S.Seifullin Kazakh Agrotechnical University

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S.Seifullin Kazakh Agrotechnical University
Dean of the Faculty of Agronomy
_____ Stybayev G.Zh.
«__» _____ 2022г.

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»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor4 years) trimester	Labor protection and basics of lifesafety	OTOBZh 1117	GER	Elective subjects	5.0	Bachelor	Mechanization of technological processes	1	2	Introduction to the specialty, the basics ofinitial military training, ecology in the scope of secondary school, the basics of valeology, physics, chemistry, information and communication technologies.	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.	Formulate an idea of the problems of sustainable development associated with anthropogenic and technogenic impact. Assess the role of the "human" factor in high-risk work, analyze information about the state of the environment and working conditions at workplaces, analyze phenomena and events of a natural, man-made andsocial nature, choose solutions to the problem of ensuring optimal working conditions, industrial safety and life in emergency situations, integrate the results of scientific research in the field of labor protection and life safety.	Basics of anti-corruption culture
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor4 years) trimester	Basics of anti-corruption culture		GER	Elective subjects	5.0	Bachelor	Economy	1	2	fundamentals of economics and law, philosophy	Economics and organization of production of the agro-industrial complex, Fundamentals of Agribusiness and Entrepreneurship, Marketingin the agro-industrial complex	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 conditionfor combating corruption, psychological features of thenature of corrupt behavior, formation of anti-corruptionculture, features of formation of anti-corruption cultureof youth, ethnic features of formation of anti-corruptionculture, moral and ethical responsibility for corruption in various spheres. Discipline allows you to learn aboutlegal responsibility for corruption offenses	Apply economic and legal knowledge in the field of agriculture. Navigate the branches of Kazakhstani law forstate regulation of the economy and agricultural business. Analyze the economic state of industries, predict the prospects for the development of economic entities in the conditions of the domestic and world markets, identify keyelements and evaluate its impact on the organization, organizational structure. Determine the economic efficiency of the application of technological methods for the production and processing of agricultural products. Assess and integrate the underlying theories of motivation,leadership, and power to address strategic and operationalmanagement challenges, understand the importance of the principles and culture of academic integrity and anti- corruption culture.	Labor protection and basics of lifesafety

B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor4 years) trimester	Introduction toleadership in education	VLO 1121	GER	Elective subjects	5.0	Bachelor	Профессиональное образование	1	2	History of Kazakhstan at school, world history,social studies and self-knowledge, law, literature	Business Statistics, Fundamentals of Agribusiness and Entrepreneurship	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 distributionof 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 sametime the concept of leadership behavior (three leadership styles (K. Levin), research at the Universityof 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).	Apply economic and legal knowledge in the field of agriculture. Navigate the branches of Kazakhstani law forstate regulation of the economy and agricultural business. Analyze the economic state of industries, predict the prospects for the development of economic entities in the conditions of the domestic and world markets, identify keyelements and evaluate its impact on the organization, organizational structure. Determine the economic efficiency of the application of technological methods for the production and processing of agricultural products. Assess and integrate the underlying theories of motivation,leadership, and power to address strategic and operationalmanagement challenges, understand the importance of the principles and culture of academic integrity and anti- corruption culture.	Basics of economics andlaw
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor4 years) trimester	Basics of economics andlaw		GER	Elective subjects	5.0	Bachelor	Economy	1	2	School course of historyof Kazakhstan, fundamentals of law, mathematics	Accounting in Agriculture, Economics and organization of production of the agro-industrial complex, Marketingin in the agro-industrial complex	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.	Apply economic and legal knowledge in the field of agriculture. Navigate the branches of Kazakhstani law forstate regulation of the economy and agricultural business. Analyze the economic state of industries, predict the prospects for the development of economic entities in the conditions of the domestic and world markets, identify keyelements and evaluate its impact on the organization, organizational structure. Determine the economic efficiency of the application of technological methods for the production and processing of agricultural products. Assess and integrate the underlying theories of motivation,leadership, and power to address strategic and operationalmanagement challenges, understand the importance of the principles and culture of academic integrity and anti- corruption culture.	Introduction toleadership in education
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor4 years) trimester	Ecology and sustainable	EUR 2315	AS	Elective subjects	3.0	Bachelor	Ecology	2	1	biology, chemistry	Agriculture, Agrometeorology, Programmingof crop yields	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.	Formulate an idea of the problems of sustainable development associated with anthropogenic and technogenic impact. Assess the role of the "human" factor in high-risk work, analyze information about the state of the environment and working conditions at workplaces, analyze phenomena and events of a natural, man-made andsocial nature, choose solutions to the problem of ensuring optimal working conditions, industrial safety and life in emergency situations, integrate the results of scientific research in the field of labor protection and life safety.	Business Statistics

B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor4 years) trimester	Business Statistics	BS 2343	AS	Elective subjects	3.0	Bachelor	Accounting and finance	2	1	fundamentals of economics and law, philosophy	Accounting in Agriculture, Economics and organization of production of the agro-industrial complex, Marketingin in the agro-industrial complex	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 valuesand indicators of variation. Selective method in statistical studies of business processes. Statistical hypothesis testing. Random variables and probabilisticmodels. 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).	Apply economic and legal knowledge in the field of agriculture. Navigate the branches of Kazakhstani law forstate regulation of the economy and agricultural business. Analyze the economic state of industries, predict the prospects for the development of economic entities in the conditions of the domestic and world markets, identify keyelements and evaluate its impact on the organization, organizational structure. Determine the economic efficiency of the application of technological methods for the production and processing of agricultural products. Assess and integrate the underlying theories of motivation,leadership, and power to address strategic and operational management challenges, understand the importance of theprinciples and culture of academic integrity and anti- corruption culture. Solve mathematical problems and models, find the most appropriate solution methods for mathematical thinking and logic. Calculate and apply mathematical, statistical, informational and graphical methods of data analysis to study various processes in the production of crop productsand the management of agricultural technologies with further generalization of the results obtained.	Ecology and sustainable
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor4 years) trimester	Numerical methods	ChM 2221	BS	Elective subjects	3.0	Bachelor	Computer science	2	3	mathematics, chemistry, physics	Accounting in Agriculture, Management in crop production, Methods of Mathematical Modeling, Probability and application	The course covers the basics of numerical modeling, the solution of applied problems leading to simple differential equations (DDC) and individual derivative differential equations (DGD), the integration of three diagonal systems of algebraic equations, DCK and GDT (scipy.integrate). In Python, DCC and GPD teachthe use of numerical solutions, finite difference methods.	Apply methods, technologies, ways of obtaining, storing and processing information. Classify basic information processing algorithms, develop programs and use application packages in agronomy, apply modern information technologies in the production of crop products. Present and analyze basic information for solvingspecific problems in crop production. Solve mathematical problems and models, find the most appropriate solution methods for mathematical thinking and logic. Calculate and apply mathematical, statistical, informational and graphical methods of data analysis to study various processes in the production of crop productsand the management of agricultural technologies with further generalization of the results obtained.	Basis of Land regulation

B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Basis of Land regulation	OZ 2239	BS	Elective subjects	3.0	Bachelor	Land management	2	3	biology, chemistry	Agriculture, Agrometeorology, Soil science and agrochemistry	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.	Describe and distinguish between the structure and diversity of plant forms, plant life processes, identify wild plants and crops of the region according to their characteristics and their optimal placement, taking into account land and soil-climatic resources. Classify the organization of hereditary material at the gene, chromosome and genomic levels, interpret the molecular genetic and cellular levels of organization of plant life	Numerical methods
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	General biology of organisms	OBO 2216	BS	Elective subjects	7.0	Bachelor	Biology, Plant Protection and quarantine	2	3	biology, chemistry, physics, knowledge of animal taxonomy	Cell culture and plant tissue, Cellular technologies in crop production and breeding	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.	Describe and distinguish between the structure and diversity of plant forms, plant life processes, identify wild plants and crops of the region according to their characteristics and their optimal placement, taking into account land and soil-climatic resources. Classify the organization of hereditary material at the gene, chromosome and genomic levels, interpret the molecular genetic and cellular levels of organization of plant life	Biology of ontogenesis of plants
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Biology of ontogenesis of plants	BOR 2243	BS	Elective subjects	7.0	Bachelor	Biological science	2	3	biology, chemistry	Cell culture and plant tissue, Cellular technologies in crop production and breeding	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.	Describe and distinguish between the structure and diversity of plant forms, plant life processes, identify wild plants and crops of the region according to their characteristics and their optimal placement, taking into account land and soil-climatic resources. Classify the organization of hereditary material at the gene, chromosome and genomic levels, interpret the molecular genetic and cellular levels of organization of plant life	General biology of organisms
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Bases of termodynamics and electromagnetism	OTE 2225	BS	Elective subjects	5.0	Bachelor	Физики и химии	2	3	physics	Biophysics	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, show the ability to work with measuring instruments and application packages, solve applied problems with further generalization of the results obtained in crop production. Understand electrical, magnetic and optical phenomena in crop production.	Plant compositions and floristry
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Plant compositions and floristry	RKF 2244	BS	Elective subjects	5.0	Bachelor	Forest resources and forestry	2	3	biology	Cellular technologies in crop production and breeding, Crop protection, Plant science	The history of the formation of flower arrangements. Style directions of floristry and phytodesign. The art of flower arrangement. Basics of building flower arrangements. Basics of working with fresh flowers and dried flowers. Compositions in European style. "Forms" in floral arrangement. Construction of planar and three-dimensional composition for offices and residential interiors. Types	Describe and distinguish between the structure and diversity of plant forms, plant life processes, identify wild plants and crops of the region according to their characteristics and their optimal placement, taking into account land and soil-climatic resources. Classify the organization of hereditary material at the gene, chromosome and genomic levels, interpret the molecular genetic and cellular levels of organization of	Bases of termodynamics and electromagnetism

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B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Methods of Mathematical Modeling	MMM 3217	BS	Elective subjects	5.0	Bachelor	Higher mathematics	3	1	higher mathematics	Intelligent data analysis, Statistical processing of experimental data	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.	Solve mathematical problems and models, find the most appropriate solution methods for mathematical thinking and logic. Calculate and apply mathematical, statistical, informational and graphical methods of data analysis to study various processes in the production of crop products and the management of agricultural technologies with further generalization of the results obtained.	Programming of crop yields
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Programming of crop yields	PUSK 3242	BS	Elective subjects	5.0	Bachelor	Agriculture and plant growing	3	1	Fundamentals of land management, Biology of plant ontogenesis	Basics of the scientific researches, Intelligent data analysis, Statistical processing of experimental data	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.	Analyze agrometeorological information in crop production technology. Describe the main types and varieties of soils, assess the levels of its fertility, establish the doses and methods of applying organic and mineral fertilizers for the planned harvest of crops. Assess the phytosanitary condition of crops, analyze technologies for phytosanitary optimization of agroecosystems by vegetation phases. Apply a system of agrotechnical measures to improve soil fertility; build crop rotations, tillage systems for crops, taking into account soil and climatic conditions, develop modern technologies for cultivating field crops Interpret the main selection and seed production processes, phenomena and patterns, demonstrate knowledge about seeds. Use modern laboratory equipment to perform qualitative and quantitative analysis of the characteristics and properties of various crops. Generalize and combine knowledge about creating models, varieties and hybrids. Evaluate breeding materials with a set of useful traits based on knowledge of phenotypic, biochemical and molecular genetic techniques. Plan and organize the propagation of seeds of crop varieties. Conduct field experiments and use research methods.	Methods of Mathematical Modeling
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Biophysics	Bio 3216	BS	Elective subjects	7.0	Bachelor	Физики и химии	3	1	physics, higher mathematics	Advanced Physics, Intelligent data analysis	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.	Apply the basic laws and principles of physics, research methods to analyze the results of the experiment and simulate the situation, show the ability to work with measuring instruments and application packages, solve applied problems with further generalization of the results obtained in crop production. Understand electrical, magnetic and optical phenomena in crop production. Solve mathematical problems and models, find the most appropriate solution methods for mathematical thinking and logic. Calculate and apply mathematical, statistical, informational and graphical methods of data analysis to study various processes in the production of crop products and the management of agricultural technologies with further generalization of the results obtained.	Cell culture and plant tissue

B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Cell culture and plant tissue	KKTR 3245	BS	Elective subjects	7.0	Bachelor	Biological science	3	1	biology, chemistry	Herbology, Physiology and biochemistry of plants	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	Describe and distinguish between the structure and diversity of plant forms, plant life processes, identify wild plants and crops of the region according to their characteristics and their optimal placement, taking into account land and soil-climatic resources. Classify the organization of hereditary material at the gene, chromosome and genomic levels, interpret the molecular genetic and cellular levels of organization of plant life	Biophysics
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Probability and application	VP 3313	AS	Elective subjects	4.0	Bachelor	Higher mathematics	3	1	information and communication technologies	Intelligent data analysis, Statistical processing of experimental data	The course is a continuation of sections of advanced mathematics in the field of probability theory. The discipline will allow students to use mathematical methods to study various processes. The course contains the following sections: discrete random variables, continuous random variables, regression analysis, correlation analysis, analysis of variance, non-parametric methods of analysis between quantitative and qualitative variables.	Apply methods, technologies, ways of obtaining, storing and processing information. Classify basic information processing algorithms, develop programs and use application packages in agronomy, apply modern information technologies in the production of crop products. Present and analyze basic information for solving specific problems in crop production.	Precision agriculture basics
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Precision agriculture basics	OTZ 3341	AS	Elective subjects	4.0	Bachelor	Mechanization of technological processes	3	1	soil science	Agriculture, Plant science, Soil science and agrochemistry	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.	Analyze agrometeorological information in crop production technology. Describe the main types and varieties of soils, assess the levels of its fertility, establish the doses and methods of applying organic and mineral fertilizers for the planned harvest of crops. Assess the phytosanitary condition of crops, analyze technologies for phytosanitary optimization of agroecosystems by vegetation phases. Apply a system of agrotechnical measures to improve soil fertility; build crop rotations, tillage systems for crops, taking into account soil and climatic conditions, develop modern technologies for cultivating field crops	Probability and application
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Advanced Physics	UKF 3316	AS	Elective subjects	6.0	Bachelor	Физики и химии	3	2	physics, biophysics	Agrometeorology, Plant science, Soil science and agrochemistry	Discipline An advanced course in physics forms ideas about the picture of the world, natural phenomena and processes, and ways to describe them. In the course of mastering the content of the discipline, students get the opportunity to develop ideas about natural phenomena and processes, laws, relationships and interactions, as well as get an idea of models of physical processes and phenomena that explain their essence.	Apply the basic laws and principles of physics, research methods to analyze the results of the experiment and simulate the situation, show the ability to work with measuring instruments and application packages, solve applied problems with further generalization of the results obtained in crop production. Understand electrical, magnetic and optical phenomena in crop production.	Adaptive technologies in crop production
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Adaptive technologies in crop production	ATR 3340	AS	Elective subjects	6.0	Bachelor	Agriculture and plant growing	3	2	General biology of organisms, fundamentals of Land Management	Crop protection, Plant science, Soil science and agrochemistry	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 Creation of technological processes to control the growth, development and formation of high-quality crops.	Analyze agrometeorological information in crop production technology. Describe the main types and varieties of soils, assess the levels of its fertility, establish the doses and methods of applying organic and mineral fertilizers for the planned harvest of crops. Assess the phytosanitary condition of crops, analyze technologies for phytosanitary optimization of agroecosystems by vegetation	Advanced Physics

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B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Advanced Chemistry	UKH 3324	AS	Elective subjects	8.0	Bachelor	Физики и химии	3	2	chemistry	Applied Chemistry, Physiology and biochemistry of plants	The knowledge gained in the first and second courses is being deepened. The course consists of three parts: general, inorganic and organic chemistry. The general chemistry section discusses reaction mechanisms, binary diagrams, and colloidal systems. In the section of inorganic chemistry, attention is paid to redox reactions, electrochemical systems. Additions to the structure of molecules, spectroscopy issues are considered in the section of organic chemistry.	Approve the basic properties of the most important chemical and bioactive substances, explain the reaction equations, physicochemical methods of analysis; apply the properties of chemicals in the production of crop products, evaluate the equivalents of substances in the preparation of solutions of various concentrations, plan and implement an experiment on the use of chemicals in agronomy using guidelines and literature sources.	Private selection
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Private selection	ChS 3339	AS	Elective subjects	8.0	Bachelor	Agriculture and plant growing	3	2	biology, chemistry	Cellular technologies in crop production and breeding, Crop Breeding, Plant genetics, Seed production and varietal technology of crops	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.	Interpret the main selection and seed production processes, phenomena and patterns, demonstrate knowledge about seeds. Use modern laboratory equipment to perform qualitative and quantitative analysis of the characteristics and properties of various crops. Generalize and combine knowledge about creating models, varieties and hybrids. Evaluate breeding materials with a set of useful traits based on knowledge of phenotypic, biochemical and molecular genetic techniques. Plan and organize the propagation of seeds of crop varieties. Conduct field experiments and use research methods.	Advanced Chemistry
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Applied Chemistry	PH 3214	BS	Elective subjects	5.0	Bachelor	Физики и химии	3	3	chemistry	Intelligent data analysis, Statistical processing of experimental data	In the course of applied chemistry, students deepen their theoretical knowledge and form new practical skills. For example, the regularities of formal kinetics studied in the first year are applied to open reactors, redox processes are supplemented by the study of E- pH diagrams. The issues that were not considered earlier are also considered: high-molecular compounds and radicals, examples of the production of chemical technologies.	Apply methods, technologies, ways of obtaining, storing and processing information. Classify basic information processing algorithms, develop programs and use application packages in agronomy, apply modern information technologies in the production of crop products. Present and analyze basic information for solving specific problems in crop production.	Physiology and biochemistry of plants
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Physiology and biochemistry of plants	FBR 3246	BS	Elective subjects	5.0	Bachelor	Biology, Plant Protection and quarantine	3	3	general biology of organisms, plant systematics, biology of plant ontogenesis	Crop protection, Plant genetics	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	Describe and distinguish between the structure and diversity of plant forms, plant life processes, identify wild plants and crops of the region according to their characteristics and their optimal placement, taking into account land and soil-climatic resources. Classify the organization of hereditary material at the gene, chromosome and genomic levels, interpret the molecular genetic and cellular levels of organization of plant life	Applied Chemistry

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B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Fundamentals of Agribusiness and Entrepreneurship	OAP 3218	BS	Elective subjects	5.0	Bachelor	Economy	3	3	fundamentals of economics and law, labor protection and fundamentals of life safety	Accounting in Agriculture, Marketing in the agro-industrial complex	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.	Apply economic and legal knowledge in the field of agriculture. Navigate the branches of Kazakhstani law for state regulation of the economy and agricultural business. Analyze the economic state of industries, predict the prospects for the development of economic entities in the conditions of the domestic and world markets, identify key elements and evaluate its impact on the organization, organizational structure. Determine the economic efficiency of the application of technological methods for the production and processing of agricultural products. Assess and integrate the underlying theories of motivation, leadership, and power to address strategic and operational management challenges, understand the importance of the principles and culture of academic integrity and anti- corruption culture.	Economics and organization of production of the agro-industrial complex
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Economics and organization of production of the agro-industrial complex	EOPA 3241	BS	Elective subjects	5.0	Bachelor	Technology of production of products of stock-raising	3	3	fundamentals of economics and law, philosophy	Accounting in Agriculture, Management in crop production, Marketing in the agro-industrial complex	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	Apply economic and legal knowledge in the field of agriculture. Navigate the branches of Kazakhstani law for state regulation of the economy and agricultural business. Analyze the economic state of industries, predict the prospects for the development of economic entities in the conditions of the domestic and world markets, identify key elements and evaluate its impact on the organization, organizational structure. Determine the economic efficiency of the application of technological methods for the production and processing of agricultural products. Assess and integrate the underlying theories of motivation, leadership, and power to address strategic and operational management challenges, understand the importance of the principles and culture of academic integrity and anti- corruption culture.	Fundamentals of Agribusiness and Entrepreneurship
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	English for special purposes	AYaDSC 4223	BS	Elective subjects	6.0	Bachelor		4	1	foreign language	Crop protection, French language, Plant science	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	Apply a foreign language in speech professionally oriented situations of communication, study information from foreign sources in the original language. Write, describe, compare, discuss, explain thoughts, facts and opinions orally and in writing in the field of agronomy	Accounting in Agriculture
B077 - «Plant	6B08105 - «Advan	Full-time (bachelor 4	Accounting in	BUCH	BS	Elective	6.0	Bachelor	Accounting and finance	4	1	fundamentals of economics	Management in crop	Features of accounting in agriculture : IFRS 41 "Agriculture". Features of	Apply economic and legal knowledge in the field of agriculture. Navigate the branches of	English for special

growing»	ced Agronomy Science»	years) trimester	Agriculture	4237		subjects						and law, philosophy	production, Marketingin the agro-industrial complex	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 andlivestock. Preparation of financial statements and formation of financial results in agriculture.	Kazakhstani law forstate regulation of the economy and agricultural business. Analyze the economic state of industries, predict the prospects for the development of economic entities in the conditions of the domestic and world markets, identify keyelements and evaluate its impact on the organization, organizational structure. Determine the economic efficiency of the application of technological methods for the production and processing of agricultural products. Assess and integrate the underlying theories of motivation,leadership, and power to address strategic and operational management challenges, understand the importance of the principles and culture of academic integrity and anti- corruption culture.	purposes
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor4 years) trimester	French language	FYa 4212	BS	Elective subjects	10.0	Bachelor	Иностранных языков	4	2	English for special purposes	Management in crop production, Plant science, Statistical processing of experimental	The discipline is aimed at mastering the vocabulary andlanguage features of the French language by students and the formation of intercultural and communicative competence of students in the process of foreign language education.	Apply a foreign language in speech professionally orientedsituations of communication, study information from foreign sources in the original language. Write, describe, compare, discuss, explain thoughts, facts and opinions orally and in writing in the field of agronomy	Plant genetics
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor4 years) trimester	Plant genetics	GR 4238	BS	Elective subjects	10.0	Bachelor	Biological science	4	2	biology, chemistry	Management in crop production, Plant science, Seed production and varietal technology of crops	The discipline studies the cytological, molecular cytoplasmic foundations of heredity, the chromosometheory of heredity, the variability of genetic material, the basics of population genetics, cellular and geneticengineering, types of hybridological analysis.	Describe and distinguish between the structure and diversity of plant forms, plant life processes, identify wild plants and crops of the region according to their characteristics and their optimal placement, taking into account land and soil-climatic resources. Classify the organization of hereditary material at the gene, chromosome and genomic levels, interpret the molecular genetic and cellular levels of organization of plant life. Interpret the main selection and seed production processes, phenomena and patterns, demonstrate knowledge about seeds.Use modern laboratory equipment to perform qualitative and quantitative analysis of the characteristics and properties of various crops. Generalize and combine knowledge about creating models, varieties and hybrids. Evaluate breeding materials with a set of useful traits based on knowledge of phenotypic, biochemical and molecular genetic techniques. Plan and organize the propagation of seeds of crop varieties. Conduct field experiments and use research methods.	French language
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor4 years) trimester	Management incrop production	MR 4217	BS	Elective subjects	3.0	Bachelor	Management and marketing	4	2	fundamentals of economics and law, philosophy	Basics of the scientific researches, Plant science, Statistical	The course examines the basic concepts and categories of management, theory and practice of developing and making managerial decisions in business entities of various forms of ownership in the areas of managing functional processes in an organization, implementing investment	Apply economic and legal knowledge in the field of agriculture. Navigate the branches of Kazakhstani law forstate regulation of the economy and agricultural business. Analyze the economic state of industries, predict the prospects for the development of economic entities in the conditions of the domestic and	Marketingin inthe agro-industrial complex

													processing of experimental data	projects, managing small groups and teams, improving the efficiency of an organization and interacting with the external environment.	world markets, identify key elements and evaluate its impact on the organization, organizational structure. Determine the economic efficiency of the application of technological methods for the production and processing of agricultural products. Assess and integrate the underlying theories of motivation, leadership, and power to address strategic and operational management challenges, understand the importance of the principles and culture of academic integrity and anti- corruption culture.	
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Marketing in the agro-industrial complex	MA 4240	BS	Elective subjects	3.0	Bachelor	Management and marketing	4	2	mathematics, chemistry, physics	Basics of the scientific researches, Plant science, Statistical processing of experimental data	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	Apply economic and legal knowledge in the field of agriculture. Navigate the branches of Kazakhstani law for state regulation of the economy and agricultural business. Analyze the economic state of industries, predict the prospects for the development of economic entities in the conditions of the domestic and world markets, identify key elements and evaluate its impact on the organization, organizational structure. Determine the economic efficiency of the application of technological methods for the production and processing of agricultural products. Assess and integrate the underlying theories of motivation, leadership, and power to address strategic and operational management challenges, understand the importance of the principles and culture of academic integrity and anti- corruption culture.	Management in crop production
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Crop protection	ZSK 4309	AS	Elective subjects	3.0	Bachelor	Biology, Plant Protection and quarantine	4	2	biology	Basics of the scientific researches, Herbology	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.	Analyze agrometeorological information in crop production technology. Describe the main types and varieties of soils, assess the levels of its fertility, establish the doses and methods of applying organic and mineral fertilizers for the planned harvest of crops. Assess the phytosanitary condition of crops, analyze technologies for phytosanitary optimization of agroecosystems by vegetation phases. Apply a system of agrotechnical measures to improve soil fertility; build crop rotations, tillage systems for crops, taking into account soil and climatic conditions, develop modern technologies for cultivating field crops	Entomology and Phytopathology
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor 4 years) trimester	Entomology and Phytopathology	EF 4337	AS	Elective subjects	3.0	Bachelor	Forest resources and forestry	4	2	biology	Basics of the scientific researches, Herbology	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.).	Analyze agrometeorological information in crop production technology. Describe the main types and varieties of soils, assess the levels of its fertility, establish the doses and methods of applying organic and mineral fertilizers for the planned harvest of crops. Assess the phytosanitary condition of crops, analyze technologies for phytosanitary optimization of agroecosystems by vegetation phases. Apply a system of agrotechnical measures to improve soil fertility; build crop rotations, tillage systems for crops, taking into account soil and climatic conditions, develop modern	Crop protection

															technologies for cultivating field crops	
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor4 years) trimester	Statistical processing of experimental data	SOED 4309	AS	Elective subjects	3.0	Bachelor	Computer science	4	3	mathematics, information and communication technologies		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.	Solve mathematical problems and models, find the most appropriate solution methods for mathematical thinking and logic. Calculate and apply mathematical, statistical, informational and graphical methods of data analysis to study various processes in the production of crop productsand the management of agricultural technologies with further generalization of the results obtained.	Basics of the scientific researches
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor4 years) trimester	Basics of thescientific researches	ONI 4342	AS	Elective subjects	3.0	Bachelor		4	3	general biology of organisms, soil science		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 ofexperimental data.	Interpret the main selection and seed production processes, phenomena and patterns, demonstrate knowledge about seeds.Use modern laboratory equipment to perform qualitative and quantitative analysis of the characteristics and properties of various crops. Generalize and combine knowledge about creating models, varieties and hybrids. Evaluate breeding materials with a set of useful traits based on knowledge of phenotypic, biochemical and molecular genetic techniques. Plan and organize the propagation of seeds of crop varieties. Conduct field experiments and use research methods.	Statistical processing of experimental data
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor4 years) trimester	Seed production and varietal technology of crops	SSTSK 4322	AS	Elective subjects	3.0	Bachelor	Agriculture andplant growing	4	3	plant genetics		The discipline "Seed production and varietal technologyof crops" forms theoretical and practical knowledge necessary for the organization of the production of varietal seeds and develops organizational forms and technological techniques for obtaining high-quality seeds of varieties and hybrids of agricultural crops. Thestudy of the discipline course is based on basic knowledge of other biological sciences, especially such as genetics, physiology, cytology, biochemistry, breeding, etc.	Describe and distinguish between the structure and diversity of plant forms, plant life processes, identify wild plants and crops of the region according to their characteristics and their optimal placement, taking into account land and soil-climatic resources. Classify the organization of hereditary material at the gene, chromosome and genomic levels, interpret the molecular genetic and cellular levels of organization of plant life	Herbology
B077 - «Plant growing»	6B08105 - «Advanced Agronomy Science»	Full-time (bachelor4 years) trimester	Herbology	Ger 4338	AS	Elective subjects	3.0	Bachelor	Agriculture andplant growing	4	3	biology, crop protection		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, methodsfor evaluating the effectiveness of plant protection products and methods.	Analyze agrometeorological information in crop productiontechnology. Describe the main types and varieties of soils, assess the levels of its fertility, establish the doses and methods of applying organic and mineral fertilizers for the planned harvest of crops. Assess the phytosanitary condition of crops, analyze technologies for phytosanitary optimization of agroecosystems by vegetation phases. Apply a system of agrotechnical measures to improve soilfertility; build crop rotations, tillage systems for crops, taking into account soil and climatic conditions, develop modern technologies for cultivating field crops	Seed production and varietal technology of crops

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Head of the department Turbekova A.S.