1 ECBD 5205 Environmrnt and conservasion of biological diversity

Module designation	ECOL 52001 Environmental pollution and its assessment ECBD 5205 Environmrnt and conservasion of biological diversity
Semester(s) in which the module is taught	1
Person responsible for the module	Adilbektegi G.A. candidate of geographical sciences, associate professor
Language	Kazakh/Russian/English
Relation to curriculum	For programm 7M05206 – Environmental protection and rational use of natural resources in which the module is taught ECOL 52001 Environmental pollution and its assessment elective, semester 1, BD EC Basic discipline elective component (elective course)
Teaching methods	Lecture: Multimedia lecture. lecture developed by the author of the discipline. Questions and answers Seminar assignments (practice): Case study, brainstorming, works in group, communicative method, method of 6 hats, cinquain method. SIW tasks: Each subgroup prepares scientific news on the topic for the last 3 years; videos on the topic of practical work, presentations, and debates on the topic will be organized
Workload (incl. contact hours, self-study hours)	lecture -30, seminar -15, private study-105, total - 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	To obtain a positive assessment, you must demonstrate the following knowledge 1. Acquaintance with the modern level of biological diversity in the world; 2. Identification of endangered species and ecosystems as a result of anthropogenic impact; 3. Knowledge of biodiversity of plants and animals in Kazakhstan; 4. Study of the factors influencing the decline in biodiversity.
Module objectives/intended learning outcomes	The student must: Know: structure and levels of biodiversity; biodiversity measurement methods; biodiversity change; the role of biodiversity in human life; the threat of loss of biodiversity; To be able to: apply in practice basic general professional knowledge of theory and research methods; the ability to use modern methods of processing, analysis and synthesis of information; acquire new knowledge using modern information educational technologies; Possess: the technique of obtaining up-to-date information on various problems of biodiversity; methods of analysis and forecasting of the influence of factors of natural and technogenic environment for biodiversity; practical methods of studying biodiversity.
Content	Types of biocenotic relationships within ecosystems and the preservation of biological diversity. National strategy for the balanced use of biodiversity. Comparative analysis of the degree of biodiversity of the Earth and the Republic of Kazakhstan, the botanical-geographical and zoogeographical division of the Republic of Kazakhstan territory by the degree of originality of flora and fauna Tool: creating an analogy, developing a biodiversity model.
Exams and assessment formats	During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the fifteenth week before the exam) to test students' knowledge orally. Time for intermediate control is 50 minutes. The exam is conducted orally. Each exam ticket has three questions and the student is given 30 minutes to prepare

Study and examination requirements and forms of examination	The exam on the subject "Environment and Biodiversity Conservation" is taken orally. As: First of all, in order to fully test the knowledge of students, a deep definition of their speech skills, the ability to express their thoughts is determined only by oral communication. Secondly, exam questions in a given discipline can be graded in the form of examples. Thirdly, only the oral examination method allows you to fully assess the knowledge of students (for example, ask additional questions).
Reading list	1. Brodsky A.K. Introduction to biodiversity issues. - SPb, 2002 .-- 144 p. 2. Geography and monitoring of biodiversity // Conservation of biodiversity "- Minsk: Publishing house of NUMTs, 2002. - 438 p. 3. Lebedeva N.V., Drozdov N.N., Krivolutsky D.A. Biodiversity and methods for its assessment. M .: Publishing house Mosk. University: 1999.95 p. 4. Primak R. Basics of biodiversity conservation / Per. from English O.S. Yakimenko, O. A. Zinovieva. M .: Publishing house of Nuchny and educational-methodical center. 2002.256 p. https://kahoot.com/ https://www.microsoft.com/ https://www.socrative.com/

2 EEE 5206 Ecological epidemiology and ecopathology

Module designation	ECOL 52001 Environmental pollution and its assessment
Semester(s) in which the module is taught	1
Person responsible for the module	Tussupova Zh.B. - associate professor / Meiramkulova K. -professor
Language	Kazakh/Russian/English
Relation to curriculum	For programm 7M05206–Environmental protection and rational use of natural resources in which the module is taught ECOL 52001 Environmental pollution and its assessment elective, semester 1, BD EC Basic discipline elective component (elective course)
Teaching methods	Lecture: Multimedia lecture. interactive method, differentiated approach, project method, lecture-conference, “hot chair” method, model method (real situation modelling). Seminar assignments (practice): Divide the group into several subgroups. Each subgroup is prepared individually and each subgroup makes its own calculation on the topic of practical work SIW tasks: Each subgroup prepares scientific news on the topic for the last 3 years; videos on the topic of practical work, presentations, and debates on the topic will be organized
Workload (incl. contact hours, self-study hours)	lecture -30, seminar -15, private study-105, total – 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	Ecological toxicology
Module objectives/intended learning outcomes	Knowledge: master students know that they learn how to assess the quality of various environmental components, food products, as well as to assess the risk of adverse chemical and physical factors. Skills: students know how to apply methods of planning and conducting ecological and epidemiological knowledge. Competences: students are able to use basic knowledge of the course sections, methods of quantitative information processing.
Content	Environmental factors and risk assessment of the population morbidity. Dependence of some diseases of the population on environmental conditions, environmental conditions, and hazards that may pose a health risk.

Exams and assessment formats	During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the fifteenth week before the exam) to test students' knowledge orally. Time for intermediate control is 50 minutes. The exam is conducted orally. Each exam ticket has three questions and the student is given 30 minutes to prepare
Study and examination requirements and forms of examination	Passing an oral exam has certain advantages since it creates a possibility to prepare the answer in the most complete justified and detailed form with examples and explanations. It forms the student's creative approach to the subject, contributes to the development of skills in analysis and synthesis of the studied material, which in turn leads to a deep understanding and the formation of a comprehensive, holistic and interrelated view of the studied discipline.
Reading list	1.Karabalin S. K. Ecological epidemiology 2017, 420 pages 2.Shuralev E. A., Mukminov M. N. Ecological epidemiology / Textbook on the course "Ecological epidemiology". - Kazan: Kazan University, 2018. – 364p. 3.B. A. Revich, S. L. Avaliani, G. I. Tikhonova Environmental epidemiology Textbook for higher education institutions Edited by B. A. Revich M., Publishing Center "Academy", 2019, 384 p. Microsoft teams

3 ECBD 5206 Environmental assessment and examination of design documentation

Module designation	ECOL 52001 Environmental pollution and its assessment ECBD 5206 Environmental assessment and examination of design documentation
Semester(s) in which the module is taught	1
Person responsible for the module	Nurushev V.Zh. -professor
Language	Kazakh/Russian/English
Relation to curriculum	For programm 7M05206 – Environmental protection and rational use of natural resources in which the module is taught ECOL 52001 Environmental pollution and its assessment elective, semester 1, BD EC Basic discipline elective component (elective course)
Teaching methods	Lecture: Multimedia lecture. lecture developed by the author of the discipline. Questions and answers, communicative method, method of 6 hats, cinquain method, interactive method, differentiated approach, project method, lecture-conference. Seminar assignments (practice): Divide the group into several subgroups. Each subgroup is prepared individually and each subgroup makes its own calculation on the topic of practical work SIW tasks: Each subgroup prepares scientific news on the topic for the last 3 years; videos on the topic of practical work, presentations, and debates on the topic will be organized
Workload (incl. contact hours, self-study hours)	lecture -30, seminar -15, private study-105, total - 150
Credit points	5 (ECTS)

Required and recommended prerequisites for joining the module	To obtain a positive assessment, you must demonstrate the following knowledge 1. the possibility of using state expertise of projects, environmental expertise for environmental quality management and rational nature management; 2. concept and methodology of environmental impact assessment, navigate diversity methods of environmental design and expertise, in the requirements for the design documentation; 3. basic legal and instructive-methodological documents in this area, legal basics of expertise
Module objectives/intended learning outcomes	The student must: Know: the possibility of using state expertise of projects, environmental expertise for environmental quality management and rational nature management; must be able to: - navigate in legal, regulatory and technical and instructive and methodological documents in this area; - evaluate the environmental aspects of economic projects must own: - skills in planning and carrying out work on environmental justification and providing projects of economic activity and carrying out their expertise. must demonstrate the ability and willingness to: ability and readiness for practical application of the acquired knowledge of environmental design and expertise in solving professional problems and making decisions in in the course of economic activity, as well as responsibility for the quality of work and scientific reliability of the results.
Content	The concept of environmental assessment. Scientific and theoretical foundations. Legal basis of environmental expertise. General understanding of design and environmental engineering Research Environmental impact assessment. Content, structure, business procedure, methodological approaches. The section "Environmental protection " in projects". Basic requirements. Content. Calculations of environmental damage. Compensatory measures.
Exams and assessment formats	During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the fifteenth week before the exam) to test students' knowledge orally. Time for intermediate control is 50 minutes. The exam is conducted orally. Each exam ticket has three questions and the student is given 30 minutes to prepare
Study and examination requirements and forms of examination	The exam on the subject " Environmental assessment and examination of design documentation " is taken orally. As: First of all, in order to fully test the knowledge of students, a deep definition of their speech skills, the ability to express their thoughts is determined only by oral communication. Secondly, exam questions in a given discipline can be graded in the form of examples. Thirdly, only the oral examination method allows you to fully assess the knowledge of students (for example, ask additional questions).
Reading list	1. Brodsky A.K. Introduction to biodiversity issues. - SPb, 2002 .-- 144 p. 2. Geography and monitoring of biodiversity // Conservation of biodiversity "- Minsk: Publishing house of NUMTs, 2002. - 438 p. https://kahoot.com/ https://www.microsoft.com/ https://www.socrative.com/

4 EASE 5208Ecological aspects of security in the energy sector

Module designation	ECOL 52002 Ecological problems and environmental protection
Semester(s) in which the module is taught	1
Person responsible for the module	Tussupova Zh.B. - associate professor /
Language	Kazakh/Russian/English
Relation to curriculum	For programm 7M05206–Environmental protection and rational use of natural resources in which the module is taught ECOL 52002 Ecological problems and environmental protection elective, semester 1, BD EC Basic discipline elective component (elective course)
Teaching methods	Lecture: Multimedia lecture. Questions and answers Show of short videos on the topic of the lecture Seminar assignments (practice): brainstorming, works in group, communicative method, method of 6 hats. SIW tasks: Each subgroup prepares scientific news on the topic for the last 3 years; videos on the topic of practical work, presentations, and debates on the topic will be organized
Workload (incl. contact hours, self-study hours)	lecture -30, seminar -15, private study-105, total – 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	Climate change and the «green» economy
Module objectives/intended learning outcomes	Knowledge: master students know on prospects and directions of development of the global energy system, clean energy, main regulatory documents that control the impact of energy facilities on the environment, and public health. Skills: students know how to determine by calculation environmental characteristics of atmospheric air, hydrosphere, and soil in the territory affected by the enterprise. Competences: master students are able to make environmental decisions.
Content	National concept of energy security of Kazakhstan. Expanding the use of local and alternative energy sources, reducing greenhouse gas emissions in the energy sector of Kazakhstan, the effectiveness of energy-saving and energy efficiency programs of the national economy, the analysis of tasks for the development of nuclear energy.
Exams and assessment formats	During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the fifteenth week before the exam) to test students' knowledge orally. Time for intermediate control is 50 minutes. The exam is conducted orally. Each exam ticket has three questions and the student is given 30 minutes to prepare
Study and examination requirements and forms of examination	Passing an oral exam has certain advantages since it creates a possibility to prepare the answer in the most complete justified and detailed form with examples and explanations. It forms the student's creative approach to the subject, contributes to the development of skills in analysis and synthesis of the studied material, which in turn leads to a deep understanding and the formation of a comprehensive, holistic and interrelated view of the studied discipline.

Reading list	1.Kurlyandskaya, O. G. Ecological threat: hydrocarbon energy and man-made disasters in water areas 2019.-- 640 p. 2. Energy Ecology: Training manual / Under the general editorship of V. Ya. Putilov. - M.: MEI Publishing House, 2018 – 716 p. 3. Baskakov, A. P. Non-traditional and renewable energy sources: a textbook / A. P. Baskakov. M.: "Bastet", 2017 – 368 p. 4. Adamenko, O. Alternative fuels and other non-traditional sources of energy / O. Adamenko [et al.]. - Ivano-Frankivsk, 2016. -256 p. 5. Kashkarov, A. P. Wind generators, solar panels and other useful structures /A. P. Kashkarov. - M.: DMK Press, 2018. -144 p. https://www.microsoft.com/

5 MTCEC 5209Mutagenesis, teratogenesis, carcinogenesis under the influence of environmental conditions

Module designation	ECOL 52002 Ecological problems and environmental protection
Semester(s) in which the module is taught	1
Person responsible for the module	Kapsalyamov B. -professor
Language	Kazakh/Russian/English
Relation to curriculum	For programm 7M05208 –Environmental protection and rational use of natural resources The educational program is designed to prepare masters in the field of environmental protection and rational use of natural resources.
Teaching methods	Lecture: Multimedia lecture. Video lecture developed by the author of the discipline. Questions and answers Show of short videos on the topic of the lecture Seminar assignments (practice): Divide the group into several subgroups. Each subgroup is prepared individually and each subgroup makes its own calculation on the topic of practical work SIW tasks: brainstorming, works in group, communicative method.
Workload (incl. contact hours, self-study hours)	lecture -30, seminar -15, private study-75, total – 135
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	Mutagenesis and environment
Module objectives/intended learning outcomes	Mutagens, carcinogens and teratogens in the environment. The main patterns of human interaction and the environment, the functional relationships between them, the mechanisms of mutagenic, carcinogenic and teratogenic substances on the human body. Tool: charting, illustration

Content	The discipline deals with: issues of the level of toxic exposure the content of heavy metals in environmental objects is considered. The reactions of the systems of the organism level are presented as the primary toxic effects resulting in changes in the population and biocenotic parameters. The problem of adaptation of biological systems to environmental pollution by pollutants is discussed. Objectives of the study of the academic discipline: When studying the course, undergraduates must know: the basic concepts and laws of environmental toxicology as one of the branches of fundamental ecology based on the laws of mutageesis, teratogenesis, and carcinogenesis under the influence of environmental conditions; possess: systematic and integrated approaches to the analysis of ecotoxicological problems from the standpoint of the ideology of sustainable development of the biosphere.; be competent: in matters of knowledge of the properties, laws and principles of functioning of ecological systems and the distinctive features of technogenic systems; existing scientific ideas about the limits of the stability of the biosphere and their violation in the conditions of technogenesis; ecotoxicological effects arising under the influence of factors of technogenic nature at different levels of the organization of living things: molecular-genetic, cellular-tissue, ontogenetic, population-species, biocenotic.
Exams and assessment formats	During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the fifteenth week before the exam) to test students' knowledge orally. Time for intermediate control is 50 minutes. The exam is conducted orally. Each exam ticket has three questions and the student is given 30 minutes to prepare
Study and examination requirements and forms of examination	The exam in this subject is given orally.Because: First of all, in order to fully test the knowledge of students, a deep definition of their speaking skills, the ability to express their thoughts is determined only by oral communication. Second, the third question of the exam questions of this discipline can be assessed in the form of calculations, and it can be assessed only by asking the meaning of oral formulas. Thirdly, I think that only the oral exam method allows you to fully assess the knowledge of students (for example, to ask additional questions).
Reading list	1.Ecological toxicology: a textbook and a practical course for undergraduate and graduate studies / T. V. Zhuikova, V. S. Bezel. - M.: Yurayt Publishing House, 2018 — - 362 p. - (Series: Bachelor and Master. Academic course). 2Alekseenko, V. A. Chemical elements in urban soils / V. A. Alekseenko, A.V. Alekseenko — - M.: Logos, 2014. 3Korniszewski L. Dziecko z zespolem wad wrodzonych. Diagnostyka dysmorfologiczna. Wydawnictwo lekarskie PZWL. — Warszawa, 2005. — S.260 4Nikitin A. I. Harmful environmental factors and the human reproductive system (responsibility to the future generation). St. Petersburg: LBI., 2005. - p. 245 5 Ecological monitoring of hazardous production facilities: experience of creation and prospects of development (on the example of environmental control and monitoring systems for the destruction of chemical weapons): monograph / under the general editorship of prof. V. N. Chupis. - M.: Scientific Book, 2010. Google (Google Class/ GoogleForms)

6 MESPP 5210 Management of ecological safe processes and production

Module designation	ECOL 52002 Ecological problems and environmental protection
Semester(s) in which the module is taught	1
Person responsible for the module	Kapsalyamov B. -professor
Language	Kazakh/Russian/English
Relation to curriculum	For programm 7M05208 –Environmental protection and rational use of natural resources The educational program is designed to prepare masters in the field of environmental protection and rational use of natural resources.
Teaching methods	Lecture: Multimedia lecture. Project method, lecture-conference, “hot chair” method. Show of short videos on the topic of the lecture Seminar assignments (practice): Divide the group into several subgroups. Each subgroup is prepared individually and each subgroup makes its own calculation on the topic of practical work SIW tasks: Each subgroup prepares scientific news on the topic for the last 3 years; videos on the topic of practical work, presentations, and debates on the topic will be organized
Workload (incl. contact hours, self-study hours)	lecture -30, seminar -15, private study-75, total – 135
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	Ecological safety and forecasting
Module objectives/intended learning outcomes	Environmental management in accordance with international standards ISO 14000 and OHSAS 18000. Analysis of existing strategies and governance structures in the field of environmental safety. Proposals to improve the environmental safety management system. Tool: write an essay, come up with a new model.
Content	The discipline deals with: issues of creating low-waste, resource-saving technologies, ways to solve problems of rational use of natural resources, concepts of waste-free production, basic principles and ways of creating waste-free and low-waste technologies and industries, intensive, legislative mechanisms of environmentally safe processes, issues of environmental standardization, ISO 14000 standards and assessment of the state of work on the implementation of management systems in the Republic of Kazakhstan Objectives of the study of the academic discipline: When studying the course, undergraduates must be able to:to describe the types of environmental safety in production and energy, to compare their impact on the environment, to model modern methods of control of the environmental service. facts: organizational, managerial, economic, legal mechanisms for the management of environmentally safe processes and production; methods and techniques of resource saving, modern technologies of project management; regulatory and legal requirements in the field of resource saving, the organization of processes; be able to: select the appropriate administrative, economic, apply appropriate methods of project management; to possess skills application of regulatory and legislative requirements in the field of resource saving processes; be competent: in matters of legislative management mechanisms to ensure the environmental safety of specific processes and industries; in assessing the environmental risk of production technologies.

Exams and assessment formats	During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the fifteenth week before the exam) to test students' knowledge orally. Time for intermediate control is 50 minutes. The exam is conducted orally. Each exam ticket has three questions and the student is given 30 minutes to prepare
Study and examination requirements and forms of examination	The exam in this subject is given orally.Because: First of all, in order to fully test the knowledge of students, a deep definition of their speaking skills, the ability to express their thoughts is determined only by oral communication. Second, the third question of the exam questions of this discipline can be assessed in the form of calculations, and it can be assessed only by asking the meaning of oral formulas. Thirdly, I think that only the oral exam method allows you to fully assess the knowledge of students (for example, to ask additional questions).
Reading list	Oranova T. I. Fundamentals of the development of non-waste and low-waste technologies Nalchik: Kab. - Balk. un-t., 2004. - 56 p. The program for the development of the mining and metallurgical industry in the Republic of Kazakhstan for 2010-2014 was approved by the Government Decree Republic of Kazakhstan dated October 30, 2010, No. 1144 https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/ https://www.socrative.com/

7 EEW 7301 Environmental education and worldview

Module designation	ECOL 73001 Rational use of nature
Semester(s) in which the module is taught	2
Person responsible for the module	Saspugayeva G.Y.- PhD, associate professor /Adilbektegi G.A.- associate professor /Abzhalelov A.B.- professor
Language	English/Kazakh/Russian
Relation to curriculum	For programm 7M05206–Environmental protection and rational use of natural resources in which the module is taught ECOL 73001 Rational use of nature, semester- 2 , PD UK-profiling discipline, university component
Teaching methods	Lecture: Multimedia lecture. Video lecture developed by the author of the discipline. Questions and answers, interactive method, differentiated approach, project method, lecture-conference, “hot chair” method, model method (real situation modelling). Seminar assignments (practice): Divide the group into several subgroups. Each subgroup is prepared individually and each subgroup makes its own calculation on the topic of practical work SIW tasks: Each subgroup prepares scientific news on the topic for the last 3 years; videos on the topic of practical work, presentations, and debates on the topic will be organized Presentation for each lesson using a computer, projector, interactive whiteboard
Workload (incl. contact hours, self-study hours)	lecture -30, seminar -15, private study-105, total - 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	Rational use of natural resource, Basics of ecology and life safety, Social ecology

Module objectives/intended learning outcomes	The objectives of the study of the academic discipline: students should master the system of environmental knowledge - about the relationships between the body and the environment, about the fitness of organisms, about populations, species, biogeocenoses, the biosphere, their structures and functions that are inherent in their laws. This knowledge forms the basis for the formation of a responsible attitude among students and the natural environment, their understanding of the need for careful and rational use of the wealth of nature by humanity, which is an invaluable public domain. The course environmental education and worldview plays a large role in the education system, in the development and upbringing of the younger generation.
Content	"Environmental education and worldview“ is a discipline that pay attention to environmental education and upbringing of students, which aims to shape the public attitude of schoolchildren to nature, to supplant consumer approaches and nature by a rational attitude,
Exams and assessment formats	Course policy and procedures -be on lectures/seminars in time; -attendance of classrooms; -active participation in discussion of issues; -preliminary preparation for lectures and seminars on basic literature; -qualitative and timely performance SIW; participation in all types of assessments (current assessments, SIW, intermediate assessments, final assessment Oral examination Oral examination with choosing tickets. Because in oral examination students can show their knowledge by talking, discussing and analysing the questions. In test exam they can’t show this ability During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the fifteenth week before the exam) to test students' knowledge orally. Time for intermediate control is 50 minutes. The exam is conducted orally. Each exam ticket has three questions and the student is given 30 minutes to prepare
Study and examination requirements and forms of examination	Checking the learning outcomes in a specific discipline of the educational program is carried out by taking an exam. The forms of exam is determined by the lecturer or leading teacher. The forms of the exams can be oral, written, combined, computer testing or matrix testing. A lecturer and a teacher for practical training develops a set of theoretical questions covering the content of the entire course, and practical tasks to determine the formation of skills and abilities. Depending on the form of exams the lecturer prepares the examination materials which include exam tickets (where at least two questions are included) or tests. Examination tickets are revealed only on the day of exam, though the students are given the list of approximate questions beforehand to get ready for exams. The questions cover all taught material. The exam tickets may consist of at least one theoretical question and one practical (applied). Usually one discipline demands 25 examination tickets. Tests are prepared according to the taught material and are huger in amount. They can also include theoretical and practical questions, they can have answer options or demand fulfilling the gaps. In addition, the lecturer develops criteria for assessing knowledge, skills and abilities. These criteria take into account the specifics of the discipline. The assessment criteria are available to all students in the syllabus of the disciplines.

Reading list	1.State compulsory standards of secondary general education of the Republic of Kazakhstan. 2.General methodology for teaching biology. Verzilin N.M., Korsunskaya V.M. 2017 3.Korobkin V.I. Ecology, 2018 4.Alisheva K.A. Ecology, 2017 5.I.E. Suleimenov et al. Sustainable development. Environmental education. A guide for the prep. universities and teaches. Schools. Almaty: Kazakh University. 2017 6.Shetty K., Sarkar D. Advancing ethnic foods in diverse global ecologies through systems-based solutions is essential to global food security and climate resilience – integrated human health benefits, 2018. Microsoft teams

8 IWRM 7302 Integrated water resources management

Module designation	ECOL 52002 Ecological problems and environmental protection
Semester(s) in which the module is taugh	2
Person responsible for the module	Zandybay A, - associate professor / Akbayeva L. -professor
Language	Kazakh/Russian/English
Relation to curriculum	For programm 7M05206 – Environmental protection and rational use of natural resources in which the module is taught ECOL 52002 Ecological problems and environmental protection, semester- 2 , profile discipline, elective component (elective course)
Teaching methods	Informational or problematic lecture Seminar assignments (practice): Case study, brainstorming, works in group, communicative method, method of 6 hats, cinquain method SIW tasks: performing tasks on the topic of the lecture: essays, watching videos, reading special literature
Workload	lecture -15, seminar -30, self-study-105, total – 150
Credit points	5(ECTS)
Required and recommended prerequisites for joining the module	To effectively master the content of the discipline, it is necessary to know the basics of geography, chemistry, physics, as well as related disciplines bioecology, Complex monitoring of water objects
Module objectives/intended learning outcomes	Purpose: to form students' system of knowledge and skills in management based on taking into account all types of water resources (surface, ground and return waters) within hydrographic boundaries, which links the interests of various industries and levels of the water use hierarchy, involves all stakeholders in decision-making, promotes the efficient use of water, land and other natural resources in the interests of sustainable provision of the requirements of nature and society in water. The student must learn to identify the problems of the water sector and solve practical problems The student must learn to identify the problems of the water sector and solve practical problems

Content	Water resources management is carried out within hydrographic boundaries, in accordance with the morphology of a particular river basin; management provides for the accounting and use of all types of water resources (surface, ground and return waters), taking into account the climatic characteristics of the regions; close coordination of all types of water use and all organizations involved in water management horizontally between sectors and vertically between the levels of the water management hierarchy (basin, sub-basin, irrigation system, WUA, economy); public participation not only in management, but also in financing, maintenance, planning and development of water infrastructure; priority of natural requirements in the activities of water management bodies; focus on water saving and combating unproductive water losses of water management organizations and water users; water demand management, along with resource management; information support, openness and transparency of the water resources management system; economic and financial stability of management.
Exams and assessment formats	During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the fifteenth week before the exam) to test students' knowledge orally. Time for intermediate control is 50 minutes. The exam is conducted orally. Each exam ticket has three questions and the student is given 30 minutes to prepare. Oral examination, The assessment of knowledge in the discipline provides for the formulation of additional questions, for which the student gives oral explanations in the conversation.
Study and examination requirements	Milestone 1 The student must pass 5 essays, write a test, participate in seminars, defend 1 presentation. Milestone 2 The student must pass 4 essays, write a test paper, participate in seminars, defend 1 presentation. Final: The student is obliged to submit lecture notes, self-study notes, take an oral survey on the topics studied. The undergraduate must demonstrate the ability to determine the effectiveness of water resources management, to be guided in the choice of means of solving environmental problems. Compulsory attendance at classrooms, active participation in the discussion of issues, preliminary preparation for lectures and seminars on the teaching aid and basic literature, high-quality and timely completion of IWS assignments, participation in all types of control (current control, IWS control, midterm control, final the control).

Reading list	1. CapNet (February 2008). Performance and Capacity of River Basin Organizations. Cross-case Comparison of Four RBOs. UNDP/CapNet. Gleick, P. H. (2020). 2. Dirty Water: Estimated Deaths from Water-Related Diseases 2000-2020. 3. Pacific Institute for Studies in Development, Environment, and Security. GWP TAC (2000), Background Paper No. 4. Integrated Water Resources Management. Global Water Partnership, Stockholm, Sweden. GWP TEC (2017). 4. Catalyzing Change: a Handbook for Developing Integrated Water Resources Management (IWRM) and Water Efficiency Strategies. Global Water Partnership, Stockholm, Sweden. Hooper, B. P. (2015). 5. Adoption of Best Management Practices for Dryland Salinity. The Need for an Integrated Environmental Management Approach. Results of a Study in the Goran Catchment. Centre for Water Policy Research, N.S.W. University of England, Armidale, Australia. Hooper, B. P. (2015). 6. Integrated River Basin Governance: Learning from International Experience. IWA Publishing, London, United Kingdom. Margerum, R. D. and Born, S. M. (2020). https://www.socrative.com/

9 VEMA 7303 «Vegetative and Endocrine Mechanisms of Adaptation»

Module designation	ECOL 52002
Semester(s) in which the module is taught	2
Person responsible for the module	Meiramkulova K. -professor
Language	English, Kazakh, Russian
Relation to curriculum	Master of Natural Science in the educational program «7M05208 – Environmental protection and rational use of natural resources the module is taught- ECOL 52002 Ecological problems and environmental protection by the curriculum EEE 5206 in the 2nd semester basic discipline of elective courses.
Teaching methods	Lecture: Multimedia lecture. Video lecture developed by the author of the discipline. Questions and answers; presentation of short videos on the topic of the lecture and communication with students on the issues raised in the video. Seminar assignments (practice): Divide the group into several subgroups. Each subgroup is to be given a topic and/or issue to make a presentation and defense. Case study, brainstorming. SIW tasks: Each subgroup carries out a small research, study of the latest explorations on the topic; makes presentations and then discusses it in the class. Project method
Workload (incl. contact hours, self-study hours)	lectures -30, seminars -15, private study-105, total - 150
Credit points	5
Required and recommended prerequisites for joining the module	Knowledge and skills in: Ecological aspects of natural science, Ecological toxicology. Medical Ecology.

Module objectives/intended learning outcomes	Objectives - - formation of theoretical and methodological competencies in the basic theoretical and practical knowledge and skills in the field of physiology, social ecology. To develop basic skills of setting ecological problems related to human health, developing strategies and projects for sustainable development. Know – the description of the endocrine system, the autonomic nervous system (ANS), a concise explanation of how the endocrine system, hormone signaling pathways and ANS are affected by environmental conditions and how the effects of synthetic chemical exposure on hormone signaling are dependent on environmental context; Be able to – to activities for the study ability of independent research and analysis of information in the field of nervous system and endocrine mechanisms of adaptation for use in the process of scientific and practical activities. Have skills – know how to apply knowledge in the field of biology for the development of general professional disciplines and solving professional problems.
Content	The environmental factors of climate, nutrition, and management are considered major stressors on human health and reproduction. There is no doubt that there is a certain correlation between environmental stressors and disrupt of the endocrine system. Moreover, respiratory illnesses, gastrointestinal and hormonal diseases are among ubiquitous ones in Kazakhstan.
Exams and assessment format	During the academic semester, two intermediate controls are to be held (the first after the 7th week of study and the second in the 15th week before the exam) to test students' knowledge in oral form. Time for intermediate control is 50 minutes. Time for preparation is 30 minutes per student. Students select an examination paper with three questions based on the studied topics.
Study and examination requirements and forms of examination	During lectures and practice we have to get immediate feedback and/or answer. Students are also motivated to ask questions, share their knowledge at the lecture and practice classes. It is one of the important ways to evaluate students' knowledge and skills. It will be more helpful to communicate messages to groups of people, like a sort of brain storm, at assembly meetings in future. The form of examination control is oral. The main grounds for it, as follows: Oral form of examination is more effective, as there can be personal contact and communication. It is the best way to evaluate knowledge on subject, communication skills, to judge how students mastered specific terms, how deep their understanding of definitions, basic concepts and principles of the subject. During oral examinations it is more convenient to ask additional questions to students, which will help to control the depth of students' knowledge and understanding of the disciline.
Reading list	1. Ozernuk N.D. Mechanisms of adaptation – M.Nauka 2000-270 p. 2. The problems of adaptation of biological systems M.Nauka 2001-295p . 3. Smirnov A.N. Elements of endocrines regulation. GEOTAP-Media,2008, 352 p. 4.Sean C.lema,27.04.2017 Enviromental Endocrinology,doi:10.1093/obo/9780199363445-0066 https://www.microsoft.com/ https://www.socrative.com/

11 MEOUR 7305 Medical and environmental foundations of sustainable development

Module designation	ECOL 73002 Rational use of resources
Semester(s) in which the module is taught	2
Person responsible for the module	Kobetaeva Nazira Kulumbetovna, Doctor PhD, Associate Professor
Language	Russian
Relation to curriculum	For program 5M060800 – Ecology in which the module is taught ECOL 73002 Rational use of resources elective, semester 2, PD EC Profile discipline elective component (elective course)
Teaching methods	Lecture: Multimedia lecture. Video lecture developed by the author of the discipline. Questions and answers. Show of short videos on the topic of the lecture. Differentiated approach, project method, lecture-conference, “hot chair” method, model method (real situation modelling). Seminar assignments (practice): Divide the group into several subgroups. Each subgroup is prepared individually and each subgroup makes its own calculation on the topic of practical work. SIW tasks: Each subgroup prepares scientific news on the topic for the last 3 years; videos on the topic of practical work, presentations, and debates on the topic will be organized.
Workload (incl. contact hours, self-study hours)	lecture – 30, seminar – 15, private study – 105, total – 150.
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	Existing competences in Environmental Management, Environmental Economics, Ecology and Sustainable Development.
Module objectives/intended learning outcomes	Objectives: Formation of students' understanding of the relationship between the quality of the environment and human health, providing a comprehensive, systematic approach to the analysis of human relations with the environment and to solving problems of sustainable development. Know – basic terms and concepts of the medical and environmental foundations of sustainable development; theoretical foundations and laws of geochemistry and geophysics, the environment; fundamentals of environmental management and economics of environmental management in the framework of the medical and environmental foundations of sustainable development; Be able to at a high level possess knowledge of the basics of environmental management, environmental economics, and sustainable development; use various knowledge and information resources and apply them within the framework of the medical and environmental foundations of sustainable development; explain the main relationships and patterns of medical and environmental and geographical processes; Have skills – to master the methodological basis for a comprehensive assessment of the state and dynamics of the medical and environmental situation and sustainable development of the territory; apply the knowledge gained to justify measures to improve the medical and environmental situation, environmental protection and sustainable development of regions; analyze and model medical and environmental situations, factors of their formation and development.

Content	The discipline «Medical and environmental foundations of sustainable development» is a variable discipline in the structure of the educational program. This discipline will give a complete understanding of the inextricable link between health protection and the goals of sustainable development; about the spatial and temporal features of the development of relationships in the human – environment system at the global, regional and local levels; understanding the priority of preserving health as the main task of environmental policy and a necessary condition for achieving sustainable development. The discipline deals with the formation of students' ideas of the historical unity of the quality of the environment and human health, providing a comprehensive, systematic approach to the analysis of human relationships with the environment and to solving problems of sustainable development.
Exams and assessment formats	During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the fifteenth week before the exam) to test students' knowledge orally. The student's oral exam is taken by two examiners (an independent examiner and a teacher). When conducting an oral exam, the student chooses the exam ticket. The preparation time for the oral response should be 40 minutes. Score for the oral exam is announced immediately after the completion of the survey of all students. Final score is entered in the exam sheet and signed by the independent examiners and the teacher leading the discipline.
Study and examination requirements and forms of examination	The exam on the subject of Medical and environmental foundations of sustainable development is taken orally. Because: 1. It involves a conversation with a teacher who immediately reveals the true depth of the student's knowledge of the material. 2. The teacher will be able to assess the level of theoretical training and the formation of practical skills of the student. 3. The student can be asked additional questions both on the content of the exam ticket and on any sections of the discipline that will allow to the examines to find out the level of knowledge of information on the subject.
Reading list	1. Kozhagulov S.O. Ecology and sustainable development: - Almaty, 2016. 2. Sustainable development: people, ecology, economy: recommended bibliographic index/ SSEU Scientific Library. – Samara, 2017. – 120 p. 3. Ecology and sustainable development. Fundamentals of general ecology: a textbook/ A.T. Oralova, A. Zh. Auelbekova Karaganda State Technical University. – Karaganda: Publishing House KarSTU, 2016 – 100 p. https://whiteboard.fi/ https://kahoot.com/

12 NTSBM 7306- New technologies and sustainable use of biological raw materials

Module designation	ECOL 73002 Rational use of resources
Semester(s) in which the module is taugh	3
Person responsible for the module	Kapsalyamov B. –professor, Akbayeva L. -professor
Language	Kazakh/Russian/English
Relation to curriculum	For programm 7M05206 – Environmental protection and rational use of natural resources in which the module is taught ECOL 73002-Rational use of resources, semester- 3 , basic discipline, university component (course)

Teaching methods	Informational or problematic lecture. Interactive method, differentiated approach, project method, lecture-conference, “hot chair” method, model method (real situation modelling). Seminar assignments (practice): Seminar in the form of a conference, debate, oral survey SIW tasks: performing tasks on the topic of the lecture: essays, watching videos, reading special literature
Workload (incl. contact hours, self-study hours)	lecture -30, seminar -15, self -study-105, total – 150
Credit points	5(ECTS)
Required and recommended prerequisites for joining the module	To effectively master the content of the discipline, it is necessary to know the basics of geography, chemistry, physics, as well as related disciplines bioecology, Complex monitoring of water objects
Module objectives/intended learning outcomes	It is important for an environmental specialist to study this discipline, since knowledge of the latest technologies for the use of raw materials will allow him to skillfully carry out production and management activities in the relevant enterprises. Associated with the use of natural raw materials. The purpose of studying the discipline. To give the undergraduate the basic theoretical and practical knowledge and skills in the field of industrial ecology on the use of biological and raw materials. The tasks of studying the discipline. - To give undergraduates the theoretical knowledge underlying technological processes for the rational use of raw materials - To acquaint undergraduates with the latest technologies and methods of their implementation in the production process. - To instill in undergraduates the skills of solving practical problems in the production process of using, processing raw materials.
Content	The academic discipline "new technologies for the rational use of biological and raw materials" is a complex applied discipline that includes both theoretical foundations from a number of natural science disciplines such as bioecology, geology, geochemistry, and the basic principles of nature management, specific technologies for processing raw materials, waste management, etc. The academic discipline sets out:- principles of rational use of natural resources - modern efficient technologies for the use of natural resources: biotechnology, low-waste technologies for processing mineral raw materials, their secondary use, closed cycles in the chemical and metallurgical industries and the use of water resources. - Unconventional methods of using raw materials.
Exams and assessment formats	During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the fifteenth week before the exam) to test students' knowledge orally. Time for intermediate control is 50 minutes. The exam is conducted orally. Each exam ticket has three questions and the student is given 30 minutes to prepare. Oral examination, The assessment of knowledge in the discipline provides for the formulation of additional questions, for which the student gives oral explanations in the conversation.

Study and examination requirements and forms of examination	Milestone 1 The student must pass 5 essays, write a test, participate in seminars, defend 1 presentation. Milestone 2 The student must pass 4 essays, write a test paper, participate in seminars, defend 1 presentation. Final: The student is obliged to submit lecture notes, self-study notes, take an oral survey on the topics studied. The undergraduate must demonstrate the ability to determine the environmental efficiency of technologies, to be guided in the choice of means of solving environmental problems.Compulsory attendance at classrooms, active participation in the discussion of issues, preliminary preparation for lectures and seminars on the teaching aid and basic literature, high-quality and timely completion of IWS assignments, participation in all types of control (current control, IWS control, midterm control, final the control).
Reading list	1. Laskorin B.N., Gromov B.V., Tsygankov A.P., Senin V.N. Problems of the development of waste-free production. –M .: Stroyizdat, 2020 2. Encyclopedic dictionary-reference book "Environment" // Ed. Goncharova E.M. –M .: Progress, 2018 3. Gusev R.K. Environmental law: Textbook. -M .: Legal firm "Contract": "Infra-M", 2021, -208 p. 4. Blinov L.N., Orkina T.N., Tantsura N.P. Fundamentals of Environmental Chemistry. Part 1: Tutorial. –SPb .: Publishing house of St. Petersburg State Pedagogical University, 2015, - 76 p. 5. Korobkin V.I., Peredelsky L.V. Ecology in questions and answers. Rostov on Don: publishing house "Phoenix", 2019, 383 p. 6. Ksenzenko V.I., Kuvshinnikov I.M., Skorobogatov V.S. and other General chemical technology and foundations of industrial ecology. Textbook for universities / Under. ed. IN AND. Ksenzenko.-M.: Chemistry, 2021.-328 p. https://edpuzzle.com/ https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/

EMB 7308 Ecological microbiology and biotechnology

Module designation	ECOL 52002 Ecological problems and environmental protection
Semester(s) in which the module is taught	3
Person responsible for the module	Khussainov M. - associate professor
Language	Kaz/Russian/English
Relation to curriculum	For programm 7M05208 – Environmental protection and rational use of natural resources in which the module is taught ECOL 52002 Ecological problems and environmental protection PD EC Profile discipline elective component (elective course)
Teaching methods	Lecture: Multimedia lecture. Seminar assignments (practice): Case study, brainstorming, works in group, communicative method, method of 6 hats. Independent work of the student: When implementing the plan of independent work, the student must read the theoretical material not only in textbooks and textbooks specified in the bibliographic lists, but also get acquainted with publications in periodicals. The student needs to creatively rework the material studied independently and provide it for the report in the form of an abstract and a summary of the topics of independent work. Verification of the implementation of the independent work plan is carried out in accordance with the schedule of submission of reports.

Workload (incl. contact hours, self-study hours)	lecture -30, seminar -15, private study-105, total - 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	Environmental biotechnology, microbiology, botany
Module objectives/intended learning outcomes	The purpose of the discipline is to acquire a system of knowledge about the spread of microorganisms in the environment, the use of living organisms and systems to solve environmental problems, including waste processing and pollution control, and the acquisition of skills and skills to use the knowledge gained to solve practical problems in the field of ecology and nature protection. Upon completion of this course, the master's student must know: - basic theoretical foundations of the physiological and biochemical characteristics of microorganisms to the extent necessary to understand the role of the microbiota in maintaining ecological balance in the biosphere. - theoretical foundations of the use of microorganisms in biotechnologies aimed at reducing environmental pollution. - theoretical foundations of the ecology of microorganisms and the nature of the impact of environmental factors on microbiological activity, ecological niches for various microorganisms - how to use specific forms of bacteria for their application in environmental biotechnologies. be able to: - regulate microbial processes of waste transformation in metanteks in order to ensure the continuous formation of biogas. - to identify and describe the biological diversity of microorganisms functioning in contaminated soils, and to assess its change in the process of reclamation and to evaluate it with modern methods of quantitative information processing. - use theoretical knowledge in the practical activities of solid and liquid waste treatment. Use bioreactors, metanteks and biofilters used to clean liquid waste released by animals, to produce biogas and fertilizers. - observe the succession of microbes occurring in the reactors and when the qualitative composition of the microorganisms involved in the processes changes, take appropriate measures (changes in ph, temperature) own: - methods of sampling from environmental objects and methods for determining the number and activity of microorganisms that have the ability to biodegrade xenobiotics and their derivatives. - basic knowledge of the course of microbial succession during the biodegradation of various pollutants. - techniques for optimizing microbiological activity and directed regulation of microbiological processes in waste processing, soil bioremediation, and wastewater treatment - knowledge of changes in the physiological characteristics of microbes during the operation of the reactor that purifies liquid waste.
Content	The course covers the basics of microbial genetics and genetic engineering, agricultural microbiology, and environmental biotechnology. Technological issues related to the use of microorganisms and microbiological methods in solving environmental problems that pollute industrial premises and the environment are described in detail. The technologies of bio-treatment of livestock effluents, processing of agricultural waste and processing industry are considered. Further prospects for the use of biotechnology for integrated environmental protection and restoration of soil fertility are shown.
Exams and assessment formats	During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the fifteenth week before the exam) to test students' knowledge orally. Time for intermediate control is 50 minutes. The exam is conducted orally. Each exam ticket has three questions and the student is given 30 minutes to prepare

Study and examination requirements and forms of examination	The exam on the subject of Industrial ecology is taken orally. Because: First of all, in order to fully test the knowledge of students, a deep definition of their speaking skills, the ability to express their thoughts is determined only by oral communication. Second, the third question of the exam questions of this discipline can be assessed in the form of calculations, and it can be assessed only by asking the meaning of oral formulas. Thirdly, I think that only the oral exam method allows you to fully assess the knowledge of students (for example, to ask additional questions).
Reading list	Emtsev V. T., Mishustin E. N. Microbiology, Bustard, 2005, 2006. -441 p. Kuznetsov A. E., Gradova N. B. Scientific bases of ecobiotechnology. - M.: Mir, 2006. - 504 p. Kuznetsov A. E., Gradova N. B., Lushnikov S. V., Engelhart M., Weisser T., Chebotaeva M. V. Applied ecobiotechnology: in 2 t. - M.: BI-NOM.Laboratory of Knowledge, 2010. - 629 p., 485 p. https://www.microsoft.com/ https://www.socrative.com/

15 RULR 7309 Rational use of land resources

Module designation	ECOL 52002 Ecological problems and environmental protection
Semester(s) in which the module is taught	3
Person responsible for the module	Zandybay A, - associate professor / Khussainov M. - associate professor
Language	Kaz/Russian/English
Relation to curriculum	For programm 7M05208 – Environmental protection and rational use of natural resources in which the module is taught ECOL 52002 Ecological problems and environmental protection PD EC Profile discipline elective component (elective course)
Teaching methods	Lecture: Multimedia lecture. Seminar assignments (practice): Case study, brainstorming, works in group, communicative method, method of 6 hats, cinquain method. Independent work of the student: Development of a project for the choice of students (land reclamation, introduction of natural technologies of agriculture, etc.).
Workload (incl. contact hours, self-study hours)	lecture -30, seminar -15, private study-105, total - 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	microbiology, botany, geoecology, soil science, landscape science
Module objectives/intended learning outcomes	The objectives of the study of the discipline: the study of the current state, methods, techniques and technologies for the restoration and protection of land resources during their development and operation. Objectives of the study of the discipline: - to form an idea of land resources as a natural object; - to form an idea of the existing variants of pollution and violations of land resources and their consequences during the construction and operation of an industrial facility; - to consider the main directions of restoration of disturbed lands and the requirements for their implementation; - to study the technique and technology of work at the stage of the mining stage of reclamation; - to study the ecological basis of the biological stage of land reclamation disturbed by industry;

Content	Theoretical foundations of rational use of land resources The functional role of soil in natural and artificial ecosystems. General features of the use of land resources Environmental aspects of the impact of industrial production on land resources Agricultural production and its impact on the state of the land fund. Chemicalization of agricultural production and the environment. Ecological problems of agricultural mechanization. Socio-economic systems and their impact on land use Agrochemical monitoring Information support for the rational use of land resources Current state of the Land fund of the Republic of Kazakhstan Theoretical foundations of environmental sustainability of land ownership and land use Ecological and economic problems of rational land use. Land restoration works Alternative land-use systems and their ecological significance.
Exams and assessment formats	During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the fifteenth week before the exam) to test students' knowledge orally. Time for intermediate control is 50 minutes. The exam is conducted orally. Each exam ticket has three questions and the student is given 30 minutes to prepare
Study and examination requirements and forms of examination	The exam on the subject of Industrial ecology is taken orally. Because: First of all, in order to fully test the knowledge of students, a deep definition of their speaking skills, the ability to express their thoughts is determined only by oral communication. Second, the third question of the exam questions of this discipline can be assessed in the form of calculations, and it can be assessed only by asking the meaning of oral formulas. Thirdly, I think that only the oral exam method allows you to fully assess the knowledge of students (for example, to ask additional questions).
Reading list	Golovanov A. I.: Land recultivation. - M.: "Kolos", 2009. Chernikov V. A. et al. Agroecology. - M., "Kolos", 2000. Bakanina F. M. Agroecology.- Nizhny Novgorod, 2002. Aidarkhanova G. S. Agroecology: Textbook / G. S. Aidarkhanova, M. B. Khusainov, A. T. Khusainov - tipografiya Akademii "Kokshe" - Kokshetau, 2015. - 190 p. Nature management: studies. manual / edited by A. I. Golovanov. - M.: Kolos, 2008. - 346 p. https://www.microsoft.com/ https://www.socrative.com/ Google (Google Class/ GoogleForms)

16 Environmental policy and legal basis for environmental management

Module designation	ECOL 52001 Environmental pollution and its assessment
Semester(s) in which the module is taught	3
Person responsible for the module	Tussupova Zh.B. - - associate professor /
Language	Kazakh/Russian/English
Relation to curriculum	For programm 7M05206–Environmental protection and rational use of natural resources in which the module is taught ECOL 52001 Environmental pollution and its assessment elective, semester 3, PD EC Profile discipline elective component (elective course)

Teaching methods	Lecture: Multimedia lecture, interactive method, differentiated approach, project method, lecture-conference, “hot chair” method, model method (real situation modelling). Seminar assignments (practice): Divide the group into several subgroups. Each subgroup is prepared individually and each subgroup makes its own calculation on the topic of practical work SIW tasks: Each subgroup prepares scientific news on the topic for the last 3 years; videos on the topic of practical work, presentations, and debates on the topic will be organized
Workload (incl. contact hours, self-study hours)	lecture -30, seminar -30, private study-120, total – 180
Credit points	6 (ECTS)
Required and recommended prerequisites for joining the module	Ecological safety and forecasting
Module objectives/intended learning outcomes	Knowledge: master students know the main aspects of environmental policy; the content of the basic concepts, categories and institutions of the science of environmental law; normative legal acts regulating relations in the field of environmental protection and rational use of natural resources. Skills: students know how to independently interpret and apply the norms of environmental legislation, analyze and assess various situations in the field of environmental protection and nature management, assess the patterns of judicial practice; apply methods of working with published and electronic sources on environmental policy issues, be able to analyze them. Competences: students are able to treat nature and natural resources with care, respect the law, and, consequently, comply with the norms of environmental legislation.
Content	Stages of environmental law formation and features of the separation process and integration of resource branches of law. Features of the object and subject of environmental law, with the basics of the system of environmental law. The main source of environmental relations and laws of environmental legislation. Features of the right of private ownership of natural resources. The rights and obligations of natural resources.
Exams and assessment formats	During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the fifteenth week before the exam) to test students' knowledge orally. Time for intermediate control is 50 minutes. The exam is conducted orally. Each exam ticket has three questions and the student is given 30 minutes to prepare
Study and examination requirements and forms of examination	Passing an oral exam has certain advantages since it creates a possibility to prepare the answer in the most complete justified and detailed form with examples and explanations. It forms the student's creative approach to the subject, contributes to the development of skills in analysis and synthesis of the studied material, which in turn leads to a deep understanding and the formation of a comprehensive, holistic and interrelated view of the studied discipline.

Reading list	1.Environmental Code of the Republic of Kazakhstan 2. Volkov A.M. Environmental law. Textbook. Moscow: KnoRus, 2020. 344 p. 3. Potapova A. A. Environmental law. Lecture notes. Moscow: Prospekt, 2018. 104 p. 4.International environmental Law: textbook /T. G. Avdeeva, A. I. Aliev, R. R. Amirova, et al.; ed. by R. M. Valeev. M.: Statute, 2012. 639 p. 5.Pavlenko S. A. Dictionary of environmental terms in legislative normative legal and instructional and methodological documents. Moscow: Lan, 2018. 320 p. https://www.microsoft.com/ https://www.socrative.com/

10 ES 7304 Environmental Service

Module designation	ECOL 73002 Rational use of resources
Semester(s) in which the module is taugh	2
Person responsible for the module	Beisenova R.R.
Language	Kazakh/Russian/English
Relation to curriculum	For programm 7M05206 – Environmental protection and rational use of natural resources in which the module is taught ECOL 73002 Rational use of resources ECOL 73002 Rational use of resources, semester- 2 , profile discipline, elective component
Teaching methods	Lecture: Multimedia lecture. Questions and answers. Show of short videos on the topic of the lecture. Seminar assignments (practice): Case study, brainstorming, works in group, communicative method, method of 6 hats, cinquain method. SIW tasks: brainstorming, interactive method, differentiated approach, project method, lecture-conference, “hot chair” method, model method (real situation modelling).
Workload	lecture -30, seminar -15, private study-105, total – 150
Credit points	5
Requirements according to the examination regulations	Milestone 1 The student must pass 5 essays, write a test, participate in seminars, defend 1 presentation. Milestone 2 The student must pass 4 essays, write a test paper, participate in seminars, defend 1 presentation. Final: The student is obliged to submit lecture notes, independent work of undergraduates notes, take an oral survey on the topics studied.
Recommended prerequisites	To effectively master the content of the discipline, it is necessary to know the basics of geography, chemistry, physics, as well as related disciplines Ecological safety and forecasting

Module objectives/intended learning outcomes	Purpose: to give students the basics of the structure of the environmental service of the enterprise. To teach the skills of environmental service management in accordance with the types of functional features. The undergraduate must be able to organize at the enterprise the procedure for environmental protection, to understand the issues of environmental audit of environmental management systems, environmental assessment and environmental certification. Distinguish between the basic principles of environmental labeling of products. Is the acquisition of special knowledge by students on the rational use of natural resources for the organization and management of the greening of production at the enterprise. The main objectives of the discipline are: - formation of a complex of knowledge in the field of principles of rational nature management; - acquisition of skills in analyzing the state of the natural environment of the region and enterprises; - formation of principles, methods and approaches for organizing greening production processes and the release of environmentally friendly products; - the development of students' stable views on the greening of the production of enterprises as on the basis of the economic and social prosperity of society.
Content	Administrative structure and distribution of responsibility in the environmental service. Environmental management, including industrial environmental control. The territory of the sanitary protection zone of the enterprise. Activity of environmental service of the enterprise - nature user on the basis of the current annual and quarterly (monthly) plans. Tool: write an essay, come up with a new model. Environmental support of economic activities. Legal framework for environmental support of economic activities. Stages of economic activity. Environmental impact assessment as a tool for environmental management. The concept and meaning of environmental impact assessment (EIA). The use of ISO standards in the organization of environmental management systems at the enterprise. State ecological expertise as a tool for environmental management. The purpose of the environmental impact assessment. Objects and subjects of environmental expertise. Environmental audit as a tool for environmental management. Environmental monitoring as a tool for environmental management. Eco-labeling and advertising as a tool for environmental management.
Exams and assessment formats	During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the 15th week before the exam) to test students' knowledge. Time for intermediate control is 50 minutes. The exam is conducted orally. The ticket for each exam consists of three questions and is issued to the student for 30 minutes.
Study and examination requirements and forms of examination	Taking an oral exam has certain advantages, as it allows you to prepare an answer in the most complete, reasonable and detailed form with examples and explanations. Forms a creative approach of students to the subject, contributes to the development of skills in analyzing and generalizing the material being studied, which, in turn, leads to a deep understanding and the formation of a complex, holistic and interrelated understanding of the subject. the discipline is being studied.

Reading list	1. Lopatin V.N. Reader on the course "Management and Marketing in ecology. - M .: 2021.- 544 p. 2. Pakhomova N.V., Richter K., Enders A.,. Environmental management. Uch. for universities. SPb .: Peter, 2004.- 352 p. 3. Pakhomova N.V., Richter K.K. Environmental Economics and environmental management. Uch. for universities. SPb: Publishing house of SP6GU, 2020 - 488 p. 4. Svitkin M.Z., Matsuta V.D., Rakhlin K.M. Environmental systems management. SPb .: Publishing house VSEGEI, 2021 - 242 p. 5. Griedl T.E., Allenby B.R. Industrial ecology. Uchb. Allowance for universities / Per. from English ed. prof. E.V. Girusova. - M .: UNITI-DANA, 2017 .-- 527 p. (series "Foreign textbook). https://edpuzzle.com/ https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/ https://www.socrative.com/

13 SPEFP 7307- Strategy for protection the environment from pollution

Module designation	ECOL 52002 Ecological problems and environmental protection
Semester(s) in which the module is taught	4
Person responsible for the module	Beisenova Raikhan
Language	Kazakh/Russian/English
Relation to curriculum	For programm 7M05206 – Environmental protection and rational use of natural resources in which the module is taught ECOL 52002 Ecological problems and environmental protection elective, semester 3
Teaching methods	Lecture: Multimedia lecture. Questions and answers. Show of short videos on the topic of the lecture. Seminar assignments (practice): Case study, brainstorming, works in group, communicative method, method of 6 hats, cinquain method, interactive method, differentiated approach, project method, lecture-conference, “hot chair” method, model method (real situation modelling). SIW tasks: Each subgroup prepares scientific news on the topic for the last 3 years; videos on the topic of practical work, presentations, and debates on the topic will be organized.
Workload	lecture -30, seminar -30, private study-115, total - 180
Credit points	5
Requirements according to the examination regulations	Undergraduates must master all sections of the course on environmental protection strategy and score a threshold score of 50 out of 100 for all types of training. Midterm examinations must be passed.
Recommended prerequisites	Biogeochemical monitoring, Bioecology, Ecological toxicology.
Module objectives/intended learning outcomes	Purpose: formation of the ability to organize the rational use and reproduction of natural resources, environmental protection, as well as to ensure the rule of law in environmental and economic relations. Students know: the strategy of protecting the environment from pollution at the global level, at the level of the state, industrial corporation, industrial and agricultural enterprise. Students are able to make Environmental protection models. Tool: creating models. population health indicators, factors shaping human health; diseases associated with adverse climatic conditions, social factors; basics of preventive medicine.

Content	The main components of environmental protection and the organization of environmental protection, the implementation of environmental monitoring, the development of scenarios for changes in environmental components to achieve sustainable development goals. Describes the formation of the ability to organize the rational use and reproduction of natural resources, environmental protection, as well as to ensure the rule of law in environmental and economic relations, contributing to the technological and socio-cultural development of society.
Exams and assessment formats	During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the 15th week before the exam) to test students' knowledge. Time for intermediate control is 50 minutes. The exam is conducted orally. The ticket for each exam consists of three questions and is issued to the student for 30 minutes.
Study and examination requirements and forms of examination	Taking an oral exam has certain advantages, as it allows you to prepare an answer in the most complete, reasonable and detailed form with examples and explanations. Forms a creative approach of students to the subject, contributes to the development of skills in analyzing and generalizing the material being studied, which, in turn, leads to a deep understanding and the formation of a complex, holistic and interrelated understanding of the subject. the discipline is being studied.
Reading list	1. Ecological Codex RK 2. Melnikov A.A. Environmental Problems and Strategy for Its Preservation / A.A. Melnikov // M .: Gaudeamus, 2009.-712s. 3. Stepanovskikh A.S. Environmental protection / A.S. Stepanovskikh // Kurgan, 2005 4. Collection of legislative acts on environmental protection https://edpuzzle.com/ https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/ https://www.socrative.com/

15 Rational use of land resources

Module designation	ECOL 52002 Ecological problems and environmental protection
Semester(s) in which the module is taught	3
Person responsible for the module	Khussainov M. Zandybay A.
Language	Kazakh/Russian/English
Relation to curriculum	For programm 7M05208 – Environmental protection and rational use of natural resources, ECOL 52002 Ecological problems and environmental protection, profile discipline, elective component
Teaching methods	Lecture: Case study, brainstorming, works in group, communicative method. Seminar assignments (practice): method of 6 hats, cinquain method, interactive method, differentiated approach, project method. SIW tasks: “hot chair” method, model method (real situation modelling).
Workload	lecture -30, , seminar -15, private study-105, total – 150
Credit points	5
Requirements according to the examination regulations	passing midterm tests
Recommended prerequisites	microbiology, botany, geoecology, soil science, landscape science

Module objectives/intended learning outcomes	The objectives of the study of the discipline: the study of the current state, methods, techniques and technologies for the restoration and protection of land resources during their development and operation. Objectives of the study of the discipline: - to form an idea of land resources as a natural object; - to form an idea of the existing variants of pollution and violations of land resources and their consequences during the construction and operation of an industrial facility; - to consider the main directions of restoration of disturbed lands and the requirements for their implementation; - to study the technique and technology of work at the stage of the mining stage of reclamation; - to study the ecological basis of the biological stage of land reclamation disturbed by industry;
Content	Theoretical foundations of rational use of land resources The functional role of soil in natural and artificial ecosystems. General features of the use of land resources Environmental aspects of the impact of industrial production on land resources Agricultural production and its impact on the state of the land fund. Chemicalization of agricultural production and the environment. Ecological problems of agricultural mechanization. Socio-economic systems and their impact on land use Agrochemical monitoring Information support for the rational use of land resources Current state of the Land fund of the Republic of Kazakhstan Theoretical foundations of environmental sustainability of land ownership and land use Ecological and economic problems of rational land use. Land restoration works Alternative land-use systems and their ecological significance.
Exams and assessment formats	During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the 15th week before the exam) to test students' knowledge. Time for intermediate control is 50 minutes. The exam is conducted orally. The ticket for each exam consists of three questions and is issued to the student for 30 minutes.
Study and examination requirements and forms of examination	Taking an oral exam has certain advantages, as it allows you to prepare an answer in the most complete, reasonable and detailed form with examples and explanations. Forms a creative approach of students to the subject, contributes to the development of skills in analyzing and generalizing the material being studied, which, in turn, leads to a deep understanding and the formation of a complex, holistic and interrelated understanding of the subject. the discipline is being studied.
Reading list	Golovanov A. I.: Land recultivation. - M.: "Kolos", 2009. Chernikov V. A. et al. Agroecology. - M., "Kolos", 2000. https://www.microsoft.com/ https://www.socrative.com/

17 EBAMI 7311 Environmental biotechnology in agriculture and mining industry

Module designation	ECOL 52001 Environmental pollution and its assessment
Semester(s) in which the module is taugh	3
Person responsible for the module	Samatova I.S.
Language	Kazakh/Russian/English
Relation to curriculum	For programm 7M05206 – Environmental protection and rational use of natural resources in which the module is taught ECOL 52001 Environmental pollution and its assessment, semester- 3
Teaching methods	Lecture: Multimedia lecture. Questions and answers. Show of short videos on the topic of the lecture. Seminar assignments (practice): Divide the group into several subgroups. Each subgroup is prepared individually and each subgroup makes its own calculation on the topic of practical work SIW tasks: brainstorming, works in group, communicative method, method of 6 hats, cinquain method, interactive method, differentiated approach, project method, lecture-conference, “hot chair” method, model method (real situation modelling).
Workload	lecture -30, seminar -30, private study-120, total – 170
Credit points	6
Requirements according to the examination regulations	Checking the learning outcomes in a specific discipline of the educational program is carried out by taking an exam. The forms of exam is determined by the lecturer or leading teacher. The forms of the exams can be oral, written, combined, computer testing or matrix testing. A lecturer and a teacher for practical training develops a set of theoretical questions covering the content of the entire course, and practical tasks to determine the formation of skills and abilities. Depending on the form of exams the lecturer prepares the examination materials which include exam tickets (where at least two questions are included) or tests. Examination tickets are revealed only on the day of exam, though the students are given the list of approximate questions beforehand to get ready for exams. The questions cover all taught material. The exam tickets may consist of at least one theoretical question and one practical (applied). Usually one discipline demands 25 examination tickets. Tests are prepared according to the taught material and are huger in amount. They can also include theoretical and practical questions, they can have answer options or demand fulfilling the gaps. In addition, the lecturer develops criteria for assessing knowledge, skills and abilities. These criteria take into account the specifics of the discipline. The assessment criteria are available to all students in the syllabi of the disciplines.
Recommended prerequisites	"Ecology and sustainable development", "Modern environmental problems", "New technologies for the rational use of biological and raw materials", "Bioremediation and biocultivation of lands"
Module objectives/intended learning outcomes	To familiarize students with the methods of research using the basic methods of environmental biotechnology and environmental safety, biotechnological methods of environmental protection in agriculture and in industrial production. And also teach students to use microorganisms and biological objects for waste processing, wastewater treatment and atmospheric air.
Content Содержание	Environmental biotechnology in agriculture and mining industry is a discipline that studies the biotechnological methods in relation to environmental protection in agricultural production and extractive industries, biological objects, microbial cultures, communities, their metabolites and preparations used in biotechnological processes in agriculture and their inclusion in the natural cycles of substances, elements, energy and information.

Exams and assessment formats	During the academic semester, two intermediate controls are held (the first after the seventh week of study and the second after the 15th week before the exam) to test students' knowledge. Time for intermediate control is 50 minutes. The exam is conducted orally. The ticket for each exam consists of three questions and is issued to the student for 30 minutes.
Study and examination requirements and forms of examination	Taking an oral exam has certain advantages, as it allows you to prepare an answer in the most complete, reasonable and detailed form with examples and explanations. Forms a creative approach of students to the subject, contributes to the development of skills in analyzing and generalizing the material being studied, which, in turn, leads to a deep understanding and the formation of a complex, holistic and interrelated understanding of the subject. the discipline is being studied.
Reading list	Ualikhanova G. Zh. Plant biotechnology: textbook. - Almaty, 2009 .-- 336 Esimova A.M., Kedelbaev B. Sh. Technology of production of biological preparations: textbook. 2009 .-- 136 Esimova A.M., Prikhodko N.A., Nadirova Zh.K. Fundamentals of bioengineering: a tutorial. 2010 .—148 https://edpuzzle.com/ https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/

18 ASDE 7312 Assessment of the status and dynamics of the human impact on the environment

Module designation	ECOL 52001 Environmental pollution and its assessment
Semester(s) in which the module is taugh	3
Person responsible for the module	Samatova I.S.
Language	Kazakh/Russian/English
Relation to curriculum	For programm 7M05206 – Environmental protection and rational use of natural resources in which the module is taught ECOL 52001 Environmental pollution and its assessment, semester- 3
Teaching methods	Lecture: Multimedia lecture. Questions and answers. Show of short videos on the topic of the lecture. Seminar assignments (practice): brainstorming, works in group, communicative method, method of 6 hats, cinquain method, interactive method, differentiated approach, project method. SIW tasks: Each subgroup prepares scientific news on the topic for the last 3 years; videos on the topic of practical work, presentations, and debates on the topic will be organized.
Workload	lecture -30, seminar -15, private study-105, total – 150
Credit points	5

Requirements according to the examination regulations	Checking the learning outcomes in a specific discipline of the educational program is carried out by taking an exam. The forms of exam is determined by the lecturer or leading teacher. The forms of the exams can be oral, written, combined, computer testing or matrix testing. A lecturer and a teacher for practical training develops a set of theoretical questions covering the content of the entire course, and practical tasks to determine the formation of skills and abilities. Depending on the form of exams the lecturer prepares the examination materials which include exam tickets (where at least two questions are included) or tests. Examination tickets are revealed only on the day of exam, though the students are given the list of approximate questions beforehand to get ready for exams. The questions cover all taught material. The exam tickets may consist of at least one theoretical question and one practical (applied). Usually one discipline demands 25 examination tickets. Tests are prepared according to the taught material and are huger in amount. They can also include theoretical and practical questions, they can have answer options or demand fulfilling the gaps. In addition, the lecturer develops criteria for assessing knowledge, skills and abilities. These criteria take into account the specifics of the discipline. The assessment criteria are available to all students in the syllabi of the disciplines.
Recommended prerequisites	Rational use of land resources, Management of ecological safe processes and production, Environmental assessment and examination of design documentation,
Module objectives/intended learning outcomes	To familiarize students with the process of environmental assessment and assessment of the dynamics of human impact on the natural environment.
Content Содержание	Assessment of the status and dynamics of the human impact on the environment is a discipline that studies methods of forecasting of the environmental state in assessing the quality of various components of the environment, assessment of the level of anthropogenic impact on the environment, the main sources of anthropogenic impact on the environment, the intensity of industry and traffic, automobile gases and other gases released into the environment.
Study and examination requirements and forms of examination	Course policies and procedures Necessary conditions for undergraduates in the educational process: - compulsory attendance of classes; - activity during practical (laboratory) classes; - preparation for classes, homework and self-regulatory organizations. - timely execution and delivery of SRO tasks Unacceptable: being late and leaving classes; using cell phones during classes; deception and plagiarism; late delivery of tasks. Types of control of educational achievements: Linear 1. Linear control - colloquium. Linear 2. Linear control - colloquium. Final: oral exam conducting an oral exam is necessary to enable the undergraduate to reveal the knowledge gained and express his thoughts in more detail and get a complete picture of the student's preparation
Media employed	Presentation for each lesson using a computer, projector, interactive whiteboard

Reading list	Musatova, OV General and global ecology. EE "Voronezh State University named after P.M. Masherov", 2010 S.I. Rozanov General ecology: a textbook for students of higher educational institutions on the discipline "Ecology" for technical areas and specialties / Sergey Ivanovich Rozanov. - Ed. 4th, erased. - St. Petersburg ; Moscow; Krasnodar: Doe, 2014 Farmer G.T. Climate change science. A modern synthesis / G.T. Farmer, J. Cook. - New York; London: Springer Science + Business Media, 2013 https://www.microsoft.com/ https://www.socrative.com/