**S.Seifullin Kazakh Agrotechnical University**


**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 credit | Level of training | Cafedra | Course | Academic period | Pre-requisitions | Post-requisitions | Brief content of the discipline | Key learning outcomes | Name of the alternative |
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| B077 - «Plant growing» | 6B08101 - «Agronomy» | 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 | Agriculture, Agrotechnology of field crops, Crop production | 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 | Extract, generalize, evaluate, and recommend agrometeorological information for the production of agricultural products. Illustrate environmental knowledge to solve production issues, develop ways to ensure labor safety in production..<br>The ability to apply a system of agrotechnical special measures to improve soil fertility and protect it from erosion, by controlling weeds, introducing and developing crop rotation, the right soil cultivation system in order to obtain high and sustainable crop yields, use crop rotation systems and development plans, apply and adapt soil treatment systems for crop rotation crops taking into account soil and climatic conditions, and optimal placement of crops, taking into account land and soil - climatic conditions.<br>Demonstrate knowledge of the theoretical foundations of obtaining high yields and ways to increase crop yields, the ability to develop and implement modern technologies for cultivating field crops, taking into account soil and climatic conditions and material and technical equipment of farms; carry out crop management, provide control and evaluation of field crop production technology; conduct field experiments. | Cell culture and plant tissue |

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| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Cell culture and plant tissue | KKTR 1271 | BS | Elective subjects | 3.0 | Bachelor | Biological science | 1 | 2 | biology, chemistry | Biology of ontogenesis of plants, Genetics, ontogenesis, phylogeny, Molecular and cellular biology, Systematics of plant | The discipline gives students an idea of modern methods of non-traditional farming and crop production - obtaining economically useful product by cultivating cells, tissues, organs of higher plants. This discipline introduces students to the molecular biological foundations of biotechnology, experimental morphogenesis, practical application of biotechnological techniques. The discipline helps students to acquire the skills that they will need in the practical work of modern production | Demonstrate knowledge of the structure and diversity of plant forms and animals, processes of plant life, determine morphological characteristics of wild plants and crops common in the regions, to 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, chromosomal and genomic levels. | Introduction to specialty |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | General biology of organisms | OBO 1207 | BS | Elective subjects | 7.0 | Bachelor | Biology, Plant Protection and quarantine | 1 | 3 | biology, chemistry, physics, knowledge of animal taxonomy | Genetics, ontogenesis, phylogeny, Physiology and biochemistry of plants, Plant genetics, Systematics of plant | 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 and animals, processes of plant life, determine morphological characteristics of wild plants and crops common in the regions, to 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, chromosomal and genomic levels. | Biology of ontogenesis of plants |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Biology of ontogenesis of plants | BOR 1268 | BS | Elective subjects | 7.0 | Bachelor | Biological science | 1 | 3 | biology, chemistry | Plant genetics, Systematics of plant | 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 and animals, processes of plant life, determine morphological characteristics of wild plants and crops common in the regions, to 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, chromosomal and genomic levels. | General biology of organisms |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Labor protection and basics of life safety | OTOBZh 1129 | GER | Elective subjects | 5.0 | Bachelor | Mechanization of technological processes | 1 | 3 | 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 | Ecology and sustainable, Storage and processing technology for crop products | 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. | Extract, generalize, evaluate, and recommend agrometeorological information for the production of agricultural products. Illustrate environmental knowledge to solve production issues, develop ways to ensure labor safety in production.. | Basics of anti-corruption culture |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Basics of anti-corruption culture | OAK 1135 | GER | Elective subjects | 5.0 | Bachelor | Economy | 1 | 3 | fundamentals of economics and law, philosophy | Agricultural economics and statistics, Economics and organization of production of the agro-industrial complex, Fundamentals of Agribusiness and Entrepreneurship | 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 | ON1 Possess communication skills in a foreign language, understand, express, interpret concepts, thoughts, feelings, facts and opinions verbally and in writing in an appropriate range of social and cultural contexts, terminology in the professional sphere, obtaining professional content information from foreign sources. Assess and integrate the main theories of motivation, leadership and power to solve strategic and operational management tasks, 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» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Introduction to leadership in education | VLO 1133 | GER | Elective subjects | 5.0 | Bachelor | Профессиональное образование | 1 | 3 | History of Kazakhstan at school, world history, social studies and self-knowledge, law, literature | Basics of the scientific researches, Philosophy | 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). | ON1 Possess communication skills in a foreign language, understand, express, interpret concepts, thoughts, feelings, facts and opinions verbally and in writing in an appropriate range of social and cultural contexts, terminology in the professional sphere, obtaining professional content information from foreign sources. Assess and integrate the main theories of motivation, leadership and power to solve strategic and operational management tasks, understand the importance of the principles and culture of academic integrity and anti corruption culture. | Basics of economics and law |

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| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Basics of economics and law | OEP 1136 | GER | Elective subjects | 5.0 | Bachelor | Economy | 1 | 3 | Higher Mathematics, Philosophy, History of Kazakhstan | Agricultural economics and statistics, Fundamentals of Agribusiness and Entrepreneurship | 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. | Show legal and economic knowledge in the field of agro-industrial complex, agricultural economics and statistics, regulatory documentation, apply the basics of mathematical analysis to analyze the state of industries, distinguish between the features of agribusiness, plan the prospect of development of economic entities in market conditions. | Introduction to leadership in education |

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| B077 - «Plant growing» | 6B08101 - «Agronomy» | 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. | Distinguish, enumerate the laws and principles of physics, theory and methods for solving mathematical problems. Solve, analyze, generalize and draw conclusions when solving applied problems in agriculture, recommend mathematical models of typical professional problems. | Systematics of plant |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Systematics of plant | SR 2269 | BS | Elective subjects | 5.0 | Bachelor | Biological science | 2 | 2 | biology, general biology of organisms | Plant genetics | 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 and animals, processes of plant life, determine morphological characteristics of wild plants and crops common in the regions, to 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, chromosomal and genomic levels. | Bases of termodynamics and electromagnetism |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Python language and data analysis | YaPAD 2212 | BS | Elective subjects | 3.0 | Bachelor | Higher mathematics | 2 | 3 | information and communication technologies | Information technology in crop production, 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. | Find, distinguish and apply methods, methods and means of obtaining, storing, processing information, information and communication technologies, applying application packages, modern information technologies in the production of crop products | Plant genetics |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Plant genetics | GR 2264 | BS | Elective subjects | 3.0 | Bachelor | Biological science | 2 | 3 | genetics, ontogenesis, phylogeny, biology, chemistry | Cellular technologies in crop production and breeding, Selection and seed production of agricultural crops | 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. | Demonstrate knowledge of the structure and diversity of plant forms and animals, processes of plant life, determine morphological characteristics of wild plants and crops common in the regions, to 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, chromosomal and genomic levels. | Python language and data analysis |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Biophysics | Bio 2232 | BS | Elective subjects | 3.0 | Bachelor | Физики и химии | 2 | 3 | physics, higher mathematics | Information technology in crop production, Methods of Mathematical Modeling, Physical and chemical research methods | 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 and animals, processes of plant life, determine morphological characteristics of wild plants and crops common in the regions, to 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, chromosomal and genomic levels. Distinguish, enumerate the laws and principles of physics, theory and methods for solving mathematical problems. Solve, analyze, generalize and draw conclusions when solving applied problems in agriculture, recommend mathematical models of typical professional problems. | Programming of crop yields |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Programming of crop yields | PUSK 2270 | BS | Elective subjects | 3.0 | Bachelor | Agriculture and plant growing | 2 | 3 | information and communication technologies | Fundamentals of seed science of field crops, Information technology in crop production, Statistical analysis and data visualization, Zonal farming system | 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. | Distinguish, enumerate the laws and principles of physics, theory and methods for solving mathematical problems. Solve, analyze, generalize and draw conclusions when solving applied problems in agriculture, recommend mathematical models of typical professional problems. The ability to apply a system of agrotechnical special measures to improve soil fertility and protect it from erosion, by controlling weeds, introducing and developing crop rotation, the right soil cultivation system in order to obtain high and sustainable crop yields, use crop rotation systems and development plans, apply and adapt soil treatment systems for crop rotation crops taking into account soil and climatic conditions, and optimal placement of crops, taking into account land and soil - climatic conditions. | Biophysics |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Professionally-oriented Foreign Language | POIYa 3231 | BS | Elective subjects | 3.0 | Bachelor | Agriculture and plant growing | 3 | 1 | foreign language | Cellular technologies in crop production and breeding, Fundamentals of seed science of field crops, Selection and seed production of agricultural crops, Zonal farming system | To form the professional foreign language speech of future specialists to increase the level of professional competence, proficiency in a professional foreign language for the implementation of written and oral information exchange, further development of speech activity (reading, writing, listening and speaking - monologue and dialogic speech). Rules of speech behavior in accordance with situations of professional communication, depending on the style and nature of communication in the social, household and academic spheres. | Possess communication skills in a foreign language, understand, express, interpret concepts, thoughts, feelings, facts and opinions verbally and in writing in an appropriate range of social and cultural contexts, terminology in the professional sphere, obtaining professional content information from foreign sources. Assess and integrate the main theories of motivation, leadership and power to solve strategic and operational management tasks, understand the importance of the principles and culture of academic integrity and anti corruption culture. | English for special purposes |

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| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | English for special purposes | AYaDSC 3263 | BS | Elective subjects | 3.0 | Bachelor | Agriculture and plant growing | 3 | 1 | foreign language | Cellular technologies in crop production and breeding, Fundamentals of seed science of field crops, Selection and seed production of agricultural crops, Statistical analysis and data visualization | The discipline is aimed at studying general scientific terminology and terminology for the language of the corresponding specialty in English, forms skills in four types of communicative activity: reading with a full understanding of authentic texts in the specialty, the ability to write an essay on a specialty problem, the ability to listen to authentic messages containing professional information, the ability to discuss specialty issues | Possess communication skills in a foreign language, understand, express, interpret concepts, thoughts, feelings, facts and opinions verbally and in writing in an appropriate range of social and cultural contexts, terminology in the professional sphere, obtaining professional content information from foreign sources. Assess and integrate the main theories of motivation, leadership and power to solve strategic and operational management tasks, understand the importance of the principles and culture of academic integrity and anti corruption culture. | Professionally-oriented Foreign Language |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Methods of Mathematical Modeling | MMM 3233 | BS | Elective subjects | 5.0 | Bachelor | Higher mathematics | 3 | 1 | higher mathematics | Information technology in crop production, 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. | Distinguish, enumerate the laws and principles of physics, theory and methods for solving mathematical problems. Solve, analyze, generalize and draw conclusions when solving applied problems in agriculture, recommend mathematical models of typical professional problems. | Botany with the basics of fodder production |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Botany with the basics of fodder production | BOK 3273 | BS | Elective subjects | 5.0 | Bachelor | Охотоведение и рыбное хозяйство | 3 | 1 | biology | Forage production, Information technology in crop production | The discipline studies the diversity of plants, the features of their structure and activity, the systematics of lower and higher plants, the biology of the main crops, their feed advantages and cultivation technologies, the issues of rational use of forage lands, methods and techniques for improving them. | Formulate and describe the theoretical laws of chemistry, physical and chemical methods of analysis, distinguish between the composition, structure and properties of bioactive substances, solve equations of chemical reactions, determine the equivalent of chemicals, prepare solutions of various concentrations. Apply the basic laws and theories of chemistry, the properties of chemicals for use in the production of crop products. | Methods of Mathematical Modeling |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Physical and chemical research methods | FHMI 3234 | BS | Elective subjects | 3.0 | Bachelor | Физики и химии | 3 | 1 | physics, chemistry, biophysics | Information technology in crop production, Statistical analysis and data visualization, Zonal farming system | Knows the classification of physical and chemical analysis methods, general characteristics of the methods, the indicator electrode and the reference electrode, classification of chromatographic methods, ion exchange and sediment chromatography, gas and liquid chromatography; understands equilibrium and non-equilibrium electrochemical systems, sensitivity and selectivity of physicochemical methods of analysis; applies electrogravimetric, conductometric, potentiometric, polarographic, coulometric methods, chromatography in quantitative analysis, electrochemical methods of analysis. | Formulate and describe the theoretical laws of chemistry, physical and chemical methods of analysis, distinguish between the composition, structure and properties of bioactive substances, solve equations of chemical reactions, determine the equivalent of chemicals, prepare solutions of various concentrations. Apply the basic laws and theories of chemistry, the properties of chemicals for use in the production of crop products.<br>Distinguish, enumerate the laws and principles of physics, theory and methods for solving mathematical problems. Solve, analyze, generalize and draw conclusions when solving applied problems in agriculture, recommend mathematical models of typical professional problems. | Physiology and biochemistry of plants |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Physiology and biochemistry of plants | FBR 3272 | BS | Elective subjects | 3.0 | Bachelor | Biology, Plant Protection and quarantine | 3 | 1 | general biology of organisms, plant systematics, biology of plant ontogenesis | Cellular technologies in crop production and breeding, Crop protection, Selection and seed production of agricultural crops | 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 and animals, processes of plant life, determine morphological characteristics of wild plants and crops common in the regions, to 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, chromosomal and genomic levels. | Physical and chemical research methods |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Machinary in agriculture | MSH 3236 | BS | Elective subjects | 4.0 | Bachelor | Mechanization of technological processes | 3 | 1 | molecular and cellular biology, general biology of organisms | Basis of Land regulation, Crop production, Internship, Technology for the production of vegetables in protected ground, Zonal farming system | The discipline is intended for the formation of the necessary knowledge on the mechanization of technological processes in agricultural production, the device of tractors, cars and agricultural machines, technological adjustments and preparation of agricultural machines to work. | Name and describe the devices of tractors, cars and agricultural machines, select and recommend soil-cultivating, sowing and harvesting units for technological processes, patterns of their movement across the field, and offer options for their adjustments. Apply modern information technologies for the production of crop products in various agricultural production entities. | Tractors and cars |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Tractors and cars | TA 3275 | BS | Elective subjects | 4.0 | Bachelor | Mechanization of technological processes | 3 | 1 | molecular and cellular biology, general biology of organisms | Agriculture, Crop production, Internship, Precision agriculture basics | Possess the ability to compare working conditions and design features of machines, determine the properties of compliance of a tractor and a car with its functional purpose, compare brands of fuel and lubricants under different operating conditions of equipment.<br>Formation of skills to study the basics of theory and calculation, engines, testing of tractors and cars, necessary for the effective operation of machines in agro-industrial production and their operational modes of operation, technological properties. | Name and describe the devices of tractors, cars and agricultural machines, select and recommend soil-cultivating, sowing and harvesting units for technological processes, patterns of their movement across the field, and offer options for their adjustments. Apply modern information technologies for the production of crop products in various agricultural production entities. | Machinary in agriculture |

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| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Soil science | Poch 3235 | BS | Elective subjects | 5.0 | Bachelor | Soil science and agricultural chemistry | 3 | 2 | chemistry, biology | Agriculture, Agrotechnology of field crops, Crop production, Horticulture, Soils of Kazakhstan and protection of soil, Technology for the production of vegetables in protected ground, Zonal farming system | The course studies the structure of the earth's crust, its mineralogical and chemical composition. Soil-forming processes. Soil colloids and soil absorption. Structure and physical properties. Water-air and thermal modes and properties. Soil fertility. Genesis and classification of soils. Soil erosion. Methods for assessing soil fertility and its reproduction; optimal fertility parameters and soil properties to obtain sustainable crop yields in various zones of the country. | Determine and distinguish between the main types and varieties of soils, their regimes and properties, types, forms and properties of fertilizers, methods and technologies for their application for agricultural crops. Distinguish and analyze the levels of soil fertility and its components, justify the directions of their use and methods of reproduction of soil fertility. Develop doses of organic and mineral fertilizers for the planned harvest of crops. | Fundamentals of animal husbandry |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Fundamentals of animal husbandry | OZh 3274 | BS | Elective subjects | 5.0 | Bachelor | Technology of production of products of stock-raising | 3 | 2 | Botany with the basics of feed production | Adaptive technologies in crop production, Crop production, Forage production | Formation of knowledge of the biological features of the main species and breeds of animals bred in farms of different regions of the country. Reproduction of the herd and directed rearing of young animals. Feeding, keeping, breeding of farm animals and poultry. Technologies of the production of livestock products. | Demonstrate knowledge of the structure and diversity of plant forms and animals, processes of plant life, determine morphological characteristics of wild plants and crops common in the regions, to 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, chromosomal and genomic levels. | Soil science |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Fundamentals of seed science of field crops | OSPK 3303 | AS | Elective subjects | 5.0 | Bachelor | Agriculture and plant growing | 3 | 3 | biology, plant genetics | Crop production, Internship, Selection and seed production of agricultural crops | The discipline studies the issues of seed science: morphology, physiology and biochemistry of seeds; the features of the formation of their high-quality, the sowing-seedling period, the adaptive properties during the sowing-seedling period, harvesting methods and drying methods of seeds, modern methods for assessing the quality of seeds and sowing material. | Demonstrate knowledge of the theoretical foundations of obtaining high yields and ways to increase crop yields, the ability to develop and implement modern technologies for cultivating field crops, taking into account soil and climatic conditions and material and technical equipment of farms; carry out crop management, provide control and evaluation of field crop production technology; conduct field experiments. | Zonal farming system |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Zonal farming system | ZSZ 3320 | AS | Elective subjects | 5.0 | Bachelor | Agriculture and plant growing | 3 | 3 | Agriculture, Soil Science | Adaptive technologies in crop production, Agrotechnology of field crops, Precision agriculture basics | History of development and classification of agricultural systems of crop production, scientific basis of zonal systems of agriculture. The main links of zonal (modern) systems of agriculture, the principles of modern zonal systems of agriculture and crop production, Comprehensive measures to combat weeds, diseases and pests of crops, crop rotation system in modern zonal systems of agriculture, Minimizing the system of tillage. Resource-saving tillage system, advantages and conditions of use. | The ability to apply a system of agrotechnical special measures to improve soil fertility and protect it from erosion, by controlling weeds, introducing and developing crop rotation, the right soil cultivation system in order to obtain high and sustainable crop yields, use crop rotation systems and development plans, apply and adapt soil treatment systems for crop rotation crops taking into account soil and climatic conditions, and optimal placement of crops, taking into account land and soil - climatic conditions. | Fundamentals of seed science of field crops |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Statistical analysis and data visualization | SAVD 3237 | BS | Elective subjects | 3.0 | Bachelor | Higher mathematics | 3 | 3 | mathematics, information and communication technologies | Cellular technologies in crop production and breeding, Information technology in crop production, Storage and processing technology for crop products | 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. | Find, distinguish and apply methods, methods and means of obtaining, storing, processing information, information and communication technologies, applying application packages, modern information technologies in the production of crop products | Basis of Land regulation |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Basis of Land regulation | OZ 3265 | BS | Elective subjects | 3.0 | Bachelor | Land management | 3 | 3 | Agriculture, Soil Science | Precision agriculture basics | 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 and land management in modern conditions, the development of land management science. | The ability to apply a system of agrotechnical special measures to improve soil fertility and protect it from erosion, by controlling weeds, introducing and developing crop rotation, the right soil cultivation system in order to obtain high and sustainable crop yields, use crop rotation systems and development plans, apply and adapt soil treatment systems for crop rotation crops taking into account soil and climatic conditions, and optimal placement of crops, taking into account land and soil - climatic conditions. | Statistical analysis and data visualization |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Agrochemistry | Agr 3239 | BS | Elective subjects | 5.0 | Bachelor | Soil science and agricultural chemistry | 3 | 3 | biology, chemistry | Crop production, Internship, Technology for the production of vegetables in protected ground | Discipline studies the chemical composition and removal of nutrients. Plant nutrition and methods of its regulation. Methods of plant diagnostics of the conditions of mineral nutrition of plants. Chemical land reclamation. Soil modes: nitrogen, phosphorus, potash. Types of fertilizers: simple, complex (mixed, complex, combined). Organic fertilizers. Storage of fertilizers and preparing them for application. Environmental aspects of fertilizer use. | Name and describe the devices of tractors, cars and agricultural machines, select and recommend soil-cultivating, sowing and harvesting units for technological processes, patterns of their movement across the field, and offer options for their adjustments. Apply modern information technologies for the production of crop products in various agricultural production entities. | Marketingin in the agro-industrial complex |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Marketingin in the agro-industrial complex | MA 3276 | BS | Elective subjects | 5.0 | Bachelor | Management and marketing | 3 | 3 | fundamentals of economics and law | Agricultural economics and statistics, Economics and organization of production of the agro-industrial complex | Basic provisions of the theory of marketing. The structure of agribusiness and marketing features in the agro-industrial complex. Marketing management in the agro-industrial complex. Agromarketing technology. Information agromarketing. Marketing strategy of the enterprise. Price marketing in agribusiness. Sales marketing in agribusiness. The effectiveness of marketing activities in agribusiness | The ability to apply a system of agrotechnical special measures to improve soil fertility and protect it from erosion, by controlling weeds, introducing and developing crop rotation, the right soil cultivation system in order to obtain high and sustainable crop yields, use crop rotation systems and development plans, apply and adapt soil treatment systems for crop rotation crops taking into account soil and climatic conditions, and optimal placement of crops, taking into account land and soil - climatic conditions. | Agrochemistry |

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| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Basics of the scientific researches | ONI 3305 | AS | Elective subjects | 3.0 | Bachelor | Agriculture and plant growing | 3 | 3 | general biology of organisms, soil science, machine use in agriculture | Crop production, Horticulture, Internship, Pregraduation practice | 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. | Demonstrate knowledge of the theoretical foundations of obtaining high yields and ways to increase crop yields, the ability to develop and implement modern technologies for cultivating field crops, taking into account soil and climatic conditions and material and technical equipment of farms; carry out crop management, provide control and evaluation of field crop production technology; conduct field experiments. | Soils of Kazakhstan and protection of soil |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Soils of Kazakhstan and protection of soil | PKOP 3321 | AS | Elective subjects | 3.0 | Bachelor | Soil science and agricultural chemistry | 3 | 3 | Occupational safety and the basics of life safety | Agrotechnology of field crops, Precision agriculture basics, Technology for the production of vegetables in protected ground | 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 state of arable, saline, irrigated soils of the Republic of Kazakhstan. | Determine and distinguish between the main types and varieties of soils, their regimes and properties, types, forms and properties of fertilizers, methods and technologies for their application for agricultural crops. Distinguish and analyze the levels of soil fertility and its components, justify the directions of their use and methods of reproduction of soil fertility. Develop doses of organic and mineral fertilizers for the planned harvest of crops. | Basics of the scientific researches |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Horticulture | Plo 4308 | AS | Elective subjects | 5.0 | Bachelor | Agriculture and plant growing | 4 | 1 | Agriculture, soil science, fundamentals of seed science of field crops | Adaptive technologies in crop production, Fundamentals of Agribusiness and Entrepreneurship, Pregraduation practice | The discipline studies the classification, morphology and biology of the growth and fruiting of fruit plants, the biological basis of their reproduction, the organization of a fruit nursery, the technology of laying a fruit garden, the features and objectives of vegetable growing, the biological characteristics of vegetable crops, vegetable crop rotation and crop rotation, agricultural machinery for growing vegetable plants in protected and open ground, the study of zoned varieties of vegetable crops, taking into account their biological characteristics. | Describe and name the morphology and biology, varietal composition of fruit, berry, vegetable and fodder crops. Apply, analyze and recommend them for the implementation of modern technological processes of cultivation. Select and recommend technologies for improving and rational use of natural fodder lands, suggest methods and techniques for organizing the harvesting and preparation of coarse, succulent fodder. | Technology for the production of vegetables in protected ground |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Technology for the production of vegetables in protected ground | TPOZG 4323 | AS | Elective subjects | 5.0 | Bachelor | Agriculture and plant growing | 4 | 1 | Agriculture, soil science, fundamentals of seed science of field crops | Adaptive technologies in crop production, Fundamentals of Agribusiness and Entrepreneurship, Pregraduation practice | The course introduces the history, structure and methods of greenhouse vegetable growing. The discipline is aimed at studying the biology of vegetable plants, the attitude of plants to life factors and methods for regulating water, air, light, thermal, nutritional regimes in greenhouse structures. | Describe and name the morphology and biology, varietal composition of fruit, berry, vegetable and fodder crops. Apply, analyze and recommend them for the implementation of modern technological processes of cultivation. Select and recommend technologies for improving and rational use of natural fodder lands, suggest methods and techniques for organizing the harvesting and preparation of coarse, succulent fodder. | Horticulture |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Selection and seed production of agricultural crops | SSSK 4310 | AS | Elective subjects | 5.0 | Bachelor | Agriculture and plant growing | 4 | 2 | Fundamentals of seed science of field crops, plant genetics | Agrotechnology of field crops, Pregraduation practice, Storage and processing technology for crop products | The course studies the concept of a variety, the source material and methods of its creation, the types of plant breeding, the use of biotechnology in breeding, the methods of selection and evaluation of breeding material, the organization of the selection process, the state variety testing and regionalization of varieties and hybrids, seed production processes, the organization of seed production of individual crops in modern conditions, varietal and seed control in seed cultivation of field crops, varietal change and varietal renewal. | Demonstrate knowledge of the theoretical foundations of obtaining high yields and ways to increase crop yields, the ability to develop and implement modern technologies for cultivating field crops, taking into account soil and climatic conditions and material and technical equipment of farms; carry out crop management, provide control and evaluation of field crop production technology; conduct field experiments. | Cellular technologies in crop production and breeding |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Cellular technologies in crop production and breeding | KTRS 4322 | AS | Elective subjects | 5.0 | Bachelor | Agriculture and plant growing | 4 | 2 | Fundamentals of seed science of field crops, plant genetics | Adaptive technologies in crop production, Pregraduation practice, Storage and processing technology for crop products | 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 plants, achievements of cellular technology engineering and cell selection for solving practical problems of crop production | Demonstrate knowledge of the structure and diversity of plant forms and animals, processes of plant life, determine morphological characteristics of wild plants and crops common in the regions, to 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, chromosomal and genomic levels. | Selection and seed production of agricultural crops |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Forage production | Kor 4307 | AS | Elective subjects | 4.0 | Bachelor | Agriculture and plant growing | 4 | 2 | biology, fundamentals of animal husbandry | Agrotechnology of field crops, Pregraduation practice, Storage and processing technology for crop products | The discipline is intended for the formation of theoretical knowledge and practical skills in the evaluation of natural forage lands (haymaking or pasture), the development of measures that are necessary to improve the natural and sown grasslands, and will contribute to obtaining high yields of green mass, determining the nature of the economic use of a particular forage land and the preservation /improvement of its species composition, in the organization of fodder, in compliance with all known technologies. | Describe and name the morphology and biology, varietal composition of fruit, berry, vegetable and fodder crops. Apply, analyze and recommend them for the implementation of modern technological processes of cultivation. Select and recommend technologies for improving and rational use of natural fodder lands, suggest methods and techniques for organizing the harvesting and preparation of coarse, succulent fodder. | Adaptive technologies in crop production |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Adaptive technologies in crop production | ATR 4324 | AS | Elective subjects | 4.0 | Bachelor | Agriculture and plant growing | 4 | 2 | Fundamentals of seed science of field crops, soil science, fundamentals of scientific research | Agrotechnology of field crops, Information technology in crop production, Precision agriculture basics, Pregraduation practice | The course of Adaptive technologies in crop production is aimed at studying soil and climatic conditions, features of development of field crops, requirements to environmental factors and<br>Creation of technological processes to control the growth, development and formation of high-quality crops. | Demonstrate knowledge of the theoretical foundations of obtaining high yields and ways to increase crop yields, the ability to develop and implement modern technologies for cultivating field crops, taking into account soil and climatic conditions and material and technical equipment of farms; carry out crop management, provide control and evaluation of field crop production technology; conduct field experiments. | Forage production |

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| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Storage and processing technology for crop products | THPRP 4311 | AS | Elective subjects | 5.0 | Bachelor | Agriculture and plant growing | 4 | 2 | crop production, fundamentals of seed science of field crops | Bachelor's degree projects (works) | The discipline studies the theoretical foundations of storage and processing technology of crop products, improving the main processes that occur in crop production during storage and processing, studies ways to reduce the quantitative and qualitative losses of crop products during transportation, sale, storage and processing, product quality indicators and methods for its determination. | Demonstrate knowledge on the requirements for the quality of crop products and methods for assessing, use modern methods and modes for primary processing, laying for storage, storage and processing of crop products; use research methods. | Agrotechnology of field crops |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Agrotechnology of field crops | APK 4325 | AS | Elective subjects | 5.0 | Bachelor | Agriculture and plant growing | 4 | 2 | crop production, adaptive technologies in crop production | Bachelor's degree projects (works) | 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. | Demonstrate knowledge of the theoretical foundations of obtaining high yields and ways to increase crop yields, the ability to develop and implement modern technologies for cultivating field crops, taking into account soil and climatic conditions and material and technical equipment of farms; carry out crop management, provide control and evaluation of field crop production technology; conduct field experiments. | Storage and processing technology for crop products |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | 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 | 2 | crop production | 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 | Find, distinguish and apply methods, methods and means of obtaining, storing, processing information, information and communication technologies, applying application packages, modern information technologies in the production of crop products | Precision agriculture basics |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Precision agriculture basics | OTZ 4266 | BS | Elective subjects | 3.0 | Bachelor | Mechanization of technological processes | 4 | 2 | soil science | Agrotechnology of field crops, Forage production, Selection and seed production of agricultural crops | 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 technical systems for the production of crop products using precision farming technologies. | Find, distinguish and apply methods, methods and means of obtaining, storing, processing information, information and communication technologies, applying application packages, modern information technologies in the production of crop products<br>The ability to apply a system of agrotechnical special measures to improve soil fertility and protect it from erosion, by controlling weeds, introducing and developing crop rotation, the right soil cultivation system in order to obtain high and sustainable crop yields, use crop rotation systems and development plans, apply and adapt soil treatment systems for crop rotation crops taking into account soil and climatic conditions, and optimal placement of crops, taking into account land and soil - climatic conditions. | Information technology in crop production |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Fundamentals of Agribusiness and Entrepreneurship | OAP 4246 | BS | Elective subjects | 4.0 | Bachelor | Economy | 4 | 3 | Fundamentals of anti-corruption culture, occupational safety and fundamentals of life safety | | 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 complex. | Show legal and economic knowledge in the field of agro-industrial complex, agricultural economics and statistics, regulatory documentation, apply the basics of mathematical analysis to analyze the state of industries, distinguish between the features of agribusiness, plan the prospect of development of economic entities in market conditions. | Economics and organization of production of the agro-industrial complex |
| B077 - «Plant growing» | 6B08101 - «Agronomy» | Full-time (bachelor 4 years) trimester | Economics and organization of production of the agro-industrial complex | EOPA 4267 | BS | Elective subjects | 4.0 | Bachelor | Technology of production of products of stock-raising | 4 | 3 | | 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 | Show legal and economic knowledge in the field of agro-industrial complex, agricultural economics and statistics, regulatory documentation, apply the basics of mathematical analysis to analyze the state of industries, distinguish between the features of agribusiness, plan the prospect of development of economic entities in market conditions. | Fundamentals of Agribusiness and Entrepreneurship |

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Head of the department Turbekova A.S.