ones. Contents: Theoretical, practical, economic aspects of increasing energy saving in construction, ways to reduce energy consumption aimed at the construction of energy-saving buildings or houses that do not require heating, new concepts and provisions adopted on the basis of the Law of the Republic of Kazakhstan "On Energy conservation and energy efficiency" are considered. Modern concepts of heat transfer, classification of energy-saving materials, their basic properties and structure, fundamentals of technology, criteria for selection and application in construction are studied.
201	Transport Infrastructure and Environment	Purpose: Formation of world outlook based on the priority of ecologization of transport and finding ways to reduce the negative impact of vehicles and transport infrastructure on the environment. Content: Organization of production, profile, specialization and

		features of transport infrastructure facilities. The mechanism of domestic and foreign experience in the formation of transport infrastructure. The legal framework in the field of environmental protection in the transport system. Forms skills to identify problems in the analysis of specific situations of transport infrastructure, propose ways to solve them and assess the expected results, taking into account environmental safety.
202	Environmental safety of transport equipment	Purpose: Study of the most effective solutions to assess and reduce the negative impact of vehicles on the environment as part of the creation of unified transport and logistics networks. Content: Environmental transport problems, including in the Republic of Kazakhstan. Environmental monitoring, its functions, components and types. Analysis and evaluation of natural and anthropogenic environmental processes and possible ways of their regulation. Calculation methods for assessing the anthropogenic impact of transport on the environment. Environmental requirements for vehicles of different types and strict environmental standards that meet current international requirements.
203	Ecological Management	Purpose: Obtaining special knowledge by undergraduates in environmental management and protection management for organizing and managing the greening of production at the enterprise. Contents: Disclosure of the concept of "environmental management" and its system, general provisions of environmental management. Determination of the system of international standards ISO 14000 and environmental management for the enterprise. Assessment of the initial environmental situation at enterprises and planning activities in the field of environmental management. Commentary on the organization of activities in the field of environmental management and the regulatory framework for environmental management. Comparison of elements of the environmental management system at various stages of the investment process.
204	Transport Infrastructure and Environment	Purpose: The formation of a worldview based on the functioning of which is the priority of greening transport and finding ways to reduce the negative impact of vehicles and transport infrastructure on the environment. Contents: Organization of production, profile, specialization and characteristics of transport infrastructure facilities. The mechanism of domestic and foreign experience in the formation of transport infrastructure. The legal and regulatory framework in the field of environmental protection in the transport system. Forms skills to identify problems in the analysis of specific situations of transport infrastructure, propose ways to solve them and assess the expected results, taking into account environmental safety.
205	Environmental safety of transport equipment	Purpose: Study of the most effective solutions to the issues of assessing and reducing the negative load of vehicles on the environment within the framework of creating unified transport and logistics networks. Contents: Environmental transport problems, including in the Republic of Kazakhstan. Environmental monitoring, its functions, components and types. Analysis and evaluation of natural and anthropogenic environmental processes and possible ways of regulating them. Calculation methods to assess the anthropogenic impact of transport on the environment. Environmental requirements for vehicles of different types and strict environmental standards that meet current international requirements.

206	Innovative Technologies for the Production of Garments	The purpose: Assesses the impact of innovative technologies on the technological processes of garment production. Content: Innovative technologies for the production of textile materials used in the manufacture of workwear. Methodology for evaluating innovative projects for the development of light industry. Marketing research using IT technologies. "Smart" fabrics. Technical aesthetics and innovations in clothing design. Clothing of the future, technology, environmental friendliness, economy.
207	Methods of Optimization and Statistical Processing of Experimental Results	The purpose: To form a methodological and theoretical basis for solving problems of modeling and optimization of technological processes of light industry. Contents: Basic methods of statistical analysis of experimental data. Statistical methods of experiment planning. Methods for selecting empirical formulas. Approximation of experimental points. Mathematical modeling of technological processes taking into account design and technological, aesthetic, economic and environmental requirements of consumers.
208	Chemical and Physico-chemical Methods of Analysis of Environmental Objects	Purpose: to study the theoretical foundations of physical and chemical methods for analyzing the qualitative and quantitative composition of air, natural and waste waters, soils, soils, bottom sediments and biological objects; Content: features of the design and operation of equipment for the preparation of samples of natural objects and measurements by electrochemical, chromatographic , spectral methods of analysis; specialized programs for processing the results of analyzes.
209	Environmental Problems of Natural and Technical Systems	Purpose: Considers various aspects of the emergence of environmental problems of natural and technical systems and forms technogenesis . Contents: Mechanisms of formation and restoration of natural and man-made objects. Assessment of the natural and technical system as a structural and functional unit of the biotechnosphere . PTS optimization principles . Main natural and technical systems: urban and rural settlements, agricultural, energy systems, industrial zones, transport and communications, mining enterprises, recreational systems
210	Environmental Aspects of Green Technologies	Purpose : and studying the role of "green" technologies in solving the most important problems of mankind. Content : Studied the classification of "green" technologies , the main types of renewable energy sources , geothermal energy and heat pumps , the problems of measuring the efficiency of renewable energy sources , and the analysis of trends in the development of "green" technologies and the risks of introducing "green technologies , but analysis of measures of international regulation of anthropogenic impact and stimulation of "green" technologies .
211	Innovative Technologies for Processing and re-use of Liquid, Solid and Gaseous Wastes	Purpose: Consideration of the relevance and importance of low-waste and waste-free technologies, their roles and places in the concept of sustainable development of the biosphere, waste-free and low-waste production processes. Contents : Study of methods for cleaning and neutralizing waste gases, industrial waters, recycling and solid waste. Innovative technologies for processing waste from the chemical, metallurgical, mining , construction, and industry.
212	Systems of Information Support of the State of Life Safety and Environmental Protection	Purpose: formation of skills in the analysis and application of information systems aimed at ensuring safety and protecting the environment. Content: Consideration of the principles of preventive risk management and minimization of negative impact on the environment. Study of methodological approaches to conducting

		research in the field of information systems for ensuring life safety and environmental protection. Research and application of modern information technologies such as artificial intelligence, machine learning, Internet of things and big data to improve the efficiency of information systems for security and environmental protection.
213	Waste of Kazakhstan and Problems of Their Disposal	Objective: to deepen knowledge in the field of industrial waste, focused on various industries in Kazakhstan, and explore new methods of environmental engineering. Contents: Analysis of legislation and regulations governing waste management in Kazakhstan. Study of problems associated with waste in various sectors of the economy and regions of Kazakhstan. Development of new innovative approaches and technologies for efficient waste disposal, taking into account the peculiarities of Kazakhstan. Development of strategies and solutions for sustainable development and transition to a green economy in the context of waste management.
214	Methods for Assessing the Impact of Hazardous and Harmful Production Factors on Humans	Purpose: deepening knowledge in the field of assessment and analysis of the impact of hazardous and harmful production factors on human health and well-being. Content: Consideration of advanced methods and approaches to risk assessment and analysis of the impact of production factors on humans. Assessment of the magnitude and duration of the impact of production factors on the health of workers using appropriate measures and indicators. A study of the influence of various factors, such as the individual characteristics of workers and the nature of the working environment, on the effectiveness of risk control and management measures.
215	Ecological And Economic Problems Of Exploitation Of Natural Resource Potential	Purpose: Formation of deep research skills and development of new approaches, methods and technologies for the exploitation of natural resource potential in order to solve ecological and economic problems. Content: Analysis of natural resource potential and its use: ecological and economic aspect. Ecological and economic assessment of the components of the natural resource potential of Kazakhstan. Natural resource potential of the regions of Kazakhstan and the problems of its rational use. Ecological, socio-economic aspects of the protection of the natural resource potential of the Republic of Kazakhstan. The problems of preserving the unique natural resource potential and the possibility of its effective use for the development of Kazakhstan. Improving the economic efficiency of using the natural resource potential of Kazakhstan.
216	Scientific and Theoretical Principles of Creating Low-energy and Waste-free Technologies of Binding Materials	Purpose: formation of a systematic understanding and application of the principles and methods for creating low-energy and waste-free technologies for the synthesis of binders, the principles of energy and resource saving in the technology of silicate materials and products, issues of optimizing the processes of grinding raw materials and cement, firing clinker, gypsum, lime, obtaining dry building mixtures with the disposal of large-tonnage waste from the metallurgical, chemical and energy industries; formation of skills for choosing rational schemes for grinding and adjusting raw materials, low-energy roasting, utilization of technogenic raw materials. Content: Design, creation and implementation of low-energy technologies for clinker burning, production of cements and binders and products. Development of principles for the creation of low-energy and waste-free technologies for dry building mixtures, gypsum, magnesia, low-clinker and finely ground binders. Science-based design,

		implementation and adaptation of low-energy and waste-free technologies
217	Complex Processing of Technogenic Wastes of Petrochemical Industries	Purpose - formation of skills for the development of economically accessible and technically feasible technologies for involving waste from petrochemical industries in resource turnover. Contents: Ecological characteristics of petrochemical industries. Processing of waste from oil refining and petrochemicals. Complex processing of oil sludge. Recycling of plastic waste. Recycling of rubber waste. Processing of waste and by-products of petrochemistry into multifunctional additives for elastomers. Waste from fuel gasification processes and their processing. Processing of acid tar. Regeneration of waste oils.
218	Modern Problems of Petrochemistry	Purpose - formation of knowledge about the current state and promising areas of development of theoretical petrochemistry and industrial practice of chemical processing of petroleum raw materials. Contents: The history of the development of petrochemistry, its current state. The main directions of chemical processing of petroleum hydrocarbons. New catalytic processes in petrochemistry. The main theoretical problems of petrochemistry: methods for establishing detailed mechanisms of petrochemical reactions, methods for increasing selectivity, conducting petrochemical reactions under extreme conditions, increasing the efficiency of catalysts and catalytic systems. Environmental problems. Prospects for the development of petrochemistry. New methods of extraction and purification of crude oil. Development of new research methods for the mechanisms of petrochemical reactions and methods of their regulation. Development of new technological options for conducting petrochemical reactions (membrane catalysis, supercritical solvents, plasma reactors, etc.). Development of waste-free combined industries.