ҚАЗАҚСТАН РЕСПУБЛИКАСЫ БІЛІМ ЖӘНЕ ҒЫЛЫМ МИНИСТРЛІГІ /
МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РЕСПУБЛИКИ КАЗАХСТАН

АБАЙ АТЫНДАҒЫ ҚАЗАҚ ҰЛТТЫҚ ПЕДАГОГИКАЛЫҚ УНИВЕРСИТЕТІ/
КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ ПЕДАГОГИЧЕСКИЙ УНИВЕРСИТЕТ ИМЕНИ АБАЯ

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Мамандық бойынша / По специальности 5В011300 – Биология
2018/2019 оқу жылы/ учебный год

ЖАРАТЫЛЫСТАНУ ЖӘНЕ ГЕОГРАФИЯ ИНСТИТУТЫ / ИНСТИТУТ ЕСТЕСТВОЗНАНИЯ И ГЕОГРАФИИ
КАФЕДРА БИОЛОГИИ

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Мамандық/Специальность Specially _5B011300 – Biology /in English____1 курс _
Академиялық дәрежесі/Академическая степень_ Academic degree__Білім бакалавры_ Bachelor of education

№ п/п	Пәндер коды/ Коды дисциплины	Пәндер атауы/ Наименование дисциплины	Пәннің қысқаша мазмұны, мақсаты, негізгі тараулары, Цель изучения дисциплины, краткое содержание, основные разделы	Кредит саны/ Количество		Семестр	Пререквизиттер/ Пререквизиты	Постреквизиттер / Постреквизиты	Құзіреттіліктің қалыптасуы (Оқу нәтижесі) Формируемые компетенции (Ожидаемые результаты)
				KZ	**ECTS**				
1		School Local Studies	The purpose and objectives of the course "school local history to Improve the cognitive ability, cultural level of future teachers in the organization of historical and local history. Formation of ethnographic knowledge. Monuments of culture, art and traditions of the region, architecture, archeology. Local history-brings up love for His native land.	**2**	**3**	**1**	Cartography with the basics of topography" types of tactics and techniques of tourism	""Introduction to the pedagogical specialty" Fundamentals of tourism " Zonal geography»	In the process of studying School local history student should Know the centers, routes, projects, organizations, places of recreation, nature protection, safety measures. Schemes of the route, toponymy of local names of objects (lakes, rivers, villages, cities.); Skills-Hiking, setting up tents, kindling a fire, methods of drawing up the diet.

2	ZB 1226	1.Zoology invertebrates	The purpose of the discipline is to give to students a particular volume of knowledge of zoology of invertebrates The main objectives of the discipline to seize knowledge of zoology of invertebrates necessary in their vocational training.	3	5	1	General biology, Introduction to biology, Cytology	Zoology, anatomy	Are the formation of trainees along with key competencies, special competencies; - knowledge and understanding the most reference morphological features of animals to explain phylogenetic relationship; to know the basic concepts about taxonomical units, mainly placing emphasis on local fauna; - application of knowledge and understanding to watch animals in natural and laboratory conditions; - formation of judgments:To have a culture of thinking, the ability to generalize, analyze, perceive information, set goals and choose ways to achieve it;Is able to use knowledge about the modern natural science picture of the world in educational and professional activities, apply methods of mathematical information processing, theoretical and experimental research; -personal abilities: be able to use the content of educational programs in educational activities; use modern methods for conducting observations of animals; readiness to apply modern methods and technologies, including information, to ensure the quality of the educational process of the educational institution; modern methods of studying the biology of animals

	Par 1226	2.Para sitology	The purpose of the discipline: the study of structural features and life cycles parasites, relationships in the parasite-host system based on the latest achievements of science and practice. The main objectives of the discipline "Parasitology" are: the establishment of the biological diversity of parasites, their structure and taxonomic affiliation; the study of cycles of parasite development and the influence of the environment on their biology; the acquisition by students of knowledge of the diversity of parasitic organisms, the peculiarities of their connections with hosts, the influence of parasites on the vital activity of infected organisms, and the obtaining of ideas about parasitic diseases and measures for their prevention. The course is based on the principles of ecological parasitology, developed by domestic scientists Sections: 1.The subject and tasks of the main sections of parasitology: protozoology and helminthology. 2.Parasitism and its place in living nature. Types of parasitism. 3.Biocenotic basics of epizootology of parasitic diseases. 4.Parasitic protozoa, prevention of diseases caused by them, their spread. 5.Life cycles of flatworms, features. 6.General characteristics of the type Roundworms: morphological features of parasitic species. 7.Morphological features, life cycles of parasitic ticks. 8.General	3	5	1	zoology physiology genetics	biocenology biotechnology ethology	As a result of studying the discipline, the student must know: the patterns of development of the epizootic process of parasitic animals, pathological changes; must possess the skills and abilities in applying the acquired knowledge on general and private parasitology in practical activities. -knowledge and understanding "Parasitology" reflects the current state of science about the relationship of parasitic organisms with animals and humans. - application of knowledge and understanding: readiness to use systematized theoretical and practical knowledge to determine and solve research problems in the field of education; skills in conducting activities to promote knowledge about the importance of parasites in nature and human life; -forming judgments about the variety of links between parasites and the host organism; -personal abilities: develop programs of preventive conversations with students about the need to comply with hygiene rules in order to prevent infection with parasitic diseases.

	Ent 1226	3.Entomology	The purpose of the discipline is the formation of knowledge about the variety of insects, their evolution. The role of environmental factors in the life of insects. The main objectives of the discipline: the study of the morphological features of the phases of insect development; -the detailed study of biology of especially dangerous pests of forestry; - Study of methods for counting the number of severely hazardous pests and planning of control measures. Pest and useful insects in forest and forest ecosystems are studied in the course of entomology. This discipline is included in the block of disciplines of plant protection. Entomology studies general and particular sections: morphology, ecology and biology of economically significant pests of woody plants. Influence of pests of tree species on the state and stability of park and forest ecosystems, the role of natural and anthropogenic factors in the violation of the sustainability of forest ecosystems and modern means and methods of forest protection against pests.	3	5	1	zoology of invertebrates ecology plant pathology	biocenology plant protection	As a result of studying the discipline Entomology students should form the following knowledge and skills: - the student should have an idea of the place of insects in the animal kingdom system, the significance of insects in the life of nature, and become familiar with the morphological, anatomical and ecological features of insects; - the student must know the biological and morphological features of forest insect pests, methods of fighting harmful insects.

3	CG 1212	**1.Cytology and Histology**	Cytology- studying the structure of the human cells – cell membrane, cell orgenelles and inclusions, cytophysiology. 2. Histology– studying the main tissues of the human body – histogenesis, lightmicroscopical, electronmicroscopical, histochemical and functional characteristics. Gaining deep knowledge of the main morphological structures of the human body: cells, tissues, stages of the embryonal development (fertilization, early and late gastrulation, histogenesis, differentiation). The progress of modern cytology of histology is largely determined by the fact that it is based on the achievements of physics, chemistry, mathematics, and computer science. Dis takes an important place in the system of biological education, laying the foundations of the scientific structural and functional approach in the analysis of the vital activity of the human body in the norm and in pathology	**3**	**5**	**1**	Zoology of invertebrates Ecology Geography	Large workshop on zoology of invertebrates Hydrobiology Biology Pedagogical practice	At the end of the course the students will be able to: 1. Apply fundamental knowledge of histology of tissue and histology of organ systems with essentials of human anatomy; 2. Apply fundamental knowledge of various cell cytology and histology of tissue and histology of organ systems with cell, tissue and organ system physiology; 3. Describe and define laboratory techniques fo preparing cell and tissue specimens for microscope analysis; 4. Describe and recognise cells of specific tissues and organ systems;

	BK1212	2. Cell biology	The purpose of the discipline is to study modern ideas about the cellular theory, the history of the development of organelles, the structure and function of cells in connection with the introduction of new methods and achievements in such sciences as molecular biology and genetics. The study of the chromosome theory of heredity - the history of development and evidence. Localization of the basic cellular processes. The main objectives of the course are: 1. equip students with knowledge of cell biology 2. To help to form the basic idea of the morphofunctional features of organs and their systems at the cellular and subcellular level. The provisions of the cell theory. Methods of cell biology. Structures and functions of cells. Chemical composition. Cytoplasm. Plasmolemma. Chemical composition of membranes. Endoplasmic reticulum, Golgi plate apparatus. Lysosomes, peroxisomes. Mitochondria. Plastids. Centrioles. Intercellular contacts. The nucleus and chromosomes. Morphology of nuclear structures. The role of nuclear structures in life. Structure of the nucleoli. Ribosomes. Cell cycle. Cell division	**3**	**5**	**1**	Botany Zoology	Molecular biology	As a result of studying the discipline "Cell Biology" the student must to know: the unity and diversity of cells, the peculiarities of their structure; be able to: work with a microscope, know the technique of preparation, theoretically justify the observed phenomena, work independently with scientific and educational literature

4	Pol 1102	Political science	The aim of the course is to make students acquainted with some elements of political thought and political theory. The student is to acquire the capacity to interpret and assess political ideas in an independent manner, in some cases through the reading of classic sources. On the one hand, the purpose is to try to understand what may appear strange (or insidiously familiar); on the other hand, we aim to judge the truth and fecundity of the texts and arguments that we encounter. The course is primarily based on textbooks and shorter scientific texts. The intention is to give the students an introduction to different fields of political science and to present some of the research methods used. Considerable weight is placed on making the students realize the meaning of independent and critical thinking, and equip them with the necessary tools to evaluate conclusions and arguments. Students will also practice skills as part of the course, chiefly through the writing of course papers. In the seminars the student will be given the opportunity to practice speaking and argumentative skills which are further developed within courses at more advanced levels.	**2**	**3**	**2**	Sociology Philosophy History of political doctrines History	Political Theory State Formation Citizens Society Public Administration International Politics	-Practice the application of a scientific approach to sources and source material; * - Understand the value of, and bases for, good argumentation; * be able to distinguish between theoretical literature and empirical findings; * -Be able to separate personal opinions from independent conclusions drawn from the source material; * -Be familiar with the basics of source referencing.

5	NH 1213	1.General Chemistry	To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective. To provide students with the skills required to succeed in graduate school, the chemical industry or professional school. To expose the students to a breadth of experimental techniques using modern instrumentation. Formulation of fundamental knowledge in mathematics and physics, necessary for acquisition of chemical subjects; Knowledge of physical and chemical phenomena; Knowledge and acquisition of the methods of natural science; Formulation of the system of chemical concepts; Formulation of necessary skills of safe dealing with substances;	**3**	**5**	**2**	Chemistry Biology Cytology Physics	Inorganic and Laboratory Chemistry Physical Chemistry Organic and colloid chemistry Coordination Chemistry and chemical engineering	Students will learn macroscopic concepts of elements, compounds, and reactions. Students will become fluent in chemical nomenclature and terminology. Students will develop problem-solving skills and apply logic in calculations. Students will understand theories of atomic and molecular structure.

	TOH 1213	2. Theoretical Foundations of Chemistry	Theoretical chemistry is a branch of chemistry, which develops theoretical generalizations that are part of the theoretical arsenal of modern chemistry, for example, the concept of chemical bonding, chemical reaction, valence, the surface of potential energy, molecular orbitals, orbital interactions, molecule activation etc. The periodic table, shielding and penetration. The Aufbau principle, atomic systems and properties. Perturbation theory and variational method. The Hartree-Fock method. The Born-Oppenheimer approximation. Molecules and molecular morbitals. The Boltzmann distribution, ensembles and sum of states. Electron correlation, atom-centred basis sets and planar waves, superposition error, density functional theory (DFT), forcefield methods, and energy dispersion. The appplication of theoretical chemistry in industry and society	**3**	**5**	**2**	Chemistry General chemistry Physics Biology Cytology	Methods of cognition in chemistry Inorganic chemistry Organic chemistry Biochemistry	-Describe chemical bonding from a quantum mechanical perspective using molecular orbital theory * -Use statistical considerations at a molecular level to calculate thermodyanmic quantities based on spectroscopic data, as well as interprete the results through reasoning based on molecular properties * -Identify and describe the advantages and disadvantages of different theoretical models used for computer simulations to answer different chemical questions, choose between and justify the use of these models for simulations of electronic properties of simple molecules and crystals, as well as critically evaluate the calculated results * -Give examples of quantum mechanical application within technology and society.

6	Est 2214	1.Natural knowledge	The program of discipline content is aimed at achieving the following goals: - mastering knowledge about the modern natural scientific picture of the world and the methods of natural sciences; acquaintance with the most important ideas and achievements of natural science, which had a decisive influence on the development of technology and technology; - mastering the skills to apply the acquired knowledge to explain the phenomena of the surrounding world, the perception of information of natural science and professionally meaningful content; development of intellectual, creative abilities and critical thinking in the course of carrying out the simplest investigations, analysis of phenomena, perception and interpretation of natural scientific information; - education of the conviction in the possibility of knowing the lawful nature and using the achievements of the natural sciences for the development of civilization and improving the quality of life; - application of natural scientific knowledge in professional activities and daily life to ensure safety of life; competent use of modern technologies; protection of health, the environment.	**3**	**5**	**2**	Introduction to Biology "," Biogeocenosis of Kazakhstan "," Plant Anatomy and Morphology "," Plant Systematics "," Zoology of Invertebrates "," Cytology of Mystology "," Ecology and Sustainable Development ".	"Human and Animal Physiology", "Biotechnology", "Evolutionary Teaching", "Plant and Animal Resources of Kazakhstan".	- a steady interest in history and achievements in the field of natural sciences, a sense of pride in Russian natural sciences; - readiness to continue education, improve skills in selected professional activities using knowledge in the field of natural sciences; - an objective awareness of the importance of competencies in the field of natural sciences for man and society, the ability to use technological advances in physics, chemistry, and biology to enhance their own intellectual development in their chosen professional activities; - ability to analyze technogenic consequences for the environment, household and production activities of a person;

	KE 2214	2. The concept of natural science	Natural science is a branch of science concerned with the description, prediction, and understanding of natural phenomena, based on empirical evidence from observation and experimentation. Mechanisms such as peer review and repeatability of findings are used to try to ensure the validity of scientific advances. Science and technology form the basis for inventions, for manufacturing and for simple logical thinking and action. This means that scientific and technological literacy is necessary for all individuals, especially in developing countries which have to move faster in the attempt to raise the standard of living of their people. Natural science is a fusion of the major branches of science. Its study at the basic education level will equip the young person with the necessary process skills and attitudes that will provide a strong foundation for further study in science at the upper primary level and beyond. It will also provide the young person with the interest and inclination toward the pursuit of scientific work	**3**	**5**	**2**	Cytology and histology Botany Zoology Anatomy Physiology of plants Animals	"Human and Animal Physiology", "Biotechnology", "Evolutionary Teaching", "Plant and Animal Resources of Kazakhstan".	1. develop the spirit of curiosity, creativity and critical thinking. 2. develop skills, habits of mind and attitudes necessary for scientific inquiry. 3. develop the spirit of curiosity for investigating and understanding their environment 4. communicate scientific ideas effectively 5. use scientific concepts for explaining their own lives and the world around them. 6. live a healthy quality life. 7 . treat all resources of the world with humane and responsible attitude. 8. show concern and understanding of the interdependence of all living things and the Earth on which they live 9. design activities for exploring and applying scientific ideas and concepts

7	SB 1227 AMR 1227	1.Structural botany	The study of the internal structure of the plant - the anatomy of cells, tissues and organs in the order of their complication, the stage of nucleation and the subsequent development of these structures. The study of the morphology of organs both in the course of individual plant development and in the historical development of the species as a whole, as well as obtaining general information on the multiplication and reproduction of plants and structures directly involved in this process. Acquaintance with ecological groups and life forms of plants depending on the habitat, age and seasonal changes occurring in them, the ability to botanically correctly describe any flowering plant on the basis of acquired knowledge about their anatomy and morphology	**3**	**5**	**2**	General biology. chemistry	Systematization of Plants, Plant Physiology, Cytology.	to have an idea of the general structure (morphology) and fine structure (anatomy) of the plant as such; have the skills of preparing temporary anatomical drugs for the purpose of their microscopic and structural-functional studies; to have an idea of the age and seasonal changes in the life of flowering plants so that they can classify them according to their habitat; They have the ability to present their knowledge, including in the form of abstracts, abstracts, scientific reports and oral presentations.

	AMR 1227	2.Anatomy and morphology of plants	The purpose of the discipline "Anatomy and morphology of plants" is to form in students the notion of a plant as an integral organism; providing students with a system of knowledge about the diversity of plant organisms, their structure, reproduction, ecology, distribution, taxonomy, possible ways of evolution; Formation of ideas about the vegetation cover as a component of the biosphere, the dynamism of the processes occurring in it;				Cytology and Histology, Introduction to Biology	Systematization of Plants, Plant Physiology	The main tasks of the discipline "Anatomy and morphology of plants" are: - study of anatomical and morphological features of plants; options for reproduction and reproduction of plants; ecological groups and life forms of plants; Age and seasonal changes in plants; - training of students in the methods of making the simplest microscopic preparations; Formation of skills in working with microtechnology; - to give an idea of the ethics of behavior of a biology teacher in a secondary school; securing positive stereotypes of relationships in a teacher-student pair As a result of studying the discipline "Anatomy and morphology of plants" student must know: - basic concepts (terms), features of the structure of plant organisms at macro and microscopic levels; - features of plant reproduction, features of development during ontogeny and in the process of evolution; should be able to: - to use the basic methods of morphology in practical work and experimental research;

Мамандық/Специальность _5В011300 – Biology in English__2 курс_
Академиялық дәрежесі/Академическая степень___Bachelor of Education____

№ п/п	Пәндер коды/ Коды дисциплины	Пәндер атауы/ Наименование дисциплины	Пәннің қысқаша мазмұны, мақсаты, негізгі тараулары, Цель изучения дисциплины, краткое содержание, основные разделы	Кредит саны/ Количество кредитов		Семестр	Пререквизиттер/ Пререквизиты	Постреквизиттер/ Постреквизиты	Құзіреттіліктің қалыптасуы (Оқу нәтижесі) Формируемые компетенции (Ожидаемые результаты)
				KZ	**ECTS**				
1	PSUBAYa 3345	1. Planning a Modern Lesson biology	The purpose of this course is to form a thinking teacher capable of help children realize their abilities, theoretical knowledge and practical skills.	**3**	**5**	**3**	Biology in school, methods in school	Pedagogical practice	- Normative-legal documents on education; - Conceptual apparatus and terminology of the subject; - Objectives of teaching the educational subject "Biology"; - Typology of lessons, forms and principles of planning them; - Methods, forms, means of teaching, assessment of knowledge;

	POB 3345	2. Project-based training in biology	The purpose of the discipline "Design training of biology" is: to create conditions for mastering the knowledge of the essence and development of project activities. Introduction. Method of educational projects - basic concepts Characteristics of project training. Psychological and pedagogical conditions for the design of biology. Organizational and methodological conditions for project training in biology. Classification of training projects. Project based learning is not a new instruction approach in education. However, it does seem to have gained popularity lately. By asking real questions, students work to solve real, relevant problems while also learning the necessary material. Additionally, project based learning provides students opportunities to develop teamwork, communication, and technology skills, all of which are a necessity in the 21st century. In combing proficiency based assessment and project based learning, students are able to examine real relevant questions that affect their daily lives.	**3**	**5**	**3**	Biology in school, methods in school	Pedagogical practice	- highlight the main, essential features of concepts; -define criteria for comparing facts, phenomena, events, objects; -Compare objects, facts, phenomena, events according to specified criteria; - to express judgments, confirming them with facts; -classify information by specified characteristics; -to identify cause-effect relationships; - solve problem problems; - Analyze the relationship of subordination and the relationship between the components of the object; -Search and selection of information in educational and reference books, dictionaries; -work with text and extra-textual components: highlighting the main idea, searching for definitions of concepts, drawing up a simple and complex plan, finding answers to questions, writing questions to texts, drawing up a logical chain, drawing up tables and charts;

2	ASh 2228	1. Human Anatomy	Morphological features of human structure; structure and functional characteristics of organs and systems: musculoskeletal system, splanchnology, angiology, neurology, sensory systems. Ontogeny and phylogeny of organs and systems. Sexual, individual features of the structure and function of organs and systems.	**3**	**5**	**3**	School course of general biology, age physiology, zoology.	Anatomy, Human and Animal Physiology, Genetics, Human Biology, Biology of individual development	Expected results of the study of the discipline: As a result of studying the discipline, the student must: know - the structure and patterns of development of the human body in connection with its age characteristics, health status, level of physical preparedness; be able to use anatomical knowledge and skills in the organization of training and training sessions for the purpose of comprehensive and harmonious development of the physical qualities of students; own methods of monitoring the proper physical development of pupils. Competencies: - Ability to master the psychological, pedagogical, medical and biological knowledge and skills necessary to improve the physical and mental qualities of students; - readiness to ensure the protection of life and health of students in the teaching and upbringing process and after-hour activities.

	Ant 2228	2. Anthropology	The course "Anthropology" is an important part of the psychological and pedagogical training of future specialists in terms of general higher education and professional activities. This course is intended to give future specialists the knowledge and study of the process of transition from biological regularities, to which the existence of the animal ancestor of man was subordinated, to social laws. The history of anthropology. Features of children development. Characteristics of anthropologically impeccable pedagogical systems. Basic requirements for the modern teacher. Basic ideas and achievements of pedagogical anthropology. Characteristics and properties of human. Features of ontogenetic human development.	**3**	**5**	**3**	Biology. Human Anatomy and physiology. General Biology. of pedagogical anthropology.	Pedagogy. Psychology. Self-knowledge	The student should know: Basic didactic concepts, categories and principles. The history of anthropology. Features of children development. Characterization of anthropologically impeccable pedagogical systems. Basic requirements for the modern teacher. Basic ideas and achievements Characteristics and properties of human. Features of ontogenetic human development. A student must be able to a) explain: - the influence of socio-cultural conditions on the development of the individual; - generic and species features of human; - the manifestation of such human qualities as contradictoriness and integrity. b) use information in situations: - solving pedagogical problems; - communication in the "teacher-student", "teacher-teacher", "teacher-parent" system; - search for ways to solve problems in social and pedagogical activity, taking into account the anthropological views and ideas of leading scientists and educators. c) work on yourself, namely: - Self-determination in the educational space; - carry out a comparative analysis of the various approaches used in pedagogical anthropology

3	EBSh 4236	1. Experimental biology in school	Methods of organizing and conducting a biological experiment in the course of biology of secondary school. Formation of methodological knowledge and skills aimed at organizing and conducting a school biological experiment; Formation of professional competencies aimed at The use of experimental work of children to improve the effectiveness of the learning process. Subjects of the experiment including all the experiments indicated in the modern school curriculum. Acquaintance with the methods of organizing and conducting a biological experiment in the course of biology of the secondary school; formation of methodological knowledge and skills aimed at organizing and conducting a school biological experiment.	**2**	**3**	**4**	Pedagogy; Psychology. Biology at school	Plant and animal resources of Kazakhstan, molecular biology, Pedagogical practice	- is able to choose the best methods for conducting a school biological experiment; - able to organize, prepare and conduct a biological experiment in the school; - is able to select and adapt modern scientific achievements for organizing a school biological experiment; - is able to use modern information technologies in organizing and conducting biological experiments.

	Fit 4236	2. Phytodesign	The purpose of the course: the formation of initial ideas about modern phytodesign The objectives of the course: mastering students knowledge of the main areas of modern phytodesign formation of skills to analyze compositions from plants and plant material formation of ideas about the possibilities of using floral and landscape compositions in the educational process	**2**	**3**	**4**			- the main directions of modern phytodesign - features of different phyto design styles - the field of application of floral and landscape compositions - methods of preparation and modification of plants for the needs of phyto-design should be able to: - characterize floral and landscape compositions according to their composition, structure, style - to make simple floral compositions - to compare phytocenoses according to the species composition and participation of different species

4	Wel 2120	Self-knowledge	The purpose of this course is to acquire basic concepts, principles of the psychology of Self-knowledge: to formulate ideas about own psychological features, about the emotional world of the individual, to familiarize students with the basic theories of selfknowledge, self-understanding, self-help, self-management, the ability to understand themselves and the other person; to formulate ability to use their knowledge in practice. Self-knowledge as a learning subject is called upon to play a key role in creating conditions for the formation of the moral foundations of the individual, for his spiritual perfection and self-realization.	**2**	**3**	**3**	Fundamentals of pedagogy Theory of upbringing Age physiology School hygiene	History of pedagogy Social Pedagogy Family pedagogy Pedagogical psychology	-Students are expected to know about basic categories and methods of selfknowledge, features of introspection and regulation of individual states, the vital resources of the individual; -features of personal and spiritual growth. - Students are expected to be familiar with recent empirical findings on the area of emotional self-understanding. -Students will be able to use methodological procedures of analysis and selfanalysis emotional space of the individual life path.

5	ZP 2231	1. Zoology of vertebrates	The purpose of the discipline «Zoology -2» is - to give the student a certain amount of knowledge on vertebrate zoology as one of the most deeply and comprehensively studied groups of animals. and medical purposes.	**3**	**5**	**4**	invertebrate Zoology, anatomy, ecology	fauna, biogeography, animal resources	The main objectives of the discipline "Zoology -2" are: to equip students with the knowledge necessary in their vocational training, to instill practical skills of independent work: - to reveal the features of the morphology of vertebrates, the role of biological diversity - to familiarize with principles of reproduction, geographical distribution and ecology of representatives of the main taxa; - consider the variety of chordal systems organization principle - give theoretical knowledge on the identification, classification, cultivation of biological objects - to master the skills and methods of anatomical, morphological and taxonomic studies of biological objects (preparation of an object for research, fixation, cutting, coloring, microscopy, preparation, sketching, working with collection material, etc.); implement measures to protect biodiversity and rationally use natural resources for economic

	FM 2231	2. Fauna of the world	The purpose of the discipline Fauna of the World is to give students a certain amount of knowledge on the distribution of the main groups of animals on our planet. The main objectives of the discipline "Fauna of the World" are: to equip students with the knowledge necessary in their professional training, to instill practical skills of independent work	**3**	**5**	**4**	Zoology Botany Ecology	Biogeography Theriology Ornithology Ichthyology	As a result of studying the discipline Fauna of the World, the student should know: the characteristic morphological and biological characteristics of certain groups of animals, their distribution on the Earth; the student should be able to: analyze the material studied, highlight the most explaining the phylogenetic relationships, as well as related links between them, master the basic methods of scientific research and selection of objects for study, obtain basic concepts of taxonomic units, mainly focusing on local fauna; to work with educational and scientific literature; independently conduct excursions, observe animals in natural conditions, foster care for natural resources of Kazakhstan

	SAZh 2231	3. Comparative anatomy of animals	The purpose of the discipline "Comparative Anatomy of Animals" is to give students a certain amount of knowledge on the morphology of the main representatives of invertebrates, to show the characteristic features in the structure The main objectives of the discipline "Comparative Anatomy of Animals" are: to reveal the morphological features of the structure of animals, to carry out a comparative analysis; to familiarize with the characteristic features of animals, knowledge of which is necessary in their professional training; to consider the structure of vertebrate animals, to carry out a comparative analysis; to give theoretical knowledge about the features of the structure of animals, to show the progressive features of the organization; to acquire practical skills in practical work	**3**	**5**	**4**	zoology of invertebrates Anatomy Physiology	Biogeography ecology animal resources	As a result of studying the discipline "Comparative Anatomy of Animals", the student should know: the characteristic morphological and biological characteristics of certain groups of animals; the student should be able to: analyze the studied material, identify the most characteristic morphological signs of animals, make comparisons in the structure and identify the characteristic features, master the basic methods of scientific research and selection of objects for study, get the basic concepts of morality.

6	EB 2101	Economics and business	The organization of business is a modern science of organizational and production-economic relations in the business sphere, pportunities application of scientific approaches in practice, as well as the echanism for making decision-making decisions in the field of business organization, one's own business, priority areas of business. Purpose: to form a systemic view of students about the organization of business as a modern science, application of scientific approaches to practice in the conditions of Kazakhstan, as well as the mechanism making decisions on the possibilities of applying scientific approaches in practice in Kazakhstan, as well as the mechanism making management decisions about opportunities for applying scientific approaches to practice in the conditions of Kazakhstan, as well as the mechanism decision-making.	**3**	**5**	**4**	Macro microeconomics Economic theory, Managerial Economics	Development management decisions, management psychology, Controlling in management	At the end of the course the students will be able to: give students a holistic view of the theory. - practice of business organization as economic system, prepare them for - creative research of management problems - business, developing the necessary skills of analysis scientific concepts and use of their provisions in diploma work, as well as in practical work.

7	DTE 2214	Digital technologies in education	The use of digital technologies that increase the effectiveness of the lesson, developing the motivation of learning, which makes the learning process more successful. CT-significantly expand the possibilities of presentation of educational information, involve students in the learning process,contributing to the widest disclosure of their abilities,enhance mental activity. Relevance and importance of the use of digital technologies in the work of teachers. Digital technologies: - computer equipment; - interactive whiteboard; - multimedia; - electronic textbooks; e-mail; - Internet resources; - cellular communication; satellite technologies, etc. Means CT-in education / hardware/. Means CT-in education /software/. Classification of CT in the solved pedagogical problems. Practical application of CT in education.	**3**	**5**	**4**	Pedagogy. Psychology and human development. Introduction to the teaching profession	Production of visual AIDS. Biology at school. Modern technologies of teaching biology.	- able to process text, digital, graphic and audio information for the preparation of didactic materials / options tasks, tables, drawings, diagrams, drawings/to work with them in the classroom; - able to create slides on this training material, to demonstrate the presentation in the classroom; - able to use the available software products in their discipline; -able to use educational software/ training, fixing, controlling.

8	SR 2229	1, Systematics of plants	The purpose of the discipline "Botany 2" is to familiarize students with modern scientific achievements of botany at present, study the characteristics of plants belonging to certain taxa, identify similar signs between them, as well as the causes of origin and development in the process of evolution. The main tasks of the discipline "Workshop on botany" are: - to acquaint students with the classification of flora systems, the theoretical and practical significance of plants; - to acquaint students with the modern system of the organic world - to formulate concepts of higher plants; -To teach students to identify differences and similarities between representatives of individual taxa, distribute them to larger taxonomic groups. -to understand the principles of building a phylogenetic system As a result of studying the discipline "Practical work on botany," the student must know: - the main taxonomic categories of plants;	**3**	**5**	**4**	Cytology and histology, Introduction to biology,Anatomy and morphology of plants	Physiology of plants, Plant resources and their territorial distribution, flora and fauna of the world	It is the study of the characteristics of plants belonging to certain taxa, the identification of similar features between them, as well as the causes of their occurrence and development in the process of evolution. The main objectives of the discipline "Botany "(Systematics of plants) are: 1. to acquaint students with the history of systematics and its formation as a science, with the classification of plant systems and the principles of their construction; 2. to give a General description of the most significant groups of lower and higher plants with the analysis of their types of reproduction and reproduction cycles, as well as the position in the system; 3. to teach students to identify differences and similarities between representatives of individual taxa, to distribute them into larger taxonomic groups-genera, families, orders, classes and departments; 4. give a complete picture of the evolution of the most important taxa and ways of evolutionary development of the plant world as a whole. As a result of studying the discipline "Botany" (Systematics of plants), the student must know

	FM 2229	2. Flora of the world	Study of regularities of distribution of flora of plant communities depending on environmental conditions, structure, features of functioning and distribution of biocenoses of interrelations of their components	**3**	**5**	**4**	Cytology and histology, Introduction to biology,Anatomy and morphology of plants	Physiology of plants, Plant resources and their territorial distribution, flora and fauna of the world	As a result of studying the discipline, the student must be able to characterize the features of the flora of the globe, to determine the patterns of their geographical location, to organize an event for the protection of rare and endangered plant species, comprehensively characterize the features of the flora of the globe, to determine the patterns of their geographical location, to find out the nature of environmental relations and physiological differences of the main landscapes of the globe, to consider the principles of floral zoning, to highlight the issues of protection of rare and endangered plant species

	LR 2229	3. Medicinal plants	The purpose of the discipline: the formation of students ' theoretical ideas about the main directions and methods of use of medicinal plants in biotechnological methods of drug production plant raw materials; elementary analysis skills medicinal plant raw materials in the laboratory Objectives: to acquaint students with the main and promising areas receptions medicinal plant raw materials to form the ability to independently collect, process, interpretation of biological information to solve scientific and practical tasks in the field of uses medicinal plant	**3**	**5**	**4**	Organic chemistry, Basics of biochemistry, Chemistry of biologically active substances'	General biology and Microbiology Genetics, Fundamentals of molecular biology, Genetic engineering;	know: objectives and methods of obtaining medicinal plant raw materials basic creation methods plants with improved therapeutically pharmacological properties by methods of biotechnology Auggie methods definition of BAS medicinal plant raw materials for use medical biotechnology know: justify the need for the use of a particular research method for solving practical problems in the field of obtaining medicinal plant raw materials independently carry out the collection, processing

Мамандық/Специальность _5В011300 – Biology in English__3 курс_
Академиялық дәрежесі/Академическая степень___Bachelor of Education____

№ п/п	Пәндер коды/ Коды дисциплины	Пәндер атауы/ Наименование дисциплины	Пәннің қысқаша мазмұны, мақсаты, негізгі тараулары, Цель изучения дисциплины, краткое содержание, основные разделы	Кредит саны/ Количество кредитов		Семестр	Пререквизиттер/ Пререквизиты	Постреквизиттер/ Постреквизиты	Құзіреттіліктің қалыптасуы (Оқу нәтижесі) Формируемые компетенции (Ожидаемые результаты)
				KZ	**ECTS**				
1	Bioch 3230	1. Biochemistry	The course aims to provide an advanced understanding of the core principles and topics of Biochemistry and their experimental basis, and to enable students to acquire a specialised knowledge and understanding of selected aspects by means of a stem/branch lecture series and a research project. This course is an introduction to cellular chemistry and covers such topics as the structure and function of biological molecules, including nucleic acids, enzymes and other proteins, carbohydrates, lipids, and vitamins. Also, the course provides an introduction to metabolic pathways and bioenergetics, including glycolysis, fermentation and respiration, oxidation of fatty acids, and photosynthesis.	**3**	**5**	**5**	Bioorganic chemistry Inorganic chemistry	Biotechnology of plants Cytology Physiology Molecular biology	At the end of this course student will know: 1) structure and properties of living organisms of organic compounds (proteins, carbohydrates, lipids, nucleic acids, vitamins, enzymes, and hormones); 2) chemistry of the main processes of vital activity of cells plant and animal organisms (biosynthesis, synthesis and disintegration of carbohydrates, etc.); 3) mechanisms of energy conversion in the cells of living organisms (energy balance).

	SFBM 3230	2. Structure and functions of biological molecules	The study of the chemism of metabolic processes in living organisms, the transformation of energy in the processes of plastic and energy metabolism. 1. Synthesis and decomposition of proteins. 2. Synthesis of carbohydrates 3. Ways of decay of carbohydrates (fermentation, dichotomous and apotomic decays)	**3**	**5**	**5**	Inorganic chemistry Organic chemistry Cytology	Plant Physiology Biotechnology Physiology of humans and animals Genetics and selection Molecular biology	the student should know: chemistry of the basic processes of vital activity of cells of plant and animal organisms (biosynthesis, protein, synthesis and decomposition of carbohydrates, etc.); mechanisms of energy conversion into cells of living organisms (energy balance). The student should be able to: conduct biochemical studies of living organisms, determine the qualitative composition of compounds, analyze the results and draw conclusions

	BMOV 3230	3 Biological molecules and metabolism	the goal is the mastering by students of knowledge about the most important biochemical compounds, the ways of their metabolism, the evolution of the metabolism of living beings of the task: mastering by students knowledge about the structure of molecules, properties and functions of the basic groups of organic compounds that are part of living organisms, the assimilation of knowledge about metabolism, the similarities and differences in metabolism in various systematic and ecological groups of living organisms, the formation in students of ideas about the object, goals and methods of modern biochemistry preparation of students for the mastery of such disciplines as genetics, molecular biology, physiology of animals and plants, the formation of skills in performing laboratory experiments detection of organic substances and investigation of their properties	**3**	**5**	**5**	Inorganic chemistry Organic chemistry	Plant Physiology Biotechnology Molecular biology	should know: the basic features of the structure of the molecules of carbohydrates, lipids, proteins, nucleic acids, vitamins, hormones, pathways from synthesis and decay, properties and functions in living organisms should be able to explain how the substance functions with its structure, what factors influence its synthesis and decay.

2	FChZh 3232	1. Human and Animal Physiology	The purpose of the discipline is to study the vital activity of the whole organism, physiological systems, organs and individual cellular structures The main objectives of the course are: 1. To equip students with knowledge of modern physiology, which considers a living organism as a system of interrelated processes at all levels of organization (organism, system, organ, tissue, cellular, subcellular); 2. Develop the skills of conducting a scientific experiment; 3. Form a motivation for a healthy lifestyle. Physiology of excitable formations. Physiology of the nervous system. Physiology of the muscular system. Integrative activity of the brain. Physiology of the sensory system. Physiology of the endocrine system and reproductive physiology. Physiology of the visceral systems.	**3**	**5**	**5**	Cytology, Histology, Human anatomy, Development physiology of pupils	Anatomy of the central nervous system, Physiology of higher nervous system	As a result of studying the discipline " Human and animal physiology", the student must Know: the structure and functions of the human body and animals. Explains: the fundamentals of biological processes and the physiological mechanisms of the operation of various systems and organs of living organisms. Be able to: conduct a scientific experiment, theoretically substantiate the observed phenomena, and work independently with scientific and educational literature.

	Nei 3232	2. Fundamentals of human and animal physiology	The purpose of the discipline is to study the vital activity of the whole organism, physiological systems, organs, cells and individual cellular structures. The main tasks are: 1. To arm students with knowledge of modern physiology, which considers a living organism as a system of interrelated processes, at all levels of organization (Organism, system, organ, tissue, cellular, subcellular). 2. To generate motivation for a healthy lifestyle. Subject and methods of research. Physiology of the cell. Physiology of excitable formations. Physiology of the nervous system. The physiology of the neuro-motor apparatus. excretory system.	**3**	**5**	**5**	Anatomy Cytology Histology Age physiology Physics Chemistry	Genetics Biochemistry Molecular biology Psychophysiology biophysics	As a result of studying the discipline, the student must know the structure and functions of the human and animal body. To be able to: conduct a scientific experiment, theoretically substantiate the observed phenomena. Have the skills of conducting an experiment. To apply: modern experimental methods of working with biological objects in the laboratory, skills of working with modern instruments and equipment. Demonstrates: basic ideas about the basics of biology human, prevention and health protection and uses them in practice. Uses: methods of observation, description, identification, classification, cultivation of biological objects.

3	Gen3341	1. Genetics	The aim of the discipline is to show the laws of genetics and variability, its theoretical and practical meaning, the role of genetics in biology, economy, medicine, and their interrelation. The main objectives of the course "Genetics and selection ": To demonstrate genetic patterns, structure of chromosomes, cytological bases of reproduction of plants and animals, biochemistry of nucleic acids, features of ontogenesis. As a result of studying the course "Genetics" the student should gain knowledge on the achievements of genetics science, molecular genetics, populations genetics, human genetics, medical genetics and gene engineering.	**3**	**5**	**5**	Cytology and histology, Introduction to biology, plant Physiology, Biochemistry	Molecular biology, Evolutionary science	fundamentals of genetic laws of inheritance and variability, mutational variability; Mendel's teachings, chromosomal theory. Linked inheritance and gender genetics; genetic basis of ontogenesis; genetic basis of evolution. Analyze and summarize the material. To present correct and logical simple and compound elements;

	GCh 3341	2. Human Genetics	The science of heredity and variability of mental and psychophysiological properties, which arose at the junction of psychology and genetics. The subject of psychogenetics is the interaction of heredity and environment in the formation of interindividual variation of human psychological properties (cognitive and motor functions, temperament). In recent years, such branches of psychogenetics as genetic psychophysiology, which studies hereditary and environmental determinants of brain bioelectrical activity, genetics of individual development, as well as genomics of behavior, studying the effect of genetic effects on behavior and various types of psychopathology are actively developing. Morphological peculiarities of human structure; the structure and functional characteristics of organs and systems: musculoskeletal, splanchnology, angiology, neurology, sensory systems. Ontogenesis and phylogenesis of organs and systems.	**3**	**5**	**5**	Cytology and histology, Introduction to biology, plant Physiology,	Biochemistry Molecular biology, Evolutionary science	Fundamentals of genetic laws of inheritance and variability, mutational variability; Mendel's teachings, chromosomal theory.Linked inheritance and gender genetics; genetic basis of ontogenesis; genetic basis of evolution.Analyze and summarize the material. To present correct and logical simple and compound elements;

4	MI 3243	Methods of research	To form ideas about the methodology and methods of scientific and pedagogical research and their application in practice, to reveal the theoretical aspects of the methodology and logic of scientific research. 1. Introduction. The planning of the study. 2.Work with literary sources. 3. Research methods. Processing of the data, conclusions and generalizations. 4.Student learning dialog 5. Inclusive education of schoolchildren	**2**	**3**	**6**	Use of information and communication technologies in biology Pedagogical management; Inclusive education;	Methods of teaching chemistry, methods of teaching biology Pedagogical practice.	- able to apply research planning methods and data processing techniques; - able to apply methods of working with literary sources and use them in writing; - is able to apply the logic of construction of the work, presentation of material, design of generalizations and conclusions; - is able to formulate conclusions and generalizations; - is able to use various methods of scientific research; - able to use diagnostic methods of development, communication, activity of children of different ages.

5	Micr 3339	1. Microbiology	formation of an integral system of knowledge about microorganisms: the features of the structural and functional organization of cells, their metabolism and the role in the organic world of the planet and the vital activity of people; principles of the modern classification of microorganisms and the degree of their influence on the course of evolution.	**2**	**3**	**6**	Pathological physiology, pharmacology	Microbiology and Immunology: Microbiology:	the main groups of microorganisms, their classification; - the importance of microorganisms in nature, human and animal life; - the main groups of microorganisms, their classification; - the importance of microorganisms in nature, human and animal life; - microscopic, cultural and biochemical methods of research; - rules for selection, delivery and storage of biomaterials; - methods of sterilization and disinfection; - concepts of pathogenicity and virulence; - sensitivity of microorganisms to antibiotics; - forms of exposure of pathogenic microorganisms to animals. - microscopic, cultural and biochemical methods of research; - rules for selection, delivery and storage of biomaterials;

	Vir 3339	2. Virology	the study of pathogenic and conditionally pathogenic microorganisms, causative agents of infectious diseases and the creation of the basis for the development of microbiological thinking among students, forming the basis for successful assimilation of disciplines	**2**	**3**	**6**	Pathological physiology, pharmacology	Microbiology and Immunology: Microbiology:	students should know: basic concepts of general microbiology, virology and immunology; the basis of morphology, physiology, genetics, ecology of microorganisms, sources and ways of transmission of infections, their pathogenesis, basic bacterial preparations used for the prevention, treatment and diagnosis of infectious diseases;
	Bac 3339	3. Bacteriology	The purpose of studying the discipline is to master the methodology of diagnosing viral and bacterial infections, peculiarities of the microbiological method research, interpretation of results. The objectives are to study the morphological features of microorganisms, algorithm for diagnosing bacterial and viral infections, identification methods microorganisms and interpretation of the results. peculiarities of staining causative agents of bacterial infection;	**2**	**3**	**6**	Pathological physiology, pharmacology	Microbiology and Immunology: Microbiology:	Students should know: -Termins used in bacteriology -Basic laboratory diagnostic methods used in bacteriology -The features of the structure, their cell wall. -Basic regulatory documents on bacteriological safety when working with a pathogen - rules for the collection, transport and storage of diagnostic material for research; should be able to: - Prepare a microscopic preparation from a biomaterial, a cultural material. Identify different types of bacteria. - Inoculate the pathogen to various nutrient media.

6	FR 3233	1. Plant Physiology	The study of all processes occurring in plant organisms at different levels of organization: at the level of the cell, organs and the whole plant (cell physiology, water regime, mineral nutrition, photosynthesis, respiration, plant growth and development, mechanisms of plant resistance and protection), the disclosure of regulatory mechanisms these processes and the protection of plants from adverse factors. 1.Physiology of the growth cell. 2. Water regime. 3. Mineral nutrition. 4. Photosynthesis. 5. Growth and development of plants. 6. Breathing. 7. Mechanisms of protection and resistance of plants.	**3**	**5**	**6**	Botany Cytology Biochemistry	Genetics Selection Biotechnology Ecology	the student should know: 1) features of life processes, growth; 2) the chemistry of the basic processes occurring in the cell (protein biosynthesis, photosynthesis and respiration). The student should be able to: to carry out physiological-biochemical studies of plants, phenolic measurements of the growth and development of plants, analysis of the water regime, photosynthesis, and the like. and have research and development skills in plant studies

	FROB 3233	2. Physiology of plants with the fundamentals of biochemistry	Study of the physiological processes of green plants at different levels of organization: at the level of the cell, organs and the whole plant (cell physiology, water regime, mineral nutrition, photosynthesis, respiration, plant growth and development, mechanisms of plant resistance and protection), the mechanisms of regulation of these processes and protection of plants from adverse factors 1.Physiology of the growth cell. 2. Water regime. 3. Mineral nutrition. 4. Photosynthesis. 5. Growth and development of plants. 6. Breathing. 7. Mechanisms of plant protection and resistance.	**3**	**5**	**6**	Botany Cytology Biochemistry	Genetics Selection Biotechnology Ecology	the student should know: 1) features of the processes of life-activity of plants; 2) the chemistry of the processes that occur in the cell The student should be able to: to carry out physiological-biochemical studies of plants, phenolic measurements of the growth and development of plants, analysis of the water regime, photosynthesis, and the like. and have the research skills of studying plants

	SFRO 3233	3. Structural and functional features of the plant organism	The purpose of the discipline is to form and develop students' understanding of the regularities of the vital activity of the plant organism, its metabolic systems, the coordination of their functioning in time and space, and their specificity. The obtained knowledge can be used to solve the problems of increasing the productivity of plants and biotechnology.	**3**	**5**	**6**	Botany Cytology Biochemistry	Plant Physiology Selection Biotechnology Ecology	should know: the evolution and structural organization of the cell; specificity of plant cell function; processes of energy transformation and synthesis of ATP; specific signs of respiration in plants; structural and functional organization of the photosynthetic apparatus, mechanisms of electron transport regulation, the main ways of photoassimilation of carbon dioxide in different groups of plants; mechanisms of ion intake into the apoplast, membrane transport systems, ways and mechanisms of short and long distance transport, functions of mineral nutrition elements; the molecular structure of water, its properties and functions in the plant organism, the supply and transport of water at the level of the cell and the whole plant; regularities and principles of regulation of plant growth and development; on interaction with environmental factors and mechanisms to overcome adverse effects; on the synthesis, accumulation and functions of secondary metabolites.

7	PD SchC **3323**	Psychological climate in an inclusive school	The purpose and objectives of inclusive education. To reveal the need for inclusion of society. Inclusion - as a process of development of extremely accessible education for everyone in accessible schools and educational institutions, formation of learning processes with setting adequate goals for all students, the process of elimination of various barriers to the greatest support for everyone and the maximum disclosure of its potential. Provision of legislative and regulatory documents, consultation, close work with specialists, psychologists and teachers. The role of the state and society in the development of inclusive education	**3**	**5**	**6**	Experimental psychology, Ethnopedagogics, self-Knowledge, Pedagogical anthropology, Modern educational technologies, Comparative psychology	Methods of teaching pedagogy, methods of teaching psychology, Gender education, Theory of psychological counseling	Knowledge: the need for state and public support for people with disabilities, methods of teaching inclusive education. Skill: determine the level of ability and analyze the age, sensory and intellectual capabilities of the student. Communication skills and culture in educational institutions, rules and internal norms of behavior. Identify problems that require a more General and conceptual approach to address them. Expected results of the study: - preparation of mini-projects - - development of the program, involvement of students, students with disabilities in the organization and conduct of joint, extracurricular activities, exhibition and demonstration works

8	CAEIE 4306	Creating an adaptive educational inclusive environment	The purpose of inclusive education is to provide the right to education for students with disabilities, overcoming social, physiological and psychological barriers to the inclusion of children with disabilities in education, providing psychological, pedagogical and social support in the socio-cultural space, social adaptation and integration	**3**	**5**	**6**	Pedagogy. Psychology and human development.	Introduction to the teaching profession	examine children with various developmental disabilities; to develop pedagogical variable routes; organize an interactive correctional and developmental environment that meets the educational needs of children with disabilities; develop an individual program of correctional and developmental work; to carry out correctional and pedagogical activity in the conditions of inclusive education; to carry out productive interaction with the participants of the pedagogical process;

Мамандық/Специальность _5В011300 – Biology in English__4 курс_
Академиялық дәрежесі/Академическая степень___Bachelor of Education____

№ п/п	Пәндер коды/ Коды дисциплины	Пәндер атауы/ Наименование дисциплины	Пәннің қысқаша мазмұны, мақсаты, негізгі тараулары, Цель изучения дисциплины, краткое содержание, основные разделы	Кредит саны/ Количество кредитов		Семестр	Пререквизиттер/ Пререквизиты	Постреквизиттер/ Постреквизиты	Құзіреттіліктің қалыптасуы (Оқу нәтижесі) Формируемые компетенции (Ожидаемые результаты)
				KZ	**ECTS**				
1	BE 4237	1.Biological Evolution	The course focuses on modern evolutionary theory in relation to the origins and dynamics of genetic diversity in time and space, reproductive isolation and evolutionary relationships among organismal groups. Students will investigate how interactions between the evolutionary forces mutation, recombination, selection, migration and genetic drift drive the patterns and processes of biodiversity at different levels of biological organisation. The course consists of lectures, literature seminars, computer exercises and independent projects in which students will use empirical and simulated data to develop their evolutionary thinking and to solve problems in evolution, ecology and conservation biology.	**2**	**3**	**7**	Botany Zoology Natural Science	Genetics Molecular Biology Ecology Microbiology Botany Zoology Evolutionary Teaching	By the end of this course, students will be able to: 1. Explain important processes, principles and concepts and critically evaluate theories and empirical research within evolutionary biology 2. Apply evolutionary theory and concepts to address empirical and theoretical questions in evolutionary biology 3. Independently investigate evolutionary questions using literature and analyses of empirical data. 4. Lead and summarize discussions on evolution in seminars and practical exercises orally as well as in writing1. 5. Communicate the principles, theories, problems and research results associated with questions that lie within the evolutionary framework to specialists and laymen orally and in writing

	PG 4237	2. Population genetics	The course begins with an introduction to genetic heritance and mendelian genetics, followed by two main parts. The principles of population genetics: allele frequencies, spectrum of allele frequencies, linkage disequilibrium, genetic diversity and measures of diversity, Wright-Fisher model, coalescense theory, inbreeding, population structure and selection. Analysis of population genetics: coalescense theory and simulations, estimation of parameters (mutational and recombination rates) and neutrality tests. Examples of complex models.	**2**	**3**	**7**	Genetics Evolution theories Mathematical models in biology	Philosophy Cytology Botany Zoology Genetics	By the end of this course, students will be able to: -Solve biological problems with the help of population genetics principles. -Explain the principles of population genetics. -Identify relevant question formulations in population genetics and propose strategies to solve the problems. -Use previously acquired knowledge (mathematics, statistics and programming) to solve genetic problems

2	Biof 4234	1. Biophysics	This graduate course is designed as a broad introduction into the field of biophysics for graduate students with the background in chemistry, physics, computer science, and biology. The goal of the course is to present the concepts of physical chemistry and map their application on a rapidly expanding interdisciplinary interface, combining biology, chemistry, and physics. The course aims to balance the need for rigorous mathematical treatment with the simplicity of presentation. The course consists of three parts. The first part introduces students to the fundamental concepts in physical chemistry, which are commonly used in the description of biological systems. Two other parts demonstrate a multiscale nature of biophysics by exploring macroscopic and microscopic applications. The use of computational approaches is emphasized.	**3**	**5**	**7**	Physics Zoology Botany	Theoretical Biology Applied Biophysics	By the end of this course, students will be able to: 1. apply fundamental physical principles and concepts to biological phenomena 2. recognize multiscale nature of biophysics, from molecular to cellular and organism levels 3. appraise recent nanoscale advances in biophysics 4. apprehend synergetic contributions of theory, experiment, and computer simulation to the field of biophysics

	PBiof 4234	2. Applied Biophysics	Biophysics is the original interdisciplinary subject. It is now entering with a vengeance into physics departments and students with a strong physical background require exposure to how their knowledge of physics can and has been used to solve important and frontier problems in biology. Thus, this course is aimed at those who possess a background in the physical sciences without any biological training. The course is an introduction to Biophysics and covers such topics as protein structure and function, membrane structure, replicative processes and their nanomachines, cellular structure and signaling, neuronal function, bioenergetics and the fundamentals of bioharvesting of energy from the sun for food and for sensory processes such as vision. The approach is to both achieve a basic understanding of many of these topics and the critical experiments that have been done to lay the basis of our understanding of biophysical systems. It will provide third year undergraduate students and master's degree students in physics and the physical sciences with a good introduction to this area of growing importance at the frontiers of science.	**3**	**5**	**7**	Physics Zoology Botany	Theoretical Biology	After the course student will be able to: - understand important processes of life and how they are studied with biophysical methods; - perform and suggest biophysical experiments to study structural or functional properties of biological molecules; - analyze and draw conclusions from experimental results; - know the main provisions of biophysics of cells and holistic organisms; - know the basic physical laws that underlie biological laws and phenomena; - know the first and second principles of thermodynamics;

3	POO1 212	**Modeling of biology lesson on the basis of ICT**	The use of digital technologies that increase the effectiveness of the lesson, developing the motivation of learning, which makes the learning process more successful. CT-significantly expand the possibilities of presentation of educational information, involve students in the learning process,contributing to the widest disclosure of their abilities,enhance mental activity. Relevance and importance of the use of digital technologies in the work of teachers. Digital technologies: - computer equipment; - interactive whiteboard; - multimedia; - electronic textbooks; e-mail; - Internet resources; - cellular communication; satellite technologies, etc.	**6**	**5**	**7**	Pedagogy. Psychology and human development. Introduction to the teaching profession	Production of visual AIDS. Biology at school. Modern technologies of teaching biology.	- able to process text, digital, graphic and audio information for the preparation of didactic materials / options tasks, tables, drawings, diagrams, drawings/to work with them in the classroom; - able to create slides on this training material, to demonstrate the presentation in the classroom; - able to use the available software products in their discipline; -able to use educational software/ training, fixing, controlling/.

4	NB 4235	1. Neurobiology	The goal is to prepare the trainee for independent work in the field of neurobiology, to form a system of modern ideas about the physiology of the nervous system. Tasks: - to acquaint students with modern ideas about the structural and functional organization of the nervous system at the anatomical, histological, cellular levels; - to give an idea of the cellular and molecular mechanisms that provide information transfer between cells; - to acquaint students with the main integrative mechanisms in the central nervous system; - to acquaint the trainees with the methodological approaches and approaches used in the study of the functions of the nervous system in the body of vertebrates and invertebrates. The structure of intercellular contacts; Transport of substances through the membrane; Electrical signals of cells. Ionic mechanisms of formation of membrane potential and action potential; Mechanisms of synaptic signal transmission; Signaling mechanisms of action of substances; Neurotransmitters. Neuromodulators; Neurophysiology of sensory systems. Neurophysiology of motor systems; Integrative functions of the brain. Neurophysiological basis of behavior.	**3**	**5**	**7**	Human Anatomy, Cytology and Histology, Biochemistry, Human and Animal Physiology, Bases of Developmental Biology, Molecular Biology	Regulatory systems of the body	As a result of studying the subjects, the student Knows: - structural and functional organization of the vertebrate nervous system (human) and model invertebrates; -ionic mechanisms mediating electrical signals of cells and synaptic signal transmission; - localization, metabolism, organization of the receptor apparatus. Understands: - cellular mechanisms mediating the realization of integrative functions of the brain (processing of visual, auditory, somatosensory signals); - biological effects of the main neurotransmitter systems of the animal body; Applies to: - skills in working with microscopic techniques to assess the morphological characteristics of nerve cells; - the basis of microelectrode methods for studying the electrical activity of nerve cells; - methods for analyzing the electrical activity of neurons and studying the behavior of animals; - conceptual-categorial apparatus of neurobiology for the analysis of the physiological basis of mental processes; Analyzes: - use knowledge of integrative functions of the central nervous system for the analysis of behavioral activity of animals and humans; - To search for and analyze data on the problem in scientific, scientific and technical and other information sources, to compile analytical reviews; Synthesis: - develop an interdisciplinary approach to problem solving; - compiles reports on research projects; - organize work on the preparation of scientific reports, abstracts. Evaluates: - compare the integrative functions of the central

	PF 4235	2. Psychophysiology	The purpose of mastering the course "The Physiology of Higher Nervous Activity" is the formation of a system of knowledge about the basic mechanisms and patterns of brain activity in the provision of higher nervous (psychic) activity of animals and humans. The origin, history appearance, content and methods of physiology of higher nervous activity. Basic concepts and principles of higher nervous activity. Reflex theory. Principles of reflex theory. Mechanisms of memory. Integrative brain activity and behavior. Thinking and speaking. Sleep, dreams, hypnosis.	**3**	**5**	**7**	Cytology, Histology, Human anatomy, Development physiology of pupils, Anatomy of the central nervous system, Human and animal physiology	Biochemistry Biophysics, Biotechnology	As a result of studying the discipline " The Physiology of Higher Nervous Activity", the student must Know: basic principles, patterns of higher nervous activity; Explains: physiological mechanisms that are realized at various levels (from subcellular to organism) and underlying higher nervous activity under normal and pathological conditions; main scientific problems and discussion issues in the modern physiology of higher nervous activity; Be able to: application of acquired knowledge in the implementation of practical activities, scientific research.

	NF4235	3. Neurophysiology	The discipline of Neurophysiology is a branch of physiology and neuroscience that is concerned with the study of the functioning of the nervous system. The primary tools of basic neurophysiological research include electrophysiological recordings, such as patch clamp, voltage clamp, extracellular single-unit recording and recording of local field potentials, as well as some of the methods of calcium imaging, optogenetics, and molecular biology. In Neurophysiology, the organization and function of the nervous system will be explored. The first section will cover neurons, their mechanism of communication and how they are put together to build systems within the nervous system. The second section will explore in-depth sensory and motor systems. Brain and behavior will comprise the last section of the course. Disease states will be introduced, as appropriate, to strengthen conceptual understanding through examples of dysfunction.	**3**	**5**	**7**	Biology Cytology Histology Human anatomy Development physiology of pupils	Regulatory systems of the body Biochemistry Biophysics	By the end of this course, students will be able to: To understand in some detail how electrical and chemical signaling within and between nerve cells works. To understand the experimental and theoretical approaches used to study neurophysiology, both for basic research and medical diagnostics. To understand fundamental principles of how the nervous system uses electrical activity to encode and decode information about the outside world and internal states. To further develop critical thinking and communication skills. This will be measured in the ability to interpret graphs, experimental designs, and problem discussion. Students will be required to participate in instructor-led discussions of the material as they analyze problems and propose possible mechanisms used by neurons to solve them. Weekly quizzes will be used to test some of these goals and reinforce the learning of the material.

5	MB 4340	1. Molecular Biology	This course is about genes - their structure and function - therefore, students will study nucleic acid structure and the mechanics of replication, repair, transcription, and translation in bacteria, archaea and eukaryotes. A central goal is understanding gene regulation at all levels, and the structure-function relationships of nucleic acids and proteins. Critical experiments will be examined to learn how our current understandings have come about. Techniques in molecular biology will be examined in lecture as necessary to understand experiments and concepts. We will also study protein structure and function – especially protein interactions with nucleic acids – and post-translational events since proteins constitute the functional output of genes (with an increasing number of exceptions). We will also pursue a selection of topics which varies from year to year such as the molecular biology of HIV [and other retroviruses], influenza virus, and how current genomics projects (e.g., comparative and functional, and other '-omics') are altering our understanding of molecular biology.	**3**	**5**	**7**	Biochemistry The Concept of Modern Natural Science	General information genetics Biotechnology of microorganisms.	By the end of this course, students will be able to: -Explain how the structure and chemistry of nucleic acids relate to their functions, their relative stability, and their interactions with proteins. Understand the regulation of protein and nucleic function by structure-function relationships and macromolecular interactions. Know the complete structures of DNA/RNA components, the different forms of nucleic acids (A, B, Z) and the types of amino acids that mediate backbone and sequence-specific binding. Relate DNA structure to forms of DNA damage. -Compare & contrast mechanisms of DNA replication, repair, recombination, transcription, gene regulation, RNA processing and translation in bacteria & eukaryotes. -Interpret the results of experiments using standard molecular techniques such as gel shift, transcription run-on assay, linker scanning promoter analysis, etc. to explain how classic experiments have led to our current understandings about DNA replication, recombination, transcription, gene regulation, etc. -Explain how recent genomics and functional genomics advances are altering our views of molecular biology in, for example, eukaryotic transcription and chromatin function.

	GI 4340	2. Genetic Engineering	The main purpose of mastering the discipline "Genetic engineering" is the acquisition of students ' knowledge in modern areas of this new field of experimental molecular biology. To achieve this purpose are allocated tasks to present in the lectures information about the modern trends of creation of the molecular vectors of the different systems of cloned genes methods of obtaining superproduction proteins in prokaryotic and eukaryotic systems, approaches to creation of modern and safe anti-viral vaccines using methods of genetic engineering, methods of creating transgenic animals and plants.				Microbiology Botany Molecular biology Biochemistry Genetics. Immunology.	Molecular virology Mutagenesis and reparation;	to have an idea of modern and developing areas of genetic engineering; know the biochemical and molecular biological basis of genetic engineering; to know about the features of the methods used to obtain new vector systems and superproducts of target proteins; to have an idea of the prospects of genetic engineering and related areas of life Sciences.

6	ITOB 4348	1. Innovative technologies for teaching biology	This section of pedagogy, studying the laws of assimilation of knowledge and skills and formation of students ' beliefs. Didactics, in turn, is based on the theory and practice of methodology, on the other – gives General scientific approaches to research in the field of methodology, ensuring the unity of methodological principles in the study of the learning process. The formation of perceptions, ideas and development of concepts, value relations should be carried out taking into account the psychological characteristics of students. In addition, the method of teaching is closely related to the biological Sciences – botany, Zoology, anatomy, physiology and hygiene of humans, animals, plant physiology, Cytology, Microbiology, genetics, biochemistry, etc.the Course "Innovative technologies of teaching biology" is also associated with geography, ecology, astronomy, soil science and other Sciences.	**3**	**5**	**7**	pedagogical psychology, biology of pedagogy and psychology.	Pedagogical practice of students	Innovative technologies of biology teaching in modern school; - develop a long-term and thematic plan for the study of biology in accordance with the requirements of innovative technologies of teaching biology; - make a plan and outline of innovative biology lessons; - to develop a methodology for the use in the educational process of problem, research and other approaches to teaching biology, etc.

	NPOB 4348	2. New approaches in teaching biology	The main goal of the discipline: - the arming of students with theoretical foundations and practical competences for the education, upbringing and development of schoolchildren in the study of wildlife; - preparation for the development of the spiritual and moral qualities of the child's personality on the basis of the disclosure of historically complex relationships between nature and society, the environment and the individual; - the formation of conviction in the interrelationship between the processes of education, upbringing and development of students, the need for creative dedication in dealing with children. Objectives: To consider various approaches to the construction of a course of biology in general education schools, gymnasiums, lyceums. Also prepare students for the education of schoolchildren of biology for any of the alternative programs.	**3**	**5**	**7**	Basic biological disciplines Pedagogy Psychology	Teaching practice	By the end of this course, students will be able to: -Instrumental: Knowledge of the structure of biological education, the comprehensive use of biological concepts and terms, knowledge of the skills of constructing charts and tables showing the logical structure, consistency, system and interconnection of learning components; -Interpersonal: Understanding the socio-cultural orientation and principles of humanization of modern biological education; substantiation of philosophical, scientific, ethical approaches in the study of objects of living nature; the ability to create conditions for the development of the creative abilities of the individual. -Systemic: knowledge of the fundamental, biological and borderline with them theory, their logical structure, their significance in the formation of the natural scientific picture of the world and application in practice; the ability to use regularities in substantiation and forecasting;

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