IS 2101 Introduction to the specialty

Module designation	ECOL 22001 Fundamentals of Natural Sciences
Semester(s) in which the module is taught	1
Person responsible for the module	Abzhalelov A.B., Doctor of Biological Sciences, professor
Language	Kaz/Russian
Relationtocurriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22001 Fundamentals of Natural Sciences, University discipline
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 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).
Workload (incl. contact hours, self-study hours)	lecture -15, seminar -30, private study-105, total - 150
Credit points	5 (ECTS)
Requiredandrecommendedprerequisitesforjoiningthemodule	Existing competences in chemistry, ecology, ecology of the soil, water, air, geology. List of related subjects: chemistry, physics of environment, ecology of the person, social ecology, plant ecology
Module objectives/intended learning outcomes	Objectives -: The course "Introduction to the Specialty" examines the natural science foundations of environmental education. Mastering the basics of ecology develops the ability to further independent understanding of the complex and diverse material of modern necology. Knowledge about the formation of the population and ecosystem, the patterns of the third distribution contribute to a deeper disclosure of complex dialectical connections in the biosphere. Considering the ecosystem as a structural unit of the biosphere, resulting from the interaction of natural and anthropogenic factors, students get a more complete picture of the universal connection and interaction in nature and society. To know is the assimilation of the essence of scientific and technical progress; to acquaint with the positive and negative aspects of technical progress; Have the opportunity to become familiar with the characteristics of the main industrial sectors and their interaction with each other; admit the ways and directions of the impact of various industrial enterprises on the main components of the biosphere and their consequences; Have skills - to master the ways of greening technological processes of various industrial enterprises; master the ways and methods of environmental monitoring; learn the understanding between natural cooperation in the field of environmental protection.
Content	The intensification of human economic and production activities in modern conditions of nature management and the global scale of anthropogenic impact on the main components of the biosphere create a situation of acute ecological crisis caused by the degradation of environmental objects. In this regard, the role of environmental impact management is important to optimize the conditions for human interaction with nature.
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	The exam in the discipline "Introduction to the specialty" is taken orally. You need to know that only the oral examination method allows you to fully assess the knowledge of students (for example, ask additional diverse questions).
Readinglist	1. Koshkarov N. B., Abseitov E. T., Massenov K. B. Textbook «Basics of ecological rationing and expertise». Almaty, - 2018. 2. Kuznetsova T. A.; Biology. 2nd ed., Database: Lan Publishing. 2018. 3. Scientific foundationsofecobiotechnology: a textbook / Alexander E. Kuznetsov, Nina B. Gradova. - Moscow: Mir, 2016. 4. Protection of terrestrial and aquatic ecosystems: a textbook / R. A. Alybaeva; Ministry of Education and Science of the Republic of Kazakhstan. - Almaty: Bastau, 2013. 5. Bigaliev A. B., Khalilov M.F., Sharipova M.A. Basics of General Ecology, - Almaty, “Kazakh University”, 2007. https://edpuzzle.com/ https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/

BB 2102 Biodiversity of biocenoses

Module designation	ECOL 22001 Fundamentals of Natural Sciences
Semester(s) in which the module is taugh	2
Person responsible for the module	Zhantokov B.ZH., senior lecturer of the department
Language	Russian, Kazakh
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22001 Fundamentals of Natural Sciences, semester- 3. BD UC-basic discipline, university component
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): works in group, communicative method, method of 6 hats, cinquain method, interactive method, differentiated approach, project method.
Workload (incl. contact hours, self-study hours)	lecture -30, seminar -15, private study-105, total – 150
Credit points	5
Required and recommended prerequisites for joining the module	To effectively master the content of the discipline, it is necessary to know the ecological aspects of natural science, bioecology, Introduction to the specialty
Module objectives/intended learning outcomes	The objectives of the discipline: to familiarize students with the methods of control for the removal of biological resources, taking into account the possible damage to biodiversity not only within the country, but also in neighboring States-parties to the Convention, as well as in the conservation and sustainable use of components of biological diversity of the Republic of Kazakhstan and obtaining economic benefits, that is, the development and improvement of the strategy of nature management, the legal framework and the system of financial support for biodiversity conservation programs. The knowledge, skills and abilities acquired during the study of the discipline are necessary for the formation of ecological thinking, outlook, the ability of the individual to navigate in matters of rational nature management, as well as for further study of the disciplines: fundamentals of system ecology, environmental protection, microbiology, taxonomy.
Content	"Biocenosis biodiversity" is a synthetic discipline that studies the diversity of all extant and extinct plant species and how to bring this diversity into a logical ordered system.

Exams and assessment format	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 Biodiversity of biocenoses 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	Muslim S.B. Flora of Kazakhstan ,Almaty 2009. Protection of terrestrial and aquatic ecosystems: a textbook / R. A. Alybaeva; Ministry of Education and Science of the Republic of Kazakhstan. - Almaty: Bastau, 2013. Practicum on Microbiology: a textbook for university students / A. I. Netrusov, M. A. Egorova, L. M. Zakharchuk, etc.; edited by A. I. Netrusov. - Moscow: Akademiya, 2005 https://kahoot.com/ https://www.microsoft.com/ https://www.socrative.com/ Google (Google Class/ GoogleForms)

BCTE 2103 Biological components of the environment

	ECOL 22003 Applied ecology
Semester(s) in which the module is taught	2
Person responsible for the module	Adilbektegi G. – candidate of geographical sciences, assistant professor of the department Tussupova Zh.B. – candidate of biological sciences, assistant professor of the department
Language	Russian, Kazakh
Relation to curriculum	For programme 6B05208 – Ecology and nature management in which the module is taught ECOL 22003Applied ecology elective, semester 2, Elective component
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: 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 -15, seminar -30, private study-105, total - 150
Credit points	5 (ECTS)

Required and recommended prerequisites for joining the module	Introduction to the specialty
Module objectives/intended learning outcomes	Knowledge: students know that are given basic knowledge about the classification of living organisms, life forms, understanding the patterns of their distribution in the environment; are taught to assess their biocenotic role. Theoretical knowledge of basic concepts in the field of biology is fixed on practical exercises and forms the natural science outlook. Skills: students know how to apply knowledge in the field of biology for development of general professional disciplines and solving professional issues. Competences: students are able to do activities for the study, assessment of the state and protection of biota as a component of ecosystems and the biosphere, for the implementation of measures for environmental monitoring and protection of the environment, assessment, and protection of biodiversity.
Content	The discipline studies the biology of living organisms, which reveals the laws of life and its development as a special phenomenon of nature. Among other sciences, biology is a fundamental discipline and belongs to the leading branches of natural science.
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.General Biology: Textbook /Ed. Konstantinova V. M. - M.: Academia, 2018. - 704 p. 2.Konstantinov, V. M. General biology: Textbook / V. M. Konstantinov. - M.: Akademiya, 2019. - 304 p. 3.Tupikin, E. I. General biologywiththebasicsofecologyand environmental protection: A textbook /E. I. Tupikin. - M.: Academia, 2017. - 516 p. 4.Netrusov, A. I. Biology. University course: Textbookforstudentsofinstitutionsofhigher professional education / A. I. Netrusov, I. B. Kotova. - M.: IC Academy, 2017. - 384 p. 5.Azova, M. M. Human geneticswiththebasicsofmedicalgenetics (forspo) /M. M. Azova. - M.: KnoRus, 2018. - 539 p. https://edpuzzle.com/ https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/

APE 2201Animals and plants ecology

Module designation	ECOL 22001 Fundamentals ofNaturalSciences
Semester(s) in whichthemoduleistaught	3
Person responsibleforthemodule	Adilbektegi G. - candidate of geographical sciences, assistant professor of the department Bakeshova Z.hU. Senior teacher
Language	Kaz/Russian/English

Relation tocurriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22001Fundamentals of Natural Sciences, semester- 3, Elective component
Teaching methods	Case study, brainstorming, works in group, communicative method, method of 6 hats. Lecture: Traditional, problematic, multimedia. Answers security questions. Shows short videos on the topic of the lecture. Tasks for the seminar (practice): Performing tasks in subgroups. Each subgroup works individually and draws up projects on the topic of practical work. Tasks for SIR: Each subgroup prepares scientific articles and news on the topic. Make presentations on the topic of practical work.
Workload (incl. contacthours, self-studyhours)	lecture -15, seminar -30, private study-105, total - 150
Creditpoints	5 (ECTS)
Required and recommended prerequisites for joining the module	Existing competencies in biology, chemistry, ecology, soil, water, air ecology. List of related subjects: Biodiversity of biocenoses, bioecology..
Module objectives/intended learning outcomes	The purpose of mastering the discipline "Ecology of animals and plants" is to understand the mechanisms of the impact of environmental factors on living organisms and the mechanisms of impact on the environment, to study the forms of relationships between living organisms and various forms of adaptation of organisms.
Content	To study the seasonal characteristics of ethology and the relationship of living organisms that adapt to the conditions of existence. Students should understand the biological cycles of a species that ensure the survival of individuals and determine the nature of the dynamics of the population of a species; adaptation of animals and plants to environmental conditions; ecological relationship of animals and plants; Ecological groups of living organisms in relation to various environmental factors. The content of the discipline consists of topics; 1. Factorial ecology of animals and plants. 2. Habitat of organisms 3. Ecology of the population 4. Community ecology 5. Study of plant life forms and plant development strategies. 6.Plant resistance and their response to adverse effects of factors
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	An oral exam is provided for this discipline, as the exam requires students to demonstrate practical skills based on the theoretical knowledge gained during the examinations. Specific examples should be used to show the numerous forms of adaptation of plants and animals to changing environmental conditions.

Reading list	1.Kaman Ulykpan. Ecology ofanimals / KamanUlykpan. | Pavlodar: Kereku, 2009 .-204 pages 2.Potapov, Igor Vladimirovich. Zoologywiththebasicsofanimalecology: textbook. manualforpedstudents. universities / I. V. Potapov. - M.: AcademiA, 2001 .-- 292 p. : ill. - (Higher education). - Bibliography: p. 290 3.Sharipkhanova A.S. Simdikterecology: O :y ралы. - Eskemen: S. Amanzholovatyndaғy SHҚMU baspasy, 2011. - 111 b. ISBN 978-601-80142-2-2. https://www.microsoft.com/ https://www.socrative.com/ Google (Google Class/ GoogleForms)

BM 2202 Biogeochemical monitoring

Module designation	ECOL 22002 Ecological research methods
Semester(s) in which the module is taught	3
Person responsible for the module	Rakhisheva A.
Language	Kazakh
Relation to curriculum	For programm 6B052 – Environment in which the module is taught ECOL 22002 Ecological research methods, semester- 3, Elective component
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. Method of 6 hats, cinquain method, interactive method, differentiated approach,
Workload (incl. contact hours, self-study hours)	lecture -15, seminar -30, private study-105, total - 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	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.

Module objectives/intended learning outcomes	Tasks. Formation of knowledge about the basic provisions of biogeochemistry and skills in conducting biogeochemical monitoring. Gives students an idea of the biogeochemical structure of the biosphere, the main migration routes of chemical elements and the role of living organisms in this process. Know the basic laws of the geographical distribution of chemical elements in the biosphere and the features of biochemical processes and biogeochemical circulation of elements in organisms. To be able to - determine the biogeochemical assessment of the state of the environment and biota. Have skills - evaluates the influence of living organisms on the evolution of the chemical components of the biosphere and their relationship.
Content	A discipline based on biology and geochemistry, which studies the chemical composition of living organisms, their participation in geochemical processes occurring in the biosphere of the Earth.
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	V.N. Bashkin Biogeochemistry. M .: High school, 2008.- 423p. O.S. Bezuglova, D.S. Orlov Biogeochemistry. A textbook for students of higher educational institutions. Series "Textbooks, teaching aids". - Rostov-on-Don: "Phoenix", 2000. - 320 p. https://edpuzzle.com/ https://whiteboard.fi/ https://kahoot.com/

BE 2203 Bioecology

Module designation	ECOL 22001 Fundamentals of Natural Sciences
Semester(s) in which the module is taught	3
Person responsible for the module	Saspugayeva G.Y.,- PhD, associate professor, Kobetaeva N.K. -PhD, associate professor, Orkeyeva A.N.- senior teacher
Language	Kazakh, Russian, English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22001 Fundamentals of Natural Sciences, semester- 3 , Elective component
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): 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). 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	Biological components of the environment, Introduction to the ecology
Module objectives/intended learning outcomes	Give students a basic knowledge of the basic principles of bioecology and develop skills for conducting bioecological monitoring. The course includes issues of stages, models of ecology of organisms and the environment, adaptation mechanisms of living organisms, natural associations, ecosystems, problems of rational use of natural resources and problems of modern ecology. The obtained knowledge and methods to be able to use on the basis of production practices of environmental monitoring.
Content	Knowledge about the peculiarities of the life activity of living organisms, laws and phenomena in nature and the relationship of organisms with the environment. As well as training in the influence of various factors on the vital activity of living organisms and measures to protect them.
Exams and assessment formats	The exam is taken orally, that is, in the form of an examination ticket. The exam tickets consist of 25 options. Each ticket consists of 3 questions. The exam questions cover all the material passed in 1 semester of full training at the lecture and practical lesson. Taking students ' oral exams in the form of exam tickets, we can fully test their knowledge: knowledge about the main functional ecological units: individual species, populations, biogeocenoses, ecosystems; to master the problems of natural resources and their effective use-to form a theoretical knowledge of the biosphere-the global ecosystem; to perfectly assess how they have mastered the emphasis on knowledge on modern environmental problems and their development.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
Study and examination requirements and forms of examination	An examination session is usually referred to as the period of time during the academic semester when students take exams. Teachers should prepare the exam materials and distribute them 1 month in advance and inform students about the form of the exam session before the start of each session. The exam forms can be oral, written, combined, computer-based testing, or matrix testing. Exam tickets are made up of 3 questions. Depending on the number of students in the group, exam tickets are drawn up. If the exam will take place in the form of a test, there should be several test options. Each option should have at least 20-25 questions. Students ' knowledge, skills and abilities are evaluated depending on the answer to the exam. The system for evaluating students ' learning outcomes is presented in the syllabus.

Reading list	1.Bigaliev, A. B.. Bioecology.- Almaty,2016 2.Kolesnikov S. I. Biology with the basics of ecology.- Rostov n/A: Phoenix, 2016. - 224s. 3.Kolomaeva S. Zh.. Ecology and sustainable development.- Almaty,2018 4.Prostakov N.I., Golub V. B. Bioecology. Study guide: -VSU Publishing House, 2015. 5.Lyubimov VB; E.V.Borzdyko; I. V. Melnikov; Avramenko M.V. Bioecology (practical training) Russia, Europe: Limited Liability Company "Publishing House" Academy of Natural Sciences ", 2015. 6.Tikhonov A.I. Ecological problems: A course of lectures. - Ivanovo, 2072 7. A. D. Sakharova. Bioecology, textbook, -International State Ecological Institute named after BSU. Belarus, Europe: UMO for Science Education, 2013.Alisheva K.A. Ecology, 2016 8. Kenesariev U.I. Ecology and population health, 2017 https://www.microsoft.com/

ET 2204 Ecological toxicology

Module designation	ECOL 22005 Engineering ecology
Semester(s) in which the module is taught	3
Person responsible for the module	Kapsalyamov B. doctor of technical sciences, professor of the department
Language	Kaz/Russian
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22005Engineering ecology elective, semester 5, Elective component
Teaching methods	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). 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: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 aspects of natural science, bioecology, Introduction to the specialty

Module objectives/intended learning outcomes	The purpose of this course is the formation of theoretical Environmental toxicology studies chemical and chemical-biological processes in the environment, gives a general idea of the state of the environment, the impact of human activities on it, and the problems of rational use of natural resources. The course examines the impact of pollutants on natural chemical and technological processes, ways to prevent them from entering the habitat of living organisms, as well as changes in the biosphere as a whole that occur as a result of environmental pollution (chemical aspects). The aim of the course is to familiarize students with the scientific and methodological foundations of studying the chemical aspects of the impact of human activity on natural objects, on the processes occurring in the air, water and soil when pollutants enter, and the possibility of preventing environmental pollution. After studying the discipline, the student must: * know the basic laws of chemical and chemical-biological processes occurring in the biosphere ;; * be able to analyze possible transformations of emissions and discharges of industrial enterprises and transport into air, water and soil and their impact on living organisms; * have the skills of analytical determination of toxicants in natural objects.
Content	The purpose of the discipline: teach students to identify environmental xenobiotics, understand the damage to their effects on ecosystems, assess the dynamics of ecosystem degradation and to organize ecotoxicological expertise. The course includes the issues of distribution, migration, transformation of toxic substances, their effects on ecosystems and the circulation in the biosphere, especially in food chains; Tools to achieve the goal: independent work of students with a teacher, practical work in laboratory classes, work experience.
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 A. Zh.Bozhbanov, G. Zh.Medeuova. Ecotoxicology. :- learning process.- Karaganda.- 2014. -276 pages. 2 Golodovskaya L. F. chemistry surrounding the environment. Moscow, 2008 3 chemistry of the environment: educational process / Myrzalieva S. K., Abdibattayeva M. M., Berdikulova F. A., Aimbetova E. O.- Almaty: Kazakh University, 2014. - 284 pages. https://edpuzzle.com/ https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/ https://www.socrative.com/ Google (Google Class/ GoogleForms)

EMB 2205 Ecological metrology and Biometry

Module designation	ECOL 22001 Fundamentals of Natural Sciences
Semester(s) in which the module is taugh	3
Person responsible for the module	Akbayeva Lyailya, candidate of biological sciences, professor of the department
Language	Russian, ,English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22001 Fundamentals of Natural Sciences, semester- 3 , basic discipline, elective component (elective course)
Teaching methods	Informational or problematic lecture with the calculation of tasks Seminar assignments (practice): Divide the group into several subgroups. Each subgroup is prepared individually SIW tasks: Statistical processing and presentation of the data set. 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 (incl. contact hours, self-study hours)	lecture -30, seminar -30, self-study-120, total – 180
Credit points	6 (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 biology, geography, chemistry, physics, as well as related disciplines Biology, biodiversity of biocenoses, Introduction to the specialty, bioecology.
Module objectives/intended learning outcomes	Purpose: to familiarize environmental students with the basic methods of measuring and analyzing experimental material and assessing their reliability using various mathematical and statistical formulas and methods, as well as teach students to use these formulas and methods. Objectives of the course: The knowledge that the student receives in the course of "Biometrics" should become the basis for carrying out scientific research work, writing term papers and final qualification works. During the laboratory course, students should master the following practical knowledge, skills and abilities: 1. planning an experiment; 2. drawing up variation series for a set of empirical data, calculating the main statistical indicators and evaluating them; 3. parametric and nonparametric methods for testing statistical hypotheses; 4. correlation, variance and regression analysis.
Content	The course includes questions: data collection and rational organization of research in biology and statistical processing of results; familiarize with the methods of statistical processing in biological research; solving problems of determining arithmetic average, arithmetic error, standard deviation, student criterion, ANOVA test, regression and correlation. The content of the discipline: Metrology - the science of measurements, methods and means of ensuring their unity and ways to achieve the required accuracy. The subject of metrology is the extraction of quantitative information about the properties of objects with a given accuracy and reliability; the regulatory framework for this is metrological standards. Biometrics is an applied science that studies specific biological objects using mathematical methods. The objectives of the course include the study of planning experiments, familiarity with the numerical characteristics of the description of empirical data, the study of distribution laws, the construction of statistical estimates, parametric and nonparametric methods for testing statistical hypotheses, variance, correlation and regression analysis/

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 student must know the basic creation of the basis of the general theory of measurements, the development and standardization of methods and measuring instruments, methods for determining the accuracy of measurements, the basics of ensuring the uniformity of measurements and uniformity of measuring instruments, the basics of mathematical statistics, processing the results of observations, experiments and research, grouping experimental material, identifying the most important statistical indicators of accuracy and criteria of materiality, measurement of contingency, etc. The student must be able to master the skills of statistical processing. Grouping data, analyzing results. The student must understand the meaning and significance of statistical methods of processing empirical material. 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 control).
Reading list	1. Lakin G.F. Biometrics. Mu: Higher. shk. 2020.352s. 2. Bedritskaya T.V., Nakvasina E.N. Biometric Methods in Ecology and Biology. Arkhangelsk, 2017..40s. 3. B.P. Van der Waerden, Mathematical Statistics. Moscow: 2019. 4. Glotov N.V., Zhivotovsky L.A., Khovalov N.V., Khromov-Borisov N.N. Biometrics. L .: 2016 5. Kurshakova B.S. Correlation and regression analysis in practical application. Selection theory in plant populations. 6. Plokhinsky N.A. Biometrics. Moscow: 2020. 7. https://edpuzzle.com/ 8. https://whiteboard.fi/ 9. https://kahoot.com/

DERPM 2206 Digital environmental research processing methods

Module designation	ECOL 22002 Ecological research methods
Semester(s) in which the module is taught	3
Person responsible for the module	Daribai Ainur., PhD, Assistant professor of the department
Language	Kaz/Russian/English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22002 Ecological research methods elective, semester 3, Elective component

Teaching methods	Lecture: Multimedia lecture. Oral explanation. 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: 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. Case study, brainstorming, works in group, communicative method.
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	Existing competences in ecology, ecological toxicology, biogeochemical monitoring, animals and plants ecology. List of related subjects: chemistry, physics of environment, ecology of the person, social ecology, plant ecology
Module objectives/intended learning outcomes	Objectives: The purpose of this course is to gain theoretical knowledge and practical skills in the field of anthropogenic impact of industrial enterprises on the environment, students' ideas about the main sources of pollution, the composition of pollutants and their quantitative assessment. Know: Students know that the analysis of experimental material, as well as various mathematical and statistical formulas and methods Have skills: experimental planning, compilation of empirical data and compilation of variation series for calculating basic statistical indicators. Competencies: knowledge of parametric and nonparametric methods for testing statistical hypotheses, correlation, variance and regression analysis, processing control results.
Content	The course is a necessary subject in the training of ecologists. Statistical methods are also needed when conducting experiments. Environmental research methods are used to further improve environmental research and decision-making
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.Tikhonov, A.H. Statistical processing of experimental results. Moscow, 2001 2. Vosmirko, E.O. Environmental statistics / Statistics questions. Russia 2013 3. Aubakirov H.Ə. Biometrics, Almaty, 2011 https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/ https://www.socrative.com/

BMR 2207 Bioindicator methods of research

Module designation	ECOL 22002 Ecological research methods
Semester(s) in which the module is taugh	3
Person responsible for the module	Zhantokov B.ZH., Massenov Kairat
Language	Russian, Kazakh,English

Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22002 Ecological research methods, semester- 3 , BD EC basic discipline, elective cours
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: 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. 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 – 180
Credit points	6
Required and recommended prerequisites for joining the module	To effectively master the content of the discipline, it is necessary to know the basics of biology, geography, chemistry, physics, as well as related disciplines Biology, biodiversity of biocenoses, Introduction to the specialty, bioecology.
Module objectives/intended learning outcomes	The purpose of studying the discipline: To give the theoretical foundations (principles and types) bioindication at different levels of the organization of the living in different environments, as well as teach practical skills in the use of bioindication and biotesting methods. Tasks of studying the academic discipline: The objectives of the course are to give students the skills to use the acquired theoretical and practical knowledge in solving theoretical problems and practical problems related to the assessment of environmental pollution. In the course of studying the subject, students should be clearly guided by the clarity of the tasks set in the study: namely, which indication is best used: specific or non-specific, expensive or rapid assessment, etc. That is, the ability to make the right choice from numerous methods is also a difficult task that requires proper qualifications.
Content	Bioindication is an applied science that is an integral part of environmental monitoring-monitoring the state of the environment. The tasks of bioindication include a regular assessment of the quality of the environment with the help of specially selected living objects for this purpose, since in the end, only on the basis of the study of living objects can we give an idea of the ecological well-being of the studied environmental objects. The course bioindication methods of research gives an idea of the basic requirements for practical work, criteria for assessing the environment, equipment, methods of bioindication at various levels of the organization of living things. It will characterize individual test objects used for bioindication of the environment.
Exams and assessment format	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	The exam on the subject Bioindicator methods of research of is taken orally. Because: 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. In addition, I think that only the oral examination method allows you to fully assess the knowledge of students (for example, to ask additional questions).

Reading list	Bioindication of the state of the environment: a textbook for students of higher educational institutions / R. R. Beisenova, L. V. Kubrina, E. V. Donets, A. I. Gigoryev; Ministry of Education and Science of the Republic of Kazakhstan, L. N. Gumilyov Eurasian National University. – Astana 2016. Bioindication of the quality of the natural environment By: Zhukova, Anna Anatolyevna; Mastitsky, Sergey Eduardovich. Belarus, Europe Minsk : BSU, 2014. Biomonitoring of the state of the environment: a textbook for students and undergraduates of higher educational institutions / R. R. Beisenova, L. V. Kubrina, E. V. Donets, A. I. Grigoriev. - Almaty : Evero, 2014. https://edpuzzle.com/ https://whiteboard.fi/ https://kahoot.com/

EG 2208 Ecological Geology

Module designation	ECOL 22001 Fundamentals of Natural Sciences EG 2208 EcologicalGeology
Semester(s) in which the module is taugh	3
Person responsible for the module	Adilbektegi G.A., Zhumabayeva S.D.
Language	Russian, Kazakh
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22001Fundamentals of Natural Sciences, semester- 3
Teaching methods	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). Lecture: Multimedia lecture. 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: 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-120, total – 180
Credit points	6
Required and recommended prerequisites for joining the module	To obtain a positive assessment, you must demonstrate the following knowledgecomprehensive review of criteria for assessing ecosystems and the current state of ecological and geological conditions, ecological functions of the lithosphere
Recommended prerequisites	Introduction to the specialty, biogeochemical monitoring, Animal and plant ecology

Module objectives/intended learning outcomes	Purpose: Land management, structure, features of geology, geodynamic processes, endogenous, exogenous, technogenic processes, formation of natural and anthropogenic systems, dynamics, etc. Know -study of the topography, structure, faults, dynamic state of the earth's surface, as well as expertise on practical necessity. Be able to:- –Organization of ecological and geological studies for the purpose of assessing and forecasting the environmental situation for various economically developed territories and natural and man-made objects. Availability of skills –analysis of the environmental impact of the main functions of the lithosphere on the body and man, collection, processing and use of geological information.
Content	Purpose: Land management, structure, features of geology, geodynamic processes, endogenous, exogenous, technogenic processes, formation of natural and anthropogenic systems, dynamics, etc. Know -study of the topography, structure, faults, dynamic state of the earth's surface, as well as expertise on practical necessity. Be able to:- –Organization of ecological and geological studies for the purpose of assessing and forecasting the environmental situation for various economically developed territories and natural and man-made objects. Availability of skills –analysis of the environmental impact of the main functions of the lithosphere on the body and man, collection, processing and use of geological 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 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 "EcologicalGeology" 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. Vasileva, M. Yu. Geoecological features of geospheres: a training manual / M. Yu. Vasiliev. Saratov: Nauka, 2011.84 p. ISBN 978-5-9999-0981-7. 2. Golubev, G.N. Fundamentals of geoecology: textbook / G.N. Golubev. 2nd ed. Erased. Moscow: KnoRus, 2016.352 p. 3. Koronovsky, N.V. Geology: textbook / N.V. Koronovsky, N.A. Yasmanov. 9th ed., Erased. Moscow: Academy, 2014.448 p. 4. https://edpuzzle.com/ 5. https://whiteboard.fi/ 6. https://kahoot.com/ 7. https://www.microsoft.com/

EB 2209 Ecological biogeography

Module designation	ECOL 22003Applied ecology
Semester(s) in which the module is taugh	4
Person responsible for the module	Akbayeva Lyailya, candidate of biological sciences, professor of the department
Language	English

Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 2200 Applied ecology, semester-4, basic discipline, university component (course)
Teaching methods	Informational or problematic lecture 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. Case study, brainstorming, works in group, communicative method, method of 6 hats, cinquain method, interactive method
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 biology, geography, chemistry, physics, as well as related disciplines Biology, biodiversity of biocenoses, Introduction to the specialty, bioecology.
Module objectives/intended learning outcomes	Purpose: have basic knowledge of the geography of living organisms, understand the basic laws of their distribution in the biosphere as a whole, apply knowledge for the organization of biogeographic monitoring. Objectives of studying the academic discipline: - to give knowledge about the basic laws of the distribution of living organisms on the Earth; - to give concepts about the biosphere, to study the main limits of the distribution of living organisms, their composition, productivity and biomass; - study the ecological foundations of biogeography, assess environmental factors and their interaction; - show the geographical patterns of differentiation of the living cover of the land; - to study the basics of chorology (the doctrine of the area) and the patterns of the modern geographical distribution of the main groups of living organisms, the types and causality of the configuration and breaks of areas; - to consider the main reasons for the dynamics of habitats and changes in the composition of living organisms; - to consider the floristic and faunistic zoning of the land, to characterize the faunistic and floristic areas; - to study the composition, structure and characterize the features of faunistic and floristic elements; - to study the geography of cultivated plants and domestic animals; - to characterize the main types of land biomes; - to consider modern zoning and assess the biodiversity of organisms distributed on land and in the World Ocean; - to study modern issues of biodiversity protection and rational use of biological resources.
Content	Course studies physiographic (climatic, hydrological, geomorphological, soil geochemical), paleographic characteristics of the territory, the main goal of biogeography, patterns of geographical distribution of organisms and communities. Tools to achieve the goal: motivation of students to research, independent work of students with a teacher, practical work in laboratory classes, work experience. A number of basic provisions of modern biogeography are considered, in particular, the regularities of the distribution of plants and animals on the Earth are highlighted, information on the areas of endemic taxa of plants and animals of various floristic and faunistic regions is presented, the principles of floristic and faunistic zoning are substantiated, and the features of vegetation and fauna of the main biomes are considered.
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 student must be able to operate with basic ecological concepts, systemic concepts of the interaction of biological systems of different levels of organization with the environment, ready to explain the essence of fundamental environmental laws and phenomena; I am ready to use the results of geographical research to predict the development of natural and socio-economic processes. Mandatory attendance at classrooms, active participation in discussion of issues, preliminary preparation for lectures and seminars on the teaching aid and basic literature, high-quality and timely completion of tasks of the IWS, participation in all types of control (current control, IWS control, midterm control, final control).
Reading list	Biogeography [Text]: textbook / G.M. Abdurakhmanov et al. - 2nd ed. - M .: Academy, 2017 .-- 480 p. Mashkin for universities / V.I. Mashkin. - 2nd ed. - M .: "Academic project" 1. 2., 2016. - 384 p. Petrov, K.M. Biogeography: textbook / K.M. Petrov. - M .: Academic project, 2018 .-- 400 p. Vlasova, T.V. Physical geography of continents and oceans [Text]: textbook / T.V. Vlasova, M.A. Arshinova, T.V. Kovaleva. - M .: Academy, 2020 .-- 340 p. Ivanov, V.A. Fundamentals of Oceanology [Text]: textbook. allowance / V.A. Ivanov, K.V. Pokazeev, A.A. Schrader. - SPb .: Lan, 2018 .-- 576 p., V.I. Zoogeography: a tutorial. Microsoft teams Google (Google Class/ GoogleForms)

SE 2210 Social ecology

Module designation	ECOL 22004 Social and legal aspects of ecology
Semester(s) in which the module is taugh	4
Person responsible for the module	Akbayeva Lyailya, candidate of biological sciences, professor of the department
Language	English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22004 Social and legal aspects of ecology, semester- 4, basic discipline, university component (course)
Teaching methods	Informational or problematic lecture 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. Cinquain method, interactive method, differentiated approach, project method, lecture-conference, “hot chair” method, model method (real situation modelling).
Workload (incl. contact hours, self-study hours)	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 biology, geography, chemistry, physics, as well as related disciplines Biology, biodiversity of biocenoses, Introduction to the specialty, bioecology.

Module objectives/intended learning outcomes	Purpose: formation of the ecological culture of the individual through familiarization with the basics of the functioning of socio-natural systems, the principles of interaction between man, society and nature. The purpose of studying the discipline. Provide the philosophical and methodological training of students for their understanding of the peculiarities of the development of the general ecological culture of the individual, improving the professional and pedagogical culture of future specialists through familiarization with the basics of the organization and functioning of socio-natural systems, the principles of human interaction. society and nature, the laws of human functioning and development in the living environment, the conceptual foundations of environmental education and upbringing. The tasks of studying the discipline. -Form ecological thinking in students - To instill the skills of educational work in order to form an ecological culture among the population. - to acquaint students with the basics of general and social ecology, human ecology, nature management, environmental pedagogy; -Ensure the continuity and consistency of environmental education at the stages of general education and vocational training; -increase the level of professional competence of students by establishing a system of intersubject connections between the course content and the content of the major disciplines.
Content	Course studies the evolution of the relationship between man and nature, consideration of the basic laws of the relationship of nature and society; analysis of various aspects of the global transformation of the modern world, identifying trends and characteristics of the formation of environmental culture and environmental thinking. Tools to achieve the goal: the motivation of students to sociological research, independent work of students with a teacher. At the present stage, the survival of mankind, social progress depends on the state of the "nature-society" system. Environmental and social issues are inextricably linked. However, nurturing environmental motivation is a difficult task. The progress of society is often identified with an increase in the consumption of material goods, which entails an increase in the exploitation of natural resources. The modern way of life is unthinkable without the press, television, communications, and recreation services. All developing countries are striving to create a consumer society. However, for every step of civilization, mankind pays too expensive a fee, which results in ecological disasters accompanying the growth of the gross product and the cost of its production.
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 student is required to be able to give an in-depth analysis of the problems of society and relations with nature accompanied by the fact that only public policy and the actions of society are filled with rationality, overflowing with environmental problems and that each member of the community can only be avoided when environmental awareness is achieved. 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	Markovich D.Zh., Social Ecology.-M., 2018 Moiseev N.N. Philosophical aspects of social ecology.-M., 2019 Losev A.V., Provadkin G.G., Social ecology.-M., 2016. Deryabko S.D., Yasvin V.A. Environmental pedagogy and psychology. - Rostov-on-Don: Phoenix. 2016.- 480 p. White L. The Historical Roots of Our Ecological Crisis. // Global problems and universal values.-M., 2020. https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/ https://www.socrative.com/

FELS 1110 Fundamentals of ecology and life safety

Module designation	EDUC 21001 Module of general education
Semester(s) in which the module is taught	4
Person responsible for the module	ZhantokovB.Zh. Rakhisheva A.D. Saspugaeva G.E.
Language	Kazakh, Russian, English
Relation to curriculum	For all programs, including the current ones, in which the elective component is taught, semester 4, Elective component
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. 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).
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	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.
Module objectives/intended learning outcomes	The goalistoequipfuturespecialistswiththeoreticalknowledge and practicalskillsnecessarytocreatesafe and harmlesslivingconditions; forecasting and makingcompetentdecisions in emergencysituationstoprotectthepopulation and productionpersonnelof national economyfacilitiesfromthe possible consequencesofaccidents, catastrophes, naturaldisasters and theuseofmodernmeansofdestruction, aswellasduringtheeliminationoftheseconsequences. Know - toimaginetheconditionsof human existence in a safeenvironment and negative environmental factors; Be ableto - recognizethreats: theirtypes, place, possible consequences, theamountofharm, thepossibilityof a threat, etc .; applytheknowledgegained in practice and takequalifiedactions in theeventof a danger, emergency. Havetheskills - toact in emergencysituationsofpeace and wartime, to carry out rescue and other urgent work in theeliminationoftheconsequencesofaccidents, environmental disasters, naturaldisasters and theuseofmodernmeansofdestruction;
Content	The academic discipline is aimed at studying the ways of safe human interaction with the environment, global changes in the environment and strategies for the survival of mankind. Sustainable functioning of economic facilities in emergency situations (ES), issues of prevention and elimination of the consequences of natural and man-made emergencies, as well as the use of modern means of destruction.
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	To admit a student to the final certification, the following requirements are put forward: Be sure to attend classroom sessions, actively participate 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 control).

Reading list	KhotuntsevYu.L. "Ecology and ecological safety", M. "Academy", 2002 Baytuganova M.O. "Occupational health and safety", study guide - Almaty: Evero, 2019. https://edpuzzle.com/ https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/ https://www.socrative.com/

EB 2211 Evolution of the biosphere

Module designation	ECOL 22004 Social and legal aspects of ecology
Semester(s) in which the module ist aught	4
Person responsible for the module	Kobetayeva N.K, Ph.D. in Biology, Associate Professor of thedepartment Bakeshova Z.hU. Senior teacher
Language	Kaz/Russian/English
Relation tocurriculum	Forprogramm 6B05208 – Ecology and nature management in which themoduleistaught ECOL 22004 Socialand legal aspects ofecology, semester- 4 , Elective component
Teaching methods	Lecture: Traditional, problem-based, multimedia lecture. An s wersto control questions. Showing short videoclips on the topic of the lecture. Tasks for the seminar (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).
Workload (incl. contacthours, self-studyhours)	lecture -30, seminar -15, private study-105, total - 150
Creditpoints	5 (ECTS)
Required and recommended prerequisites for joining the module	Existing competencies in biology, evolution aryscience, chemistry, ecology, soil, water, airecology, geology, poleontology, mathematics. List ofrelatedsubjects: biology, chemistry, environmental physics, animaland plant ecology.
Module objectives/intended learning outcomes	Objectives -: The purpose of this course is to form an idea of the ecological evolution of the biosphere, the most rapid development of civilization in order to preserve the habitat. Students should know: the basic concepts of the origin of the solar system, the Earth and the biosphere, the stages of the origin of life, the biospheric microflora of the main group of living organisms, the laws of the ecological functioning of the biosphere. In order to: substantiate the conditions for the stability of the biosphere and the values of all its constituent types of organisms; Identify Fjandar Goethem against his biosphere evolution
Content	The course "Evolution of the Biosphere" explores the problems of the origin and development of the biosphere over 4.5 million years of the Earth's mild existence as a planet, reveals thematic patterns and methods of identifying the evolution of groups of organisms, the formation of marine and marine organisms. Terrestrial ecosystems, the impact of life development on the state of a healthy environment, major events, causes of environmental crises in the history of the Earth, irresistible consequences for biota. The content of the discipline consists of topics; 1. The structure of the hebiosphere 2. Solar radiation and its formation. 3. Neighborhood and geographic areas 4.History of the Hebiosphere 5. Geochronological scale and history of organisms. 6 the future of the biosphere

Exams and assessment formats	During thea cademic semester, two intermediate controlsareheld (thefirst after the sevent hweekof studyand thesecond after the fifteent hweekbeforetheexam) toteststudents' knowledgeorally. Time for intermediate controlis 50 minutes. The examiscon ductedorally. Eachexam ticket hasthree questions and the studentisgiven 30 minutes toprepare
Study and examination requirements and forms of examination	The exam on the subject of Evolution of the biosphere is taken orally. Because: First of all, in order to fully test the knowledge of students, a deep definition of the irspeakingskills, theabilityto express theirthoughtsisdeterminedonlyby oral communication. Second, the third question oft heexam quest ions oft hisdis ciplinecan beassessed in the form of calculations, and itcan beassesse donlybyask ing the meaningof oral formulas. Thirdly, I thinkthatonlythe oral exammet hodallow syoutofully assessstheknow ledgeofstudents (forexample, toask additional questions).
Reading list	1.Earthscience: geoecology: textbook / Barskov I.S .; otv. ed. A. V. Smurov. M.:KDU, 2010, 563 p. 2.Eskov K. Yu. Amazingpaleontology. Historyofthe Earth andlife on it. M: ENASKNIGA, 2012.312 p. 3. BakhovZh.K., AshitovaN.Zh. The originandevolutionofthebiosphereof Almaty: Epigraph, 2016. ISBN 978-601-310-388-4. 152 B Works in group communicatife method. https://kahoot.com/ https://www.microsoft.com/

LAE 2212 Environmental studies

Module designation	ECOL 22001 Fundamentals of Natural Sciences
Semester(s) in which the module is taught	4
Person responsible for the module	Saspugayeva G.Y-PhD, associate professor /Kobetaeva N.K.- associate professor /Nurgalieva Z.Zh.- associate professor
Language	Kazakh/Russian/English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22001 Fundamentals of Natural Sciences, semester- 4, Elective component
Teaching methods	Lecture: Multimedia lecture. Video lecture developed by the author of the discipline. Questions and answers. Lecture-conference, “hot chair” method, model method (real situation modelling). 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 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	The basics of biology, geography, chemistry, mathematics, physics, as well as disciplines bioecology, introduction to the specialty

Module objectives/intended learning outcomes	Purpose: teach the student to identify possible ways of restoring disturbed areas; analyse knowledge about the ecological capacity of natural systems and the limits of their sustainability. Students must: know the objects of the human environment, components of the biotic, abiotic and social environments, their interaction; understand the patterns of interaction between man and the environment; master the basics of environmental management; The course motivates students to more in-depth study and analysis of environmental issues.
Content	"Learning about environment" is a discipline about the environment, the dynamics of its change and the impact on the biosphere, the main components of the environment, the concept of living matter.
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 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.
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.Aidosov A., Theoretical bases of forecasting of natural processes and ecological environment, 2018 2.Arustamov EA, Ecological bases of nature management, 2016 3.Vasiliev V., Ecology and International Relations, 2018 4.Gatsenko NA, Biosphere and natural disasters, 2016 5.Drozdov NN, In the Animal World, 2017 6.Mamedov, N.M. Introduction to the theory of stability. Course of lectures / N.M. Mamedov. - M .: Stupeni, 2018 .-- 240 p. 7. Demina, S.A. Law on guard of nature / S.A. Demina. - M .: Legal literature, 2017 .-- 700 p. 8. Kurok, M.L. On environmental protection / ed. A.M. Galeeva, M.L. The trigger. - M .: Politizdat; Edition 2, add., 2017 .-- 384 p. https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/ https://www.socrative.com/

ME 2213 Medical Ecology

Module designation	ECOL 22003 Applied ecology
Semester(s) in which the module is taught	4
Person responsible for the module	Beisenova Raikhan
Language	kazakh
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22003 Applied ecology elective, semester 4
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): Case study, 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 5 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 -15, seminar -30, private study-105, total - 150
Credit points	5 (ECTS)
Requiredandrecommendedprerequisitesforjoiningthemodule	Biogeochemical monitoring, Bioecology, Ecological toxicology.
Module objectives/intended learning outcomes	Purpose: to teach to identify aspects of the impact of the environment on public health. Students know: population health indicators, factors shaping human health; diseases associated with adverse climatic conditions, social factors; basics of preventive medicine. Students can: interpretate of the results of complex diagnostic methods for assessing the health of the population. Encourages students to study regional issues of ecology and public health.
Content	Medical descriptions of environmental factors and their impact on public health.
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	The oral exam in the discipline involves questions on the course materials to which the student must answer. In case of controversial points during the exam, the teacher asks additional questions to clarify and complete the answer.

Readinglist	Medical ecology. A.N.Stozharov. Minsk, 2007. 370 p. Medical ecology. V.P.Ivanov., N.V. Ivanova., A.V.Polonikov. Saint Petersbourg, 2012. 300 p. https://edpuzzle.com/ https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/ https://www.socrative.com/ Google (Google Class/ GoogleForms) Microsoft teams

Biogeochemical provinces

Module designation	ECOL 22001 Fundamentals of Natural Sciences
Semester(s) in which the module is taught	4
Person responsible for the module	Rakhisheva A.
Language	Kazakh
Relation to curriculum	For programm For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22001 Fundamentals of Natural Sciences, semester- 4, Elective component
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. Case study, brainstorming, works in group, communicative method, method of 6 hats.
Workload (incl. contact hours, self-study hours)	lecture -15, seminar -30, private study-105, total - 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	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.

Module objectives/intended learning outcomes	Objectives - expansion and deepeningoftheoreticalknowledgeabouttheprevalenceofdiseases, theirdevelopmentdepending on geographicalconditions Know - scientificallybasedinformationabouttheimpactofthecharacteristicsofthegeographicenvironment on human health Be ableto - independentlysearch and analyzeinformationaboutthegeographicaldistributionofdiseases and otherpathologicalconditionsof a person. Haveskills - toassessthedangersofexposureto adverse factors in different geographiczones
Content	Lack or too large amount of certain chemical elements (or element) in the earth's crust in certain areas, therefore, the appearance of pathological changes in living organisms is called biogeochemical provinces. Biogeochemical provinces study the geography of the spread of diseases and the influence of natural, economic and socio-economic factors on human health.
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	Krasnoshchekov G.P. Ideas and founders: human ecology, public health. Togliatti: Kassandra 2012, 108 p. U.I. Kenesariev, N. Zh. Zhakashov, Ecology and public health: .- Almaty: Evero, 2011 .- 232 p. https://www.microsoft.com/ https://www.socrative.com/ Google (Google Class/ GoogleForms) Microsoft teams

SE 2301Soil ecology

Module designation	ECOL 22001 Fundamentals of Natural Sciences
Semester(s) in which the module is taught	5
Person responsible for the module	Khussainov M., Tussupova Zh.,B.
Language	Kaz/Russian
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22001 Fundamentals of Natural Sciences, University component

Teaching methods	Lecture: Multimedia lecture. Seminar assignments (practice): The use of interactive teaching methods, educational work in teams. Interactive method, differentiated approach, project method, lecture-conference, “hot chair” method, model method (real situation modelling). 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 -15, Laboratory Classes -30, private study-105, total – 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	Geology, mineralogy, geomorphology, geobotany, microbiology, hydrology, climatology, chemistry, physics.
Module objectives/intended learning outcomes	The purpose of the course: to form students ' fundamental knowledge about the biocontainment of the geographical envelope, modern theoretical foundations and methodological approaches of soil science, its applied aspects. As a result of studying this discipline, the student must: know-modern soil terminology, soil classification, factors and general scheme of soil formation, composition, properties, functions of soils. be able to assess soil properties in the field and laboratory conditions, use laboratory equipment. possess the skills of analyzing the general physical, chemical and physico-chemical properties of soils, cartographic work.
Content	The course "Soil Ecology" lays the natural history foundation for environmental education. Mastering the basics of soil science develops the ability to further independently comprehend the complex and diverse material of modern ecology. Knowledge about the formation and genesis of soils, the patterns of their distribution contributes to a deeper disclosure of complex dialectical relationships in nature. Considering soils as natural-historical bodies that have emerged as a result of the interaction of natural and anthropogenic factors, the student gets a more complete understanding of the universal connection and interaction in nature and society. This is the special methodological role of Soil Ecology in the cycle of Earth sciences.
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	Gennadiev A. N., Glazovskaya M. A. Geography of soils with the basics of soil science. - Moscow: Higher School of Economics – 2005. - 461 p. A classic university textbook. Dobrovolsky G. V., Nikitin E. D. Ecological functions of the soil: A textbook. - M.: MSU Publishing House, 1986. - 137 p. Soil Science. / I. C. Kauriev, N. P. L. Panov, N. N. Rozov, M. C. Strattonovich, A.D. Fokin. - Post. I. O. C. Kauricheva. - M.: Agropromiz-dat, 1989. - 719 P. https://edpuzzle.com/ https://whiteboard.fi/ https://kahoot.com/

EG 2302 Ecology of geosystems

Module designation	ECOL 22002 Ecological research methods EG 2302 Ecology of geosystems
Semester(s) in which the module is taugh	5
Person responsible for the module	Adilbektegi G.A., Zhumabayeva S.D.
Language	Russian, Kazakh
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22002 Ecological research methods, semester- 5
Type of teaching, contact hours	Contact hours and class size separately for each teaching method: lecture -30, seminar -15.
Workload	lecture -30, seminar -15, private study-105, total – 150
Credit points	5
Required and recommended prerequisites for joining the module	Introduction to the specialty
Module objectives/intended learning outcomes	Purpose of the discipline: training of specialists with profound theoretical knowledge of the laws of spatial differentiation of natural-anthropogenic geographic systems. The course forms students' ideas about a single ecosphere, about the inte rrelations of the atmosphere, hydrosphere, lithosphere and biosphere, taking into account the impact on them of human society. Tools to achieve the goal: independent work of students with a teacher, participation in practical seminars.
Content	Ecology of geosystems is a complex scientific discipline that studies natural and natural-anthropogenic geosystems of a high hierarchical rank: landscape zones, physical-geographical countries, regions, provinces for the purpose of nature conservation. The essence of the geoecological approach is to assess possible changes in nature or their consequences from the standpoint of the need to ensure and maintain a healthy ecological environment within a certain geographic system.
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 "Ecology of geosystems" 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. Karlovich K.A. Geoecology. Textbook for universities. - M .; 2005. 2. Rodzevich N.N. Geoecology and nature management. Textbook for universities. - M., 2003. 3. V. Chigarkin Geoecology of Kazakhstan. - 2nd ed. rev. and add. - Almaty, 2006. – 412 p. 4. *https://edpuzzle.com/* 5. *https://whiteboard.fi/* 6. *https://kahoot.com/* 7. *https://www.microsoft.com/*

IE 2303 Industrial ecology

Module designation	ECOL 22005 Engineering ecology
Semester(s) in which the module is taught	5
Person responsible for the module	Massenov Kairat. candidate of technical sciences, professor of the department
Language	Kaz/Russian/English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22005 Engineering ecology elective, semester 5, Elective component
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: 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. 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).
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 physics, chemistry, ecology, ecology of the soil, water, air, geology, mathematics. List of related subjects: chemistry, physics of environment, ecology of the person, social ecology, plant ecology

Module objectives/intended learning outcomes	Objectives - : The purpose of this course is the formation of theoretical knowledge and practical skills in the field of man-made impacts of industrial enterprises on the environment, students' ideas about the main sources of pollution, the composition of pollutants, and their quantitative assessment. Ability to calculate emissions of harmful substances into the atmosphere. Formation of theoretical knowledge and practical skills in legislative support in the field of environmental legal relations. The main provisions of the Environmental Code of the Republic of Kazakhstan. Know - Assimilation of the essence of scientific and technological progress; to acquaint with the positive and negative sides of technical progress; Be able to acquaint with the characteristics of the main industrial sectors and their interactions with each other; to learn the ways and directions of influence of various industrial enterprises on the main components of the biosphere and their consequences; Have skills - to master the ways of greening technological processes of various industrial enterprises; master the ways and methods and conduct of environmental monitoring; assimilate the understanding between natural cooperation in the field of environmental protection.
Content	The intensification of economic and industrial human activity in modern conditions of nature management and the global scale of its anthropogenic impact on the main components of the biosphere create a situation of acute ecological crisis caused by the degradation of environmental objects. In this regard, in order to optimize the conditions for human interaction with nature, the role of environmental impact management is important.
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	1. Massenov K.B.; Abseitov E.T. Textbook "Industrial Ecology", 480 Art ISBN 9965-799-84-9 2018 (available in the library and at the department) 2. Massenov K.B.; Abseitov E.T. Monograph "Engineering environmental protection" VOL. No. 2, 263 pages. ISBN 978-601-238-540-3 2018 (available in the library and at the department) 3. Massenov KB; Abseitov E.T. Monograph A-17 "Industrial ecology", 398 pages ISBN 978-601-238-541-0.2018. (available in the library and at the department) 4. Massenov KB; Abseitov E.T. Industrial Ecology Textbook 480 pages ISBN 9965-799-84-9 2018 (available in the library and at the department) 5. Massenov KB; E. Abseitov; Aitlesov K Onu Araly "Onerkusiptik ecology", 207 pp. ISBN 978-601-206-064-5 2018 lived (available in the library and at the department) 6. I. I. Mazur, O. I. Moldavanov Course of Engineering Ecology. Moscow "Higher School" 2001. (available in the library) 7. A. G. Vetoshkin. Theoretical foundations of environmental protection: Textbook. manual / M .: Higher school., 2008 - 397s .; silt (available in the library) https://www.microsoft.com/ https://www.socrative.com/

UE 2304 Urboecology

Module designation	ECOL 22003 Applied ecology
Semester(s) in which the module is taugh	5
Person responsible for the module	Zhantokov B.ZH., senior lecturer of the department
Language	Russian
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22003 Applied ecology, semester-5 , BD EC - basic discipline, elective cours
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: 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. 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 -15, private study-105, total – 150
Credit points	5
Required and recommended prerequisites for joining the module	To effectively master the content of the discipline, it is necessary to know the bioecology,, ecological aspects of natural science, ecological biogeography

Module objectives/intended learning outcomes	Knowlege: the basic principles of environmental protection from pollution, methods of monitoring the state of the environment, the importance of environmental factors and the sanitary and hygienic role of green spaces. Be able to: apply monitoring methods to monitor the state of green spaces, taking into account environmental factors in the city, select an assortment of plants for a particular object. Possess: methods of monitoring the urban environment, the ability to make recommendations aimed at preserving the environmental functions of plantings.
Content	The discipline " Urboecology" helps students to master the basic concepts and principles of the ecology of cities and settlements, knowledge about the interaction of environmental factors in the urban environment, about the formation of the urban environment, familiarizing them with modern urban planning proposals aimed at protecting the health of the population of cities, problems of maintaining the balance and stability of the urban environment. The discipline also introduces students to monitoring the state of the urban environment and monitoring the state of green spaces.
Exams and assessment format	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 Urboecology is taken orally. Because: 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. In addition, I think that only the oral examination method allows you to fully assess the knowledge of students (for example, to ask additional questions).
Reading list	Ruchin A. B., Meshcheryakov V. V., Spiridonov S. N. Urban ecology for biologists. - Moscow: KolosS, 2009 Tetior A. N. Urban ecology. - M.: Publishing Center "Academy", 2007. Filin V. A. Ecology of the visual environment of the city / V. A. Filin // Ecology and life. – 2007 https://edpuzzle.com/ https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/ https://www.socrative.com/

PEB 2305 Population ecology and biocenology

Module designation	ECOL 22001 Fundamentals of Natural Sciences
Semester(s) in which the module is taught	3
Person responsible for the module	Daribai Ainur., PhD, Assistant professor of the department
Language	Kaz/Russian/English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22001 Fundamentals of Natural Sciences. elective, semester 3, Elective component

Teaching methods	Lecture: Multimedia lecture. Oral explanation. Communicative method, method of 6 hats, cinquain method, 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	Existing competences in ecology,industrial ecology, soil ecology. List of related subjects: chemistry, physics of environment, ecology of the person, social ecology, plant ecology
Module objectives/intended learning outcomes	Objectives: The purpose understanding of regional and global environmental problems associated with the study of environmental patterns of interaction of living organisms with each other and the environment. The course includes the questions of numerous and complex internal links of a biocenosis as a structural unit of living nature that has certain limits of stability; dynamics of population processes (fertility and mortality rates, age and sex structure, population dynamics, etc.); Know: students know that to form in students the basic concepts and notions about the role of population and biocenosis in the biosphere Have skills: students now to apply knowledge consideration of modifying and regulating factors affecting the quantitative side of the population. Competences: To give students an idea of the structure of the species in the population, their static and dynamic performance
Content	To give students an idea of the structure of species in the population, their static and dynamic characteristics, takes into account the biotic factors between them,population changes in close connection with the action of a combination of biotic and abiotic environmental factors.
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	1. Ruchin AB Ecology of populations and communities. Textbook. M .; IzdCenter of the Academy, 2006. 2. Gilyarov MS, Species, population and biocenosis. Russia, St. Petersburg; Russian Ornithological Journal, 2015 3. A.Zh. Akbasova, G. Sainova "Ecology" Almaty 2010 https://www.microsoft.com/ https://www.socrative.com/ Google (Google Class/ GoogleForms) https://edpuzzle.com/ https://whiteboard.fi/

MGR 2306 Methods of geoecological researches

Module designation	ECOL 22005Engineering ecology MGR 2306 Methods of geoecological researches
Semester(s) in which the module is taugh	5
Person responsible for the module	Adilbektegi G.A., Zhumabayeva S.D.
Language	Russian, Kazakh
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22005Engineering ecology, semester- 5
Teaching methods	Lecture: Multimedia lecture. lecture developed by the author of the discipline. 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, lecture-conference, “hot chair” method, model method (real situation modelling).
Workload	lecture -30, seminar -15, private study-105, total – 150
Credit points	5
Required and recommended prerequisites for joining the module	Ecology of geosystems
Module objectives/intended learning outcomes	Purpose: teach students to apply methods of restoring disturbed areas; analyze knowledge about the ecological capacity of natural systems and the limits of their sustainability. The course examines methods for studying the geographical environment and its constituent natural, natural-anthropogenic and socio-economic territorial geosystems. Analysis of possibilities for restoring disturbed geosystems using information technologies. Tools to achieve the goal: the motivation of students to research, independent work of students with a teacher.
Content	The course "Methods of Geoecological Research" examines methods of studying the geographic environment and its constituent natural, natural-anthropogenic and socio-economic territorial geosystems on the basis of a humanitarian-ecological approach with the aim of rational nature management and optimizing the interaction of society with the environment.
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 "Methods of geoecological researches" 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. N.V. Gagina, T.A. Fedortsova Methods of geoecological research. - Minsk, BSU, 2002 - 98c. 2. Geoecological monitoring, Yazikov, E.G. , Tomsk, 2003 3. Geoecology. Industrial ecology, Manankov, A.V., Tomsk, 2010 4. Ecological Geology, Abalakov, A.D. , Irkutsk, 2007 5. Geochemistry of landscapes and geography of soils, Moscow, 2012 6. *https://whiteboard.fi/* 7. *https://kahoot.com/* 8. *https://www.microsoft.com/* 9. *https://www.socrative.com/* 10. *Google (Google Class/ GoogleForms)*

ME 2307 Macroecosystem Ecology

Module designation	ECOL 22003 Applied ecology
Semester(s) in which the module is taught	5
Person responsible for the module	Kapsalyamov B. doctor of technical sciences, professor of the department ./ Saspugayeva G.Y-PhD, associate professor./Samatova I.S.-senior teacher, ,Zhumabayeva S.D.-senior teacher
Language	Kazakh/Russian/English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22003 Applied ecology, semester-5, Elective component
Teaching methods	Lecture: Multimedia lecture. Video lecture developed by the author of the discipline. Questions and answers. Case study, brainstorming, works in group, communicative method, method of 6 hats. 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 -15, seminar -30, private study-105, total - 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	Social ecology, Environmental studies, Evolution of the biosphere, Biogeochemical provinces
Module objectives/intended learning outcomes	"Macroecosystem Ecology" is a discipline that study broad specter of modern environmental problems of the Earth. The course gives an idea of the laws in natural systems, the relationship between the organism and their environment, role of human activity in some global problems of environment. Aims of discipline: discipline focused on the description and explanation for graduates scientific information on the general principles of the formation of modern environmental problems, its methods and areas of work and the basics of assessing the quality of the various components of the environment. Tasks of the discipline: -Basic concept of modern environmental problems; -Examine and understand the current methods of studying the ecology, legal regulations governing the quality of the environment; -Help undergraduates based on modern technology to master the methods of independent research and analysis in the field of modern environmental problems, the use of it in the process of scientific and practical activities of a student

Content	The course deepens the knowledge of modern environmental problems graduate of the general laws of adverse effects of the environment on the human body, reveals the complex mechanisms of environmentally - driven changes in health, and contributes to a master's degree in basic knowledge for the development of a set of measures to minimize the impact of climate change on humans.
Exams and assessment formats	The exam is taken orally, that is, in the form of an examination ticket. The exam tickets consist of 25 options. Each ticket consists of 3 questions. The exam questions cover all the material passed in 1 semester of full training at the lecture and practical lesson. Taking students ' oral exams in the form of exam tickets, we can fully test their knowledge: knowledge about the main functional ecological units: individual species, populations, biogeocenoses, ecosystems; to master the problems of natural resources and their effective use-to form a theoretical knowledge of the biosphere-the global ecosystem; to perfectly assess how they have mastered the emphasis on knowledge on modern environmental problems and their development.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
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. Bogolyubov, Sergei Alexandrovich Actual problems of environmental law. Grif UMO of universities of Russia / Bogolyubov Sergey Alexandrovich. - M.: Yurayt, 2015 .-- 877 p. 2. Bulatov, Ramil Global environmental problems, society and economy / Ramil Bulatov. - M.: Publishing solutions, 2012. - 600 p. 3. Visual material. Environmental problems of the world / Great geographical discoveries. - M.: Bustard, 2015 .- 788 p. 4. Burko R.A. Environmental problems of modern society and their solutions / R.A. Burko, T.V. Tereshina//Young Scientist. - 2013. - No. 11. - S.237-238. 5. Voloshchenko A.E., Guskov G.V. Nature management. - M.: Dashkov i K, 2013 .-- 310 p. 6. Vinokurova D.V. Environmental pollution control system. - N. Novgorod:, 2011. - p. 56 7. Golub A.A., Strukova E.B. Natural resource economics. - M.: Aspen - Press, 2011 .-- 319 p. Google (Google Class/ GoogleForms)

ESF 3402 Ecology of aquatic ecosystems

Module designation	ECOL 22006 EcologicalGeneticsand Climatology
Semester(s) in which the module is taught	3
Person responsible for the module	Daribai Ainur., PhD, Assistant professor of the department
Language	Kaz/Russian/English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22006 EcologicalGeneticsand Climatology. selective, semester 3, Elective component
Teaching methods	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). Lecture: Multimedia lecture. Oral explanation. 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: 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 -15, seminar -30, private study-105, total - 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	Existing competences in soil ecology, methods of geoecological researches, urboecology.List of related subjects: chemistry, physics of environment, ecology of the person, social ecology, plant ecology

Module objectives/intended learning outcomes	Objectives: The discipline includes basic data on the physicochemical and biological properties of water, hydrobionts, channel processes, the role of hydrobionts in the processes of self-purification of water, the integrated use of water resources in the economy, negative impacts of natural and anthropogenic nature on hydroecosystems, the introduction of environmentally friendly technologies Know: the basic concepts and ideas about the role of hydroecosystems in the biosphere, knowledge of the laws of formation of hydrosystems Have skills: to form the concept of the consequences of anthropogenic influences on hydroecosystems; Competences: to equip with knowledge and skills to conduct scientific research in the field of rational use of water resources.
Content	The course forms knowledge about the ecology of ecosystems, gives an idea of the living conditions of aquatic ecosystems, their structure and studies the interaction of aquatic inhabitants, their populations and communities.
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	1.Bestuzheva A.S. General Hydroecology MISS - MGSU, 2015 2.Loginova, E.V .; Lopukh, P. S, Hydroecology, Moscow, 2014 3.Makarevich T. A .; Kamlyuk L.V. Hydroecology, Moscow, 2014 https://edpuzzle.com/ https://whiteboard.fi/

PNR 2309 Protection of natural resources

Module designation	ECOL 22007 Environmental management and eco-tourism
Semester(s) in which the module is taught	5
Person responsible for the module	Daribai Ainur., PhD, Assistant professor of the department
Language	Kaz/Russian/English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22007 Environmental management and eco-tourism, elective, semester 5, Elective component

Teaching methods	Lecture: Multimedia lecture. Oral explanation. 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
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 ecology, ecological toxicology, biogeochemical monitoring, animals and plants ecology. List of related subjects: chemistry, physics of environment, ecology of the person, social ecology, plant ecology
Module objectives/intended learning outcomes	Objectives:identify possible ways to preserve and restore natural resources; know the principles of safe environmental management.The course includes: scientific package of measures for the conservation, rational use and restoration of natural resources and the natural environment, the wealth of the subsoil, the purity of the waters, forests and the atmosphere of the Earth. Know: students know that about ecological resources, their classification, rational use of resources and protection of natural resources Have skills:Conservation of nature has economic, historical, social, and state significanceuse conservation measures; economic, historical, social and state significance resources Competences:
Content	The course is a necessary subject in the training of future specialists. It allows students to master the basic concepts of the relationship between man and nature, the basic principles of urban industry and urbanization, the real relationship between the development of technology and technology
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	1.Kolesnikov S.I. Ecological bases of nature management, Moscow, 2012 2.Kuatbaev AT . Ecology and environmental problems. 2017. Almaty https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/ https://www.socrative.com/

RUNR 2310 Rational use of natural resources

Module designation	ECOL 22005 Engineering ecology
Semester(s) in which the module is taught	5
Person responsible for the module	Meiramkulova Kulyash,, Zandibay Amanbek , Khussainov M.
Language	English, Kazakh, Russian
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22005 Engineering ecology, Elective component
Teaching methods	Lecture: Multimedia lecture. Seminar assignments (practice): The use of interactive teaching methods, educational work in teams. 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	Geology, 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	Chelnokov A. A. Environmental protection and energy saving: textbook . /A. A. Chelnokov, L. F. Yushchenko. - Kokshetau: Keleshek-2030, 2013-442 p. Romanova, E. P. Natural resources of the world [Electronic resource]: textbook / E. P. Romanova, L. I. Kurakova, Yu. G. Ermakov.- 3, 72MB. - Moscow: MSU Publishing House, 1993. - 304 p. Golovanov A. I.: Land recultivation. - M.: "Kolos", 2009. Chernikov V. A. et al. Agroecology. - M., "Kolos", 2000. -N.I. Bebrezovski Natural resource and its use. – Minsk: BNTU, 2005. – p.115-146, 158-183; Watt K., Ecology and natural resource management. – M., 1991; Friedman, Yali (2008) Building Biotechnology: Starting, Managing and Understanding Biotechnology. Washington, DC: Logos Press. ISBN 978-0-9734676-3-5. Hulse, J. (2007). Sustainable Development at Risk. Ignoring the Past OttawaFoundation Books/IDRC; Hopwood, B., Mellor, M. and O'Brien, G. (2005). Sustainable Development: Mapping Different Approaches. Sustainable Development 13, 38–52. Microsoft teams

EM 2311 Ecological monitoring

Module designation	ECOL 22007 Environmental Management and Ecotourism
Semester(s) in which the module is taught	6
Person responsible for the module	Saspugayeva G.Y-PhD, associate professor, Zandibai A- associate professor
Language	Kazakh/Russian/English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22001 Fundamentals of Natural Sciences, semester- 6, University component
Teaching methods	Lecture: Multimedia lecture. Video lecture developed by the author of the discipline. Questions and answers. Works in group, communicative method, method of 6 hats, cinquain 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 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	The basics of biology, geography, chemistry, mathematics, physics, as well as disciplines bioecology, introduction to the specialty
Module objectives/intended learning outcomes	"Environmental Monitoring" is a discipline about natural fluctuations and changes in the state of the environment in students, which will allow: 1) evaluate the indicators of the state of the functional integrity of ecosystems and the human environment; 2) identify the reasons for changes in these indicators and assess the consequences of such changes, as well as determine corrective measures in cases where the target indicators of environmental conditions are not achieved; 3) create prerequisites for determining measures to correct the emerging negative situations before damage is caused. Students ahould know: - the purpose of monitoring the natural environment, methods of observation and analysis of the state of ecosystems; - the reasons for changes in the species composition of flora and fauna under the influence of human activities; - mechanisms to ensure the sustainability of ecosystems; - main groups of pollutants, ways of their migration, transformation and accumulation in ecosystems. be able to: - use methods for the detection and quantification of the main pollutants in the environment; - apply basic mathematical modeling methods and computer methods for analyzing the state of ecosystems; - to use a systematic approach when formulating the tasks of studying biospheric processes.
Content	The intensification of economic and industrial human activity in modern conditions of nature management and the global scale of its anthropogenic impact on the main components of the biosphere create a situation of acute ecological crisis caused by the degradation of environmental objects. In this regard, in order to optimize the conditions for human interaction with nature, the role of environmental impact management is important. Students should own: - methods of assessing the impact on the natural environment; - methods of ecological monitoring of the natural environment; - methods of scientific experiment in laboratories, field and industrial conditions
Exams and assessment formats	The exam is taken orally, that is, in the form of an examination ticket. The exam tickets consist of 25 options. Each ticket consists of 3 questions. The exam questions cover all the material passed in 1 semester of full training at the lecture and practical lesson. Taking students ' oral exams in the form of exam tickets, we can fully test their knowledge: knowledge about the main functional ecological units: individual species, populations, biogeocenoses, ecosystems; to master the problems of natural resources and their effective use-to form a theoretical knowledge of the biosphere-the global ecosystem; to perfectly assess how they have mastered the emphasis on knowledge on modern environmental problems and their development.

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. Gorshkov M.V. Environmental monitoring. Moscow 2010, 425 pages 2.Ashikhmina, T.Ya. Environmental monitoring. T.Ya. Ashikhmina.- M.: Academic project, 2019 .-- 416 p. 3. Vartanov, A.Z. Methods and devices for environmental control and environmental monitoring / A.Z. Vartanov, A.D. Ruban, V.L. Skinner. - Vologda: Infra-Engineering, 2016 .-- 640 p. 4. Kropotov Yu. A., Proskuryakov A. Yu., Belov A. A. Algorithms of automated systems for environmental monitoring of industrial production: monograph 5. Latyshenko, K.P. Environmental Monitoring: Textbook and Workshop for Applied Bachelor's Degree / K.P. Latyshenko. - Lyubertsy: Yurayt, 2016 .-- 375 p. 6.Sharova, N.I. Environmental monitoring of the technosphere: Textbook / N.I. Sharova. - SPb .: Lan, 2017 .-- 368 p. 7.Tikhonova, I.O. Environmental monitoring of the atmosphere: Textbook / I.O. Tikhonova, V.V. Tarasov, N.E. Kruchinin. - M .: Forum, SIC INFRA-M, 2018 .-- 136 p. Microsoft teams

HHE 2312 Habitat and human ecology

Module designation	ECOL 22006 Ecological Genetics and Climatology
Semester(s) in which the module is taught	6
Person responsible for the module	Massenov Kairat. candidate of technical sciences, professor of the department
Language	Russian/English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22006 Ecological Genetics and Climatology semester 6, Eelective component

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 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. 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).
Workload (incl. contact hours, self-study hours)	lecture -15, seminar -30, private study-105, total - 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	Existing competences in basics of biology, ecology and sustainable development, geoecology, chemistry, mathematics, physics, soil science and the basics of life safety is necessary.
Module objectives/intended learning outcomes	Objectives - : the acquisition of specific ideas about the environment, the study of the human-nature system and society, the formation of a system of knowledge about the interaction of man and the environment in the universe. Know - theoretical foundations of life safety, the human-environment system, the composition of the environment, the structural diagram of the interaction of a person in a modern industrial society with the biosphere, technosphere and social environment, the theory of nature management and environmental and legal regimes for the use of resources Be able to know exchange of flows of matter and energy, social environment, information; about the problems of the relationship between nature and society; on the forms, scope and significance of environmental protection, human interaction of the environment and natural resources. Have skills – to use the knowledge gained about the laws of human interaction with the environment in practical activities to preserve sustainable development
Content	Habitat - all bodies and phenomena with which the organism is in direct or indirect relationship. The habitat directly or indirectly affects the state, development and reproduction of individual organisms and populations. Distinguish between abiotic, biotic and anthropogenic habitats
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 Habitat and human ecology is taken orally. Because: 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. In addition, I think that only the oral examination method allows you to fully assess the knowledge of students (for example, to ask additional questions).

Reading list	1. Akimov V.A., Lesnykh V.V., Radaev N.N. Risks in nature, the technosphere, society and the economy. - M.: Business Express, 2004. - 352 p 2. Bigaliev A. B., Khalilov M.F., Sharipova M.A. "Basics of General Ecology", - Almaty, "Kazakh University", 2007. 3. Aytkazin M.A. Life Safety. - Almaty, 2003. 4. Life Safety: Proc. for universities. / Ed. S.V. Belova; 5th ed., Rev. and add. - M .: Higher. school., 2005.- 606 p. 5. Reimers N. F. Hopes for the survival of mankind. Conceptual ecology. M., ITS "Young Russia", 1992 6. Life Safety: Proc. for medium prof. studies./About. Ed.C.V. Belova; 5th ed., Isp. And add. - M.: Higher. sh., 2006. - 424 p. 92. 7. Prikhodko N.G. Life Safety: Course of lectures. - Almaty: HSP "Adilet", 2000. 8. "Biological Encyclopedic Dictionary." Ch. ed. M. S. Gilyarov; Edited .: A. A. Babaev, G. G. Vinberg, G. A. Zavarzin and others - 2nd ed., Amended. - M .: Owls. Encyclopedia, 1986 (Available in the university library) Microsoft teams

ER 2313 Ecologycal resource science

Module designation	ECOL 22008 System ecology
Semester(s) in which the module is taught	6
Person responsible for the module	Khussainov M., Zhumabayeva S.D.
Language	Kaz/Russian
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught , ECOL 22008- System ecology Eelective component
Teaching methods	Lecture: Multimedia lecture. Seminar assignments (practice): The use of interactive teaching methods, educational work in teams. Case study, brainstorming. 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)	Lectures -15/1, Practical exercises -30/2, SRO-105/7
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	Geology, social ecology, methods of geoecological research, soil ecology.

Module objectives/intended learning outcomes	: Know– be able to navigate the trends in the development of the ecological and economic system; use of complete and incomplete information on environmental responsibility; planning of changes in the modern environmental safety management system; ability to see contradictions and establish connections between phenomena; solving complex multi-faceted tasks; Be able to:- environmental analysis and monitoring; Availability of skills – conducting an environmental assessment of certain types of natural resources and their complexes and analyzing their consequences, issues of their protection, effective use and resource supply; creating an assessment of environmental and economic problems and setting problems, developing technologies for resource protection and resource extraction; Making management decisions in the normal functioning of the ecosystem of the Republic of Kazakhstan and issues of conservation of natural resources;
Content	1. Consider existing approaches to the study and assessment of natural resources. 2. To study the classification of natural resources on various grounds. 3. To consider different categories of natural resources (land, water, mineral resources, etc.), to assess their volumes, to analyze patterns of distribution, dynamics of consumption, problems of use and protection of natural resources. 4. Explore different approaches to assessing the natural resource potential of the territory. 5. Consider the environmental and legal regimes of resource use (land use, subsurface use, water use).
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 studen ts (for example, to ask additional questions).
Reading list	Ivanov Evgeny Sergeevich, Kochurov Boris Ivanovich. Ecological Resource Studies 2015 S. A. Bakhbaeva, A. M. Rakhmetova. Environmental Resource Studies. 2016 Chigarkin, A.V. Ecological resource: educational resource / A.V. Chigarkin.- Almaty: Kazakh University, 2004. - 239 P. https://edpuzzle.com/ https://whiteboard.fi/ https://kahoot.com/

Module designation	ECOL 22004 Social and legal aspects of ecology
Semester(s) in which the module is taught	6
Person responsible for the module	Massenov Kairat. candidate of technical sciences, professor of the department
Language	English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22004 Social and legal aspects of ecology semester 6, Elective component
Teaching methods	Lecture: Multimedia lecture. Cinquain method, 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 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 -15, seminar -30, private study-105, total - 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	Existing competences in "Social Ecology and Sustainable Development", "Environmental Impact Assessment", "Environmental Monitoring"
Module objectives/intended learning outcomes	Objectives - : the aggravation of the ecological situation in the world in the middle of the twentieth century brought the ecology out of the subject of studying a limited circle of biologists and placed it among the most important modern sciences Know - theoretical and practical training of students in the legal framework of environmental management and marketing Be able to know of environmental legislation, studying the mechanism of its application; Have skills - mastering the theoretical and practical skills of its application in life
Content	From its general ecology, its most important part is singled out - social ecology, which studies the conditions and patterns of interaction between society and the environment. In the social ecology, legal ecology is an integral part. Public relations in the sphere of interaction between society and nature are regulated by a complex of branches of law.
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 Institutional support of environmental protection is taken orally. Because: 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. In addition, I think that only the oral examination method allows you to fully assess the knowledge of students (for example, to ask additional questions).

Reading list	1. Baideldinov DL Bekisheva S.D. Ecological Law of the Republic of Kazakhstan: Textbook of Alterations: Interleague, 2004 (available in the library) 2. Kushumbaev AA Ecological Law of the Republic of Kazakhstan: Textbook for Universities Astana: Foliant, 2001 330 p. (available in the library) 3. Kulteleev S.T. Workshop on Environmental Law of the Republic of Kazakhstan Almaty: Daneker, 2001.106 p. (available in the library) 4. Koshkarov N. B., Abseitov E. T., Massenov K. B. Textbook «Basics of ecological rationing and expertise» ISBN 9965-799-45-8, 128 p. Almaty- 2018. TOO Nur-Print (available in the library and at the department) 5. Akhmedzhanova GB, Shaldybaev Zh. A., Kadysov S. Sh. Ecological Law of the Republic of Kazakhstan: educational and methodological benefits .- Pavlodar: Kereku. 2009 (available in the library) 6. Google (Google Class/ GoogleForms)

ERE 2315 Environmental regulation and examination

Module designation	ECOL 22008 System ecology
Semester(s) in which the module is taught	6
Person responsible for the module	Massenov Kairat. candidate of technical sciences, professor of the department
Language	English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22008 System ecology of ecology semester 6, Elective component
Teaching methods	Lecture: Multimedia lecture. Questions and answers Show of short videos on the topic of the lecture Seminar assignments (practice): 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 (incl. contact hours, self-study hours)	lecture -15, seminar -30, private study-105, total - 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	Existing competences in: "Environmental Audit", "Environmental Impact Assessment", "Environmental Monitoring"
Module objectives/intended learning outcomes	Objectives -: Within the course, significant attention is paid to the study of the fundamentals of environmental management in the Republic of Kazakhstan. Know - to provide students with general theoretical knowledge of the existing legal, regulatory and institutional framework for environmental regulation and environmental impact assessment in Kazakhstan and other countries of the world. Be able to present the current state and trends in the development of scientific and applied knowledge in this area, to professionally prepare students for conscious and effective participation in the procedures for rationing of environmental management and environmental impact assessment Have skills - to have skills to organize and ensure the implementation of state policy to limit the negative impact on the biosphere.

Content	When studying the legislative and regulatory framework in the field of environmental regulation and expertise in the Republic of Kazakhstan, as well as procedures of environmental regulation and expertise, international aspects of the development of environmental regulation and environmental assessment, EU directives are also considered. The study of the procedures of environmental regulation and examination takes place using practical examples of the planned economic and other activities in Kazakhstan.
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 Environmental regulation and examination is taken orally. Because: 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. In addition, I think that only the oral examination method allows you to fully assess the knowledge of students (for example, to ask additional questions).
Reading list	1. Koshkarov N. B., Abseitov E. T., Massenov K. B. Textbook «Basics of ecological rationing and expertise» ISBN 9965-799-45-8, 128 p. Almaty- 2018. TOO Nur-Print (available in the library and at the department) 2. Malte Faber, Reiner Manstetten "Philosophical Basics of Ecology and Economy" ISBN: 0415494559, 208p, 2009 Rutledge (available in the library) 3. Donchenko V.K., Pitulko V.M., Rastoskuev V.V., et al. Ecological Expertise. - M.: Publishing Center "Academy", 2004.(available in the library) 4. Galanevich, A.G. Environmental Impact Assessment and Ecological Expertise // Ecological Expertise. No. 3, -M. 1999 (available in the library) 5. Bespamiatov G. P., Krotov Yu. A. Maximum permissible concentrations of chemical substances in the environment. Directory. L .: Chemistry, 1985. (available in the library) 6. Butorina M.V., Vorobiev P.V., Dmitrieva A.P., et al. Engineering ecology and environmental management. M.: Logos, 2003. (available in the library) https://edpuzzle.com/ https://whiteboard.fi/

WM 3301 Waste management

Module designation	ECOL 22007 Environmental management and eco-tourism
Semester(s) in which the module is taugh	6
Person responsible for the module	Akbayeva Lyailya, candidate of biological sciences, professor of the department
Language	Russian ,English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22007 Environmental management and eco-tourism, semester- 3 , profile discipline, elective component (elective course)

Teaching methods	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). Informational or problematic lecture with the calculation of tasks Seminar assignments (practice): Divide the group into several subgroups. Each subgroup is prepared individually 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 -30, private study-120, total – 180
Credit points	6(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 biology, geography, chemistry, physics, as well as related disciplines Introduction to the specialty, Protection of natural resources.
Module objectives/intended learning outcomes	Purpose: know about the activities of national and foreign sectors of the economy in the field of waste management, waste minimization; assess global and regional risks for ecosystems associated with waste. The course gives an idea of the processes of formation and movement of waste in the “natural environment-man” system, production and consumption wastes. Knowledge of emissions to the environment and their features, effects, problems and technology and decontamination policy. Tools to achieve the goal: motivation of students to research, independent work of students with a teacher.
Content	The course includes questions: Measures for the collection, transportation, processing, recycling or disposal of waste, as well as control over these processes. In this case, waste is usually understood to mean that waste that occurs as a result of human activity. This management system is aimed at reducing the harmful effects of waste on human health, on the environment, for economic reasons in connection with the possibility of recycling most of the waste, as well as for aesthetic reasons.
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 student must demonstrate theoretical knowledge of waste management at all stages of the process. To be able to solve problems of collection, transportation, utilization and burial and recycling of waste.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 control).

Reading list	Environmental protection from production and consumption waste: a textbook for universities. 2017, 230s. Smirnov S., Bushuev N. Methods for determining the toxicity classes of production and consumption wastes. N.E. Bauman, 2020, 98p. Ryazantseva A., Lukashina G. Waste hazard passport. Determination of waste hazard class. MGIU, 2018, 124 p. Yu.S. Drugov Analysis of contaminated soil and hazardous waste: a practical guide. 2018. https://kahoot.com/ https://www.microsoft.com/

EPE 3302 Environmental engineering

Module designation	ECOL 22005 Engineering ecology
Semester(s) in which the module is taught	6
Person responsible for the module	Kapsalyamov B. doctor of technical sciences, professor of the department ./ Massenov Kairat. candidate of technical sciences, professor of the department
Language	Kazakh /Russian/English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22005 Engineering ecology elective, semester 6, Elective component
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: interactive method, differentiated approach, project method.
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	Industrial ecology", "The general ecology", Environmental chemistry "Person and biosphere", Human ecology "Analytical chemistry and physical and chemical methods of the analysis".
Module objectives/intended learning outcomes	Objectives - : Engineering environment protection — set of the scientific and engineering principles on improvement of the environment providing clear water, air and the earth for dwelling of the person and other organisms and also on cleaning of the polluted sites. Know - acquaintance of students with scientific and methodological bases of studying of production aspects, influences industrial the enterprise on natural objects, on the processes proceeding in air, water and the soil at hit of pollutants and a possibility of prevention of environmental pollution from the engineering point of view Be able to know the main regularities of industrial productions and methods of cleaning of industrial emissions in the atmosphere and to be able to analyze possible transformation of emissions and dumplings' of the industrial enterprises in air, water and the soil and influence on live organisms; Have skills - to have skills of analytical definition of industrial emissions in natural objects and to develop system of an economic and legal regulation of nature protection activity of concrete technical object

Content	For the purpose of achievement of the maximum ecological safety of economic activity of the person and decrease in risk of anthropogenic impact on the environment, experts in this field of knowledge are environmental engineers — carry out development, design, adjustment, operation and improvement of the nature protection equipment and technology, will organize nature protection work at the enterprises and territorial and industrial complexes, carry out expertise of projects, technologies and productions, carry out certification of production
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 Environmental engineering 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	1. Massenov KB; Abseitov E.T. Monograph "Engineering protection of the environment" VOLUME № 1, 288 pages. ISBN 978-601-238-540-3 2018 y (available in the library and at the department) 2. Massenov KB; Abseitov E.T. Monograph "Engineering protection of the environment" VOLUME № 2 263 pages. ISBN 978-601-238-540-3 2018 y (available in the library and at the department) 3. Massenov KB; Abseitov E.T. Monograph A-17 “Industrial ecology» , 398 pages. ISBN 978-601-238-541- 0. 2018 y (available in the library and at the department) 4. Massenov KB; Abseitov E.T. Textbook "Industrial ecology", 480 pages ISBN 9965-799-84-9 2018 y (available in the library and at the department) 5. Massenov KB; Abseitov E.T. Aytlessov K Textbook "Industrial Ecology" 207 pages . ISBN 978-601-206-064-5 2018 y https://www.microsoft.com/ https://www.socrative.com/

EA 3303Ecological audit

Module designation	ECOL 22007 Environmental management and eco-tourism EA 3303 Ecological audit
Semester(s) in which the module is taugh	6
Person responsible for the module	Adilbektegi G.A.
Language	Russian, Kazakh
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22007Environmental management and eco-tourism, semester- 5

Teaching methods	Lecture: Multimedia lecture. lecture developed by the author of the discipline. 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). Work on the licensed software ERA air.
Workload	lecture -30, seminar -30, private study-120, total – 180
Credit points	6
Required and recommended prerequisites for joining the module	Social ecology
Module objectives/intended learning outcomes	Purpose: teach how to choose rational solutions for environmentally friendly production, own methods and ecological and economic bases of environmental impact assessment; collect, store and process environmental information. The course includes objective, non-departmental assessment activities for compliance with current environmental legislation, regulations and legal acts, methodological and regulatory documents in the field of environmental protection and environmental management. Tools to achieve the goal: motivation of students to research, independent work of students with a teacher.
Content	The course "Environmental audit" is designed to study an independent, objective non-departmental assessment of the company's activities for compliance with the current environmental legislation, regulatory and legal acts, methodological and regulatory documents in the field of environmental protection and nature management, the activities of business entities and the state of the environment - objects of environmental auditing.
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 "Ecological audit" 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. Polushina E.A., Prituzhalova O.A. Environmental Management and Audit: Textbook. Tyumen: Publishing house of Tyumen State University, 2008 .-- 128 p. 2. Fundamentals of Environmental Auditing. A textbook for environmental auditors, a system of professional retraining and advanced training of civil servants, managers and specialists of industrial enterprises. - M .: Publishing house of MNEU, 2001 .-- 392 p. 3. Serov G.P. Environmental audit. Conceptual and organizational and legal framework. - M .: Examination, 2000 .-- 110 p. 4. https://edpuzzle.com/ 5. https://whiteboard.fi/ 6. https://kahoot.com/ 7. https://www.microsoft.com/ 8. https://www.socrative.com/

GM 3304 Greenhouse gas management

Module designation	ECOL 22005 Engineering ecology
Semester(s) in which the module is taught	6
Person responsible for the module	Kapsalyamov B. doctor of technical sciences, professor of the department
Language	Kaz
Relation to curriculum	For programm6B05208 – Ecology and nature management in which the module is taught ECOL 22005Engineering ecology elective, semester 6, Elective component
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): 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 -30, private study-120, total - 180
Credit points	6 (ECTS)
Required and recommended prerequisites for joining the module	Digital environmental research processing methods
Module objectives/intended learning outcomes	Purpose: the ability to identify and describe the main local, regional, global greenhouse processes, choose rational solutions to eliminate ecosystem dysfunctions, own methods of environmental impact assessment of greenhouse gases. The course is designed to study the inventory of greenhouse gas emissions, developing a GHG emission reduction program; Participation in the activities of national and international organizations in the field of greenhouse gas emission control. Tools to achieve the goal: the motivation of students to research, independent work of students with a teacher
Content	The purpose of studying the discipline " Greenhouse gas management" is to provide fundamental and applied knowledge about the basic laws of the formation of the climate system, its composition, principles of functioning and factors of anthropogenic impact on it. The objects of professional activity within the studied discipline are: - natural, anthropogenic, natural-economic, ecological-economic, engineering-ecological, production, social, social territorial systems and structures at the global, national, regional and local levels; - state planning, control, monitoring, expertise of environmental components of all forms of economic activity. Purpose: to identify and describe local, regional, global greenhouse processes, choose rational solutions to eliminate ecosystem disturbances, own methods for assessing the impact of greenhouse gases on the environment. Questions: inventory of greenhouse gases; plans for monitoring greenhouse gas emissions; development of a program to reduce GHG emissions; development of design documentation to reduce greenhouse gas emissions. Participation in the activities of organizations for the management of greenhouse gas emissions.
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. Khromov SP., Petrosyants M.A. Meteorology and climatology. 7th ed. - M: Publishing house of Moscow University, 2006.-582 p. 2. IPCC, 2007: Climate Change, 2007: Impacts, Adaptation and Vulnerability. Contribution Working Group II in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC, Geneva, Switzerland, 2007, -124 p. 3. IPCC, 2007: Climate Change, 2007: Climate Change Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Group climate change experts. IPCC, Geneva, Switzerland, 2007, 123 p. 4. Assessment report on climate changes and their consequences on the territory of the Russian Federation. in 2 volumes.M .: Roshydromet, 2008. https://kahoot.com/ https://www.microsoft.com/ https://www.socrative.com/

SE 3401 System Ecology

Module designation	ECOL 22008-System Ecology
Semester(s) in which the module is taught	7
Person responsible for the module	Massenov Kairat. candidate of technical sciences, professor of the department
Language	Kaz/English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22008 System ecology of ecology semester 7, University component
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): communicative method, method of 6 hats, cinquain method, interactive 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. GIS programme.
Workload (incl. contact hours, self-study hours)	lecture -15, seminar -30, private study-105, total - 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	General ecology; Mathematical modeling in ecology; Industrial ecology; Analytical chemistry; Human ecology
Module objectives/intended learning outcomes	Objectives: Features and interrelation of the main components of the ecosystem, the ability to perform systematic analysis in solving major problems in general ecology Be able to organized world system, metabolism, energy flow in ecosystems, and biological stability of the environment. Have skills - to have skills of ecological model of the population, ecosystem and world simulation model.

Content	Fundamentals of system theory and GIS, system analysis. Formation of the system idea of ecology, the basic principles of systemology, the structure of the ecosystem, the circulation of matter and energy in the ecosystem, the information process in the ecosystem. Ecological model and modeling. Element of systematic analysis of ecology in environmental protection.
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 System Ecology is taken orally. Because: 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. In addition, I think that only the oral examination method allows you to fully assess the knowledge of students (for example, to ask additional questions).
Reading list	1. Petrosyan L. A. Introduction to mathematical ecology / L. A. Petrosyan, V. B. Zakharov. - L .: Leningrad Publishing House. University, 1986. (Available in the University Library) 2. Reimers N. F. Ecology (theories, laws, rules of principles and hypotheses). M .: Young Russia, 1994 . (Available in the university library) 3. Smith J. Models in ecology. - M .: Mir, 1987. 4. Волкова В. P. Fundamentals of the theory of systems and systems analysis / V. P. Volkova, A. A. Denisov. SPb .: SPb. GTU, 1997. https://edpuzzle.com/ https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/

ESF 3402 Ecological safety and forecasting

Module designation	ECOL 22006 Ecological Genetics and Climatology
Semester(s) in which the module is taught	7
Person responsible for the module	Daribai Ainur., PhD, Assistant professor of the department
Language	Kaz/Russian/English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22006 EcologicalGeneticsand Climatology. selective, semester 7, Elective component
Teaching methods	Lecture: Multimedia lecture. Oral explanation. Case study, brainstorming. 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 -15, seminar -30, private study-105, total - 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	Existing competences in soil ecology, ecologicalaudit, waste managementmethods of geoecological researches.. List of related subjects: chemistry, physics of environment, ecology of the person, social ecology, plant ecology

Module objectives/intended learning outcomes	Objectives: The purpose learn to identify local, regional, global environmental sources of environmental hazards, choose rational solutions to eliminate threats to ecosystems, own environmental-economic methods of environmental impact assessment; the ability to make forecasts based on the collection, systematization and processing of environmental information; The discipline studies the methods of predicting the state of the environment and the possibilities of applying the methods of forecasting. Know: the basic concepts of forecasting the state of the environment and the history of its development, its relationship with ecology Have skills: students to apply knowledge processing of control results, planning of experiments, assessment of the quality of environmental components, forecasting. Competences: Students are supplementation of knowledge, including environmental protection, interaction of living organisms with the environment, forecasting of air pollution and climate change, pollution prevention measures.
Content	The course forms the knowledge of future professionals, including the protection of the environment, the conditions of interaction of living organisms with the environment, including the forecasting of air pollution and climate change, pollution prevention 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 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	1.Tumenbaeva, N. Environmental control, Astana, 2012 2.Berlin, M.E. Forecasting and regulation of atmospheric pollution. Leningrad: Hydrometeorology, 2005 3.Aidosov, A. Theoretical bases of forecasting of natural processes and ecological environment of the environment.- Almaty: Kazakh University, 2000 https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/

MEM 3404 Mechanisms of environmental management

Module designation	ECOL 22007 Environmental management and eco-tourism
Semester(s) in whichthemoduleistaught	7
Person responsibleforthemodule	Kobetayeva N.K, Ph.D. in Biology, Associate Professor of the department Bakeshova Z.hU. Senior teacher
Language	Kaz/Russian/English
Relation tocurriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22007 Environmental management and eco-tourism, semester- 7, Elective component

Teaching methods	Lecture: Traditional, problem-based, multimedia lecture. Interactive method. Tasks for the seminar (practice): Case study, brainstorming, works in group, communicative method, method of 6 hats. Tasks for SIW: differentiated approach, project method.
Workload (incl. contact hours, self-study hours)	lecture -15, seminar -30, private study-105, total - 150
Credit points	5 (ECTS)
Required and recommended prerequisites for joining the module	Existing competences in physics, chemistry, ecology, ecology of the soil, water, air, geology, mathematics. List of related subjects: chemistry, physics of environment, ecology of the person, social ecology, plant ecology
Module objectives/intended learning outcomes	Purpose: to identify and correctly select all the necessary technologies for the rational management of nature to eliminate violations of the structure and functions of ecosystems, own methods and ecological and economic bases for assessing the impact on the environment.
Content	The course includes environmental management of the environment, theory and practice of sustainable development, management principles and environmental aspects, interpreted as an area of general knowledge. Tools for achieving the goal: motivation to search for students in the store, independent work of students with a teacher. The content of the discipline consists of topics; 1.economic mechanisms of environmental protection 2. Planning and financing of environmental protection measures; 3. Establishment of limits on the use of natural resources, emissions and discharges of pollutants into the environment and waste disposal; 4. establishment of standards for payments and amounts of payments for the use of natural resources, emissions and discharges of pollutants into the environment, waste and other types of harmful effects; 5. Compensation in accordance with the established procedure for damage caused to the environment and human health.
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.Mamyrov N.K., Tonkopiy M.S., Upishev E.M. Environmental Economics: Textbook. Almaty: Economy, 2005 - 368b. 10 2.O.S. Shimova, N.K. Sokolovsky. Fundamentalsof Ecology and Economics of Natural ResourceUse: Textbook. / 2nd ed., Rev. andadd. - Minsk: BSEU, 2002 .-- 367 p. ISBN 985-426-797-0. https://www.socrative.com/ Google (Google Class/ GoogleForms) Microsoft teams

AIE 3405 Environmental Impact Assessment

Module designation	ECOL 22006 Ecological Genetics and Climatology AIE 3405 Environmental Impact Assessment
Semester(s) in which the module is taugh	7

Person responsible for the module	Adilbektegi G.A.
Language	Russian, Kazakh
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22006 Ecological Genetics and Climatology, semester- 7
Teaching methods	Lecture: interactive method, multimedia lecture, project method. Seminar assignments (practice): ERA air licensed program. 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	lecture -15, seminar -30, private study-105, total – 150
Credit points	5
Required and recommended prerequisites for joining the module	Ecological monitoring
Module objectives/intended learning outcomes	Purpose: identify and describe the main local, regional, global environmental conditions, own methods and environmental-economic assessment of environmental impact based on the collection and processing and analysis of environmental information; Course is designed to study the procedure in which the possible consequences of planned economic and other activities, improve the environment with taking into account the requirements of the environmental legislation.Tools to achieve the goal: motivation of students to research, independent work of students with a teacher.
Content	The course "Environmental Impact Assessment" is intended to study the procedure within which the possible consequences of planned economic and other activities for the environment and human health are assessed, measures are developed to prevent adverse consequences (destruction, degradation, damage and depletion of natural ecological systems and natural resources), improvement of the environment, taking into account the requirements of the environmental legislation of the Republic of Kazakhstan.
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 Impact Assessment" 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	Fedorova, A.I. Workshop on ecology and environmental protection: textbook for universities / A.I. Fedorova, A.N. Nikolskaya, Moscow: Humanitarian publishing center VLADOS, 2003, 288 p. Rozanov, S.I. General ecology: a textbook for technical directions and specialties / S.I. Rozanov. - 3rd ed., Stereotype. - SPb .: Lan, 2003. - 288 p. https://kahoot.com/ https://www.microsoft.com/

EB 3406 Environmental biotechnology

Module designation	ECOL 22006 Ecological Genetics and Climatology
Semester(s) in which the module is taugh	7
Person responsible for the module	Zhantokov B.ZH., senior lecturer of the department
Language	Russian, Kazakh
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22006 Ecological Genetics and Climatology, semester- 7 , 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. Case study, brainstorming. 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	lecture -15, seminar -30, private study-105, total – 150
Credit points	5
Required and recommended prerequisites for joining the module	To effectively master the content of the discipline, it is necessary to know the ecological monitoring, bioecology, biodiversity of biocenoses, biological components of the environment/
Module objectives/intended learning outcomes	Objectives of the study of the discipline: is the study of the special application of biological systems and processes for solving problems of environmental protection and rational use of natural resources. The objectives of the study of the discipline: is to master the principles and methods of isolation, study the identification of the main groups of microorganisms, study the features of their physiology, making microbes promising objects of biotechnological research.
Content	Ecological biotechnology is one of the sections of biotechnology dedicated to solving the problems of environmental protection and rational use of natural resources using biological systems and processes. These processes include the disposal of agricultural, household and industrial waste, the treatment of wastewater and air-gas emissions, the destruction of xenobiotics, the production of effective and non-toxic drugs to control diseases and pests of cultivated plants and domestic animals, as well as the creation of alternative and environmentally friendly methods for the reproduction of food, medicines, energy and mining.
Study and examination requirements and forms of examination	The exam on the subject of Environmental biotechnology is taken orally. Because: 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. In addition, I think that only the oral examination method allows you to fully assess the knowledge of students (for example, to ask additional questions).
Reading list	Scientific foundations of ecobiotechnology: a textbook / Alexander E. Kuznetsov, Nina B. Gradova. - Moscow: Mir, 2016. Fundamentals of biotechnology / K. H. Almagambetov. - Astana : NCB MES RK, 2006. Environmental biotechnology. / edited by K. Foerster and D. Weiz – - L., 1990. Agricultural biotechnology: textbook for universities / V. S. Shevelukha, E. A. Kalashnikova, E. S. Voronin, et al.; edited by V. S. Shevelukha. - 2nd ed., reprint. and add.. - Moscow: Higher School, 2013. Google (Google Class/ GoogleForms) Microsoft teams

EZ 3407 Ecological zoning and sensing

Module designation	ECOL 22008 System ecology
Semester(s) in which the module is taugh	7
Person responsible for the module	Zhantokov B.ZH., Zandibai A.
Language	Russian, Kazakh
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22008 System ecology, semester-7 , 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 Seminar assignments (practice): Case study, 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	lecture -15, seminar -30, private study-105, total – 150
Credit points	5
Required and recommended prerequisites for joining the module	To effectively master the content of the discipline, it is necessary to know the ecological monitoring, ecology of geosystems
Module objectives/intended learning outcomes	The objectives of the study of the discipline: to develop students 'understanding of the use of geoinformation systems, to supplement students' knowledge of the concept of spatial data, about geoinformatics as a science. Objectives of the study of the discipline: - - introduction to theoretical questions and basic postulates of geoinformatics; - development of ideas about how to collect and encode field research; - development of map information input views; - consideration of the theory of geoinformation modeling; - familiarization with the methods of geographical representation of information in GIS.
Content	The following are the requirements for the professional readiness of the graduate, the formation of which is influenced by the development of the discipline "GIS Tools" in combination with other disciplines of training in the direction. Construction of mathematical models of research objects and the choice of a numerical method for their modeling, the choice of a ready-made or the development of a new algorithm for solving the problem. Performing mathematical (computer) modeling and optimization of objects on the basis of available research and design tools, including standard and specialized application software packages.
Study and examination requirements and forms of examination	The exam on the subject of Ecological zoning and sensing is taken orally. Because: 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. In addition, I think that only the oral examination method allows you to fully assess the knowledge of students (for example, to ask additional questions).

Reading list	Mathematical modeling and identification of geodynamic systems [Electronic resource]: monograph / V. K. Pankrushin. - Novosibirsk : SGGA, 2002 Tips.B. Ya. Information technologies [Text] Textbook for universities / B. Ya. Soviets, V. V. Tsekhanovsky. . Research and analysis of the accuracy of special engineering and geodetic networks by the method of mathematical modeling [Electronic resource]: method. instructions / A. P. Karpik, I. N. Chesheva ; SGGA. - Novosibirsk : SGGA, 2009 https://www.microsoft.com/ https://www.socrative.com/

CCGE 3408 Climate change and the «green» economy

Module designation	ECOL 22006 Ecological Genetics and Climatology CCGE 3408 Climate change and the «green» economy
Semester(s) in which the module is taugh	7
Person responsible for the module	Adilbektegi G.A.
Language	Russian, Kazakh
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22006Ecological Geneticsand Climatology, semester- 7
Teaching methods	Lecture: Multimedia lecture. 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: 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 -15, seminar -30, private study-105, total – 150
Credit points	5
Required and recommended prerequisites for joining the module	To obtain a positive assessment, you must demonstrate the following knowledgemastering theoretical knowledge about the climate, its changes as a result of economic activities on a global and national scale, the impact of climate on natural and economic systems; formation of students' understanding of the "green" economy as the basis for sustainable development on a global and national scale and the main tool for combating climate change; developing students' skills in analyzing the state of the environment in connection with climate change, taking into account the requirements of the "green" economy; obtaining information on greenhouse gases, their role in climate change, mechanisms for reducing GHG emissions, their implementation in Kazakhstan, and the regulatory system.
Recommended prerequisites	Ecological monitoring, Industrial ecology, Social ecology, Environmental studies, Ecology of geosystems

Module objectives/intended learning outcomes	Purpose: identify and describe the main regional, global climate processes, choose rational ways to solve environmental problems associated with climatic factors.The course studies current trends in climate change, its consequences, sustainable development issues, the main provisions of the concept for the transition of the Republic of Kazakhstan to a green economy, international agreements to combat climate change. Tools to achieve the goal: the motivation of students to research, independent work of students with a teacher
Content	The course "Climate Change and Green Economy" is designed to study modern trends in climate change, its consequences, sustainable development issues, the main provisions of the concept for the transition of the Republic of Kazakhstan to a "green" economy, international agreements to combat climate change, as well as Kazakhstan's obligations on international climate change agreements. In the discipline "Climate Change and Green Economy", students will study the consequences of climate change, consider sustainable development issues, analyze the state and prospects for the use of renewable energy sources in Kazakhstan, consider the problems in agriculture, water supply and other problems caused by climate change in Kazakhstan. sectors of the economy.
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 "Climate change and the «green» economy" 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	Strategy "Kazakhstan-2050" Towards a green economy in Europe: EU environmental policy targets and objectives 2010–2050 ISO 50001 - Energy management Environmental Code of the Republic of Kazakhstan https://www.microsoft.com/ https://www.socrative.com/

ME 3410 Mutagenesis and environment

Module designation	ECOL 22008 System ecology
Semester(s) in which the module is taugh	7
Person responsible for the module	Akbayeva Lyailya, candidate of biological sciences, professor of the department
Language	English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22008 System ecology, semester-7, profile discipline, elective component (elective course)

Teaching methods	Informational or problematic lecture 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. 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).
Workload (incl. contact hours, self-study hours)	lecture -15, seminar -30, private 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 biology, geography, chemistry, physics, as well as related disciplines Biology, biodiversity of biocenoses, Introduction to the specialty, bioecology.
Module objectives/intended learning outcomes	Purpose: To give students an understanding of the danger of environmental factors of mutagenesis, the mechanisms and consequences of mutagenesis. To teach students the basic principles of environmental and genetic monitoring, the basics of genetic toxicology Identify the environmental problems associated with the genotoxic influence of environmental factors, as well as to understand and take into account the role of the mutation process in the adaptation and evolution of organisms. Objectives of the course: 1. To master theoretical knowledge concerning the process of mutagenesis. 2. To master methods for solving practical problems to prevent the impact of mutagenic sources on living organisms 3. To master the techniques of laboratory methods to eliminate the consequences of mutagenic effects on living objects.
Content	The content of the discipline "Mutagenesis and OS" offers complex systems of genetic impact of unfavorable environmental factors on plants and animals, types and types of mutation mechanisms, main diseases associated with mutations, as well as the possibility of using mutagenesis in practice. Theoretical knowledge of the basic principles of environmental genetic monitoring, the basics of genetic toxicology and physical mutagenesis. Tools to achieve the goal: the motivation of students to research, independent work of students with a teacher, laboratory work to consolidate skills.
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 examiner has the 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, to which the student gives oral explanations in the course of 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 student must know the basic must be able to identify mutagenic factors and solutions to problems associated with environmental pollution by mutagens. Understand how to minimize the harm of mutagens, and use mutagenesis for good. 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 control).
Reading list	Abilev S. K., Glazer V. M. Mutagenesis with the basics of genotoxicology: a tutorial. - M .; SPb. : Nestor-History, 2015 .-- 304 p. Alikhanyan S.I., Akifov A.S. General genetics, M., "High School", 2018 Alikhanyan S.I., Akifov A.S. General genetics, M., "High School", 2020 Lobashov M.E., Tikhomirova M.M. Genetics with the basics of selection, M., "Education", 2016 https://www.microsoft.com/ https://www.socrative.com/

EK 3413Ecology of Kazakhstan

Module designation	ECOL 22004 Social and legal aspects of ecology
Semester(s) in which the module is taught	7
Person responsible for the module	Daribai Ainur., PhD, Assistant professor of the department
Language	Kaz/Russian/English
Relation to curriculum	For programm 6B05208 – Ecology and nature management in which the module is taught ECOL 22004 Social and legal aspects of ecology, elective, semester 3, Elective component
Teaching methods	Lecture: Multimedia lecture. Oral explanation. Questions and answers, Show of short videos on the topic of the lecture Seminar assignments (practice): 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 (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	Existing competences in ecology, ecological audit, waste management. List of related subjects: chemistry, physics of environment, ecology of the person, social ecology, plant ecology

Module objectives/intended learning outcomes	Objectives: identify and describe the main national environmental problems, choose rational solutions to eliminate violations of the structure and functions of ecosystems, ability to collect, store and process environmental information for analysis, evaluation. Know: environmental problems, knowledge about environmental monitoring, characteristics of natural resources with timely detection of environmental changesthat analysis of experimental material, and various mathematical and statistical formulas and methods Have skills: to study and analyze complex environmental problems and their forecast, preventive measures Competences: methods for the rational use of resources, information support, assessment of resource protection.
Content	The course forms the knowledge of future specialists, including environmental protection, environmental problems in Kazakhstan and measures to prevent pollution of the atmosphere, hydrosphere and lithosphere.
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	1. Kozachek A.V. Ecological bases of nature management, Rostov-on-Don, 2008 2. KenesarievYu.I., Ecology and Healthcare, Almaty, 2009 3. Ospanova, A.K .. Ecology and sustainable development.- Pavlodar, 2010 https://edpuzzle.com/ https://whiteboard.fi/ https://kahoot.com/ https://www.microsoft.com/