CATALOG OF ELECTIVE DISCIPLINES

7M01 - Pedagogical sciences
(Code and classification of the field of education)

7M015 - Teacher training in natural science subjects
(Code and classification of the direction of training)

0114
(Code in the International Standard Classification of Education)

M014 - Training of teachers of biology (kazakh, russian, english language)
(Code and classification of the educational program group)

7M01505 - Biology
(Code and name of the educational program)

Master
(Level of preparation)

set of 2023

Semey 2023

Developed
By the Academic Committee of the EP
The head of the AC Mukaev Zh. T.
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Reviewed
At the meeting of the Quality Assurance Commission
Natural and Mathematical of the faculty
Recommended to be for approved
by the Academic Council of the University
Record No 4.1 "04" April 2023 y.
Chairman of the Commission _____

Approved
at the meeting of the Academic Council of the University
Protocol №5 "21" April 2023
Chairman of the Academic Council Oralkanova I.A.

Development biology

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline examines the processes of individual development (ontogenesis) of plant and animal organisms, formative processes during the period of individual development of the organism in space and time, explores the genetic, molecular and biochemical mechanisms of metabolism in cells and tissues in the process of formation, studies the features of cellular and subcellular levels of organization of living organisms. Studies aspects of the development process at the molecular, cellular, tissue, organ and organizational levels.

Purpose of studying of the discipline

Establishment and substantiation of the features of the composition and structure of various cells of the body.

Learning Outcomes

ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON7 To use the acquired knowledge and skills to solve topical environmental, economic and social problems.

Learning outcomes by discipline

1. Demonstrate knowledge of the basic methods of cytochemical evaluation of organic compounds in the cell
2. master the methods of biochemical cell research
3. explain the basic concepts that make up the essence of modern biochemical research

Prerequisites

Bachelor

Postrequisites

Evolution Biology

The modern problems of biology

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline studies the empirical and theoretical levels of cognition, is aimed at the formation of theoretical knowledge in the discipline and is the basis for practical classes, during which undergraduates work out research skills, solving practical problems and master the basics of scientific work.
Topics from related disciplines are considered, knowledge of which is necessary for understanding general biological laws, concepts of modern natural science, theory of evolution and genetics related to conceptual biological disciplines
Objective: to obtain basic knowledge about the main areas of research currently being conducted by biologists, about the problems of obtaining reliable information using experimental and epidemiological studies

Purpose of studying of the discipline

to obtain basic knowledge about the main areas of research currently being conducted by biologists, about the problems of obtaining reliable information using experimental and epidemiological studies

Learning Outcomes

ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON7 To use the acquired knowledge and skills to solve topical environmental, economic and social problems.

Learning outcomes by discipline

1. Demonstrate knowledge of the main directions of biological research
2. Possess methods of identifying cause-and-effect relationships of statistics in biology;.
3. Explain the basic concepts that make up the essence of modern biological research,

Prerequisites

Bachelor

Postrequisites

Evolution Biology

Theoretical Biology

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

Theoretical biology develops biological thinking among undergraduates and forms a scientific worldview. The course reveals the multidimensionality of the levels of organization of living matter, the principle of stable disequilibrium of biological systems, the specifics of the biological form of motion of matter. Special attention is paid to the biological picture of the world, the systematic organization of biological objects and methods of studying theoretical biology, the interaction of theoretical biology with other sciences. Theoretical biology develops biological thinking among undergraduates and forms a scientific worldview. The course reveals the multidimensionality of the levels of organization of living matter, the principle of stable disequilibrium of biological systems, the specifics of the biological form of motion of matter. Special attention is paid to the biological picture of the world, the systematic organization of biological objects

and methods of studying theoretical biology, the interaction of theoretical biology with other sciences.

Purpose of studying of the discipline

To acquaint with history of theoretical biology, its development as sciences, its main concepts, to show its place in system of the modern biological disciplines, and also its role in formation of the modern views in biology

Learning Outcomes

ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON7 To use the acquired knowledge and skills to solve topical environmental, economic and social problems.

Learning outcomes by discipline

1 To state the stages and factors of the development of theoretical biology;
2 Demonstrate basic knowledge of the physiological, biochemical, genetic essence of life, the systemic organization of biological objects.
3 Possess the methodology and scientific basis of theoretical biology;

Prerequisites

Bachelor

Postrequisites

Evolution Biology

Herpetofauna Of Kazakhstan

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

This subject provides for the study of amphibians and reptiles of the Republic of Kazakhstan. With a deep study of the discipline, undergraduates develop clear knowledge about the distribution of these animals on the territory of Kazakhstan, also about taxonomy, the ecology of frogs, snakes, lizards, also about useful species of this group, about the species conservation of amphibians and reptiles of the republic, a description of the more common species of reptiles and amphibians.

Purpose of studying of the discipline

To know the representatives of the herpetofauna of Kazakhstan, their distribution, ecology.

Learning Outcomes

ON4 To explain the role of evolutionary theory in the biological worldview, to have modern ideas about the basics of evolutionary theory, about micro- and macroevolution.
ON7 To use the acquired knowledge and skills to solve topical environmental, economic and social problems.

Learning outcomes by discipline

1.Study of species composition and distribution of species of herpetofauna of Kazakhstan. Knowledge: distinctive features, principles of taxonomy, ecology of amphibia and reptilia.
2. To apply the knowledge gained in practice of independent research, to be able to work with literature on herpetofauna of Kazakhstan.
3.During the course on the herpetofauna of Kazakhstan undergraduates must master the skills of fish research, animal identification; skills of identification and processing of material in the laboratory, taxidermy skills.

Prerequisites

Bachelor

Postrequisites

Evolution Biology

Ichthyofauna Of Kazakhstan

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

This discipline provides for the study of the ichthyofauna, i.e. fish of Kazakhstan. When studying the course, undergraduates form systemic knowledge about the species composition of fish, about the distribution of fish in various reservoirs of Kazakhstan, also about the importance, use and ecology of fish, also about rare and endangered species of fish, about the conservation of valuable fish and the ichthyofauna of Kazakhstan widely used for commercial purposes , as well as knowledge about the scientific work of ichthyologists in Kazakhstan.

Purpose of studying of the discipline

To assess the current state of fish stocks in Kazakhstan`s reservoirs and to know recommendations for their sustainable use while preserving the biological diversity of the ichthyofauna.

Learning Outcomes

ON4 To explain the role of evolutionary theory in the biological worldview, to have modern ideas about the basics of evolutionary theory, about micro- and macroevolution.
ON7 To use the acquired knowledge and skills to solve topical environmental, economic and social problems.

Learning outcomes by discipline

1. Study of species composition and distribution of species of ichthyofauna of Kazakhstan. .Knowledge: distinctive features, principles of taxonomy, ecology of fish.
2. To apply the knowledge gained in practice of independent research, to be able to work with literature on ichthyofauna of Kazakhstan.
3. During the course on the ichthyofauna of Kazakhstan undergraduates must master the skills of fish research, animal identification; skills of identification and processing of material in the laboratory, taxidermy skills.

Prerequisites

Bachelor

Postrequisites

Evolution Biology

Invertebrates of Kazakhstan

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

This discipline deals with the study of widespread groups of animals - invertebrates. These animals include protists, cholerates, snails and bivalves, free-living and parasitic worms of humans and farm animals, higher and lower crayfish and arachnids, six-legged, which are found in different ecological niches. The discipline includes consideration of the works of entomologists of Kazakhstan, undergraduates get acquainted with various scientific literature and determinants.

Purpose of studying of the discipline

In the course of studying the discipline invertebrates of Kazakhstan, undergraduates should know the biodiversity of invertebrates of Kazakhstan, their importance in nature and human life, the areas of their distribution.

Learning Outcomes

ON4 To explain the role of evolutionary theory in the biological worldview, to have modern ideas about the basics of evolutionary theory, about micro- and macroevolution.
ON7 To use the acquired knowledge and skills to solve topical environmental, economic and social problems.

Learning outcomes by discipline

1. to know the distribution areas of classes, orders and families of invertebrates in Kazakhstan; to know the taxonomic ranks of invertebrates; to master the practical skills of determining invertebrates; know the methods of morphological studies of objects; you must know the importance of invertebrates in nature and in human life.
2. apply the acquired knowledge in practice of independent research, be able to work with the literature on invertebrate zoology.
3. During the course, undergraduates must master the skills of research of invertebrates; the skills of determining and processing material in the laboratory.

Prerequisites

Bachelor

Postrequisites

Evolution Biology

Modern problems of human biology

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline covers a wide range of issues and is represented by three modules.
The first reveals the biological and social essence of man. Theories of social Darwinism, the ecology of social consciousness, the role of the environment in the development of the human psyche are considered.
The second module is devoted to anthropogenesis and human environments, geographic polymorphism and polytypes. The third module examines human interaction with the environment and the role of environmental and hygienic factors.

Purpose of studying of the discipline

Familiarization with current problems and promising areas of biology

Learning Outcomes

ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON7 To use the acquired knowledge and skills to solve topical environmental, economic and social problems.

Learning outcomes by discipline

- to explain the biological and social essence of a person; to argue the role of social consciousness and the environment in the development of the human psyche;
-to draw up schemes of human evolution; to describe the main anthropological types;
-to identify the features of human development at the present stage of evolution and the relationship of human health with the ecological state of the environment.

Prerequisites

Bachelor

Postrequisites

Physiology of the central nervous system and higher nervous activity

Modern problems of human physiology

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The issues of the vital activity of the human body as a single integral system regulated by neuro-humoral mechanisms are considered; features of adaptation in global environmental conditions; the mechanisms of human resistance to environmental stressors are clarified;

the role of various levels of the central nervous system in the formation and regulation of emotional states and the elucidation of the mechanisms of mental activity that ensure the integrative functions of the human brain.

Purpose of studying of the discipline

Study of current problems and promising areas of human physiology

Learning Outcomes

ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON7 To use the acquired knowledge and skills to solve topical environmental, economic and social problems.

Learning outcomes by discipline

-Demonstrate knowledge about the human body as an integral system;
--explain the mechanisms of neurohumoral regulation in ensuring the body`s resistance to environmental influences;
-describe the role of the central nervous system in providing integrative functions of the human brain;
-analyze and evaluate the level of development of the human body at the present stage in terms of changing environmental and social living conditions

Prerequisites

Bachelor

Postrequisites

Physiology of the central nervous system and higher nervous activity

Ecological human physiology

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline studies the features of the life of the human body and the mechanisms of its adaptation in a constantly changing environment, the dependence of the functions of organs and physiological systems on the effects of environmental factors in various physical and geographical zones, natural cycles. The impact on the human body of working and living conditions, increasing physical and emotional-psychological stress, as well as stressful situations is considered.

Purpose of studying of the discipline

To study the peculiarities of the human body`s vital activity and the mechanisms of its adaptation to the environment

Learning Outcomes

ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON7 To use the acquired knowledge and skills to solve topical environmental, economic and social problems.

Learning outcomes by discipline

-explain the peculiarities of the vital activity of the human body and animals;
- to reveal the mechanisms of adaptation of humans and animals to environmental conditions;
-apply the basic parameters of physiological systems in solving situational problems;
-analyze the data of physiological systems in normal and abnormal conditions.

Prerequisites

Bachelor

Postrequisites

Physiology of the central nervous system and higher nervous activity

New approaches to teaching

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course provides features of the methodology of joint group work, discussion, presentation and individual research, new approaches in teaching and learning within the framework of seven modules. He reveals the technology of dialogic learning, since dialogue occupies a central place in the lesson and can contribute to the intellectual development of students and their effectiveness in learning. In the technology of developing critical thinking, great importance is attached to methods that form the ability to work with questions.

Purpose of studying of the discipline

to provide in-depth theoretical knowledge about the learning process and about students;
- to develop practical teaching skills; to expand the range of methodological and didactic approaches in teaching; to improve competencies in the field of lesson planning;

Learning Outcomes

ON2 Apply knowledge of the theoretical and methodological foundations of scientific research in pedagogy and in a special field. Demonstrate methods of implementing research results into practical pedagogical activity.
ON8 Critically analyze existing concepts, theories and approaches to the analysis of processes and phenomena, integrate knowledge gained in different disciplines to solve research problems in new unfamiliar conditions.

Learning outcomes by discipline

1. Possess the skills of critical thinking (reflection) about your practice;
2. Students have the opportunity to develop their own teaching activities and the activities of their organization in connection with the expected changes at the regional, national and international levels.
3. Students have a basic knowledge and understanding of learning, and are able to take into account the diversity of students in the teaching process and support their well-being in a psychologically and ethically sound manner, taking into account their life and learning

context.
4. analyze and synthesize information obtained as a result of observation, performance of a certain experience, as well as during reflection or reasoning.

Prerequisites
Bachelor

Postrequisites
Pedagogical practice

Professional teacher landmark

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
The course is aimed at expanding the range of knowledge and skills in the field of innovative teaching and upbringing methods, examines new approaches to teaching biology, critical thinking teaching technology, features of formative and summative assessment of students` knowledge, the possibility of using ICT in teaching biology, features of teaching gifted children, learning in accordance with the age characteristics of students, as well as leadership in management and training.

Purpose of studying of the discipline
Preparation of a master `s student for teaching at a university and the creation of conditions for the formation of his professional image .

Learning Outcomes
ON2 Apply knowledge of the theoretical and methodological foundations of scientific research in pedagogy and in a special field. Demonstrate methods of implementing research results into practical pedagogical activity.
ON8 Critically analyze existing concepts, theories and approaches to the analysis of processes and phenomena, integrate knowledge gained in different disciplines to solve research problems in new unfamiliar conditions.

Learning outcomes by discipline
Apply fundamental scientific, pedagogical, managerial, communicative knowledge and skills in professional activities.
Knows the methodology of scientific research in the field of biological education; the content of the curriculum of the course taught.
He is able to independently conduct seminars, practical, laboratory classes, taking into account the requirements of the developed and approved methodological guidelines.
- determine the features of your pedagogical image;
- to identify the orientation of the axiological, ontological, methodological components of the professional image of the teacher;
- to carry out the selection of ways to form a professional image and implement them in their teaching activities;
- plan personal and professional development in the context of the professional image of the teacher

Prerequisites
Bachelor

Postrequisites
Pedagogical practice

Biology teaching technology in secon dary vocational and university

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
The course is aimed at developing undergraduates` theoretical knowledge and practical skills, the ability to organize pedagogical work and scientific work for the correct selection and processing of educational material necessary for conducting classes, consistent and accessible presentation of its scope and content to students in the process of teaching biology at universities and colleges. The focus is on the development of independent cognitive activity of students in the process of teaching biology.

Purpose of studying of the discipline
Reveal the conceptual basis of active learning biology in high school and post-secondary educational institutions.

Learning Outcomes
ON2 Apply knowledge of the theoretical and methodological foundations of scientific research in pedagogy and in a special field. Demonstrate methods of implementing research results into practical pedagogical activity.
ON8 Critically analyze existing concepts, theories and approaches to the analysis of processes and phenomena, integrate knowledge gained in different disciplines to solve research problems in new unfamiliar conditions.

Learning outcomes by discipline
1. Determine the tasks and the plan for studying the chosen methodological issue, use different research methods in its development;
2. Apply theoretical knowledge on the technology of teaching biology in universities and colleges in solving practical educational tasks.
3. Solve professional problems and typical professional tasks that arise in real situations of activity using knowledge and life experience, values and inclinations.

Prerequisites
Bachelor

Postrequisites
Pedagogical practice

Actual problems of genetics

Discipline cycle	Profiling discipline
Course	1
Credits count	5

Knowledge control form	Examination

Short description of discipline
The course examines the molecular genetic foundations of heredity, chromosomal polymorphism in the human population, genetic monitoring of the human population due to environmental pollution, prevention and occurrence of hereditary diseases, polymorphism of the human immune system, issues of genetic safety, issues of genetic toxicology, problems of cloning, DNA methylation, PCR assays and issues of the use of chemicals and radiation in plant breeding.
Goal
To study the current state of genetics and the solution of existing genetic problems

Purpose of studying of the discipline
To study the current state of genetics and the solution of existing genetic problems

Learning Outcomes
ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON7 To use the acquired knowledge and skills to solve topical environmental, economic and social problems.

Learning outcomes by discipline
1. to present a complete picture of the state of genetics at the present stage of its development;
2. to use modern research methods and information and communication technologies to model crosses.
3. discuss the causes and consequences of mutations for the vital activity of living organisms and the evolution of life on the planet;

Prerequisites
Bachelor

Postrequisites
Evolution Biology

Human Genetics

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
The course examines the main methods of studying human genetics: genealogical method, twin method, population-statistical method, cytogenetic method. The issues of the influence of environmental factors on heredity and variability in the human population, problems and prevention of mutagenesis are studied. During the course, undergraduates will be able to better understand the cause-and-effect relationships of biological processes in nature, explain the patterns and mechanisms of variability of signs.

Purpose of studying of the discipline
To study the patterns of inheritance and variability of traits in humans

Learning Outcomes
ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON7 To use the acquired knowledge and skills to solve topical environmental, economic and social problems.

Learning outcomes by discipline
1. apply the acquired knowledge to understand the basic patterns of inheritance and variability of traits in humans.
2. Describe the types of heredity (nuclear – chromosomal and extra–nuclear - cytoplasmic) and their causes;
3. Determine the influence of factors on the type of variability;
4. To present a complete picture of the main patterns of inheritance and variability of traits in humans

Prerequisites
Bachelor

Postrequisites
Evolution Biology

Population Genetics

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
The course examines the history of the concept of "population", the modern definition of population. undergraduates will study the features of the genetic structure of the population, population-genetic processes: gene drift, mutations, migrations, crossing systems. The connection between population genetics and evolution, the Hardy– Weinberg law – the basic law of population genetics, genetic polymorphism of populations as the basis of biological diversity and the problems of biodiversity conservation are also considered, which contributes to the development of analytical thinking in revealing the issues of understanding evolution at the present stage

Purpose of studying of the discipline
To study the history of the development of the concept of population and modern evolutionary and genetic processes

Learning Outcomes
ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON7 To use the acquired knowledge and skills to solve topical environmental, economic and social problems.

Learning outcomes by discipline
1. Explain the basic laws of population genetics and the problems of preserving genetic diversity
2. Determine the genotypic structure of populations and the frequency of alleles and genotypes by phenotypic frequencies in populations;

3. to present a complete picture of the history of the formation and modern understanding of the evolution of populations
4. apply the acquired knowledge to understand genetic processes in populations

Prerequisites
Bachelor

Postrequisites
Evolution Biology

Anthropology

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
After studying this course, the undergraduate will master the knowledge of anthropology and develop the skills to apply them in a future career. The course is aimed at developing the knowledge, skills and abilities of undergraduates in anthropology and developing the relevant professional and personal qualities of a manager. The course program takes into account the specifics of the future professional activity of undergraduates.

Purpose of studying of the discipline
The purpose of studying the subject of "Anthropology" is to form an understanding of the formation of human and human phenomena.

Learning Outcomes
ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON4 To explain the role of evolutionary theory in the biological worldview, to have modern ideas about the basics of evolutionary theory, about micro- and macroevolution.

Learning outcomes by discipline
1. The knowledge gained in the process of studying the subject is the basis for the formation of a scientific worldview, helping graduate students to solve many modern problems related to the origin and place of man in nature.
2. Can explain the mechanisms of major human evolutionary changes;
3. Can own the conceptual apparatus of anthropology to the extent necessary.

Prerequisites
Bachelor

Postrequisites
Evolution Biology

Bionic

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
Applied science of application in technical devices and systems of principles of organization, properties, functions and structures of wildlife, that is, forms of life in nature and their industrial analogues. Biological bionics, which studies the processes occurring in biological systems; theoretical bionics, which builds mathematical models of processes.

Purpose of studying of the discipline
to show the importance of biological knowledge for the development of technology, architecture, instrumentation, to form in students a scientifically based understanding of the world, the ability to analyze facts and identify cause-and-effect relationships.

Learning Outcomes
ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON4 To explain the role of evolutionary theory in the biological worldview, to have modern ideas about the basics of evolutionary theory, about micro- and macroevolution.

Learning outcomes by discipline
1. Can apply theoretical knowledge in practical activities based on bioforms;
2. Possesses the skills of aesthetic development of the laws of wildlife and harmony;
3. He is able to analyze the constructive systems of living organisms as perfect solutions of nature, the application of the principles of the structure and functioning of bioforms in human activities.

Prerequisites
Bachelor

Postrequisites
Evolution Biology

Biochemistry and physiology of plants

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
Physiology and biochemistry study the life processes of plants, the functions of the plant organism, the chemical composition, changes in substances and all possible energy in the environmental conditions in the process of plant ontogenesis. This is possible only with

deep knowledge of the plant organism, anatomy, plant morphology, physics of inorganic, organic and physical colloids, chemistry and other subjects. Physiology and biochemistry of plants, relying on regularities, improve the theoretical foundations of growth and development.

Purpose of studying of the discipline
Physiology and biochemistry of plants, relying on regularities, improve the theoretical foundations of growth and development.

Learning Outcomes
ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON4 To explain the role of evolutionary theory in the biological worldview, to have modern ideas about the basics of evolutionary theory, about micro- and macroevolution.

Learning outcomes by discipline
1. Mechanisms of regulation and the main patterns of relationships between plants and the environment based on knowledge about the nature of the main physiological processes and biochemistry of green plants
2. Owns the methods of biochemical analysis in the study of the chemical composition of plants.
3. It has the ability to recognize morphological features wild plants common in the regions other crops, assessment of their physiological condition, identification of adaptive potential and growth and development improvement factors and product quality.

Prerequisites
Bachelor

Postrequisites
Evolution Biology

Decorative plant growing

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline includes the main branches – floriculture and decorative arboriculture. When studying the course, the issues of plant assortment, agrotechnics of growing the most important flower crops are considered. In the direction of Floriculture, it is important to study the purpose, structure of production areas of greenhouses, greenhouses, and to consider the work carried out in these places, and about the origin of floral and ornamental plants used in the creation of landscape architecture objects;

Purpose of studying of the discipline
formation of advanced professional knowledge and competencies among undergraduates, acquisition of skills and abilities in the field of ornamental plant growing and floriculture for the creation and reconstruction of flower beds, landscapes and interiors for various purposes.

Learning Outcomes
ON4 To explain the role of evolutionary theory in the biological worldview, to have modern ideas about the basics of evolutionary theory, about micro- and macroevolution.
ON8 Critically analyze existing concepts, theories and approaches to the analysis of processes and phenomena, integrate knowledge gained in different disciplines to solve research problems in new unfamiliar conditions.

Learning outcomes by discipline
Demonstrate knowledge of the basic theoretical provisions and methods of field, laboratory and industrial research of modern biology for solving general professional tasks;
- develop and predict the effectiveness of a rational regime for the use and restoration of plant resources;
- apply methods of plant introduction, conduct phenological observations and assess the success of the introduction.

Prerequisites
Bachelor

Postrequisites
Evolution Biology

Forage plants

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline is related to the study of forage plants growing on the territory of Kazakhstan. Considers morphobiological features, fodder and technical value, progressive technologies of cultivation of fodder and industrial crops in field and hay-pasture crop rotation, various systematic groups of plants used in forage production. The problems of protection and rational use of fodder plants in Kazakhstan are studied. Helps undergraduates to identify the main agricultural crops, develop tillage systems.

Purpose of studying of the discipline
to form a system of knowledge, skills and abilities among undergraduates in accordance with the competencies being formed about the importance and creation of a feed base for animal husbandry, modern technologies for preparing feed, improving and exploiting natural lands.

Learning Outcomes
ON4 To explain the role of evolutionary theory in the biological worldview, to have modern ideas about the basics of evolutionary theory, about micro- and macroevolution.
ON8 Critically analyze existing concepts, theories and approaches to the analysis of processes and phenomena, integrate knowledge gained in different disciplines to solve research problems in new unfamiliar conditions.

Learning outcomes by discipline
Demonstrate knowledge of the basic theoretical provisions and methods of field, laboratory and industrial research of modern biology for solving general professional tasks;
- develop and predict the effectiveness of a rational regime for the use and restoration of plant resources;
- apply methods of plant introduction, conduct phenological observations and assess the success of the introduction.
Prerequisites
Bachelor
Postrequisites
Evolution Biology

Herb plants in Kazakhstan

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline is regional in nature, it presents medicinal plants that are common in Kazakhstan and play an important role in research practice. The relevance and necessity of introducing the discipline lies in the acquisition of knowledge by undergraduates about these plants. Many of them are of great medical and economic importance as sources of medicinal, food, tanning, aromatic, dyeing and other substances.
Purpose of studying of the discipline
deepening knowledge about medicinal plants and mastering the skills of searching for them in various phytocenoses, as well as acquiring the necessary skills for growing medicinal plants and caring for them.
Learning Outcomes
ON4 To explain the role of evolutionary theory in the biological worldview, to have modern ideas about the basics of evolutionary theory, about micro- and macroevolution.
ON8 Critically analyze existing concepts, theories and approaches to the analysis of processes and phenomena, integrate knowledge gained in different disciplines to solve research problems in new unfamiliar conditions.
Learning outcomes by discipline
Demonstrate knowledge of the basic theoretical provisions and methods of field, laboratory and industrial research of modern biology for solving general professional tasks;
- develop and predict the effectiveness of a rational regime for the use and restoration of plant resources;
- apply methods of plant introduction, conduct phenological observations and assess the success of the introduction.
Prerequisites
Bachelor
Postrequisites
Evolution Biology

Physiology of the central nervous system and higher nervous activity

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline studies the functions of the central nervous system and its higher structures, the cerebral cortex, which provide the most complex relations of the human body with the external environment. The activity of the cerebral cortex is based on the activity of subcortical structures that maintain homeostasis. The integrative function of the brain ensures the individuality of adaptation to environmental conditions, the neurophysiological mechanisms of mental activity, the psyche and human behavior.
Purpose of studying of the discipline
To study the role of the central nervous system and higher nervous activity in ensuring the mental and mental activity of a person and his interaction with the environment.
Learning Outcomes
ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON4 To explain the role of evolutionary theory in the biological worldview, to have modern ideas about the basics of evolutionary theory, about micro- and macroevolution.
Learning outcomes by discipline
PO1: Describe the physiology of the central nervous system, especially the cerebral cortex, which provides the conditioned reflex activity of the body; show the role of the nervous system in providing adaptive reactions of the body;
RO2: Make diagrams of reflex arcs of conditioned reflexes, systematize the types of higher nervous activity;
RO3: Analyze the neurophysiological mechanisms of human mental activity.
Prerequisites
Modern problems of human physiology
Postrequisites
Evolution Biology

Behavior physiology

Discipline cycle	Profiling discipline
Course	2
Credits count	5

Knowledge control form	Examination

Short description of discipline
Modern ideas about the physiology of higher nervous activity, which provide patterns of behavior, are considered. The behavior of humans and animals is an integral indicator of mental activity aimed at meeting physiological, biological, social and psychological needs and is purposeful, providing the body with normal life.
Compensatory mechanisms of disturbed functions of the body are explained from the position of the theory of "functional system" P.K. Anokhin.

Purpose of studying of the discipline
To study the physiological patterns of human behavior on the basis of modern concepts of the physiology of higher nervous activity

Learning Outcomes
ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON4 To explain the role of evolutionary theory in the biological worldview, to have modern ideas about the basics of evolutionary theory, about micro- and macroevolution.

Learning outcomes by discipline
-to consider modern ideas about the physiology of higher nervous activity;
--argumentatively discuss the features of the higher nervous activity of humans and animals;
-compare and evaluate the behavior of humans and animals as an integral indicator of mental activity;
-analyze and synthesize conclusions about compensatory mechanisms of functional impairment from the perspective of the theory of "functional system"

Prerequisites
Modern problems of human physiology

Postrequisites
Evolution Biology

Physiology of sensory systems

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
Sensory systems are considered as "information inputs" to the nervous system, being its subsystems, they perceive influences from the external and internal environment. The principles of structure and function are studied from the standpoint of I.P. Pavlov`s teachings about analyzers. The role of sensory systems in the formation of subjective sensations on the basis of objective stimuli (perceptions and images), in adaptations to stimuli is revealed.

Purpose of studying of the discipline
To study the principles of the structure and function of sensory systems, as well as their role in the formation of subjective sensations

Learning Outcomes
ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON4 To explain the role of evolutionary theory in the biological worldview, to have modern ideas about the basics of evolutionary theory, about micro- and macroevolution.

Learning outcomes by discipline
-consider sensory systems as "information inputs" to the nervous system;
-explain and analyze the principles of the structure and functions of sensory systems from the standpoint of I.P.Pavlov`s teaching about analyzers;
-to draw up schemes for the formation of subjective sensations in sensory systems based on objective stimuli

Prerequisites
Modern problems of human physiology

Postrequisites
Evolution Biology

Population biology and evolution

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline studies the biology of a population, and the role of a population in evolution. When studying the course, students develop systemic knowledge about the structure, age, abundance, population density, about general biological, demographic, ecological, genetic study of populations of organisms, about their changes and interactions, in particular, about the study of population aspects of ecology, evolution, reproduction processes, about the emergence of new properties of organisms and their consolidation through natural selection.

Purpose of studying of the discipline
Formation of ideas about the population standard of living

Learning Outcomes
ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON4 To explain the role of evolutionary theory in the biological worldview, to have modern ideas about the basics of evolutionary theory, about micro- and macroevolution.

Learning outcomes by discipline
1. Knowing: as a result of evolution is aware of the appearance of species, their distribution, reproduction, diversity and the history of evolutionary development.
2. Abilities: uses various methods of evolutionary biology to explain a certain evolutionary factor; - determines the systematic position of species; - to understand the processes and principles of life on earth.
3. Skills: able to determine the systematic place of species and their common names; - explains the basic theories and methods of evolutionary biology.
Prerequisites
Invertebrates of Kazakhstan
Postrequisites
Final examination

Evolution Biology

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course examines the theory of evolution, the use of breeding methods, biogeography to prove the evolutionary process. . When considering the discipline, undergraduates fix deep issues of comparative morphology, development and paleozoology, about the main provisions and mechanisms of evolution, about complicating the organization of life, about the analysis of two selections, about neo-Lamarckism and its varieties, about the problems of anthropology, about the problems of the evolutionary process.
Purpose of studying of the discipline
Formation of dialectically materialistic views among undergraduates, increasing the ability to biological thinking, training undergraduates in research work, explanation of cause-and-effect relationships of natural phenomena.
Learning Outcomes
ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON4 To explain the role of evolutionary theory in the biological worldview, to have modern ideas about the basics of evolutionary theory, about micro- and macroevolution.
Learning outcomes by discipline
1.As a result of evolution is aware of the appearance of species, their distribution, reproduction, diversity and the history of evolutionary development.
2.Uses various methods of evolutionary biology to explain a certain evolutionary factor; - determines the systematic position of species; - to understand the processes and principles of life on earth.
3. Able to determine the systematic place of species and their common names; - explains the basic theories and methods of evolutionary biology.
Prerequisites
Invertebrates of Kazakhstan
Postrequisites
Final examination

Evolution of life

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline studies the form of movement, the development of matter, the modes of existence of protein bodies with nucleic acids. When studying the course, students develop systemic knowledge about the Earth as the only planet on which life exists, about various hypotheses for the appearance of life on Earth, about metabolism, about the appearance of plants and animals, about the emergence of man, about the importance of photosynthesis, about the division of organisms into autotrophs and heterotrophs.
Purpose of studying of the discipline
The purpose of teaching the theory of evolution is to form undergraduates a clear understanding of the factors, driving forces and laws of the evolutionary process, a materialistic worldview, an understanding of the relationship of the theory of evolution with their chosen special field of biology.
Learning Outcomes
ON3 Demonstrate an understanding of modern biosphere processes, the ability to systematically assess them, the ability to predict the implementation of socially significant projects.
ON4 To explain the role of evolutionary theory in the biological worldview, to have modern ideas about the basics of evolutionary theory, about micro- and macroevolution.
Learning outcomes by discipline
1. Knowing: as a result of evolution is aware of the appearance of species, their distribution, reproduction, diversity and the history of evolutionary development.
2. Abilities: uses various methods of evolutionary biology to explain a certain evolutionary factor; - determines the systematic position of species; - to understand the processes and principles of life on earth.
3. Skills: able to determine the systematic place of species and their common names; - explains the basic theories and methods of evolutionary biology.
Prerequisites
Invertebrates of Kazakhstan

Postrequisites

Final examination