Ministry of Agriculture of the Republic of Kazakhstan
NCJSC «S.Seifullin Kazakh Agrotechnical University»

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Dean of Technical faculty
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CATALOG
Of UNIVERSITY AND ELECTIVE DISCIPLINES
FOR THE DIRECTION OF TRAINING
6B/7M/8D072 - Manufacturing and processing industries

Nur-Sultan, 2021

Catalog of university and elective disciplines for the direction of training 6B/7M/8D072 - Manufacturing and processing industries. – Nur-Sultan, 2021. – 38p.

This catalog contains the list and content, post- and prerequisites, the volume of credits of disciplines of university and elective components offered by the university for the development of bachelor's, master's and doctoral degree programs for the direction of training 6B/7M/8D072 - Manufacturing and processing industries and is intended for students, undergraduates and doctoral students studying under the credit system.

EXPLANATORY NOTE

Dear students (undergraduates, doctoral students)! With the credit system of education, a mandatory element of the educational and methodological complex of the educational program is the catalog of university and elective disciplines (CED) in the field of training. The CED is a list of disciplines included in the university component and the component for the selection of educational programs within the training area 6B/7M/8D072 - manufacturing and processing industries.

The catalog of disciplines is used by students when drawing up an individual curriculum, developed by the student personally under the guidance of an adviser, taking into account the individual abilities of the student, his growth prospects, the needs of the labor market and production.

The catalog offers disciplines that allow students to form their educational trajectory in accordance with the educational program within the training area.

In order to form their educational trajectory, a student (undergraduate, doctoral student) must master all disciplines of compulsory and university components in accordance with the educational program, as well as choose several elective disciplines from the catalog for study.

Code and classification of training areas: 6B/7M/8D072 - Manufacturing and processing industries. Educational program: 6B07201 - "Food technology"

№	Name of the course	Number of credits	Educational trajectory (Specialization)	Summary (topicnames)	Prerequisites	Postrequisites
University component (list of disciplines according to RUP OP)-5 credit						
1.	Labor protection and basics of life safety	5	Deep processing of raw materials and biofuel production Food technology Technology of processing industries	Training of highly qualified specialists with deep theoretical and necessary practical knowledge and skills in the field of OT. Educating students with a sense of responsibility for protecting the personal health of employees with whom graduates of the Kazakh Agrotechnical University will have to work. Development of civic engagement in this state-important matter for the Republic of Kazakhstan.	Physics, Mathematics, Chemistry,Standardization, metrology and certification of meat and dairy products, Standardization, metrology and certification of crop products.	Professional internship, pre-graduate practice;Designing of food production enterprises;Designing plants for the processing of vegetable raw materials and the production of biofuels; Diplom project (work).
Cycle of basic disciplines (DB) (list of disciplines according to RUP OP)-112 credits University component						
2.	Mathematics	5	Food technology; Technology of processing industries; Deep processing of raw materials and biofuel production.	Methods of mathematics, about its role in the development of other sciences. Application of mathematical methods. Basic definitions, theorems, rules, mathematical methods and practical application. Practical skills in solving problems on all the topics of the course provided by the program.	School course of mathematics	Equipments for food products; Equipments for deep processing of raw materials and biofuels production; Processes and devices of food products; Processes and devices of processing industries.
3.	Chemistry	6	Food technology; Technology of processing industries; Deep processing of	Basic methods and principles of chemistry, physico-chemical research methods, basic laws and limits of their applicability. Application of theoretical knowledge to solve specific chemical	School course of chemistry	Theoretical foundations of food products technologies .

			raw materials and biofuel production.	problems and situations. Analysis of the results of chemical processes.. Conducting chemical experiments, working with chemical devices and reagents. Calculation and processing of the received data.		
4.	Physics	4	Food technology; Technology of processing industries; Deep processing of raw materials and biofuel production.	Application of theoretical knowledge to solve specific physical problems and situations. Analysis of the results of a physical experiment. Simulation of physical situations using a computer. Conducting a physical experiment, working with measuring instruments. Calculation and processing of the received data. Basic physical theories and principles, physical research methods, basic laws and limits of their applicability.	School course of physics	Equipments for food products; Equipments for deep processing of raw materials and biofuels production; Processes and devices of food products; Processes and devices of processing industries.
5.	Microbiology	4	Food technology; Technology of processing industries; Deep processing of raw materials and biofuel production..	Basic information about the place of prokaryotes among living organisms, about the morphology, physiology and genetics of microorganisms, as well as about metabolism in a microbial cell. General characteristics of viruses. The use of microorganisms and their metabolites in the food industry. The influence of external factors on microorganisms. Conversion of nitrogen compounds by microorganisms. The concept of infection and immunity.	Chemistry	Biochemistry of food products; Technochemical control, quality assessment and safety of food products; Technochemical control, quality assessment and safety of crop production.
6.	Chemistry and Biochemistry of food products	10	Food technology; Technology of processing industries; Deep processing of raw materials and biofuel production..	Chemistry and Biochemistry is one of the fundamental disciplines in the preparation of a bachelor of food production. Goals and objectives of the discipline: formation of the bachelor's system, knowledge, skills and abilities in biochemistry, acquisition of the basics of knowledge of technological processes; mastering the importance of a complex of knowledge about the chemical nature and transformation of	Chemistry	Fundamentals of technologies for deep processing of raw materials and biofuels production; Technochemical control, quality assessment and safety of food products; Technochemical

				substances in the body, maintaining the quality and safety of food products necessary to meet human needs; Mastering the methods of analyzing the quality of raw materials, semi-finished products and the safety of finished products aimed at reducing the risk of low-quality food products in the field of circulation.		controlquality assessment and safety of crop production.
7.	Professionally-oriented Foreign Language	4	Food technology; Technology of processing industries; Deep processing of raw materials and biofuel production..	Theory of speech communication, phonetic, spelling, lexical, grammatical norms of a professionally oriented foreign language. Introductory, search, study and viewing reading. The sequence of presentation of thoughts, reasoning, translation of texts in the specialty	School course of English language; English language	English language (additiionaly)
8.	Professional Kazakh (Russian) language	3	Food technology; Technology of processing industries; Deep processing of raw materials and biofuel production.	Norms of the Kazakh language according to the profile of the specialty. Meaning-structural features of texts of various functional styles. Communication skills and speech skills when reading texts in the specialty. Monologue and dialogic speech. Characteristics of the correctness of speech and the system of norms of professional language. Analysis of own speech errors.	Kazakh (russian) language	-
9.	Descriptive geometry and engineering graphics	3	Food technology; Technology of processing industries; Deep processing of raw materials and biofuel production..	Teaching the future bachelor the theoretical and practical basics of descriptive geometry and engineering graphics, the ability to solve spatial geometric problems of an engineering nature on flat images of objects.	School course of graphics, mathematics	Draft execution automation
10.	Applied mechanics	5	Food technology; Technology of processing industries; Deep processing of raw materials and biofuel production..	Any device is designed based on careful calculations and methods that must meet all accepted standards. The serviceability of the equipment and its durability depends on a properly calculated design, which requires deep technical knowledge. In this course, students	School course of Physics, Mathematics	Technological machines and equipment of processing industries

				study the theory of applied mechanics and master the skills of computational and experimental work. The program provides for solving problems in the statics and kinetics of a mechanical system, material selection, analysis and calculation of such criteria of equipment operability as strength, rigidity and stability, calculation of mechanical gears and connections.		
11.	Automation execution drawings	5	Food technology; Technology of processing industries; Deep processing of raw materials and biofuel production..	The application of theoretical knowledge to create graphic images, display information, the basics of working in modern graphic means of interactive computer graphics (creating 2D images in Compass). To determine the geometric shape of parts based on their images, the basics of solving problems of geometric modeling of graphic information in interactive graphic packages.	Descriptive geometry and engineering graphics; Information and communication technologies	Equipments for food products; Equipments for deep processing of raw materials and biofuels production, Designing of food production enterprises; Designing plants for the processing of vegetable raw materials and the production of biofuels.
12.	Standardization, metrology and certification of food branch	5	Food technology; Technology of processing industries; Deep processing of raw materials and biofuel production..	Standardization, metrology and certification are inextricably linked, therefore, studying them in one course gives students a more complete idea of the possibility of each of these activities and their totality for compiling the market economy of Kazakhstan.	Microbiology; Chemistry and biochemistryof food products	Technochemical control, quality assesment and safety of meat and dairy products
	Cycle of basic disciplines (DB) (list of disciplines according to RUP OP)-112 credits Component of choice					
13.	Processes and devices of food products	6	Food technology	Basic properties of food products and raw materials. Principles of analysis and calculation of processes and devices. Hydrostatics. Hydrodynamics. Pumps. Separation of heterogeneous systems. Settling and deposition. Filtering. Separation of gas inhomogeneous	Physics;Mathematics;Chemistry;Applied mechanics	Equipments for food products; Designing of food production enterprises.

				systems. Mixing. Heat transfer. Heating, evaporation, cooling and condensation. Evaporation. Fundamentals of mass transfer. Absorption. Distillation and rectification. Extraction in the "LIQUID-LIQUID" system. Extraction in the Solid-liquid system. Adsorption. Drying. Crystallization. Grinding. Pressing.		
14.	Processes and devices of processing industries	6	Technology of processing industries; Deep processing of raw materials and biofuel production..	Classification of processes and devices used in primary and deep processing of grain. The theory of hydro and pneumatic processes and design features, the principle of operation, the basic calculations of devices for the implementation of these processes. The theory of hydromechanical processes and design features, the principle of operation, the basic calculations of devices for the implementation of these processes. Theory of heat and mass transfer processes and design features, principle of operation, basic calculations of devices for the implementation of these processes. The theory of mechanical and biochemical processes and design features, the principle of operation, the basic calculations of devices for the implementation of these processes.	Physics;Mathematics; Chemistry;Applied mechanics	Equipments for deep processing of raw materials and biofuels production; Designing plants for the processing of vegetable raw materials and the production of biofuels; Lifting and transporting equipment and ventilation systems for grain storage and procesing enterprises.
15.	Electrical engineering and bases of electronics	4	Technology of processing industries	Linear electric circuit and its components (basic concepts and definitions of electric and magnetic circuits). Basic laws and methods for calculating electrical circuits (application of Kirchhoff rules, the method of contour currents). Instrument systems: magneto electric, electromagnetic, electro dynamic, induction, electrostatic, electron beam oscilloscopes. The main logical elements of a computer and logical functions.	Physics, Mathematics, Applied mechanics	Equipments for deep processing of raw materials and biofuels production, Lifting and transporting equipment and ventilation systems for grain storage and procesing enterprises
16.	Thermal and	4	Food technology	Classification of equipment processes and devices	Physics, Mathematics,	Equipments for food

	refrigerating equipment of food production			used in primary and deep processing of grain. The theory of hydro- and pneumatic processes and design features, the principle of operation, the basic calculations of devices for the implementation of these processes. The theory of hydromechanical processes and design features, the principle of operation, the basic calculations of devices for the implementation of these processes. Theory of heat and mass transfer processes and design features, principle of operation, basic calculations of devices for the implementation of these processes. The theory of mechanical and biochemical processes and design features, the principle of operation, the basic calculations of devices for the implementation of these processes.	Applied mechanics	products, Lifting and transporting equipment and ventilation systems for grain storage and procesing enterprises
17.	Equipments for food products	7	Food technology	Introduction. Machines for cleaning grain from impurities. Machines for dry grain surface treatment. Machines for processing grain with water and heat. Machines for grinding grain, intermediate products and feed components. Machines for separating grinding products. Peeling, grain separation, grinding and polishing machines. Machines and devices for dosing and mixing components. Weighing and packaging equipment. Machines for pressing compound feeds.	Mathematics; Physics; Descriptive geometry and engineering graphics; Applied mechanics	Processes and devices of food products; Designing of food production enterprises.
18.	Equipments for deep processing of raw materials and biofuels production	7	Deep processing of raw materials and biofuel production.	The study of classifications, structures, basic elements, the principle of operation of equipment for the deep processing of plant raw materials and the production of biofuels, as well as their rational use in technological schemes of processing products.	Processes and devices of processing industries; Applied mechanics	Lifting and transporting equipment and ventilation systems for grain storage and procesing enterprises;Designing plants for the processing of vegetable raw

						materials and the production of biofuels
19.	Technochemical control, quality assesment and safety of meat and dairy products	9	Food technology	Organization of food quality control. Quality indicators. Factors affecting quality. Control as a means to ensure quality. Methods and means of quality control. Quality control of raw milk. Control of the production of drinking milk and cream. Quality control of washing and disinfection of containers and equipment. Evaluation of the quality of ice cream. Oil quality assessment. Control of the production of liquid fermented milk products. Classification of cheeses. Requirements for raw materials for cheese making. Schemes of technical and microbiological control of production. Organization of THC in the meat industry. Acceptance and testing of meat. Organoleptic indicators of meat. (may be meat raw materials) Characteristics of meat of individual animal species. Requirements for the quality of raw materials, containers and finished products. Control of the production process by stages of technological processing. Control and measuring devices. Quality control of finished sausage products. Control of the salting process and the quality of salted and smoked products. Organoleptic and physico-chemical studies of finished products. Determination of the quality of canned food.	Technology of meat and meat products; Physical methods of processing meat and dairy products; Technology of milk and dairy products; Theoretical foundations of food products technologies .	Designing of food production enterprises; Diplom project (work).
20.	Technochemical control, quality assessment and safety of crop products	9	Technology of processing industries	Formation of graduates' ability to research the quality of raw materials, semi-finished products, finished products and technological processes, which allows the bachelor to work successfully in his chosen field of activity,	Technology of vegeyable oils; Flour technology, cereals and feed; Technology of post-harvest processing	Designing plants for the processing of vegetable raw materials and the production of biofuels; Diplomproject (work).

				broaden his horizons, improve professional skills, which will contribute to increasing his competitiveness in the labor market.	of grain and grain drying; Technology of bred and pasta products;Elevator ware-housing, processing and storage of crop production; Theoretical fundamentals of technologies for deep processing of raw materials and biofuels production	
21.	Theoretical foundations of food products technologies	10	Food technology	Introduction. General information about nutrition. Metabolism. The main food and biologically active substances. Characteristics, structure and properties, nutritional value, need and features of assimilation by the consumer's body. The main qualitative characteristics, nutritional, biological and energy value. The concept of quality, quality indicators. Organoleptic, physico-chemical indicators of food quality. Food safety indicators. Quality assessment. Rationing of quality. Fundamentals of technological processes. Separation of heterogeneous systems. Thermal processes. Mass transfer processes. The main chemical transformations in the process of technological processing. Dispersed and colloidal systems. The main chemical transformations in the process of technological processing. Biochemical fundamentals of food production technology. The main raw materials. Grain crops. Flour. Malt. Starch and starch products. Sugar. Oilseed raw materials. Seeds and fruits of oil seeds.	Chemistry and biochemistry of food products; microbiology.	Technology of milk and dairy products;Technology of meat and meat products,also in writing diploma project (work)

22.	Grain science and theoretical foundations of processing industries	10	Technology of processing industries	The discipline "Grain science and theoretical foundations of processing industries" provides for the acquisition by students of theoretical knowledge, practical skills and general information about cereals, oilseeds and legumes, their morphological and anatomical structure, about those crops that are used at grain processing enterprises, necessary for the preparation of a bachelor's degree in Food Technology.In addition, he studies the theoretical foundations of the following industries: technologies of grain, flour, cereals, mixed feeds; production of bread, pasta and confectionery products, preparation of confectionery products of various groups of sweets, marmalade, dragees; sugar production technologies; starch and treacle production technologies; fermentation production technologies; alcoholic beverage production technologies.	Physics; Mathematics; Chemistry	Flour technology, cereals and feed; Technology of bred and pasta products.
23.	Fundamentals of technologies for deep processing of secondary raw materials of animal origin	6	Food technology	Students should know the basic technological techniques, features and principles of technologies for deep processing of raw materials of animal origin for further application of competencies in the study of post-requirements disciplines. Students should be able to classify raw materials by their component composition and choose the appropriate types of pre- and final processing to obtain a particular type of product with high added value. Students should have the skills to independently apply various techniques to establish changes in composition and processing at the stages of deep processing, as well as have the skills to use different strains of microorganisms for enzymatic processing in	Processes and devices of food products; Equipments for deep processing of raw materials and biofuels production	Designing of food production enterprises

				obtaining final products.		
24.	Fundamentals of technologies for deep processing of secondary raw materials of plant origin	6	Technology of processing industries	Students should know the basic technological techniques, features and principles of technologies for deep processing of raw materials of plant origin for further application of competencies in the study of post-requirements disciplines. Students should be able to classify raw materials by their component composition and choose the appropriate types of pre- and final processing to obtain a particular type of product with high added value. Students should have the skills to independently apply various techniques to establish changes in composition and processing at the stages of deep processing, as well as have the skills to use different strains of microorganisms for enzymatic processing in obtaining final products.	Processes and devices of processing industries; Equipments for deep processing of raw materials and biofuels production	Designing plants for the processing of vegetable raw materials and the production of biofuels
25.	Commodity of food products	3	Food technology	The course consists of two sections. The first section outlines the theoretical foundations of commodity science. The main provisions, terms and definitions in this field of knowledge are given. The chemical composition, nutritional value of food products, factors determining them, classification and coding of goods, assortment policy, product information are considered. The issues of the quality of goods and the main methods of determining quality indicators, examination of goods are presented. In the 2nd section consumer properties of separate groups of food products and raw materials, features of their formation and evaluation are considered.	Chemistryand biochemistryof food products; Microbiology.	Physical methods of processing meat and dairy products;Technology of meat and meat products, Technology of milk and dairy products.
26.	Elevator ware-housing, processing and storage of crop production	3	Technology of processing industries	Classification of granaries and requirements for them, mechanics of bulk materials, a construction site, a master plan for a grain receiving enterprise,	Physics;Mathematics; Applied mechanics ; Descriptive geometry	Lifting and transporting equipment and ventilation systems for

				post-harvest processing of crop production, grain warehouses and mechanized work towers, elevators, operational calculation of the elevator, technological features of modern elevators, workshops and plants for seed processing, warehouses for storing grain processing products, operation of elevators and grain receiving enterprises.	and engineering graphics; Technology of post-harvest processing of grain and grain drying.	grain storage and procesing enterprises; Designing plants for the processing of vegetable raw materials and the production of biofuels.
27.	Fundamentals of scientific research food products	6	Food technology	General information about science and scientific research. Epistemological foundations of scientific research. Organization of scientific research. Processing of scientific information. theoretical research. Experimental studies. Experimental factorial mathematical models. Experimental plans and their properties. processing of experimental results. Registration of the results of scientific work and ways of informing the scientific community.	Standardization, metrology and sertification ofmeat and dairy products; Commodity of food products; Theoretical foundations of food products technologies .	Technochemical control, quality assessment and safety of meat and dairy products; Designing of food production enterprises, used for conducting research works (term papers, term project, diploma projects, theses, scientific reports, etc.).
28.	Lifting and transporting equipment and ventilation systems for grain storage and procesing enterprises	6	Technology of processing industries	Introduction. The role of lifting and transporting devices and pneumatic transporters in the development of industry and agriculture. Scope of application. Classification and operating modes, advantages and disadvantages of lifting and transporting devices and pneumatic transporters. The main nodes of loading and transporting machines. Lifting and traction mechanisms. Locking and braking devices. Cargo handling devices. Flexible traction elements. Polispasts. Rope blocks and drums. Asterisks. Devices, components and calculation bases of lifting and transporting machines. Characteristics of devices and components. Theoretical foundations of the calculation of transporting and lifting machines.	Equipments for deep processing of raw materials and biofuels production; Grain science and theoretical foundations of processing industries; Fundamentals of technologies for deep processing of raw materials and biofuels production.	Designing plants for the processing of vegetable raw materials and the production of biofuels;Labor protection; Course and diploma design, industrial technological and pre-graduate practices

				Traction calculation of the conveyor. Lifting, loading-loading and transporting machines. Rail and trackless cars. Belt conveyors. Elevators (norii). Scraper, slat and plate conveyors. Screw conveyors (screw). Designs of the main elements and devices of transporting machines. Unified designs of devices, assembly units and parts. Working bodies and auxiliary devices. Rotary devices of conveyors. Tensioning devices of conveyors and elevators. Conveyor frames and bases. Automobile, railway unloaders and loaders.		
29.	Physico-chemical methods of processing food products	6	Food technology	Methods for determining the optical properties of food products. Processing of food products with alternating electric current. Electrocontact methods of food processing. Electroplasmolysis. A high-frequency method of processing meat and dairy products. Ultrahigh frequency method of food processing. Processing of food products in an electrostatic field. Processing of food products using acoustic methods. Processing of food products by infrared radiation	Theoretical foundations of food products technologies; Equipments for food products.	Technochemical control, quality assesment and safety of meat and dairy products; Technology of meat and meat products, Technology of milk and dairy products; Designing of food production enterprises.
30.	Technology of post-harvest processing of grain and grain drying	6	Technology of processing industries	Grain as an object of storage; characteristics of grain masses; basic operations with grain and seeds performed at granaries; grain as a commodity and an object of consumption; weighing equipment, weighing procedure and operation of scales; grain cleaning technology; grain drying and aeration plants; shaft and chamber grain dryers; recirculating grain dryers; mobile grain dryers; in-line technological lines of granaries; features of technological lines for processing grain of various crops; environmental protection and fire-explosion safety equipment.	Grain science and theoretical foundations of processing industries, Fundamentals of technologies for deep processing of raw materials and biofuels production.	Designing plants for the processing of vegetable raw materials and the production of biofuels; Elevator ware-housing, processing and storage of crop production;Lifting and transporting equipment and ventilation systems for grain storage and procesing enterprises;Flour

						technology, cereals and feed
Cycle of profile disciplines (PD) (list of disciplines according to RUP OP)-60 credits University component						
31.	Management	3	Deep processing of raw materials and biofuel production. Food technology Technology of processing industries	New managerial competencies in the context of globalization and new technologies. External environment and corporate culture. Managing a highly effective corporate culture. Factors of the international business environment. Modern problems of entrepreneurship development in Kazakhstan. Types of planning. The fundamental strategies of the company. Models of managerial decision-making. Designing adaptive organizations: their advantages and disadvantages. A model of planned organizational changes. Issues of the use of human resources in modern conditions. Dynamics of organizational behavior. Work in teams. Leadership in modern conditions. Power and influence. Motivational reinforcement theory. Organizational control as a key function of Management.	Mathematics	Economics and entrepreneurship.
32.	Economics and entrepreneurship	6	Deep processing of raw materials and biofuel production. Food technology Technology of processing industries	To master the conceptual apparatus and terminology; the essence of the enterprise as an object of management, its place and role in the system of the national economy; the main factors of production: the resource base of the enterprise and the efficiency of the use of various resources; methods for calculating the efficiency of production and economic activities of enterprises, the effectiveness of the main directions of STP, capital investments; features of the use of production funds, labor productivity growth and profitability of production; methods of organizing labor processes and operations; the main methods	Mathematics, Management.	Designing of food production enterprises, Designing plants for the processing of vegetable raw materials and the production of biofuels; Diplomproject (work).

				of personnel management; the theory of employee motivation.		
33.	Designing of food production enterprises	8	Food technology	Design of food industry enterprises. Designing objects of food industry enterprises and small-capacity enterprises for processing meat and milk. Feasibility studies of construction or reconstruction of meat industry enterprises, selection and justification of technical schemes, product calculation, calculation and selection of technological equipment, layout of workshops and industrial buildings.	Commodity of food products, Technology of meat and meat products, Technology of milk and dairy products, Equipments for food products,	Pre-graduate practice, Diplom project (work)
34.	Designing plants for the processing of vegetable raw materials and the production of biofuels	8	Technology of processing industries	The main stages and principles of designing technological schemes for the storage, processing of plant raw materials and the production of biofuels are considered. The methods of calculation and selection of the main technological and transport equipment, calculation of the quantitative balance of the technological process of production, design of in-shop communications are given.	Fundamentals of technologies for deep processing of raw materials and biofuels production, Equipments for deep processing of raw materials and biofuels production, Lifting and transporting equipment and ventilation systems for grain storage and procesing enterprises.	Pre-graduate practice, Diplom project (work)
35.	Technology of milk and dairy products	8	Food technology	Microbiology of milk and dairy products, basic Microbiology: morphology and physiology of microorganisms; the influence of the external environment on the development of microorganisms; the spread of microorganisms in nature; the role of microorganisms in the transformation of substances in nature; special Microbiology: microorganisms used in the production of dairy products; causative agents of spoilage (defects) of milk and dairy products;	Commodity of food products, Theoretical foundations of food products technologies ,Chemistry and biochemistryof food products, The technology of public catering.	Technochemical control, quality assesment and safety of meat and dairy products; Designing of food production enterprises, Diplom project (work).

				fundamentals of industrial hygiene and sanitation at dairy production enterprises; Microbiology of raw, drinking milk, sourdough, Microbiology of fermented dairy products, butter, cheese, canned milk and ice cream, dairy by-products. Bio Chemistry of milk and dairy products. Technology and organization of milk and dairy products production.		
36.	Technology of bread and pasta products	8	Technology of processing industries	Technology of bread, flour confectionery and pasta: theoretical knowledge in the field of technology of bakery, confectionery and pasta production; analysis of modern technologies and evaluation of their effectiveness; chemical composition, organoleptic and physico-chemical properties of raw materials and its baking qualities; modern methods of quality of finished products; ways to improve the quality and nutritional value of products; assortment of bread and pasta, their nutritional value; technological processes for obtaining products of bakery and pasta production; features of the technological process of preparation of various types of confectionery products; interchangeability of various types of raw materials and replacement rules; accounting and analysis of consumption of raw materials and packaging materials	Grain science and theoretical foundations of processing industries, Technology of post-harvest processing of grain and grain drying, Flour technology, cereals and feed	Designing plants for the processing of vegetable raw materials and the production of biofuels
37.	Technology of meat and meat products	8	Food technology	Improving the knowledge and professional competence of future specialists, as well as expanding the horizons of meat and meat products technology, semi-finished products production technology, management of existing technological processes, mastering the technique of economic calculations in the design of enterprises.	Chemistry, Microbiology, Chemistry and biochemistry of food products, Equipments for food products, Theoretical foundations of food products	Designing of food production enterprises; Diplom project (work).

					technologies, Physical methods of processing meat and dairy products.	
38.	Flour technology, cereals and feed	8	Technology of processing industries	The purpose of teaching the discipline "Flour technology, cereals and feed" provides for the acquisition by students of theoretical knowledge and practical skills in the technology of processing grain into flour, cereals and mixed feeds. When studying the discipline, special attention should be paid to the principles and methods of technology of flour, cereals and compound feeds, theoretical provisions on which engineering variants of technological operations of the processes of cleaning, preparation and grinding of grain and husking of grain of cereals are based, which can be used in their subsequent work. Modes of cleaning and preparation of grain for processing. Requirements of flour mills and grain mills for raw materials. Rules for the organization and management of technological processes at mills, grain and feed mills. To study traditional and non-traditional types of raw materials for the production of compound feeds, the rules of their reception, placement and storage. Technological lines of feed mills. Classic and other feed production schemes	Equipments for deep processing of raw materials and biofuels production, Grain science and theoretical foundations of processing industries, Fundamentals of technologies for deep processing of ra materials and the production of biofuel, Elevator ware-housing, processing and storage of crop production,	Technochemical control of crop production; Designing plants for the processing of vegetable raw materials and the production of biofuels; Diplom project (work).
39.	The technology of public catering	8	Food technology	Folk cuisine and professional cooking. Modern trends in the development of public catering. Development of the theoretical foundations of the technology of public catering products. Technological properties of raw materials, Methods of culinary processing of food products, Classification and assortment of culinary	Chemistry, Microbiology, Chemistry and biochemistry of food products, Theoretical foundations of food products technologies .	Technology of meat and meat products; Technology of milk and dairy products; Designing of food production enterprises; Diplom project (work).

				products. Menu. Organization of production work in restaurants and bars. Types and characteristics of retail premises of restaurants and bars. Tableware, appliances and linen. Purpose and use. Processes that form the quality of public catering products. Regulatory documentation at public catering enterprises, technological maps, compounding books, brakerage. Vegetables, their primary processing and technological use. Changes in the storage of vegetables. Processing of vegetables, fruits, mushrooms. Technological properties of vegetables. Centralized production of vegetable semi-finished products. Processing of fish and non-volatile water raw materials. Characteristics, structure and composition of the muscle tissue of fish. Processing and preparation of semi-finished products, the requirement for the quality of semi-finished products. Processes occurring during the heat treatment of fish. Meat processing. Characteristics, structure and composition of muscle tissue of meat. Butchering of carcasses. The importance of meat dishes in nutrition.		
40.	Technology of vegetable oils	8	Technology of processing industries	Formation of ideas, knowledge, skills in the field of vegetable oil production from crop production (oilseeds) for the most rational use of grown products, taking into account its quality, reducing product losses during storage and processing (vegetable oil production), improving the efficiency of storage and processing, expanding the range of products.	Equipments for deep processing of raw materials and biofuels production, Processes and devices of processing industries, Grain science and theoretical foundations of processing industries, Fundamentals of	Technochemical control of crop production; Designing plants for the processing of vegetable raw materials and the production of biofuels; Flour technology, cereals and feed

					technologies for deep processing of raw materials and biofuels production	

Code and classification of training areas: 7M72 - Manufacturing and processing industries
Educational program: 7M07201 - "Food technology"

№	Name of the course	Number of credits	Educational trajectory (Specialization)	Summary (topicnames)	Prerequisites	Postrequisites
Cycle of basic disciplines (DB) (list of disciplines according to RUP OP) University Component (VC)-6 credits						
41.	History and philosophy of science	5	Food technology	Philosophy and methodology of science as a branch of philosophical knowledge. Science in culture and civilization. The emergence of science. The main stages of the historical dynamics of science. The structure of scientific knowledge. Scientific revolutions. Scientific rationality. Features of the modern stage of science development. Science as a social institution Natural sciences in the structure of modern scientific knowledge. The history of the formation of the sciences of society, culture, history and man.	Philosophy, religious studies, sociology, political science.	Knowledge of the history and philosophy of science will contribute to the formation of undergraduates' knowledge in the disciplines of specialization and methodology of scientific knowledge, skills and abilities of research activities.
42.	Foreign language (professional)	5	Food technology	What is agriculture? Knowledge of the subject. Tools and equipment. Functions. What you need to read. A bank of authentic materials. Work skills. Identification of the culture of the place of work. Identification of target events. Organizational structure. Job descriptions. Job interview. To-do lists. Organization of fairs and conferences. Job change.	Foreign language (Bachelor's degree) English for special purposes Professionally-oriented foreign language	Disciplines in the specialty in English, English for academic purposes
43.	Pedagogics of higher school	5	Food technology	Fundamentals of higher school pedagogy. The subject and tasks of higher school pedagogy. Methodology and methods of	Philosophy, psychology, history, cultural studies,	Passing of pedagogical practice

				pedagogical research in higher education. Didactics of higher education. The pedagogical process in higher education. Laws, patterns and principles of learning. Methods, forms and means of teaching in higher education. The current state of higher education in the Republic of Kazakhstan. Professional formation of a high school teacher. The process of education in high school. The purpose of education as a pedagogical problem. Educational staff as a form of functioning of an integral pedagogical process.	sociology;	
44.	Psychology of management	5	Food technology	Introduction to Management psychology. Conceptual apparatus of management psychology. The manager and the team. Conflicts in the labor collective. Managerial communication. Decision-making technology. The concept of the subject and the object of management. The leader and the leader. Psychology of the order. Personality as a subject and object of management. Democratic leadership style and its features. Psychology of criticism. Psychotypes of communication subjects. Psychological technique of persuasive influence. Psychological problems of the selection of senior personnel. Psychological problems of training and retraining of senior personnel. Recruitment and placement of personnel. Rotation of personnel. Certification and staffturnover	Philosophy, psychology, history, cultural studies, sociology;;	Passing of pedagogical practice
Component of choice						
45.	Biotechnological bases	5	Food technology	The main directions in food biotechnology.	Chemistry,	Modern technologies

	of food production			Recombinant DNA technology. Preparation of enzyme preparations and their application in the food industry. General biotechnological scheme for the production of microbial synthesis products. Deep processing of starch-containing raw materials to produce edible acids. Fundamentals of fermentation technology. The use of enzymes in the production of starch servants. Production of amino acids and vitamins. Algae in the food industry. Obtaining lipids with the help of microorganisms. Deep processing of livestock products. The use of lactic acid bacteria in the production of cheeses, fermented milk products, preservation. Microbial protein. Identification of genetically modified foods. Waste management and food industry	Microbiology, Chemistry and biochemistry of food products.	for the production of meat and dairy products; Promising technologies of deep processing of vegetable raw materials and the production of biofuels;Completion of the Master's thesis.
46.	Food safety: inspection, sanitation and HACCP	5	Food technology	Concepts of food safety. The Law of the Republic of Kazakhstan on food safety. Basic concepts, principles and characteristics of the HACCP system. The HACCP quality system in world practice. Food safety systems at agricultural enterprises. Development and implementation of HACCP at meat and dairy processing enterprises. Risk analysis during the implementation of HACCP. Veterinary and sanitary examination of food contamination by technogenic and biogenic contaminants.	Food and biological safety of products, technology of processing animal products, hygiene, veterinary and sanitary examination, contamination of food with foreign substances.	Completion of the Master's thesis.
47.	Scientific basis for food production	5	Food technology	The subject of the course "Scientific basis for food production" is the theoretical and	Inorganic and organic Chemistry, analytical	Completion of the Master’s

				practical foundations of the technology of food production from raw materials of plant and animal origin, necessary for the effective operation and development of the specialty, the study of the requirements for the raw materials of its processing methods, the acquisition of skills in the organization and management of technological processes of food production and the solution of emerging problems, their use in practice and in the implementation of the master's thesis.	and physical colloidal Chemistry, Food technology.	thesis;Moderntechnologies for the production of meat and dairy products.
Cycle of profile disciplines (PD) University component (VC)						
48.	Modern equipment for food production	5	Food technology	General information about technological equipment; Classification of modern technological equipment; Technological equipment of the meat industry, their main parameters; Machines for grinding raw materials; Kneading machines; Mixing machines; Washing machines and installations; Machines for separating inhomogeneous media; Machines for pressure treatment; Filters; Separators; Equipment used for the production of butter; Equipment for the production of cottage cheese; Equipment for roasting; Capacitive equipment; Tanks; Modern machines and machines for packaging and packaging; Modern designs of scales and dispensers.	Processes and devices of processing industries. Technological machines and equipment of processing industries. Technical systems for the production of products of deep processing of vegetable raw materials and biofuels.	Completion of the Master’s thesis.
49.	Business planning in the storage and processing of agricultural products	5	Food technology	The essence and importance of business planning in enterprise management. The choice of an enterprise development strategy and its reflection in business plans. Basic requirements for the development of	Mathematics, Management, Enterprise economics and entrepreneurship	Completion of the Master’s thesis;Modeling of processes of food production

				business plans. Principal models of the business plan. Features of the development of the section of the business plan "Marketing Plan". Development of the section of the business plan "Production Plan". Development of the section of the business plan "Financial plan". Preparation for the development of a business plan. Methodology for developing a marketing plan. Determination of the volume of production and sale of products (services). Resource usage assessment. Planning the need for personnel. Balance forecast. Profitutilization. Financial condition. Pricing		
50.	Modeling of processes of food production	5	Food technology	Basic concepts of mathematical modeling. Theoretical foundations and mathematical modeling of grain separation and grinding processes. Theoretical foundations and mathematical modeling of meat processing processes for boiled sausages. Mathematical modeling of extrusion processes. Modeling of drying based on the laws of thermodynamics. Theoretical foundations and mathematical modeling of wheat bread baking processes. Theoretical foundations and mathematical modeling of fruit and vegetable freezing processes. Theoretical foundations and mathematical modeling of meat salting processes. Mathematical modeling and optimization of nutrient conservation during sterilization. Theoretical foundations and mathematical modeling of raw materials storage processes.	Business planning in the storage and processing of agricultural products. Food technology. Processes and devices of processing industries. Technological machines and equipment of processing industries.	Promising technologies of deep processing of vegetable raw materials and the production of biofuels;Completion of the Master’s thesis.
51.	Modern technologies	5	Food technology	Prospects for the development of the meat	Technology of milk	Completion of the

	for the production of meat and dairy products			and dairy industry of Kazakhstan. Milk as a raw material of the dairy industry. Requirements for milk. Seasonal changes in the composition and properties of milk. Indicators characterizing the quality of milk. Mechanical processing of milk. The composition and properties of milk that determine the possibility of mechanical processing. Heat treatment of milk. Types of heat treatment. Technology of drinking pasteurized milk. Technology of bacterial starter cultures. The role of lactic acid microflora in the production of dairy products. Technology of fermented milk products. Technology of fermented milk products using probiotics and bifidobacteria. The technology of production of cottage cheese and cottage cheese products. Technology of production of canned milk. Technology of dry dairy products. Methods of drying products. Cheese production technology. The role and importance of meat and meat products in nutrition Composition and characteristics and types of meat raw materials. Methods of storage of meat and meat products. Methods of preserving meat Technology of production of canned goods Technology of production of canned goods.	and dairy products, Technology of meat and meat products. Fundamentals of food technology. Scientific basis for food production. Biotechnological bases of food production	Master's thesis.
52.	Innovative storage technology of processing plant products	5	Food technology	To study the issues of creating innovative technology for processing, storage and processing of cereals, legumes and oilseeds; physiological, biochemical and microbiological changes occurring in grain	Processes and devices of processing industries. Technological machines and	Completion of the Master's thesis

				during storage. Special attention in this subject is focused on solving topical issues of disinsection, hydrothermal, ultrasonic, laser, desiccation, thermal radiation, electromagnetic, ozone and ion technologies at grain processing enterprises.	equipment of processing industries Modern equipment for food production	
53.	Technical systems for the production of products of deep processing of vegetable raw materials and biofuels.	7	Food technology	Classification of equipment for deep processing of raw materials and biofuel production products. Machine and hardware schemes for the production of biofuels products. Equipment for mechanical separation and mixing of raw materials and biofuel production products. Equipment for transportation of raw materials and products of biofuel production (pumps for moving liquid, gaseous and viscous products; pneumatic pipeline and aerosol transport; Lifting and transport devices of periodic action for moving piece loads; continuous transport devices). Auxiliary equipment and devices (weighing dispensers, liquid media dispensers, gas distributors, valves, throttles, etc.). Equipment for extraction, extraction of raw materials and biofuel production products. Equipment for separation of liquid and solid phases (centrifuges and separators). Equipment for filtering and flotation of raw materials and biofuel production products. Equipment for the concentration and purification of raw materials and biofuel production products. Equipment for drying raw materials and biofuel production products. Equipment for fermentation (bioreactors, fermenters, plant	Processes and devices of processing industries. Technological machines and equipment of processing industries	Completion of the Master's thesis;Promising technologies of deep processing of vegetable raw materials and the production of biofuels; Modern equipment for food production

				plants) of raw materials for the production of biofuels. Equipment for storage of raw materials and products of biofuel production. Equipment for cleaning raw materials and biofuel production products. Equipment for generating energy from biofuels.		
54.	Principles for developing formulations of new types of food products	7	Food technology	This is a new scientific direction of research that allows us to develop the composition of complex multicomponent products with a given set of qualitative and quantitative indicators, using the basic principle of the theory of balanced nutrition - food nutrients must enter the human body in a certain amount and ratio. By varying the composition of prescription mixtures, enriching them with essential nutrients, it is possible to achieve a certain direction of physiological impact. When developing new formulations, the possibility of modeling the consumer characteristics of finished products, predicting their biological safety, quality and functional and technological properties, taking into account the phenomenon of synergy, is also of great importance, which ultimately makes it possible to increase their competitiveness. Increased competition in the raw materials and food markets leads to the need to constantly expand the range of products by correcting existing prescription compositions and developing new formulations.	Biotechnological bases of food production. food safety. Inspection, sanitation and HACCP. Scientific basis for food production. Modern equipment for food production. Modeling of processes of food production .	Completion of the Master's thesis.
55.	Promising technologies	8	Food technology	The main groups of raw materials sources.	Methods for analyzing	Completion of the

	of deep processing of vegetable raw materials and the production of biofuels			Secondary resources of deep processing of plant raw materials and biofuel production. Energy use of industrial waste. Production of liquid and gaseous biofuels. Methane and hydrogen fermentation. Technology of biogas production-methane and hydrogen. Bioethanol and biodiesel production technology. Technological schemes of bioenergy installations.	products of deep processing of vegetable raw materials and biofuels. Technical systems for the production of products of deep processing of vegetable raw materials and biofuels.Biotechnological bases of food production. Modeling of processes of food production	Master's thesis.
56.	Waste-free production technology of meat and dairy products	8	Food technology	When studying the discipline, undergraduates study modern principles of waste-free and resource-saving processing technology in obtaining high-quality and safe products from secondary resources of dairy and meat products. The study of their ways of identifying the progress of production at the present stage and obtaining new theoretical and practical scientific solutions.	Methods for analyzing products of deep processing of vegetable raw materials and biofuels. Technical systems for the production of products of deep processing of vegetable raw materials and biofuels.Biotechnological bases of food production. Modeling of processes of food production	Completion of the Master's thesis.
57.	Methods for analyzing products of deep processing of vegetable	7	Food technology	Theoretical issues of assessing the quality of raw materials and finished products. Terms and definitions. Organization of laboratory	Chemistry. Physics. Technochemical control of grain	Completion of the Master's thesis.

	raw materials and biofuels			control. Classification of compounds present in products. Classification of methods for studying the properties of raw materials and finished products. General principles of analysis and sample preparation. Organoleptic methods for assessing the quality of products. Instrumental methods for the study of rheological properties. Physico-chemical methods for studying the composition and properties of raw materials and products. Microbiological methods. Spectroscopy. The use of spectra to determine the chemical composition and safety of raw materials and finished products. Chromatographic methods of analysis: basic principles. Electrochemical research methods. Safety regulations for working in laboratories.	processing enterprises with the basics of Quality management.	
58.	Methods for assessing the quality of processing products		Food technology	The study of modern methods for assessing the quality of raw materials and processed products, the principles of analytical instruments, interstate regulations for food processing. Skills in assessing the quality of raw materials, semi-finished products and finished products, certification, requirements for quantitative and qualitative storage of products and ways to reduce natural loss and losses in storage areas, methods and modes of storage of livestock products.	Chemistry. Physics. Technochemical control of grain processing enterprises with the basics of Quality management	Completion of the Master's thesis.

Code and classification of training areas:7D72 - Manufacturing and processing industries
Educational program:8DM07201- "Food technology"

№	Name of the course	Number of credits	Educational trajectory (Specialization)	Summary (topicnames)	Prerequisites	Postrequisites
Cycle of basic disciplines (DB) (list of disciplines according to RUP OP) University Component (VC)- credits						
59.	Academic writing	5	Food technology	Application of techniques of preparation for writing (free writing, brainstorming), drawing up a plan. The basic principles of creating an essay. Working with scientific texts: abstracting. Working with scientific texts:annotation. Basics of bibliography: references, description. Review of a scientific publication. Preparation of a summary of a scientific article. Editing academic text. Development of a presentation of your own project.	Scientific basis for food production, Modeling of processes of food production , Modern technologies for the production of meat and dairy products	PhD student's research work
60.	Methods of scientific research	3	Food technology	The formulation of a scientific problem based on the disclosure of contradictions between the currently available knowledge about the object of research and the knowledge necessary for the practical solution of the problem demanded by society. The choice of the topic and the scientific justification of its relevance for practical application. Formulation of a hypothesis, development of a scientific research plan. Methods of theoretical, experimental research and registration of scientific results.	Scientific basis for food production, Modeling of processes of food production , Modern technologies for the production of meat and dairy products	PhD student's research work
Cycle of basic disciplines (DB) (list of disciplines according to RUP OP) Component of choice						
61.	Theory of food	6	Food technology	Modern scientific support, development of	Scientific basis for	PhD student's research

	technology			concepts of technological processes in the food industry. The main directions of state policy in the field of scientific support of technological processes in the food industry. Scientific support of technological process concepts in the food industry. Problems of food technology development. Theory of leading mechanical and hydromechanical processes. Theory of leading heat and mass transfer processes. Innovative high-tech food technologies. Theory of leading biotechnological processes in food products, quality. Innovative technological processes in the production of new food products. Modern aspects of functional product design.	food production, Modeling of processes of food production , Modern technologies for the production of meat and dairy products	work
62.	The advanced technologies of obtaining of biologically active substances and nutraceuticals of animal and vegetable raw materials	4	Food technology	Biotechnology of production of food additives and biologically active substances. Methods of obtaining biologically active food substances (from raw materials of plant, animal and microbiological origin) and based on organic synthesis. Classification and properties of dietary supplements, BAS. Physico-chemical properties and biological functions of dietary supplements. Food protein preparations of plant and animal origin.	Scientific basis for food production, Modeling of processes of food production , Modern technologies for the production of meat and dairy products	PhD student's research work
63.	Scientific aspects of processing plant products	3	Food technology	The main priority scientific directions of processing industries, considering theoretical issues, substantiating the technological foundations of effective processing of crop products for the production of food and starch products and alcohol.	Scientific basis for food production, Modeling of processes of food production , Modern technologies for the production of meat and dairy	PhD student's research work

					products	
64.	Scientific basis of combined products creation	3	Food technology	Study, research and development of technology of complex multicomponent products with a given set of qualitative and quantitative indicators. The main regularities are: biochemical, enzyme-microbiological processes and their influence on the qualitative characteristics of raw materials and food products; biotechnological potential of raw materials of animal and plant origin and methods of its directional regulation in order to obtain products with specified properties and composition.	Scientific basis for food production, Modeling of processes of food production , Modern technologies for the production of meat and dairy products	PhD student's research work
65.	International, regional and national certification systems	3	Food technology	Theoretical foundations of international, regional and national standardization and certification of products. Technical regulations of the Customs Union. Tasks of the International Organization for Standardization (ISO). The organizational structure of ISO. Areas of activity of ISO Committees. Algorithm for the development of an international standard. The main goals and activities of the International Organization of Legal Metrology (OIML), the General Agreement on Tariffs and Trade (GATT), the European Organization for Quality (EOC), ILAC, SEN, SENELEC, etc. The scope of the Codex Alimentarius.	Scientific basis for food production, Modeling of processes of food production , Modern technologies for the production of meat and dairy products	PhD student's research work
Cycle of profile disciplines (PD) (list of disciplines according to RUP OP)- 22 credits University component						
66.	Nanotechnology in food and processing industries	3	Food technology	Fundamentals of nanotechnology for processing raw materials and their use in food production, including historical aspects of the development of nanotechnology, basic	Scientific basis for food production, Modeling of processes of food production ,	PhD student's research work

				terms and definitions, fundamentals of nanotechnology, nanoeffects and types of nanostructures, methods of their production, directions, use cases, scientific developments on the use of nanostructured materials in food.	Modern technologies for the production of meat and dairy products	
67.	Digital technologies in science and industry	3	Food technology	Digital technologies for the raw material - consumer system using information and communication technologies. Development and implementation of big data collection, processing and analysis tools (Big data). Development and implementation of a single distributed database using blockchain technology for the integration of scientific research.	Scientific basis for food production, Modeling of processes of food production , Modern technologies for the production of meat and dairy products	PhD student's research work
68.	Genetic engineering in the food industry	3	Food technology	Modern trends in the development of genetic engineering; Technology for obtaining genetically modified organisms; Problems and prospects of genetic engineering. The main methods and equipment used for setting up genetic engineering experiments; The formation of skills for analyzing modern data on the use of genetic engineering methods in the food industry; The specifics of obtaining and processing genetically modified sources and its biological safety.	Scientific basis for food production, Modeling of processes of food production , Modern technologies for the production of meat and dairy products	PhD student's research work
69.	Methodology of mathematical processing of scientific results	3	Food technology	Original models of mathematical management of scientific results that plan and conduct research using modern methods of processing scientific results, allowing to effectively solve scientific and technical problems in the field of food technology.	Scientific basis for food production, Modeling of processes of food production , Modern technologies for the production of meat and dairy	PhD student's research work

					products	
70.	Commercialization of innovative technologies	3	Food technology	The concept of commercialization of innovative projects, assessment of potential demand. Fundamentals of commercialization of research and development results. Methods and technological techniques of professional commercialization of innovative technologies. Methods of marketing communications in the commercialization of innovative technologies. Organization of intellectual property protection in the processes of commercialization of innovative solutions. Organization of safety in the processes of commercialization of innovative developments.	Scientific basis for food production, Modeling of processes of food production , Modern technologies for the production of meat and dairy products	PhD student's research work
71.	Modern physical and electrophysical methods of food processing	3	Food technology	Physical and electrophysical methods of food processing, processing modes of raw materials, parameters. Innovative technological schemes of food processing. Innovative technologies to reduce the loss of raw materials as a result of the use of electrophysical processing methods in the food industry	Scientific basis for food production, Modeling of processes of food production , Modern technologies for the production of meat and dairy products	PhD student's research work
72.	Resource-saving technologies for food and processing industries	3	Food technology	The study of modern methods and technologies that ensure resource conservation in the processing and production of food. An analysis and a systematic approach to resource conservation with the use of waste-free and low-waste technologies is carried out. The issues of recycling of waste from the food and processing industry are considered.	Modern instrumental methods of food analysis	PhD student's research work
73.	Modern instrumental	3	Food technology	Mastering progressive methods of research	Biotechnological	PhD student's research

	methods of food analysis			of food raw materials and products in modern devices and equipment. Providing analytical training that contributes to the formation of a student's professional thinking for solving problems of food analysis. A modern approach to instrumental methods for determining the quality and safety of food systems (definition, including in-depth study of methods for analyzing contaminants of various origins.	bases of food production, Scientific basis for food production, Modern equipment of food production, Technical systems for the production of products of deep processing of vegetable raw materials and biofuels	work