S.Seifullin Kazakh Agrotechnical University

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S.Seifullin Kazakh Agrotechnical University
Dean of the Faculty of Agronomy
Stybayev G.Zh.
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CATALOG OF ELECTIVE DISCIPLINES

For students in the direction of preparation 6B081 Agronomy
Brief description of the elective disciplines of the educational program

EPG	EP	Form of education	The name of discipline	Code of subject	Discipline cycle	Component	Number of credits	Level of training	Cafedra	Course	Academic period	Pre-requisitions	Post-requisitions	Brief content of the discipline	Key learning outcomes	Name of the alternative discipline
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Introduction to specialty	VS 1205	BS	Elective subjects	3.0	Bachelor	Agriculture and plant growing	1	2	ecology, chemistry	Agrometeorology, Biotechnology of plants, Crop Breeding, Crop with the basics of biology, Genetic bases of selection	The course introduction to the specialty studies the basics of agronomy, the history and development of agronomy, soil fertility and yield, plant living conditions and methods of their regulation. To acquaint students with farming systems, crop rotation, weed control measures, tillage techniques and systems, features of the use of fertilizers to increase the yield and quality of crops, crop cultivation technology	Be competent in selecting crop varieties for specific conditions of the region and the level of intensification of agriculture, preparing seeds for sowing, analyzing and arguing the results of assessing the yield potential of a variety, a batch of seeds, predicting the quality of seeds in the vine, and be able to form the basis for assessing the yield potential and sowing technology of the analyzed seeds , the ability to conduct varietal and seed control of seed crops of agricultural crops and make calculations of seed-growing areas, logically build the direction of work in seed production and plan a variety change, variety science of the main crops of the zone. To be able to organize work on breeding and seed production processes based on the latest achievements of agricultural science, including applying modern achievements in genetic engineering, applying knowledge of biology and genetics, reproduction systems to create a variety, genetic foundations of breeding and biotechnology, in understanding the patterns of variability for breeding work , to have an idea about the genome of individual plant species, about the methods of marking traits, about the possibilities of genetic analysis, the methodology and technology of the breeding process.	Basis of Land regulation
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Basis of Land regulation	OZ 1274	BS	Elective subjects	3.0	Bachelor	Land management	1	2	biology, chemistry	Biological agriculture, Precision agriculture basics, The fundamentals of agriculture	Discipline forms knowledge on the methodological foundations and the general theory of the laws of development, content, types, principles, tasks of land management in agriculture. Considers the land fund, land tenure and land use as an object of land management, its natural, economic and social factors, the historical report of land management, agricultural policy	Demonstrate knowledge of the structure and diversity of plant forms, plant life processes, determine by morphological features wild plants and crops common in the regions and their optimal placement, taking into account land and soil-climatic resources, identify the relationship between organisms, and organisms with the environment; evaluate the factors of ontogenesis and phylogenesis of living organisms, interpret the molecular genetic and cellular levels of life organization; determine the structural and functional	Introduction to specialty

														and land management in modern conditions, the development of land management science.	organization of hereditary material at the gene, chromosome and genomic levels.	
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Labor protection and basics of life safety	OTOBZh 1130	GER	Elective subjects	5.0	Bachelor	Mechanization of technological processes	1	2	Introduction to the specialty, basics of initial military training, ecology in the scope of secondary school, basics of valeology, physics, chemistry, information and communication technologies	Biology of ontogenesis of plants, Crop protection, Ecology and sustainable	The discipline contributes to the formation of students' knowledge, practical skills to create safe and harmless living conditions, to prevent the causes and prevention of dangerous situations, to protect the population and production personnel and objects of the national economy from the possible consequences of emergency situations. It also studies the peculiarities of labor protection for women and youth, supervision and control of the implementation of labor protection legislation and responsibility for violation of labor protection requirements.	The ability to use agrometeorological information in the production of crop products, to use modern information technologies for the production of crop products, to be able to complete tillage, sowing and harvesting units and determine their movement patterns through the fields using the GPS system, to carry out technological adjustments of agricultural machines. Use environmental knowledge in various spheres of life and in ensuring labor safety in the production of crop products.	Basics of anti-corruption culture
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Basics of anti-corruption culture		GER	Elective subjects	5.0	Bachelor	Economy	1	2	fundamentals of economics and law, philosophy	Accounting in Agriculture, Agricultural economics and statistics, Business Statistics	The discipline examines the theoretical and methodological foundations of the concept of "corruption" and examines the improvement of socio- economic relations of the Kazakh society as a condition for combating corruption, psychological features of the nature of corrupt behavior, formation of anti-corruption culture, features of formation of anti-corruption culture of youth, ethnic features of formation of anti-corruption culture, moral and ethical responsibility for corruption in various spheres. Discipline allows you to learn about legal responsibility for corruption offenses	Possess the basics of economic and legal knowledge in the field of agro- industrial complex, have ideas about management, marketing, finance, etc.; know and understand the goals and methods of state regulation of the economy, the role of the public sector in the economy. Assess and integrate the main theories of motivation, leadership and power to solve strategic and operational management problems, understand the importance of the principles and culture of academic integrity and anti-corruption culture.	Labor protection and basics of life safety

B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Introduction to leadership in education	VLO 1134	GER	Elective subjects	5.0	Bachelor	Профессиональное образование	1	2	History of Kazakhstan at school, world history, social studies and self-knowledge, law, literature	Economics and organization of production of the agro-industrial complex	The discipline analyzes and studies the model of effective communication of the leader, methods of management in critical situations, methods of work in the management team and the principle of distribution of roles in the team, methods of effective control and motivation of training. It provides an opportunity to study the theory of leadership qualities and at the same time the concept of leadership behavior (three leadership styles (K. Levin), research at the University of Ohio, research at the University of Michigan, management system (R. Likert), management grid (Blake and Mouton), concept of reward and punishment, substitute leadership (S. Kerr and J. Germier).	Possess the basics of economic and legal knowledge in the field of agro- industrial complex, have ideas about management, marketing, finance, etc.; know and understand the goals and methods of state regulation of the economy, the role of the public sector in the economy. Assess and integrate the main theories of motivation, leadership and power to solve strategic and operational management problems, understand the importance of the principles and culture of academic integrity and anti-corruption culture.	Basics of economics and law
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Basics of economics and law		GER	Elective subjects	5.0	Bachelor	Economy	1	2	Higher Mathematics, Philosophy, History of Kazakhstan	Agricultural economics and statistics, Fundamentals of Agribusiness and Entrepreneurship, Management in crop production	The discipline promotes knowledge of the subject of economic theory and methods of research, the basis of public production and forms of public economy, the mechanism of functioning of the market system, production, costs and income of the firm, national economy. Give an assessment of economic growth and instability of the market economy, inflation and unemployment as manifestations of economic instability. Demonstrate knowledge and skills in the financial and monetary credit system in the national economy and economic security. To master the basics of the theory of the state and law, the basics of constitutional, administrative, civil, labor, family, criminal law.	Possess the basics of economic and legal knowledge in the field of agro- industrial complex, have ideas about management, marketing, finance, etc.; know and understand the goals and methods of state regulation of the economy, the role of the public sector in the economy. Assess and integrate the main theories of motivation, leadership and power to solve strategic and operational management problems, understand the importance of the principles and culture of academic integrity and anti-corruption culture.	Introduction to leadership in education
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Ecology and sustainable	EUR 1236	BS	Elective subjects	3.0	Bachelor	Ecology	1	3	biology, chemistry	Crop protection, Entomology and Phytopathology, General biology of organisms	In the course of the discipline, statistical programs and the features of their application are studied. Correlation. Linear regression. Autoregression in time series. Principal Component Analysis (PCA) is a statistical procedure to reduce the dimensionality of data by losing the least amount of information. It is used in many fields, including bioinformatics and image processing.	The ability to use agrometeorological information in the production of crop products, to use modern information technologies for the production of crop products, to be able to complete tillage, sowing and harvesting units and determine their movement patterns through the fields using the GPS system, to carry out technological adjustments of agricultural machines. Use environmental knowledge in various spheres of life and in ensuring labor safety in the production of crop products.	Physiology and biochemistry of plants

B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Physiology and biochemistry of plants	FBR 1276	BS	Elective subjects	3.0	Bachelor	Biology, Plant Protection and quarantine	1	3	biology, chemistry	Bioinformatics, Biology of ontogenesis of plants, Biotechnology of plants	The discipline provides an opportunity to study the physiology of the plant cell, metabolism and the role of enzymes in it, ATP formation and utilization, synthesis and breakdown of proteins, carbohydrates and lipids, plant respiration, water regime of various ecological groups of plants: hygrophyte, mesophyte, xerophyte; Adaptation of plants to extract water, carbon nutrition of plants, photosynthesis. The content of the discipline includes - the influence of external conditions on the intensity of photosynthesis of aquatic plants, root nutrition of plants, methods of studying mineral nutrition, growth and development of plants, physiological bases of plant resistance, interrelationship and regulation of physiological processes in plants, the general concept of biochemistry of plants, biochemistry of plant cells and accumulation of nutrients in grain crops, adaptation and resistance of plants to adverse factors, biochemistry of crop formation.	Demonstrate knowledge of the structure and diversity of plant forms, plant life processes, determine by morphological features wild plants and crops common in the regions and their optimal placement, taking into account land and soil-climatic resources, identify the relationship between organisms, and organisms with the environment; evaluate the factors of ontogenesis and phylogenesis of living organisms, interpret the molecular genetic and cellular levels of life organization; determine the structural and functional organization of hereditary material at the gene, chromosome and genomic levels.	Ecology and sustainable
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Bases of termodynamics and electromagnetism	OTE 2213	BS	Elective subjects	5.0	Bachelor	Физики и химии	2	2	physics	Biophysics, Physical and chemical research methods	Knows the basic concepts, research methods and parameters of thermodynamic systems; understands equilibrium and nonequilibrium processes, reversible and irreversible processes, polytropic processes, entropy, the second law of thermodynamics, phenomenon of transfer, the main task of electrostatics, electromagnetism; applies Gauss's theorem, capacitors, electric and magnetic fields, laws of Ohm; analyzes elements of geometric and wave optics, quantum optics, atomic and nuclear physics.	Apply the basic laws and principles of physics, research methods to analyze the results of the experiment and simulate the situation in future professional activities. Know and understand the theory and methods of solving mathematical problems; be able to solve problems with further generalization of the results obtained; analyze theoretical data; apply the acquired knowledge, skills and abilities in solving applied problems in agriculture.	Systematics of plant
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Systematics of plant	SR 2281	BS	Elective subjects	5.0	Bachelor	Biological science	2	2	biology, chemistry	Biology of ontogenesis of plants, Biotechnology of plants, General biology of organisms	Systematics of higher plants is a discipline that gives an idea of the species, genus, family, class, Kingdom, the main characteristics of the classes and families of flowering plants, the main types of local wild and cultivated plants; the peculiarities of structure and functioning of representatives of different kingdoms and divisions; the relationship of plants and factors of animate and inanimate nature, the plants adapted to the joint habitation; role of plants in nature, their importance in human life, national economy;	Demonstrate knowledge of the structure and diversity of plant forms, plant life processes, determine by morphological features wild plants and crops common in the regions and their optimal placement, taking into account land and soil-climatic resources, identify the relationship between organisms, and organisms with the environment; evaluate the factors of ontogenesis and phylogenesis of living organisms, interpret the molecular genetic and cellular levels of life organization; determine the structural and functional organization of hereditary material at the gene, chromosome and genomic levels.	Bases of termodynamics and electromagnetism

B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Python language and data analysis	YaPAD 2211	BS	Elective subjects	3.0	Bachelor	Higher mathematics	2	3	information and communication technologies	Bioinformatics, Statistical analysis and data visualization	The course is dedicated to an in-depth study of the Python data structure, introduces classical programming paradigms and deals with the Numpy library to approach linear algebra and its algorithms; students use these deepenings to solve concrete problems. An introduction to SQL queries completes the year with applications to Web databases.	Use the basic methods, ways and means of obtaining, storing, processing information and communication technologies. Apply basic information processing algorithms to solving applied problems, develop programs in a programming language using basic control structures and standard data types, use application software packages, apply modern information technologies in the production of crop products. Know and understand the theory and methods of solving mathematical problems; be able to solve problems with further generalization of the results obtained; basics of mathematical statistics, collection, processing and analysis of statistical data; analyze theoretical data; apply the acquired knowledge, skills and abilities in solving applied problems in agriculture; be able to draw up mathematical models of typical professional tasks and find ways to solve them, be able to make the necessary decisions based on the use of the apparatus of mathematical statistics; build models of various applied problems; own statistical packages for processing and analyzing experimental data; have the skills to search for information, methods of collecting information and the skills to apply a set of standard methods of statistical data processing.	Programming of crop yields
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Programming of crop yields	PUSK 2269	BS	Elective subjects	3.0	Bachelor	Agriculture and plant growing	2	3	information and communication technologies	Information technology in crop production, Statistical analysis and data visualization	This course considers the issues of crop yield programming, various methodologies for designing computer decision support systems in agronomy, as well as data analysis of the projected crop yield based on a balance model.	Use the basic methods, ways and means of obtaining, storing, processing information and communication technologies. Apply basic information processing algorithms to solving applied problems, develop programs in a programming language using basic control structures and standard data types, use application software packages, apply modern information technologies in the production of crop products.	Python language and data analysis
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	General biology of organisms	OBO 2208	BS	Elective subjects	7.0	Bachelor	Biology, Plant Protection and quarantine	2	3	biology, chemistry	Bioinformatics, Biological agriculture, Biotechnology of plants	Knows the general biology of organisms studies the general laws of life phenomena for all organisms; understands the biology of living organisms, plant ecology, animal ecology, the biology of bacteria and fungi, their interactions with other organisms and soil biocenosis; analyzes the mechanisms of living organisms on specific examples of biological functions related to zoology, botany, animal physiology and plant physiology; evaluates the scientific and practical (eg agronomic) importance of the topics under consideration.	Demonstrate knowledge of the structure and diversity of plant forms, plant life processes, determine by morphological features wild plants and crops common in the regions and their optimal placement, taking into account land and soil-climatic resources, identify the relationship between organisms, and organisms with the environment; evaluate the factors of ontogenesis and phylogenesis of living organisms, interpret the molecular genetic and cellular levels of life organization; determine the structural and functional organization of hereditary material at the gene, chromosome and genomic levels.	Biology of ontogenesis of plants
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Biology of ontogenesis of plants	BOR 2273	BS	Elective subjects	7.0	Bachelor	Biological science	2	3	biology, chemistry	Biological agriculture, Biotechnology of plants	The discipline is aimed at familiarizing students with the laws of reproduction and individual development of organisms as the fundamental basis of life processes. The course gives an idea of macro - and micromorphological, physiological,biochemical, molecular and genetic processes occurring in developing organisms, as well as the factors and mechanisms that control the processes of development at all stages of ontogenesis of plant organisms.	Demonstrate knowledge of the structure and diversity of plant forms, plant life processes, determine by morphological features wild plants and crops common in the regions and their optimal placement, taking into account land and soil-climatic resources, identify the relationship between organisms, and organisms with the environment; evaluate the factors of ontogenesis and phylogenesis of living organisms, interpret the molecular genetic and cellular levels of life organization; determine the structural and functional organization of hereditary material at the gene, chromosome and genomic levels.	General biology of organisms

B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Biochemistry	Bio 3230	BS	Elective subjects	3.0	Bachelor	Biology, Plant Protection and quarantine	3	1	biology, chemistry	Biotechnology of plants, Physical and chemical research methods	The discipline studies the features of the structure of biomolecules (amino acids, peptides, proteins), sugars, nucleosides, nucleic acids, fatty acids, vitamins and trace elements; chemical bases of biological processes and the most important principles of molecular logic of life; the basic chemical components of cells, molecular bases of Biocatalysis and heredity.	Be able to use the properties of chemicals for use in the production of crop products, know the basic theoretical laws of chemistry, the composition, structure and properties of the most important bioactive substances, draw up a reaction equation, master the skills of determining the equivalent of a substance, preparing solutions of various concentrations, apply the basic laws and theories of chemistry, methods research of chemical processes, have the skills to work with measuring instruments, calculate and process the data obtained in the production of crop products.	Herbology
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Herbology	Ger 3275	BS	Elective subjects	3.0	Bachelor	Agriculture and plant growing	3	1	Biology of plant ontogenesis	Crop Breeding, Crop with the basics of biology, Information technology in crop production	The course provides for the formation of in-depth professional knowledge in the field of studying the patterns of weed plant associations and their harmfulness in the cultivation of major crops. Methods of selection and analysis of weed plant samples, identification and description of weed variety, assortment of domestic and foreign herbicides, methods for evaluating the effectiveness of plant protection products and methods.	Assess the phytosanitary condition of crops, analyze the technologies for phytosanitary optimization of agroecosystems by vegetation phases. Describe the main types and varieties of soils, assess the levels of its fertility, set the doses and methods of applying organic and mineral fertilizers for the planned crop of crops. Apply a system of agrotechnical measures to improve soil fertility, make crop rotations, tillage systems for crops, taking into account soil and climatic conditions, develop modern technologies for cultivating field crops. Conduct field experiments and use scientific research methods.	Biochemistry
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Seed studies	Sem 3301	AS	Elective subjects	4.0	Bachelor	Agriculture and plant growing	3	1	Fundamentals of seed science of field crops	Information technology in crop production	The study of the discipline "Seed" provides agronomic knowledge about modern issues of seed: morphology, physiology and biochemistry of seeds; features of the formation of their diversity, the period of sowing - shoots: swelling of seeds, formation of seedlings, emergence of seedlings, adaptive properties acquired by seeds in the process of swelling and formation of seedlings, methods of harvesting and methods of drying seeds, modern methods for assessing the quality of seeds and seed material.	Be competent in selecting crop varieties for specific conditions of the region and the level of intensification of agriculture, preparing seeds for sowing, analyzing and arguing the results of assessing the yield potential of a variety, a batch of seeds, predicting the quality of seeds in the vine, and be able to form the basis for assessing the yield potential and sowing technology of the analyzed seeds , the ability to conduct varietal and seed control of seed crops of agricultural crops and make calculations of seed-growing areas, logically build the direction of work in seed production and plan a variety change, variety science of the main crops of the zone.	Plant Immunity with the basics of breeding and seed production
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Plant Immunity with the basics of breeding and seed production	IROSS 3331	AS	Elective subjects	4.0	Bachelor	Biology, Plant Protection and quarantine	3	1	biology	Bioinformatics, Biotechnology of plants	On the Fundamentals of the doctrine of immunity, genetics of resistance to diseases and pests; techniques and methods for improving plant immunity to diseases and pests; modern technologies of selection for resistance to diseases and pests; methods for assessing the resistance of new varieties and hybrids to diseases and pests; fundamentals of biotechnological methods in breeding for resistance to diseases and pests; methods of organizing the selection of diseases and pests; seed production system in the Republic of Kazakhstan.	To be able to organize work on breeding and seed production processes based on the latest achievements of agricultural science, including applying modern achievements in genetic engineering, applying knowledge of biology and genetics, reproduction systems to create a variety, genetic foundations of breeding and biotechnology, in understanding the patterns of variability for breeding work , to have an idea about the genome of individual plant species, about the methods of marking traits, about the possibilities of genetic analysis, the methodology and technology of the breeding process.	Seed studies

B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Methods of Mathematical Modeling	MMM 3231	BS	Elective subjects	5.0	Bachelor	Higher mathematics	3	1	higher mathematics	Information technology in crop production, Mathematical Methods in Biology, Statistical analysis and data visualization	The discipline will allow students to use mathematical methods to study various processes. The course contains the following sections: fundamentals of power series; application of power series to generating functions and discrete variables, integration over intervals; numerical algorithms in linear algebra, diagonalization of endomorphism and square matrices, mathematical modeling.	Apply the basic laws and principles of physics, research methods to analyze the results of the experiment and simulate the situation in future professional activities. Know and understand the theory and methods of solving mathematical problems; be able to solve problems with further generalization of the results obtained; analyze theoretical data; apply the acquired knowledge, skills and abilities in solving applied problems in agriculture.	Microbiology
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Microbiology	Mik 3279	BS	Elective subjects	5.0	Bachelor	Microbiology and biotechnology	3	1	biology, chemistry	Biotechnology of plants, Cytology, Genetic bases of selection	The course studies the systematic, morphology and reproduction of microorganisms. Microorganisms and the environment. Physiology, metabolism and energy in microorganisms. The main fermentation and oxidation processes. The conversion of carbon compounds by microorganisms. The participation of microorganisms in the nutrient cycle. Soil microbiology. The effect of agricultural practices on soil microorganisms. The relationship of soil microorganisms and plants.	Demonstrate knowledge of the structure and diversity of plant forms, plant life processes, determine by morphological features wild plants and crops common in the regions and their optimal placement, taking into account land and soil-climatic resources, identify the relationship between organisms, and organisms with the environment; evaluate the factors of ontogenesis and phylogenesis of living organisms, interpret the molecular genetic and cellular levels of life organization; determine the structural and functional organization of hereditary material at the gene, chromosome and genomic levels.	Methods of Mathematical Modeling
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	The fundamentals of agriculture	OZ 3303	AS	Elective subjects	4.0	Bachelor	Agriculture and plant growing	3	1	herbology	Basics of the scientific researches, Precision agriculture basics	Discipline studies the laws of agriculture, ways to increase soil fertility, optimization of regimes in agriculture, the scientific basis of crop rotation, classification, zonal features, introduction and development of crop rotation, the scientific basis of soil cultivation, zonal features of soil cultivation, agrotechnical assessment of the quality of soil treatment.	Assess the phytosanitary condition of crops, analyze the technologies for phytosanitary optimization of agroecosystems by vegetation phases. Describe the main types and varieties of soils, assess the levels of its fertility, set the doses and methods of applying organic and mineral fertilizers for the planned crop of crops. Apply a system of agrotechnical measures to improve soil fertility, make crop rotations, tillage systems for crops, taking into account soil and climatic conditions, develop modern technologies for cultivating field crops. Conduct field experiments and use scientific research methods.	Biological agriculture
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Biological agriculture	BZ 3332	AS	Elective subjects	4.0	Bachelor	Agriculture and plant growing	3	1	biology	Agrotechnology of field crops, Crop with the basics of biology	The discipline considers the development of organic farming, the principles of crop rotation and tillage, the use of fertilizers, biological protection of crops, and certification of organic products.	Assess the phytosanitary condition of crops, analyze the technologies for phytosanitary optimization of agroecosystems by vegetation phases. Describe the main types and varieties of soils, assess the levels of its fertility, set the doses and methods of applying organic and mineral fertilizers for the planned crop of crops. Apply a system of agrotechnical measures to improve soil fertility, make crop rotations, tillage systems for crops, taking into account soil and climatic conditions, develop modern technologies for cultivating field crops. Conduct field experiments and use scientific research methods.	The fundamentals of agriculture
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Cellular technologies in crop production and breeding	KTRS 3251	BS	Elective subjects	5.0	Bachelor	Agriculture and plant growing	3	2	general biology of organisms, plant systematics, biology of plant ontogenesis	Crop with the basics of biology, Evolutionary theory, Genetic bases of selection, Private selection, Radiation selection	The course studies methods of cultivation of plant cells and tissues depending on experimental tasks for targeted use in breeding; genetic engineering and cellular technologies in plant breeding, documentation on registration of experimental data, international databases of genetic resources NCBI, GenBank, Cell selection; identification of transgenic insertion in plant biomaterial; experimental haploidy of agricultural	Ability to use modern achievements of world science and advanced technology in the field of genetics, advanced methods of creating genetically engineered plants, modern methods of analyzing its structure, in the application of modern methods of plant biotechnology, basic methods of cultivating cells, tissues, organs of plants, to be competent in understanding the relationship of organ-forming, physiological and age processes in plant ontogenesis, to have an idea of the relationship between intracellular structures, between cells in relation to the body and tissues at various levels of organizations of living	Cytology

														plants, achievements of cellular technology engineering and cell selection for solving practical problems of crop production	matter.	
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Cytology	Cit 3277	BS	Elective subjects	5.0	Bachelor	Biological science	3	2	general biology of organisms, plant systematics, biology of plant ontogenesis	Biotechnology of plants, Genetic bases of selection, Radiation selection	Cytology is the science of cells - the structural and functional units of almost all living organisms. In a multicellular organism, all complex manifestations of life arise as a result of the coordinated activity of its constituent cells. The task of the cytologist is to establish how the living cell is built and how it performs its normal functions.	Demonstrate knowledge of the structure and diversity of plant forms, plant life processes, determine by morphological features wild plants and crops common in the regions and their optimal placement, taking into account land and soil-climatic resources, identify the relationship between organisms, and organisms with the environment; evaluate the factors of ontogenesis and phylogenesis of living organisms, interpret the molecular genetic and cellular levels of life organization; determine the structural and functional organization of hereditary material at the gene, chromosome and genomic levels. Ability to use modern achievements of world science and advanced technology in the field of genetics, advanced methods of creating genetically engineered plants, modern methods of analyzing its structure, in the application of modern methods of plant biotechnology, basic methods of cultivating cells, tissues, organs of plants, to be competent in understanding the relationship of organ-forming, physiological and age processes in plant ontogenesis, to have an idea of the relationship between intracellular structures, between cells in relation to the body and tissues at various levels of organizations of living matter.	Cellular technologies in crop production and breeding
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Statistical analysis and data visualization	SAVD 3233	BS	Elective subjects	3.0	Bachelor	Higher mathematics	3	2	mathematics, information and communication technologies	Mathematical Methods in Biology, Modern methods of chemical analysis in breeding, Statistical processing of experimental data	Knows databases using the Pandas data analysis library and the R programming language for statistical computing, a package for processing geospatial data, and using Scilab for numerical analysis; applies these tools to solve specific problems in the field of agriculture and bioresources.	Use the basic methods, ways and means of obtaining, storing, processing information and communication technologies. Apply basic information processing algorithms to solving applied problems, develop programs in a programming language using basic control structures and standard data types, use application software packages, apply modern information technologies in the production of crop products. Know and understand the theory and methods of solving mathematical problems; be able to solve problems with further generalization of the results obtained; basics of mathematical statistics, collection, processing and analysis of statistical data; analyze theoretical data; apply the acquired knowledge, skills and abilities in solving applied problems in agriculture; be able to draw up mathematical models of typical professional tasks and find ways to solve them, be able to make the necessary decisions based on the use of the apparatus of mathematical statistics; build models of various applied problems; own statistical packages for processing and analyzing experimental data; have the skills to search for information, methods of collecting information and the skills to apply a set of standard methods of statistical data processing.	Business Statistics

B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Business Statistics	BS 3270	BS	Elective subjects	3.0	Bachelor	Accounting and finance	3	2	fundamentals of economics and law, philosophy	Economics and organization of production of the agro-industrial complex, Fundamentals of Agribusiness and Entrepreneurship	The subject and methods of statistics. Statistical observation, systematization of data and their presentation. Statistical grouping, tables. Absolute and relative indicators, their graphic image. Average values and indicators of variation. Selective method in statistical studies of business processes. Statistical hypothesis testing. Random variables and probabilistic models. Statistical study of the dynamics of business processes. Economic indexes. Statistical study of the relationship of social phenomena. Software for statistical processing and analysis of data (IBM SPSS, STATISTICA, MS Excel).	Know and understand the theory and methods of solving mathematical problems; be able to solve problems with further generalization of the results obtained; basics of mathematical statistics, collection, processing and analysis of statistical data; analyze theoretical data; apply the acquired knowledge, skills and abilities in solving applied problems in agriculture; be able to draw up mathematical models of typical professional tasks and find ways to solve them, be able to make the necessary decisions based on the use of the apparatus of mathematical statistics; build models of various applied problems; own statistical packages for processing and analyzing experimental data; have the skills to search for information, methods of collecting information and the skills to apply a set of standard methods of statistical data processing.	Statistical analysis and data visualization
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Crop with the basics of biology	ROB 3304	AS	Elective subjects	3.0	Bachelor	Agriculture and plant growing	3	2	biology, crop production	Information technology in crop production, Soil science and agrochemistry	The knowledge gained in this discipline allows students to learn the classification of crops according to the following criteria: life expectancy, reaction to the length of the day, type of development and nature of growth, pollination method, length of the growing season, etc. Also, the content of this discipline covers the study of seed as one of the main means of production in plant growing. This course will study in detail the main groups of crops - cereals, legumes, oilseeds and spinners: their economic importance, the main areas of cultivation in the world, the general morphological, biological characteristics and the main elements of the technology of cultivation.	Assess the phytosanitary condition of crops, analyze the technologies for phytosanitary optimization of agroecosystems by vegetation phases. Describe the main types and varieties of soils, assess the levels of its fertility, set the doses and methods of applying organic and mineral fertilizers for the planned crop of crops. Apply a system of agrotechnical measures to improve soil fertility, make crop rotations, tillage systems for crops, taking into account soil and climatic conditions, develop modern technologies for cultivating field crops. Conduct field experiments and use scientific research methods.	Agrotechnology of field crops
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Agrotechnology of field crops	APK 3333	AS	Elective subjects	3.0	Bachelor	Agriculture and plant growing	3	2	crop production, adaptive technologies in crop production	Information technology in crop production, Soil science and agrochemistry	Discipline "Agricultural technology of field crops" is one of the main subject in the system of training specialists in the field of agronomy. The purpose of teaching this discipline is to study various field crops, taking into account the soil-climatic and economic conditions of the cultivation zone. Objectives of the discipline: to give students thorough knowledge about the morphological, botanical, biological features and cultivation technology of field crops, taking into account the requirements of the professional qualifications of agronomists, to be able to use methods of growing advanced agricultural technology to obtain high-quality, sustainable products in the specific situations.	Assess the phytosanitary condition of crops, analyze the technologies for phytosanitary optimization of agroecosystems by vegetation phases. Describe the main types and varieties of soils, assess the levels of its fertility, set the doses and methods of applying organic and mineral fertilizers for the planned crop of crops. Apply a system of agrotechnical measures to improve soil fertility, make crop rotations, tillage systems for crops, taking into account soil and climatic conditions, develop modern technologies for cultivating field crops. Conduct field experiments and use scientific research methods.	Crop with the basics of biology

B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Crop protection	ZSK 3316	AS	Elective subjects	3.0	Bachelor	Biology, Plant Protection and quarantine	3	2	ecology and sustainable development	Agrotechnology of field crops, Crop with the basics of biology, Soils of Kazakhstan and protection of soil	In the course of mastering the discipline, the student knows the systematic organization of measures to combat pests, diseases and weeds of agricultural crops, to preserve and increase the yield and quality of agricultural crops, taking into account the relationship of pests and pathogens of agricultural crops with plants, biological characteristics, factors limiting harmfulness.	Assess the phytosanitary condition of crops, analyze the technologies for phytosanitary optimization of agroecosystems by vegetation phases. Describe the main types and varieties of soils, assess the levels of its fertility, set the doses and methods of applying organic and mineral fertilizers for the planned crop of crops. Apply a system of agrotechnical measures to improve soil fertility, make crop rotations, tillage systems for crops, taking into account soil and climatic conditions, develop modern technologies for cultivating field crops. Conduct field experiments and use scientific research methods.	Entomology and Phytopathology
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Entomology and Phytopathology	EF 3329	AS	Elective subjects	3.0	Bachelor	Forest resources and forestry	3	2	ecology and sustainable development	Agrotechnology of field crops, Crop with the basics of biology, Soils of Kazakhstan and protection of soil	Types of plant diseases. The severity of disease. Types of pathogens diseases"". Phytopathological bacteria, viruses. Pathological flower plants. Mycoplasmas. Phytopathogenic nematodes. Fungi as pathogens diseases"". Biological and ecological features of insects. Framework for the protection of plants from harmful insects (biological, forestry, chemical, physical, accounting methods, etc.).	Assess the phytosanitary condition of crops, analyze the technologies for phytosanitary optimization of agroecosystems by vegetation phases. Describe the main types and varieties of soils, assess the levels of its fertility, set the doses and methods of applying organic and mineral fertilizers for the planned crop of crops. Apply a system of agrotechnical measures to improve soil fertility, make crop rotations, tillage systems for crops, taking into account soil and climatic conditions, develop modern technologies for cultivating field crops. Conduct field experiments and use scientific research methods.	Crop protection
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Biophysics	Bio 3239	BS	Elective subjects	4.0	Bachelor	Физики и химии	3	3	biology, physics	Bioinformatics, Biotechnology of plants, Modern methods of chemical analysis in breeding	Biophysics considers the physical and chemical phenomena occurring in living organisms, which underlie elementary life processes, as well as the action of physical factors on the body. The main task of biophysics is to study the processes associated with the transformation of the chemical energy of the components of living matter into other types of energy - mechanical and osmotic work, electrical and radiation energy.	Demonstrate knowledge of the structure and diversity of plant forms, plant life processes, determine by morphological features wild plants and crops common in the regions and their optimal placement, taking into account land and soil-climatic resources, identify the relationship between organisms, and organisms with the environment; evaluate the factors of ontogenesis and phylogenesis of living organisms, interpret the molecular genetic and cellular levels of life organization; determine the structural and functional organization of hereditary material at the gene, chromosome and genomic levels. Apply the basic laws and principles of physics, research methods to analyze the results of the experiment and simulate the situation in future professional activities. Know and understand the theory and methods of solving mathematical problems; be able to solve problems with further generalization of the results obtained; analyze theoretical data; apply the acquired knowledge, skills and abilities in solving applied problems in agriculture.	Plant genetics
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Plant genetics	GR 3282	BS	Elective subjects	4.0	Bachelor	Biological science	3	3	biology, plant systematics, biology of plant ontogenesis	Biotechnology of plants, Crop Breeding, Genetic bases of selection, Radiation selection	The discipline studies the cytological, molecular cytoplasmic foundations of heredity, the chromosome theory of heredity, the variability of genetic material, the basics of population genetics, cellular and genetic engineering, types of hybridological analysis.	Ability to use modern achievements of world science and advanced technology in the field of genetics, advanced methods of creating genetically engineered plants, modern methods of analyzing its structure, in the application of modern methods of plant biotechnology, basic methods of cultivating cells, tissues, organs of plants, to be competent in understanding the relationship of organ-forming, physiological and age processes in plant ontogenesis, to have an idea of the relationship between intracellular structures, between cells in relation to the body and tissues at various levels of organizations of living matter.	Biophysics

B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Statistical processing of experimental data	SOED 3306	AS	Elective subjects	4.0	Bachelor	Computer science	3	3	information and communication technologies, plant genetics, mathematics	Bioinformatics, Biotechnology of plants, Information technology in crop production, Radiation selection	This course is devoted to statistical and graphical methods of data analysis using application packages. The course includes such sections as numerical methods for solving linear differential equations; Euclidean structures; theory of functions of several variables, examples of dynamic systems in modeling, statistical data, descriptive and graphical methods of data analysis.	Assess the phytosanitary condition of crops, analyze the technologies for phytosanitary optimization of agroecosystems by vegetation phases. Describe the main types and varieties of soils, assess the levels of its fertility, set the doses and methods of applying organic and mineral fertilizers for the planned crop of crops. Apply a system of agrotechnical measures to improve soil fertility, make crop rotations, tillage systems for crops, taking into account soil and climatic conditions, develop modern technologies for cultivating field crops. Conduct field experiments and use scientific research methods.	Basics of the scientific researches
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Basics of the scientific researches	ONI 3334	AS	Elective subjects	4.0	Bachelor	Agriculture and plant growing	3	3	general biology of organisms, soil science, plant genetics	Crop Breeding, Genetic bases of selection, Information technology in crop production, Private selection, Radiation selection	The concept of science. The content of science. Methodology, methods and research process. General information about science. Methodological foundations of scientific knowledge. Empirical and theoretical levels of scientific knowledge. Organization of research. General information about NIRS. Organization of research work of students. Experimental studies in economics. Processing of experimental data.	Assess the phytosanitary condition of crops, analyze the technologies for phytosanitary optimization of agroecosystems by vegetation phases. Describe the main types and varieties of soils, assess the levels of its fertility, set the doses and methods of applying organic and mineral fertilizers for the planned crop of crops. Apply a system of agrotechnical measures to improve soil fertility, make crop rotations, tillage systems for crops, taking into account soil and climatic conditions, develop modern technologies for cultivating field crops. Conduct field experiments and use scientific research methods.	Statistical processing of experimental data
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Agricultural economics and statistics	AES 3241	BS	Elective subjects	5.0	Bachelor	Economy	3	3	fundamentals of economics and law	Economics and organization of production of the agro-industrial complex, Fundamentals of Agribusiness and Entrepreneurship	The discipline studies the efficiency of production activity, land resources and their use, economic efficiency of agricultural production, statistics of fixed assets, economics and statistics of plant production production, agroecological indicators and indicators of the development of ecologically clean agriculture, as well as processing of experimental material using programs for statistical analysis of experimental	Ability to form economic thinking among specialists of the agro-industrial complex, to form entrepreneurial and commercial approaches to solving production problems in agriculture and related industries and organizations of the agro-industrial complex, to prepare a specialist to work in conditions of economic freedom, economic power and industry reform in the transition to market relations, to know the basic methods of mathematical statistics used in production and scientific agronomy.	Accounting in Agriculture
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Accounting in Agriculture	BUCH 3278	BS	Elective subjects	5.0	Bachelor	Accounting and finance	3	3	fundamentals of economics and law	Economics and organization of production of the agro-industrial complex, Fundamentals of Agribusiness and Entrepreneurship	Features of accounting in agriculture : IFRS 41 "Agriculture". Features of accounting for biological assets. Accounting for seeds, feed and other materials. Accounting of animals for growing and fattening. Accounting of agricultural production and its implementation. The cost of production of crops and livestock. Preparation of financial statements and formation of financial results in agriculture.	Possess the basics of economic and legal knowledge in the field of agro- industrial complex, have ideas about management, marketing, finance, etc.; know and understand the goals and methods of state regulation of the economy, the role of the public sector in the economy. Assess and integrate the main theories of motivation, leadership and power to solve strategic and operational management problems, understand the importance of the principles and culture of academic integrity and anti-corruption culture.	Agricultural economics and statistics
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Soil science and agrochemistry	PA 3315	AS	Elective subjects	3.0	Bachelor	Soil science and agricultural chemistry	3	3	ecology and sustainable development	Internship	The course studies the general scheme of the soil- forming process and factors of soil formation, mineralogical, granulometric and chemical composition of soils, general physical and physico- mechanical properties of soil, etc. The student masters the methods of plant diagnostics of the conditions of mineral nutrition of plants, varieties of mineral and organic fertilizers and their composition, as well as the basics of fertilizer application.	Assess the phytosanitary condition of crops, analyze the technologies for phytosanitary optimization of agroecosystems by vegetation phases. Describe the main types and varieties of soils, assess the levels of its fertility, set the doses and methods of applying organic and mineral fertilizers for the planned crop of crops. Apply a system of agrotechnical measures to improve soil fertility, make crop rotations, tillage systems for crops, taking into account soil and climatic conditions, develop modern technologies for cultivating field crops. Conduct field experiments and use scientific research methods.	Soils of Kazakhstan and protection of soil

B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Soils of Kazakhstan and protection of soil	PKOP 3330	AS	Elective subjects	3.0	Bachelor	Soil science and agricultural chemistry	3	3	ecology and sustainable development	Internship	This discipline studies the characteristics of natural and climatic zones of the Republic of Kazakhstan, factors of soil formation in the Republic of Kazakhstan, chernozem territories of forest-steppe and steppe zones, salt flats, salt marshes, malt, soils of the desert-steppe zone (brown areas), soils of the desert zone (gray- brown areas and takyrs), soils of the foothill-desert-steppe zone (gray-earth areas), soils of floodplains and river deltas, agricultural use and soil protection, environmental problems of application, ecology of the	Assess the phytosanitary condition of crops, analyze the technologies for phytosanitary optimization of agroecosystems by vegetation phases. Describe the main types and varieties of soils, assess the levels of its fertility, set the doses and methods of applying organic and mineral fertilizers for the planned crop of crops. Apply a system of agrotechnical measures to improve soil fertility, make crop rotations, tillage systems for crops, taking into account soil and climatic conditions, develop modern technologies for cultivating field crops. Conduct field experiments and use scientific research methods.	Soil science and agrochemistry
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Mathematical Methods in Biology	MMB 4242	BS	Elective subjects	4.0	Bachelor	Biology, Plant Protection and quarantine	4	2	biology, methods of mathematical modeling	Bioinformatics, Biotechnology of plants	This course is devoted to statistical and graphical methods of data analysis. The course includes such sections as the basic concepts of probability theory, statistical data, descriptive and graphical methods of data analysis, statistical estimation, statistical hypothesis testing, regression analysis, correlation analysis, analysis of variance, non-parametric analysis methods.	Apply the basic laws and principles of physics, research methods to analyze the results of the experiment and simulate the situation in future professional activities. Know and understand the theory and methods of solving mathematical problems; be able to solve problems with further generalization of the results obtained; analyze theoretical data; apply the acquired knowledge, skills and abilities in solving applied problems in agriculture. Know and understand the theory and methods of solving mathematical problems; be able to solve problems with further generalization of the results obtained; basics of mathematical statistics, collection, processing and analysis of statistical data; analyze theoretical data; apply the acquired knowledge, skills and abilities in solving applied problems in agriculture; be able to draw up mathematical models of typical professional tasks and find ways to solve them, be able to make the necessary decisions based on the use of the apparatus of mathematical statistics; build models of various applied problems; own statistical packages for processing and analyzing experimental data; have the skills to search for information, methods of collecting information and the skills to apply a set of standard methods of statistical data processing.	Evolutionary theory
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Evolutionary theory	ET 4280	BS	Elective subjects	4.0	Bachelor	Agriculture and plant growing	4	2	biology, microbiology, biology of plant ontogenesis	Modern methods of chemical analysis in breeding, Private selection, Radiation selection	Discipline allows you to get a lot of information about the basis of evolutionary theory, develops the ability to independently comprehend the complex material of modern biology. Wide acquaintance with the history of evolutionary thought gives the student an idea of the diversity and complexity of the development of theoretical views in biology.	Demonstrate knowledge of the structure and diversity of plant forms, plant life processes, determine by morphological features wild plants and crops common in the regions and their optimal placement, taking into account land and soil-climatic resources, identify the relationship between organisms, and organisms with the environment; evaluate the factors of ontogenesis and phylogenesis of living organisms, interpret the molecular genetic and cellular levels of life organization; determine the structural and functional organization of hereditary material at the gene, chromosome and genomic levels.	Mathematical Methods in Biology
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Modern methods of chemical analysis in breeding	SMHAS 4311	AS	Elective subjects	3.0	Bachelor	Agriculture and plant growing	4	2	biology, chemistry, plant genetics	Genetic bases of selection, Mathematical Methods in Biology, Radiation selection	The study of the discipline "Modern methods of chemical analysis in breeding" provides for the acquisition of system knowledge about modern chemical methods of analysis of selection; to familiarize students with the techniques and methods of work on the basic types of analytical equipment and methods of sample preparation analyzed objects of various plants; the	Be able to use the properties of chemicals for use in the production of crop products, know the basic theoretical laws of chemistry, the composition, structure and properties of the most important bioactive substances, draw up a reaction equation, master the skills of determining the equivalent of a substance, preparing solutions of various concentrations, apply the basic laws and theories of chemistry, methods research of chemical processes, have the skills to work with measuring instruments, calculate and process the data obtained in	Private selection

														formation of the students' respective horizons, allowing them to realize the role of chemical analyzes in breeding.	the production of crop products. Be competent in selecting crop varieties for specific conditions of the region and the level of intensification of agriculture, preparing seeds for sowing, analyzing and arguing the results of assessing the yield potential of a variety, a batch of seeds, predicting the quality of seeds in the vine, and be able to form the basis for assessing the yield potential and sowing technology of the analyzed seeds , the ability to conduct varietal and seed control of seed crops of agricultural crops and make calculations of seed-growing areas, logically build the direction of work in seed production and plan a variety change, variety science of the main crops of the zone.	
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Private selection	ChS 4328	AS	Elective subjects	3.0	Bachelor	Agriculture and plant growing	4	2	biology, plant genetics	Genetic bases of selection, Radiation selection	The course is aimed at developing students' skills in using ideas and knowledge, the peculiarities of conducting the breeding process of individual crops of agricultural plants, taking into account zonal features and environmental orientation.	To be able to organize work on breeding and seed production processes based on the latest achievements of agricultural science, including applying modern achievements in genetic engineering, applying knowledge of biology and genetics, reproduction systems to create a variety, genetic foundations of breeding and biotechnology, in understanding the patterns of variability for breeding work , to have an idea about the genome of individual plant species, about the methods of marking traits, about the possibilities of genetic analysis, the methodology and technology of the breeding process.	Modern methods of chemical analysis in breeding
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Bioinformatics	Bio 4244	BS	Elective subjects	3.0	Bachelor	Biological science	4	2	biology, information and communication technologies	Information technology in crop production	Bioinformatics introduces students to the variety of biological data, with the possibility of their analysis using specialized programs. Bioinformatics analyzes the main databases on biology and medicine and the bioinformatics analysis programs built into them. Studies the analysis of DNA sequence polymorphism, analysis of population-genetic data, the method of collecting and registering biological data, and the use of biological information for making rational decisions.	Demonstrate knowledge of the structure and diversity of plant forms, plant life processes, determine by morphological features wild plants and crops common in the regions and their optimal placement, taking into account land and soil-climatic resources, identify the relationship between organisms, and organisms with the environment; evaluate the factors of ontogenesis and phylogenesis of living organisms, interpret the molecular genetic and cellular levels of life organization; determine the structural and functional organization of hereditary material at the gene, chromosome and genomic levels. Use the basic methods, ways and means of obtaining, storing, processing information and communication technologies. Apply basic information processing algorithms to solving applied problems, develop programs in a programming language using basic control structures and standard data types, use application software packages, apply modern information technologies in the production of crop products.	Biotechnology of plants
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Biotechnology of plants	BR 4271	BS	Elective subjects	3.0	Bachelor	Microbiology and biotechnology	4	2	biology, chemistry	Modern methods of chemical analysis in breeding, Private selection	Genetic, epigenetic and morphophysiological changes of cells and their importance in plant breeding, the importance of secondary metabolites in agriculture; Cell selection and haploid technologies; Improvement and preservation of plant biodiversity by clonal micromultiplication; Genetic engineering of plants. Genetically modified plants: benefits and risks. Molecular marking and genetic editing methods in plant breeding;	Demonstrate knowledge of the structure and diversity of plant forms, plant life processes, determine by morphological features wild plants and crops common in the regions and their optimal placement, taking into account land and soil-climatic resources, identify the relationship between organisms, and organisms with the environment; evaluate the factors of ontogenesis and phylogenesis of living organisms, interpret the molecular genetic and cellular levels of life organization; determine the structural and functional organization of hereditary material at the gene, chromosome and genomic levels.	Bioinformatics

B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Fundamentals of Agribusiness and Entrepreneurship	OAP 4314	AS	Elective subjects	5.0	Bachelor	Economy	4	3	fundamentals of economics and law	Bachelor's degree projects (works)	The course examines the concept, essence and economic content of agribusiness. Features of agricultural production. Content of agribusiness in the Republic of Kazakhstan. Features of agribusiness. The structure of the agro-industrial complex and agribusiness. Natural-biological and socio-economic features of the formation of agribusiness and agricultural production. Prospects for organizing small and medium-sized businesses in the agro-industrial	Ability to form economic thinking among specialists of the agro-industrial complex, to form entrepreneurial and commercial approaches to solving production problems in agriculture and related industries and organizations of the agro-industrial complex, to prepare a specialist to work in conditions of economic freedom, economic power and industry reform in the transition to market relations, to know the basic methods of mathematical statistics used in production and scientific agronomy.	Economics and organization of production of the agro-industrial complex
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Economics and organization of production of the agro-industrial complex	EOPA 4335	AS	Elective subjects	5.0	Bachelor	Technology of production of products of stock-raising	4	3	fundamentals of economics and law	Bachelor's degree projects (works)	Purpose of the course: Formation of students complex understanding of the content of the economy and the organization of production. Course objectives: Study of methods, rules and techniques for the rational organization of the production process in space and time	Possess the basics of economic and legal knowledge in the field of agro- industrial complex, have ideas about management, marketing, finance, etc.; know and understand the goals and methods of state regulation of the economy, the role of the public sector in the economy. Assess and integrate the main theories of motivation, leadership and power to solve strategic and operational management problems, understand the importance of the principles and culture of academic integrity and anti-corruption culture. Ability to form economic thinking among specialists of the agro-industrial complex, to form entrepreneurial and commercial approaches to solving production problems in agriculture and related industries and organizations of the agro-industrial complex, to prepare a specialist to work in conditions of economic freedom, economic power and industry reform in the transition to market relations, to know the basic methods of mathematical statistics used in production and scientific agronomy.	Fundamentals of Agribusiness and Entrepreneurship
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Information technology in crop production	ITR 4245	BS	Elective subjects	3.0	Bachelor	Soil science and agricultural chemistry	4	3	biology, information and communication technologies	Bachelor's degree projects (works)	The discipline is focused on studying the role and tasks of information technology in crop production, mastering the main directions of informatization of agriculture, the use of geoinformation technology in crop production, creating databases for the production of crop products, the study of statistical and application programs for agriculture	Use the basic methods, ways and means of obtaining, storing, processing information and communication technologies. Apply basic information processing algorithms to solving applied problems, develop programs in a programming language using basic control structures and standard data types, use application software packages, apply modern information technologies in the production of crop products.	Precision agriculture basics
B077 - «Plant growing»	6B08102 - «Breeding and seed production»	Full-time (bachelor 4 years) trimester	Precision agriculture basics	OTZ 4272	BS	Elective subjects	3.0	Bachelor	Mechanization of technological processes	4	3	soil science	Bachelor's degree projects (works)	The studying of technological processes of precision farming, the study of the latest laboratory equipment and GPS systems that ensure the implementation of precision farming technologies. The use of parallel and automatic driving systems and the formation of practical skills in working with GIS technologies. Formation of student's system of professional knowledge, skills and abilities on the methods and ways of organizing and reliable operation of complex	The ability to use agrometeorological information in the production of crop products, to use modern information technologies for the production of crop products, to be able to complete tillage, sowing and harvesting units and determine their movement patterns through the fields using the GPS system, to carry out technological adjustments of agricultural machines. Use environmental knowledge in various spheres of life and in ensuring labor safety in the production of crop products.	Information technology in crop production

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Head of the department Turbekova A.S.