

Ministry of Science and Higher Education of the Republic of Kazakhstan
Korkyt Ata Kyzylorda University
Institute of Engineering and Technology
EP «Electric Power Engineering, Technosphere Safety and Ecology»



SYLLABUS
Module №1 - Socio-cultural knowledge
ETD 2101- Ecology and sustainable development

Educational Program: 6B05283-Ecology and Nature Management

Course: - 3

Academic period: -3

Language of instruction:- Russian

Discipline Status: OOD/CV

Number of credits: 3

Total number of hours: 90

Lecture:15

Practical training: 15

SROP: 5

SROP: 50

Lecturer: Master, Senior Lecturer S.J.Kuzhamberdiyeva, WhatsApp phone number 8777 229 4817, E-mail: k_svetlana07@mail.ru.

Teacher(practical, seminar, laboratory classes, SROP,SRO): S.J.Kuzhamberdiyeva, Master, Senior Lecturer, WhatsApp phone number 8777 229 4817, k_svetlana07@mail.ru.

Lectures, practical classes: main academic building 9, auditorium 205.

Office hours: (according to the teacher's schedule)

Syllabus considered at the meeting of EP «Electric Power Engineering Technosphere Safety and Ecology»

Protocol № 1 « 28 » 08 2023

Head of EP  G.K. Sydykova

Syllabus reviewed and approved by the Institution of Engineering and Technology Academic Quality Committee meeting

Protocol № « 1 » 31 08 2023

Chairman of the Quality Committee  B. B. Abzhalelov

Purpose and objectives of the discipline: To familiarize students with environmental problems in the world and Kazakhstan; with the basic methods of observation of the environment and restoration of natural environments. Features of the influence of environmental factors on living organisms. The concept of sustainable development. Rational use of natural resources. To form a holistic view of the basic laws of sustainable development of nature and society.

Objectives:

- to study the basic regularities of functioning of living organisms, ecosystems of different levels of organization, the biosphere as a whole and their sustainability;
 - to form modern ideas about concepts, strategies and practical tasks of sustainable development in different countries and RK;
 - to form in students a broad comprehensive, objective and creative approach to discussing the most acute and complex problems of ecology, environmental protection and sustainable development.
- rational use of natural resources

Competencies formed during the study of the discipline:

- - the basic regularities determining the interactions of living organisms with their environment;
- - the distribution and dynamics of the number of organisms, the structure of communities and their dynamics;
- - regularities of energy flow through living systems and the cycle of substances, functioning of ecological systems and the biosphere as a whole;
- - basic principles of nature protection and rational nature management;
- - socio-ecological consequences of anthropogenic activities;
- - concept, strategies, problems of sustainable development and practical approaches to their solution at global, regional and local levels.

Be able to:

- - Identify and analyze natural and anthropogenic ecological processes and possible ways of their regulation;
 - - understand modern concepts and strategies of sustainable development of mankind, aimed at systematic change of traditional forms of economy and lifestyle of people in order to preserve the stability of the biosphere and the development of society without catastrophic crises;
- use the acquired knowledge about the regularities of interaction between living organisms and the environment in practical activities to preserve sustainable development.

To acquire: skills of analysis of ecological processes, setting of specific tasks and priorities of sustainable development of nature and society and use of obtained knowledge to solve ecological problems; knowledge on regularities of biosphere development and conditions of preserving its sustainability, as well as implementation of sustainable development ideas in different countries, including the Republic of Kazakhstan.

Prerequisites: not required

Post-requisites: Environmental Computer Modeling.

I. Technological map of the discipline

Week	Title of topics	Hours	Type of activity	Pedagogical technologies used (links to platforms)	Form of control	Literature
Module № 1 «Basic Concepts in Ecology»						
1	Lecture 1. Topic: The concept of ecology, formation and development of ecology as a science. Purpose and tasks, methods of ecology. Place and role of ecology in solving modern economic and political problems. 1.The concept of ecology, formation and development of ecology as a science. 1. 2.Purpose and tasks, methods of ecology. 3.Place and role of ecology in solving modern economic and political problems.	1	Interactive lecture, presentation	Jigso, Platonus, Google classroom Course codes: vzdjdbg ZOOM	form: group outline	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
	Practical training 1. Topic: General regularities of environmental factors impact on the actions of living organisms. The most important abiotic factors and adaptations of organisms to them. Objective: to consolidate the classification of environmental factors on the actions of living organisms. Class content: frontal questioning on the topic taking into account the following questions: 1.Ecological factors and their classification. 2.Biotic, abiotic and anthropogenic factors. 3.Limiting factors. 4.Stenobiont and eurybiont organisms.	1	Interactive group work, microgroup work, presentations	Question Answer, Synquain, Test Jigso Platonus, Google classroom Course codes: vzdjdbg ZOOM	Kahoot test, presentation report Microgroup presentations	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
	SROP 1. Topic: General regularities of the impact of environmental factors on the actions of living organisms. The most important abiotic factors and adaptations of organisms to them. Objective: to consolidate the classification of environmental factors on the actions of living organisms. Class content: prepare a report or presentation 1. What environmental factors determine the existence of organisms. 2. What is the difference between a habitat and an ecological niche. 3. How the law of minimum is formulated. Who discovered it. 4. Formulate the law of tolerance. Who established this law.	1	Microgroup work, interactive presentations	Question Answer, Synquain, Test Jigsaw microgroup presentations Platonus, Google classroom Course Codes: vzdjdbg ZOOM	Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
	SRO 1. Topic: Classification of environmental factors and adaptations of living organisms to them	5	Microgroup work interactive presentations	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
2	Lecture 2. Topic: Organism and environment, levels of organization of living matter. Environmental factors, their classification and influence on biological diversity 1. Laws of interaction between organisms and the environment. Habitat and the action of environmental factors. 2.The concept of environmental factors and their classification. 3.Joint action of ecological factors. 4.The concept of ecological niche.	1	Interactive lecture, presentation	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	form: group outline	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
	Practical lesson 2. Topic: General regularities of environmental factors impact on the actions of living organisms. The most important abiotic factors and adaptations of organisms to them. Objective: to consolidate the classification of environmental factors on the actions of living organisms. Class content: frontal questioning on the topic taking into account the following questions: 1.Ecological factors and their classification. 2.Biotic, abiotic and anthropogenic factors.	1	Microgroup work interactive presentations	Question Answer, Synquain, Test Jigsaw microgroup presentations Platonus, Google classroom Course codes: vzdjdbg ZOOM	Kahoot test, Frontal questioning, conversation - discussion on the topic	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267

	3.Limiting factors. 4.Stenobiont and eurybiont organisms.					
	SROP 2. Topic: General regularities of the impact of environmental factors on the actions of living organisms. The most important abiotic factors and adaptations of organisms to them. Objective: to consolidate the classification of environmental factors on the actions of living organisms. Class content Prepare a report or presentation. 1. What environmental factors determine the existence of organisms. 2. What is the difference between a habitat and an ecological niche. 3. How the law of minimum is formulated. Who discovered it.	1	Microgroup work interactive presentations	Question Answer, Synquain, Test Jigsaw microgroup presentations Platonus, Google classroom Course codes: vzdjdbg ZOOM	Kahoot test, Frontal questioning, conversation - discussion on the topic	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
	SRO 2. Topic: Formulate the law of tolerance. Who established this law.	5	Microgroup work interactive presentations	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	Kahoot test, Frontal questioning, conversation - discussion on the topic	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
3	Lecture 3. Topic: Terrestrial-air environment of life 1. Light regime. Ecological adaptations of plants and animals to the light regime of the terrestrial environment. 2. Temperature regime. Temperature adaptations of plants and animals 3. Humidity. Adaptations of organisms to the water regime of the terrestrial-air environment 4. Air as an environmental factor for terrestrial organisms 5. Soil and topography. Weather and climatic features Land-air environment in the life of living organisms. Edaphic environmental factors.	1	Interactive lecture, presentation	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	form: group outline	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
	Practical session 3. Topic: Ecology of populations. Levels of organization of living systems. Organism and conditions of its habitat. Laws of interaction between organisms and environment. Interspecific relationships. Objective: to consider the main regularities in the development of populations. Class content: write a glossary on this topic, taking into account the content of the following questions: 1. Levels of organization of living systems. Organism and conditions of its habitat. 2. The concept of population. 3. Ecological capacity of the environment. Laws of interaction between organisms and the environment. 4. 4. Basic forms of interspecies relationships in ecosystems.	1	Microgroup work interactive presentations	Frontal questioning, conversation - discussion on the topic Synquain, test Presentations of Jigso microgroups Platonus, Google classroom Course codes: vzdjdbg ZOOM	Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
	SROP 3. Topic: Population Ecology Purpose: to review the main regularities in the development of populations. Class content: prepare a report or presentation. 1. Factors determining population size. 2. characterize the concept of population stability.	1	Microgroup work interactive presentations	Frontal questioning, conversation - discussion on the topic Synquain, test Presentations of Jigso microgroups Platonus, Google classroom Course codes: vzdjdbg ZOOM	Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
	SRO 3. Topic: Basic population characterization	5	Microgroup work interactive presentations	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	Frontal questioning, conversation - discussion on the topic	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267

					Synquain, test Microgroup presentations	
	Lecture No. 4, 5 Topic: Notion of biocenosis, biogeocenosis, ecosystem. Functioning of terrestrial and aquatic ecosystems, their sustainability and development 1. The concept of biocenosis, biogeocenosis, ecosystem. 2. Concept of biogeocenosis. 3. Trophic relationships in ecology. 4. Role of man in the cycle of substances and energy flow. 5. Ecological pyramids. 6. Primary and secondary successions. 7. The last stable stage of ecosystems. 8. "The Law of Competitive Exclusion G.F. Gause.	2	Interactive lecture, presentation	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	form: group outline	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
4-5	Practical session 4-5. Topic: The concept of biocenosis. Species and spatial structure of biocenosis. Ecological niches. Ecological structure of biocenosis. Purpose: to consider the main mechanisms of maintaining the species structure of the community, the main provisions of the concept of biogeocenosis, the main mechanisms of stable existence of ecosystems. 1. The concept of biogeocenosis. 2. Interspecific competition as one of the main mechanisms of maintaining the species structure of the community. 3. Species structure of biocenosis. Spatial structure of biocenosis. 4. The concept of ecosystems. Classification of ecosystems. Cycle of substances. Energy flow in ecosystems. 5. Concept of ecosystem. 6. "Homeostasis" of ecosystem and "Equilibrium in Nature". 7. Role of trophic relationships in the distribution of energy flows in ecosystems. 8. Mechanism of energy transfer in ecosystems and consequences of its violation.	1	Microgroup work interactive presentations	Frontal questioning, conversation - discussion on the topic Synquain, test Presentations of Jigso microgroups Platonus, Google classroom Course codes: vzdjdbg ZOOM	Frontal questioning, conversation - discussion on the topic Kahoot test,	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
	SROP 4-5. Topic: The concept of biocoenosis Purpose: to review the main mechanisms of maintaining the species structure of the community, the main provisions of the concept of biogeocenosis. Class content: prepare a report or presentation. 1. Structure of biocoenosis. 2. Interspecies relations in a biocenosis. 3. Classification of ecosystems 4. Energetics of ecosystems.	1	Microgroup work interactive presentations	Frontal questioning, conversation - discussion on the topic Synquain, test Presentations of Jigso microgroups Platonus, Google classroom Course codes: vzdjdbg ZOOM	Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
	SRO 4-5. Topic: Concept of biotope, biocenosis, biogeocenosis and ecosystem. Food chains in an ecosystem as the basis of the biological cycle.	5	Microgroup work interactive presentations	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
6	Lecture 6. Topic: The doctrine of biosphere and biosphere-noosphere concept of V.I. Vernadsky. 1. Characteristic features of the biosphere 2. V.I. Vernadsky's doctrine of the biosphere 3. Cycle of substances in nature	1	Interactive lecture, presentation	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	form: group outline Platonus, Google classroom vzdjdbg ZOOM	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267

	<p>Practical lesson 6. Topic: Biosphere - global ecosystem of the Earth. Cycle of substances in nature. Vernadsky's doctrine of the biosphere. Noosphere as a new stage of biosphere evolution.</p> <p>Objective: to familiarize with the main components of the biosphere, to consider the mechanism of substance cycles and energy flows in the biosphere.</p> <p>Class content: individual questioning on this topic taking into account the following questions:</p> <ol style="list-style-type: none"> 1. Global role of living matter. 2. Main stages of biosphere evolution. 3. Cycle of substances and energy flows in the biosphere 	1	Microgroup work interactive presentations	Question Answer, Synquain, Test Jigsaw microgroup presentations Platonus, Google classroom Course codes: vzdjdbg ZOOM	Kahoot test, presentation report	<ol style="list-style-type: none"> 1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
	<p>SROP 6. Theme: Biosphere - global ecosystem of the Earth</p> <p>Objective: to familiarize with the main components of the biosphere; to consider the mechanism of substance and energy cycles in the biosphere.</p> <p>Class content: prepare a report or presentation.</p> <ol style="list-style-type: none"> 1. Biosphere is a global ecosystem of the Earth. 1. 2. Main stages of biosphere evolution. 2. 3. Influence of mankind on the biosphere. 3. 4. V.I. Vernadsky's theory of the noosphere. 4. 5. The role of living matter in the biosphere. 5. 	1	Microgroup work interactive presentations	Frontal questioning, conversation - discussion on the topic Synquain, test Presentations of Jigso microgroups Platonus, Google classroom Course codes: vzdjdbg ZOOM	Kahoot test, presentation report	<ol style="list-style-type: none"> 1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
	<p>SRO 6. Topic: Functions of living matter in the biosphere.</p>	5	Microgroup work interactive presentations	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	Kahoot test, presentation report	<ol style="list-style-type: none"> 1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267
7	<p>Lecture 7. Topic: Ecological and economic strategy to overcome the ecological crisis.</p> <ol style="list-style-type: none"> 1. Club of Rome. 2. Stockholm Conference on Sustainable Development. 3. UN Conference in Rio de Janeiro. 4. Aarhus Convention. 	1	Interactive lecture, presentation	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	форма: групповой конспект Platonus, Google classroom vzdjdbg ZOOM	<ol style="list-style-type: none"> 1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
	<p>Practical session 7. Topic: Ecological and economic strategy to overcome the ecological crisis. Club of Rome. Stockholm Conference on Sustainable Development. UN Conference in Rio de Janeiro.</p> <p>Objective: to consider the issues developed by the "Club of Rome" and the Stockholm Conference, classification of mineral resources and tasks of environmental management</p> <p>Class content: conversation-discussion on the topic within the framework of the following questions:</p> <ol style="list-style-type: none"> 1. The most important issues developed by the Club of Rome. 2. Solution of environmental problems at the Stockholm Conference. 3. The role of the Aarhus Convention in supporting the protection of human rights to a favorable environment. 4. Goals and objectives of environmental management. 	1	Microgroup work interactive presentations	Frontal questioning, conversation - discussion on the topic Synquain, test Presentations of Jigso microgroups Platonus, Google classroom Course codes: vzdjdbg ZOOM	Frontal questioning, conversation - discussion on the topic Kahoot test, presentation report	<ol style="list-style-type: none"> 1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
	<p>SROP 7. Theme Environmental and economic strategy to overcome the environmental crisis. Club of Rome. Stockholm Conference on Sustainable Development. UN Conference in Rio de Janeiro.</p> <p>Objective: to examine the issues developed by the Club of Rome and the Stockholm Conference.</p> <p>Class content: prepare a report or presentation.</p> <ol style="list-style-type: none"> 1. The purpose of the Club of Rome. 1. 2. The main documents of the Club of Rome. 2. 	1	Microgroup work interactive presentations	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	Frontal questioning, conversation - discussion on the topic Kahoot test, presentation report	<ol style="list-style-type: none"> 1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121

	SRO 7. Topic: Basel, Rotterdam, Stockholm, Aarhus Conventions.	5	Microgroup work interactive presentations	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
8	Lecture 8. Natural resources 1. Classifications of natural resources. 2. Mineral resources. 3. Fuel and energy resources. 4. Alternative sources of energy- Future energy	1	Interactive lecture, presentation	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	form: group outline Platonus, Google classroom vzdjdbg ZOOM	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
	Practical Session 8. Natural resources. Mineral resources. Fuel and energy resources. Methods used in the process of nature management. 1. Classification of natural resources. 2. Renewable and non-renewable resources. 3. Alternative types of energy.	1	Microgroup work interactive presentations	Question Answer, Synquain, Test Jigsaw microgroup presentations Platonus, Google classroom Course codes: vzdjdbg ZOOM	Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
	SROP 8: Natural Resources. Mineral resources. Fuel and energy resources. Methods used in the process of environmental management.	1	Microgroup work interactive presentations	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
	SRO 8. Natural resources as a means of existence of mankind.	5	Microgroup work interactive presentations	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
	Routine monitoring №1	1		Platonus	Test	
Module № 2: "Global Environmental Problems"						
9-10	Lecture 9-10. Topic Global environmental problems. The problem of the expanding greenhouse effect. 1. Causes contributing to the problem of greenhouse effect expansion. 2. The gas responsible for the heat balance of the planet. 3. Sources of greenhouse gases. 4. The adoption of the Kyoto Protocol. 5. The purpose of the Earth's ozone layer. 6. Causes contributing to the destruction of the ozone layer. 7. The adoption of the Montreal Protocol. 8. Measures taken by the RK to implement the Montreal Protocol.	2	Interactive lecture, presentation	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	form: group outline Platonus, Google classroom vzdjdbg ZOOM	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
	Practical session 9-10. The problem of the growing greenhouse effect. The problem of destruction of the Earth's ozone layer. Adoption of the Montreal Protocol. Measures taken by the RK to implement the Montreal Protocol. Objective: to examine the causes of the growing greenhouse effect Lesson content: Frontal questioning, conversation - discussion on the topic within the framework of the following questions. 1. Climate change is a global environmental problem. 2. Sources of greenhouse gases. 3. Adoption of the Kyoto Protocol. Objective: to consider the main reasons for the destruction of the Earth's ozone layer 4. The destruction of the Earth's ozone layer is a global environmental problem.	1	Microgroup work interactive presentations	Question Answer, Synquain, Test Jigsaw microgroup presentations Platonus, Google classroom Course codes: vzdjdbg ZOOM	Frontal questioning, conversation - discussion on the topic Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121

	5. Adoption of the Montreal Protocol. 6. Measures taken by the RK to implement the Montreal Protocol.					
	SROP 9-10. Topic: The problem of the expanding greenhouse effect. The problem of destruction of the Earth's ozone layer. Adoption of the Montreal Protocol. Measures taken by the RK to implement the Montreal Protocol. Objective: to examine the causes of the growing greenhouse effect. Class content: prepare a report or presentation. 1. Main sources of greenhouse gases. 2. Greenhouse gases. 3. International protocols and measures adopted in the Republic of Kazakhstan	1		Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	Frontal questioning, conversation - discussion on the topic Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
	SRO 9-10. Topic: Consequences of increasing concentration of greenhouse gases in the atmosphere. Problems of ozone layer depletion	5		Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
	Lecture 11. The problem of POPs pollution 1. POPs pollution. 2. Stockholm Convention on POPs. 3. Measures taken by the Republic of Kazakhstan to implement the Stockholm Convention on POPs.	1	Interactive lecture, presentation	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	form: group outline Platonus, Google classroom vzdjdbg ZOOM	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
11	Practical session 11. Topic: Ratification of the Stockholm Convention on Persistent Organic Pollutants (POPs). Classification of wastes and their secondary utilization. 1. Danger of persistent organic pollutants to the environment and humans. 2. GMO products. 3. Measures taken by the RoK to implement the Stockholm Convention on POPs. 4. Classification of wastes by hazard classes. 5. Dioxins - the most dangerous pollutants of the biosphere. 6. Waste as a type of secondary raw materials. 7. Waste recycling. 8. Environmental requirements for handling hazardous waste. 9. Consequences of chemical pollution of the environment.	1	Microgroup work interactive presentations	Frontal questioning, conversation - discussion on the topic Synquain, test Presentations of Jigso microgroups Platonus, Google classroom Course codes: vzdjdbg ZOOM	Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
	Lecture 12. The problem of the Caspian Sea and the Caspian Sea region 1. The Caspian Sea basin. 2. Main causes of the Caspian Sea level fluctuations. 3. Caspian Sea level rise at the present stage and its consequences. 4. Possible ways to improve the environmental situation in the Caspian region.	1	Interactive lecture, presentation	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	form: group outline Platonus, Google classroom vzdjdbg ZOOM	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
12	Practical session 12. Problems of the Caspian Sea and the Caspian region 1. Ecological problems of the Caspian Sea. 2. Anthropogenic impact on the Caspian Sea ecosystem 2. 3. Use of the Caspian Sea by neighboring states 4. Pollution of the Caspian Sea waters with oil products, phenols, pesticides.	1	Microgroup work interactive presentations		Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
13	Lecture 13. The problem of the Syrdarya river basin and the Aral Sea 1. main reasons of the Aral Sea level fluctuation. 1. 2. Use of the Aral Sea by neighboring states 3. Possible ways to improve the ecological situation in the Aral Sea region. 4. Brief historical assessment of the Syrdarya	1	Interactive lecture, presentation	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	form: group outline Platonus, Google classroom vzdjdbg ZOOM	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121

	river basin and the Aral Sea. Main causes of the Aral Sea crisis. 5. Dynamics of sea degradation from 1960 to 2000. Ecological consequences of the Aral Sea crisis. 6. ecological problems of transboundary rivers of the RK					
	Practical lesson 13. Problems of the Syrdarya River Basin and the Aral Sea Basin 1. ecological problems of the Syrdarya River 2. Decrease of sea level and water volume. 3. Increase of water salinity. 4. Pollution of the waters of the Aral Sea and the Syrdarya River with dioxins, phenols, pesticides. 5. Problems of transboundary rivers. Ecological problems of water resources of Kazakhstan	1	Microgroup work interactive presentations	Frontal questioning, conversation - discussion on the topic Synquain, test Presentations of Jigso microgroups Platonus, Google classroom Course codes: vzdjdbg ZOOM	Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
	Lecture 14. Consequences of nuclear tests at military test sites 1. Radioecological studies of wildlife in the territory of the test site before and after its closure. 2. Assessment of the impact of nuclear testing on species diversity and public health. 3. Modern methodology of biological assessment of the environment.	1	Interactive lecture, presentation	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	form: group outline Platonus, Google classroom vzdjdbg ZOOM	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
14	Practical session 14. Consequences of nuclear tests at military test sites in Kazakhstan. Norming of pollutants in the environment. Purpose: To consider the environmental problems of test sites in Kazakhstan, the main norms of environmental quality. Class content: conversation on the topic within the framework of the following questions: 1. Assessment of the impact of military polygons' activities on the environment. 2. Brief characterization of the type of activity of the training grounds.	1	Microgroup work interactive presentations	Frontal questioning, conversation - discussion on the topic Synquain, test Presentations of Jigso microgroups Platonus, Google classroom Course codes: vzdjdbg ZOOM	Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
	Lecture 15. Environmental Quality Assessment. Transition of the Republic of Kazakhstan to sustainable development 1. Main systems of ecological security in the field of environmental protection. 2. The concept of environmental security of the Republic of Kazakhstan	1	Interactive lecture, presentation	Jigso Platonus, Google classroom Course Codes: vzdjdbg ZOOM	form: group outline Platonus, Google classroom vzdjdbg ZOOM	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
15	Practical session 15. Assessment of environmental quality. Legal and economic responsibility of enterprises polluting the environment. 1. Norming of pollutants in the environment. 1. 2. Legal and economic responsibility of enterprises polluting the environment.	1	Microgroup work interactive presentations	Frontal questioning, conversation - discussion on the topic Synquain, test Presentations of Jigso microgroups Platonus, Google classroom Course codes: vzdjdbg ZOOM	Kahoot test, presentation report	1. http://rmebrk.kz/book/1037077 2. http://rmebrk.kz/book/1036663 3. http://rmebrk.kz/book/115688 4. http://rmebrk.kz/book/1136159 5. http://rmebrk.kz/book/56267 6. http://rmebrk.kz/book/1169121
	Routine monitoring №2	1		Platonus	Written and oral	
	Exam	1		Platonus		
	Total:	90				
	Of which:					
	Lectures:	15				
	Practical training:	15				
	Laboratory session:	-				
	SROP :	10				
	SRO :	50				

Note!

- The division of the course content into the number of modules depends on the specifics of the discipline and the interrelation of topics.
- Points of lecture, practical, laboratory classes, SROP, are put in the program Platonus.

II Distribution of working time of a student in accordance with the types of classes

Total number of hours	Количество академических часов				
	Lectures	Practical / Seminar	laboratory	SROP	SRO
90	15	15	-	10	50

III. Test questions

1 boundary control

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| <ol style="list-style-type: none"> 1.Symbiosis 2.Term proposed by W.Johansen in 1903 3.Ecology is the science of 4.The term "ecosystem" was first proposed in 1935. 5.The term "ecological niche" was proposed by V.Johansen in 1903. 6.Soil fertility is determined by the amount of 7.Outecology studies 8.The favorable strength of exposure to an environmental factor at which an organism thrives is called a zone 9.Members of the species Homo Sapiens are: 10.A set of individuals of the same species sharing a common gene pool and occupying a particular territory is called a 11.A group of populations of species inhabiting a certain territory and connected with each other by trophic links is called 12.The term "Ecology" is proposed by 13.The totality of all environmental factors corresponding to the ecological requirements of organisms is called 14.The basic structural unit in the system of living organisms. 15.A community of living organisms and their habitat, which forms a whole on the basis of sustainable interaction between the elements of living and non-living nature, is called: 16.The construction of a dam can be seen as an example of a factor of 17.An area of a water body or land with similar conditions of relief, climate and other abiotic factors, occupied by a certain biocenosis is called 18.Plasticity and endurance of an organism to the action of an ecological factor are called 19.Demecology is a section of ecology that studies 20.The term is used to express a broad degree of tolerance to salinity. 21.The author of the "Law of Minimum" 22.The "Law of Tolerance" of the limiting effect of the maximum established the 23.The biosphere is 24.An example of a natural ecosystem is 25.Irreversible and to a certain extent directed historical development of living nature is called 26.The role of reducers in an ecosystem is to 27.The diversity of species, the interweaving of food chains in an ecosystem serves as an indicator of the 28.Ecological factors are: 29.Abiotic factors 30.Habitat for birds 31.Climate change is.... 32.Maintaining equilibrium in the biosphere, its integrity contributes to the 33.To which type the group effect belongs | <ol style="list-style-type: none"> 34.The association of two types of populations does not affect either of them 35.A mutually beneficial cohabitation in which species can exist separately. 36.Species with low adaptability to temperature are called 37.Maintaining equilibrium in the biosphere is promoted by 38.Secondary, human-transformed, artificial elementary units of the biosphere are called 39.Ecological density is.... 40.The number of individuals of a species per unit area or unit volume of living space indicates 41.Self-extinction in spruce trees is an example. 42.A natural-territorial complex dominated by one type of biogeocoenosis is called a 43.A relationship in which 2 species interfere with each other in the extraction of a resource is called 44.The living matter of the biosphere is the 45.The sustainability of natural ecosystems is related to: 46.Autotrophs are 47.Reducers are organisms 48.The thickness of the biosphere is 49.The Republic of Kazakhstan occupies a territory of (km²) 50.The factor, the level of which approaches or exceeds the limits of endurance of an organism, is called...: 51.The concept of "Protection of natural resources" appeared in 52.The term ecosystem was introduced in 53.The term neutralism 54.The term amensalism 55.Term Commensalism 56.Term competition 57.The principle of competitive exclusion was formulated 58.The limiting factors in the organismal environment are the following 59.The basic environment of life 60.The chain of successive changes of one biocenosis to another is called the 61.Who introduced the term biogeocoenosis? 62.Biotic factors are.... 63.Which biocenosis is characterized by high productivity 64.Competition refers to.... 65.Name one of the following types of biogeocoenosis. 66.A particular feature or element of the environment that has a direct or indirect effect on organisms. 67.The doctrine of biogeocoenosis was developed by 68.What is the main cause of modern pollution of Earth's natural waters: 69.A form of relationship in which organisms belonging to different species create favorable conditions for existence: 70.On which science is ecology based: |
|---|---|

2 boundary control

- | | |
|---|--|
| <ol style="list-style-type: none"> 1.Who created and maintains the entire human life support system on Earth 2.Abiotic factor 3.Biotic factor 4.Who gave the name ecology 5.In what year did the term ecology originate 6.The study of the way of life of individual species is a branch of ecology 7.Who introduced the concept of biocenosis into science, in what year? 8.The science of animal behavior 9.The living environment of any organism, with which it is connected and on which it depends. 10.Who introduced the term biocenosis into science and in what year. 11.What is the importance of light to humans and animals? | <ol style="list-style-type: none"> 12.Heat-loving plants are named 13.The place occupied in space by each individual biocenosis 14.Temperatures at which active, physiological processes take place are called 15.Who are the sanitarians of nature 16.Adaptation of plants to high temperatures 17.To cold-blooded or poikilothermic belong 18.1903 ж. W. Johansen аңгисген терм 19.Organisms that live in a wide range of moisture content are called 20.Moisture loving plants are called 21.Type of relationship between plants and fungi 22.Plants of dry and hot climates 23.Type of relationship plants have with their pollinators 24.Type of relationship, ants protecting aphid colonies 25._____ animals that live in moderately humid conditions |
|---|--|

26. Different organisms exist from a common resource, the amount of which is limited, type of relationship
27. Biosphere is
28. One of the main mechanisms of species selection in biocenoses
29. The inability of a small light-loving herbaceous plant to survive under the dense shade of a beech or spruce, type of biotic relationship
30. Place of a species in the general system of biocenosis
30. Place of a species in the general system of biocenosis
31. A toxic mixture of smoke, fog and dust is called a
32. An example of a natural ecosystem is
33. The biosphere includes
34. Genetic changes in an organism
35. Dominant species in a biocenosis are called
36. A particular property or element of the environment that has a direct or indirect effect on organisms.
37. The sphere of the mind is....
38. The geologic shell of the Earth inhabited by living organisms is called
39. What is benthos?
40. What organisms belong to the benthos?
41. The role of reducing organisms in an ecosystem is to
42. A form of relationship in which organisms belonging to different species create favorable conditions for existence.
43. The rocky shell of the earth
44. Concepts of the UN Environment and Development "strategy" for sustainable development adopted by the UN
45. Determine the type of monitoring if plants in forested areas are monitored
46. On which science is ecology based:
47. The association of two species of populations does not affect either of them
48. How many reserves are there in Kazakhstan
49. In what year the first law of the Republic of Kazakhstan "On Environmental Protection" was introduced
50. Where the ozone layer is formed:
51. What is the name of the UN Environment Program:
52. The air envelope of the Earth is:
53. The study of ecological problems of the biosphere as a planet is concerned with
54. Ecological density is....
55. The number of individuals of a species per unit area or unit volume of living space shows
56. Types of biocenosis production are:
57. The living matter of the biosphere is.
58. The sustainability of natural ecosystems is related to:
59. The doctrine of biogeocoenosis was developed by.
60. Population homeostasis is not maintained by:
61. What are organisms that can feed on only one resource called?
62. Who is the author of the law of tolerance?
63. The founder of the doctrine of the biosphere is:
64. What are cadaver animals called?
65. Fluctuations in population size over time are called:
66. What type of population fluctuation is associated with the processes of:
67. A collection of organisms actively moving in the water column
68. What science is ecology based on:
69. In what year did E. Warming introduce the term "ecology" to botany to denote an independent scientific discipline-ecology of plants
70. Abiotic factor
71. The study of the way of life of individual species is a branch of ecology.
72. Name one of these types of biogeocoenosis.
73. Two competing species do not get along together, rule of thumb
74. One of the main mechanisms of species selection in biocenoses.
75. Inability of a small light-loving herbaceous plant to survive under the dense shade of a beech or spruce tree, type of biotic relationship

IV. List of recommended literature

Primary Literature:

1. Korobkin, V.I. Ecology Textbook for students of higher educational institutions / V.I. Korobkin, L.V. Peredelsky.- 16th ed., supplement. and revision - Rostov on Don: Phoenix, 2010.- 602 p.
2. Musina, A.S. Ecology and Sustainable Development: Textbook. - Almaty: Izdvo "Kyzdar Universitiyi", 2015. - 185 c. - ISBN 978-601-224-300-0.
3. Abubakirova, K.D. Ecology and sustainable development Textbook / K.D. Abubakirova, O.K. Kozhagulov.- Almaty: Inzhu-Marzhan, 2011.- 276 p.
4. Dmitriev, P.S. et al. Ecology and sustainable development. Lecture course : Tutorial. / P.S. Dmitriev, N.S. Bodunovskaya, D.A. Borodavko. - Petropavlovsk: SKSU named after M. Kozybaev, 2012. - 249 c. - ISBN 978-601-272-265-9.
5. Zarubaev, F.M. Ecology zhane turakty damu. Lecture notes / F.M. Zarubaev, M.K. Eshmakanov, M.F. Mukhazhanova.- Taraz, 2018.- 206 b
6. Ospanova, G.S. Ecology: Okulyk / G.S. Ospanova, G.T. Bozshataeva.- Almaty: Economy, 2011.- 351 b.:
7. Ecology and the environment: Zhogary oku oryndaryna arnalgaan okulyk / A.K.Sadanov, N.Sh.Suleimenova, N.S.Damenova, B.Y.Makhamedova - 2-shi stereotypik basylim.- Almaty: Nur-Print, 2014.- 385 b..
8. Ecology and environmental protection: Okulyk / M.S.Tonkopiya, G.S.Satbaeva, N.P.Ishkulova, N.M.Anisimova.- Almaty: Daur, 2011.- 312 b.: 60x90.- ("Kazakhstan Tuuelsizdigine - 20 years" series).
9. Brodsky, A.K. Zhalpy ekologiyu kyskasha courses.Oku kuraly / A.K. Brodsky.- Almaty: Bastau, 2010.- 188 b.:
10. Sartayeva, R.S. Human ecology, new ontology and sustainable development of Kazakhstan : Monograph. . - Almaty: IFPR KN MES RK, 2012. - 207 c.
11. McConnell, Robert L., Abel, Daniel K.. Korshaghan ortany korgaau maseleri: turakty bolashakkaka kozkaras : Okulyk. / G.B. Abieva, G.J. Zhomartova; Kyrgyz Republic Ministry of Education and Science, Kyrgyz Republic Ministry of Education and Science, Republic of Kazakhstan. - 4-basylym - Almaty: ZhShS RPBC "Daur", 2017. - 320 b.

Additional literature

1. Bulekbaeva, K.B. Ecology zhane korshaghan ortany korrau Okulyk/K.B. Bulekbaeva.- Almaty: "Otan" baspasy, 2016.- 128 b.: 60x84.- ("Zhogary Bilim" series).
2. Dzhusupova, D.B. Ecologiyalyk biotechnology Okulyk / D.B. Dzhusupova.- Almaty, 2013.- 336 b.:
3. Duisenbaeva, S.T. Tabigatty qorgaau and ecology: Theory and practice of the Oku kuraly / S.T. Duisenbaeva, S.J. Baubekov.- Almaty: KP Zhogary oku oryndarynyu kauymdastygy, 2015.- 372 b.:

Criteria for evaluating the student's work at the lecture class:

№	Evaluation criteria	Points (max)	Week														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Attendance	20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
2	Prospectus	10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
3	Activity, Critical Thinking and other criteria	70	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4	Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Criteria for evaluating the student's work at the practical training:

№	Evaluation criteria	Points (max)	Week														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Attendance	20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
2	Activity	10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
3	Prospectus	10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4	Completion of tasks	60	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
5	Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Criteria for evaluating student work on the SROP:

№	Evaluation criteria	Points (max)	Week														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Attendance	20	+	+	+	+	+	+	+	+	+	+					
2	Conspectus, Essay, Individual presentation, Group project, etc.	80	+	+	+	+	+	+	+	+	+	+					
3	Total	100	100	100	100	100	100	100	100	100	100	100					

Note!

- Criteria #1,2 and scores apply to all students.
- Evaluation criteria and corresponding points are developed by the teacher depending on the specifics of the discipline studied
- Points are posted in AIS "Platonus" weekly, according to the schedule of classes.

V. ACADEMIC POLICY

All types of work must be completed and defended within the specified deadlines. Students who failed to pass the next task or received for its fulfillment less than 50% of points, have the opportunity to work on the specified task on an additional schedule. Students who missed laboratory classes for a valid reason, work them out in additional time in the presence of a laboratory assistant, after the admission of the teacher. Students are obliged every 3 weeks to pass a colloquium in the oral form on the passed materials to obtain admission to the boundary control. Students who have not passed the colloquium are not allowed to the boundary control. Students who have not completed all types of work are not allowed to the exam. Students are obliged to fulfill the Code of Academic Integrity KSU named after Korkyt Ata. To be tolerant, respect other people's opinions. Formulate objections in a correct form. Plagiarism and other forms of dishonest work are unacceptable. Prompting, cheating and using cheat sheets during interim and final controls, midterm and final exams, copying of solved problems by other persons, taking the exam for another student are unacceptable. A student found to have falsified any course information, unauthorized access to the Internet, the use of cheat sheets, receives a final grade of "F".

For consultations on the implementation of independent works (SRO), their delivery and defense, as well as for additional information on the passed material and all other emerging issues on the course, students have the right to contact the teacher during his office hours.

Score-rating letter system for assessing students' academic achievements with conversion to the traditional grading scale

Letter grade	Digital equivalent of points	% content of points	Evaluation under the traditional system
A	4,0	95-100	That's great.
A-	3,67	90-94	
B+	3,33	85-89	All right.
B	3,0	80-84	
B-	2,67	75-79	
C+	2,33	70-74	
C	2,0	65-69	Satisfactory
C-	1,67	60-64	
D+	1,33	55-59	
D-	1,0	50-54	
FX	0,5	25-49	Unsatisfactory
F	0	0-24	

Head of EP

G.K. Sydykova