CATALOG OF ELECTIVE DISCIPLINES

7M07 - Engineering, manufacturing and construction industries
(Code and classification of the field of education)

7M072 - Industrial and manufacturing branches
(Code and classification of the direction of training)

0720
(Code in the International Standard Classification of Education)

M111 - Food production
(Code and classification of the educational program group)

7M07201 - Technology of food products (by application)
(Code and name of the educational program)

Master
(Level of preparation)

set of 2024

Semey 2024

Developed
By the Academic Committee of the EP
The head of the AC Nurymkhan Gulnur
EP Manager Assirzhanova Zhanna

Reviewed
At the meeting of the Academic Quality Committee of the Faculty of Engineering and Technology
Protocol No. 3 dated 15.01.2024
At the meeting of the Academic Quality Committee Research School of Food Engineering
Recommended for approval by the University Academic Council
Protocol No. 1 dated 06.06.2024

Approved
at a meeting of the University Academic Council by protocol No. 3 of January 16, 2024.

at a meeting of the University Academic Council by protocol No. 6 of June 18, 2024.

Engineering of low-waste industries

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course focuses on engineering principles and practices for minimizing waste in food production. The topics include sustainable processing methods, utilization of secondary (by- products), resource efficiency, industrial ecology, and cyclic technology concepts. Emphasis is placed on process analysis, optimization strategies, waste stream valorization, and environmental impact assessment in food production.

Purpose of studying of the discipline
Train in waste minimization and sustainable technologies in food production.

Learning Outcomes
ON2 To use scientific and methodological approaches in the development and improvement of food production technology with the use of modern progressive techniques in the field of food products.
ON3 Develop and improve technological processes for the production of food products of plant and animal origin.

Learning outcomes by discipline
- Analyze processing from a waste minimization perspective.
- Apply sustainable processing methods.
- Develop eco-friendly strategies.

Prerequisites
Bachelor

Postrequisites
Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methods of scientific research

Innovations in food packaging

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline examines innovations in food packaging. Vacuum and aseptic packaging, made of high molecular weight compounds (petroleum and biological source), storage of products in a gas-modified environment. Studies the use of modern efficient packaging structures. The content structures of food packaging. Food active packaging. Antimicrobial drugs. Antioxidants. Oxygen absorbers, carbon dioxide gas, ethylene. Intelligent packaging. Sensors. Indicators. Radio frequency identification. Properties of the oxygen barrier.

Purpose of studying of the discipline
Develop knowledge of modern packaging technologies and eco-friendly solutions.

Learning Outcomes
ON4 Design and implement complex studies to analyze the quality characteristics of food products. Apply methodological principles for performing laboratory studies using modern equipment
ON7 Process current production information, analyze the received data and use them in product quality management.

Learning outcomes by discipline
- Apply packaging technologies for extended shelf life.
- Design eco-friendly solutions.
- Implement sustainable packaging technologies.

Prerequisites
Bachelor

Postrequisites
Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research

Microstructural, physico-chemical analysis of food products

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline considers microstructural, physico-chemical analysis of food products. General characteristics of microstructural, physico-chemical methods of development. Studies the classification of instrumental methods of analysis. Fluorescent research methods, measurement of light quantities, a method for measuring the refractive index of light in solid, liquid media. Mass spectrometric, chromatographic, electrochemical methods of research. Electronic, vibrational, and nuclear magnetic resonance spectroscopy. Potentiometry. Voltammetry. Coulometry. A combination of different research methods.

Purpose of studying of the discipline
Acquiring knowledge in the field of microstructural and physicochemical analysis of food products

Learning Outcomes
ON4 Design and implement complex studies to analyze the quality characteristics of food products. Apply methodological principles for performing laboratory studies using modern equipment

ON7 Process current production information, analyze the received data and use them in product quality management.

Learning outcomes by discipline

- applies methods of microstructural, physical and chemical analysis of the quality of raw materials and finished products in order to predict changes in a set of properties in the processes of processing, storage and creation of food products
- analyzes research results using an electron scanning microscope and other devices
- independently carries out research to solve research and production problems using modern equipment and methods for studying the properties of raw materials, semi-finished products and finished products

Prerequisites

Bachelor

Postrequisites

Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research

Industrial processing of secondary raw materials

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course covers technologies for processing by-products and wastes from the food industry into value-added products. Topics include sourcing of secondary raw materials, extraction and purification methods, product formulation, feasibility analysis and regulatory aspects. Emphasis is placed on the sustainable use of secondary resources, recycling strategies, and principles of circular bioeconomy in food production.

Purpose of studying of the discipline

Train in processing secondary products into value-added products.

Learning Outcomes

ON2 To use scientific and methodological approaches in the development and improvement of food production technology with the use of modern progressive techniques in the field of food products.
ON3 Develop and improve technological processes for the production of food products of plant and animal origin.

Learning outcomes by discipline

- Develop products from secondary raw materials.
- Assess the environmental and economic efficiency of processing.

Prerequisites

Bachelor

Postrequisites

Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research

Development of technology for products for gerodietetic nutrition

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline examines the specifics and ways of improving herodietics, a review of research and achievements, raw materials and materials for the purpose of creating products of the herodietic direction. He studies the technologies of jelly products enriched with food additives, yogurt, rye bread, bakery products, technologies of canned meat, milk porridges, fermented milk drinks, sausage, pasty products, curd masses, molded fish semi-finished products, food additives, biologically active.

Purpose of studying of the discipline

familiarizing graduate students with the technologies of production of gerodietetic products, methods of determining quality indicators and control rules

Learning Outcomes

ON2 To use scientific and methodological approaches in the development and improvement of food production technology with the use of modern progressive techniques in the field of food products.
ON3 Develop and improve technological processes for the production of food products of plant and animal origin.

Learning outcomes by discipline

- studies the basics of dietary nutrition
- analyzes medical and biological requirements for dietary products
- uses modern technologies to produce products for the elderly
- studies recipes and technologies for preparing dietary products

Prerequisites

Bachelor

Postrequisites

Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research

Green skills technologies in food engineering

Discipline cycle	Basic disciplines

Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline examines resource- saving, Green skills technologies in food engineering. Technological flow, operation, scheme, processes in the food industry. Application of promising electrophysical methods in the food industry: high- frequency currents, IR radiation, acoustic methods, heat treatment, electromagnetic treatment, microwave methods. Classification of modern methods of raw material processing. Processing of raw materials, semi-finished products by electrophysical methods, characteristics, modes. Saving electricity when processing agricultural raw materials.

Purpose of studying of the discipline
To teach students the principles and methods of efficient resource use, the implementation of environmentally friendly technologies, and the development of "green" skills in the process of designing and producing food products.

Learning Outcomes
ON2 To use scientific and methodological approaches in the development and improvement of food production technology with the use of modern progressive techniques in the field of food products.
ON3 Develop and improve technological processes for the production of food products of plant and animal origin.

Learning outcomes by discipline
- Apply the basic principles and technologies of resource-saving and the use of "green" skills (Green skills) in the food industry.
- Analyze and apply environmentally friendly technologies to optimize production processes and minimize waste.
- Develop practical skills in implementing innovative solutions to improve resource efficiency and reduce negative environmental impacts.

Prerequisites
Bachelor

Postrequisites
Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research

Modern methods of analysis of food raw materials and products

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
The course reviews advanced analytical techniques for characterization of food components and products. Topics such as spectroscopic techniques, chromatography, thermal analysis, microscopy and advanced technologies are covered, with emphasis on their application to food quality assessment, safety and process optimization. Emphasis is placed on the fundamentals of analytical techniques, sample preparation, data interpretation, and applications in various food systems.

Purpose of studying of the discipline
formation of professional competencies and skills of the future master capable of independent creative work. Have an idea of the methodological patterns common to all sciences.

Learning Outcomes
ON4 Design and implement complex studies to analyze the quality characteristics of food products. Apply methodological principles for performing laboratory studies using modern equipment
ON7 Process current production information, analyze the received data and use them in product quality management.

Learning outcomes by discipline
Know the methods of conducting experiments and observations to solve research problems
Be able to:
- plan individual stages of research in the presence of a general plan for solving a technological problem
- use technical means and research methods (from the set of available ones) to solve the assigned problems
- analyze scientific data, results of experiments and observations

Prerequisites
Bachelor

Postrequisites
Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research

Modern mini-processing complexes

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course explores design and operation of compact, integrated food processing plants. Topics include small- scale operations, modular system configuration, process automation, resource optimization and implementation of sustainable practices, benefits of modular systems and their application in food manufacturing that allows for flexibility and scalability. Special attention is given to adaptation of industrial processes for localized or specialized food production.

Purpose of studying of the discipline
Develop knowledge of advanced analytical methods for food analysis. 1. Learn analytical methods.
2. Develop data interpretation skills.
3. Apply technologies for quality assessment.

Learning Outcomes
ON2 To use scientific and methodological approaches in the development and improvement of food production technology with the use of modern progressive techniques in the field of food products.
ON3 Develop and improve technological processes for the production of food products of plant and animal origin.
Learning outcomes by discipline
- Use advanced analysis methods.
- Interpret analysis results.
- Develop strategies to improve product quality.
Prerequisites
Bachelor
Postrequisites
Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research

Technology of gluten-free products

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline considers specialized products, development directions, and the prospects of gluten-free products. Studies gluten-free flour products, a variety of raw materials, pentose-containing, beta-glucan-containing, ingredients, mixtures, food components, a range of culinary products, formulations, properties, production, whole grains, increasing the value of food, finding optimal possible ratios, processing modes, technologies for enriching useful substances, various methods of production of gluten-free flour products, quality indicators.
Purpose of studying of the discipline
Train in creating gluten-free products with high dietary value.
Learning Outcomes
ON2 To use scientific and methodological approaches in the development and improvement of food production technology with the use of modern progressive techniques in the field of food products.
ON3 Develop and improve technological processes for the production of food products of plant and animal origin.
Learning outcomes by discipline
- Create gluten-free products.
- Apply methods for processing and enriching raw materials.
- Evaluate product quality.
Prerequisites
Bachelor Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research
Postrequisites
Technology of artificial food products

Waste-free technologies in the poultry processing industry

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
The course explores innovative zero-waste technologies in the poultry industry. Students will explore sustainable practices, by-product utilization, and the industry`s circular economy principles. Topics include advanced processing techniques, sustainable use of recycled materials, bones, feathers, and wastewater disposal. This course emphasizes reducing environmental impact while maintaining product quality and safety in modern poultry processing plants.
Purpose of studying of the discipline
Mastering knowledge in the field of waste-free technology in the poultry processing industry
Learning Outcomes
ON3 Develop and improve technological processes for the production of food products of plant and animal origin.
ON5 Develop measures to improve technological processes for food production
Learning outcomes by discipline
- study of new ways of using secondary and additional sources of raw materials
- organization of determination of quality indicators of secondary and additional raw materials, functional food products from poultry meat
- development of waste-free technologies in poultry farming
Prerequisites
Green skills technologies in food engineering Development of technology for products for gerodietetic nutrition
Postrequisites
Innovative technologies processing - meat, milk, fish Modern technologies for processing vegetables, fruits, grain Intellectual property protection

Methods of scientific research

Discipline cycle	Profiling discipline
Course	1

Credits count	5
Knowledge control form	Examination

Short description of discipline
This course covers basic research methods in food science and technology, including literature review, experiment design, data analysis, and discussion of results. Students will gain hands- on experience with modern methods, statistical tools, and critical evaluation of scientific literature, patents, which will prepare them for advanced research and professional careers in the food industry.

Purpose of studying of the discipline
Mastering knowledge of research methods in food science and technology

Learning Outcomes
ON2 To use scientific and methodological approaches in the development and improvement of food production technology with the use of modern progressive techniques in the field of food products.

Learning outcomes by discipline
- understand basic principles of scientific methodology and ethical standards
- develop an experimental design, collect, analyze and interpret data
- demonstrate skills to critically evaluate the literature, use statistical tools, visualize research results and present them convincingly in scientific publications, presentations and discussions, advancing knowledge in food technology and related fields

Prerequisites
Modern methods of analysis of food raw materials and products Green skills technologies in food engineering Development of technology for products for gerodietetic nutrition

Postrequisites
Innovative technologies processing - meat, milk, fish Modern technologies for processing vegetables, fruits, grain Intellectual property protection Food safety of raw materials and products

Methods of experimental data processing

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course covers statistical methods for analyzing experimental data relevant to food research. Topics include experiment design and development, data visualization, hypothesis testing, regression analysis, multivariate methods, and computer tools (software). Emphasis is placed on the selection of appropriate analyses, proper interpretation of results, and effective presentation of results from food-related experiments.

Purpose of studying of the discipline
Mastering of knowledge in the field of experimental data processing methods

Learning Outcomes
ON3 Develop and improve technological processes for the production of food products of plant and animal origin.

Learning outcomes by discipline
- understand the principles of statistical analysis, data visualization and interpretation of results;
- realize various methods of data processing, test statistical hypotheses, correctly interpret and clearly present conclusions;
- master the skills of selecting optimal tools and software to ensure reliability, accuracy and visibility of analytical solutions, improving the quality of food industry research and its reproducibility in practice.

Prerequisites
Green skills technologies in food engineering Development of technology for products for gerodietetic nutrition

Postrequisites
Innovative technologies processing - meat, milk, fish Modern technologies for processing vegetables, fruits, grain Intellectual property protection

Modeling of technological processes of food production

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
The course introduces methods of modeling food production processes. Students will learn to develop and apply mathematical and computational models to optimize food processing operations. Topics include process modeling, predictive modeling, and data analysis. The course emphasizes a deeper understanding of food processes and allows using tools such as optimization and real-time control to improve their efficiency.

Purpose of studying of the discipline
Acquisition of knowledge in the field of modeling technological processes of food production

Learning Outcomes
ON3 Develop and improve technological processes for the production of food products of plant and animal origin.
ON5 Develop measures to improve technological processes for food production

Learning outcomes by discipline
- reproduce the essence of technological processes in obtaining food products of a given chemical composition and structure, types of tasks for optimizing technological processes
- uses dynamic programming models; optimization methods, software for engineering calculations, processing of tabular data, processing of current production information, analysis of the obtained data
- has a basic understanding of designing technological processes using automated systems for technological preparation of food production

Prerequisites
Green skills technologies in food engineering Development of technology for products for gerodietetic nutrition
Postrequisites
Innovative technologies processing - meat, milk, fish Modern technologies for processing vegetables, fruits, grain Intellectual property protection

Organization and planning of experiments

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course focuses on the systematic design and conduct of experiments in food science research. Topics include statistical principles, factorial designs, randomization, blocking, sample size, data management, and validation of results. Emphasis is placed on the design of efficient experimental plans that maximize information while minimizing resources in food and process research.
Purpose of studying of the discipline
Acquire knowledge and skills to effectively design experiments, analyze data, and optimize research in the food industry.
Learning Outcomes
ON2 To use scientific and methodological approaches in the development and improvement of food production technology with the use of modern progressive techniques in the field of food products.
Learning outcomes by discipline
- master the theoretical foundations of organizing and planning experiments, including the choice of factors, levels and conditions of conduct
- apply rational experimental designs, use adequate statistical methods of data processing and interpretation
- improve skills in optimizing experimental parameters to improve the validity, efficiency and reproducibility of results, as well as to interact effectively in a team of researchers
Prerequisites
Modern methods of analysis of food raw materials and products Green skills technologies in food engineering Development of technology for products for gerodietetic nutrition
Postrequisites
Innovative technologies processing - meat, milk, fish Modern technologies for processing vegetables, fruits, grain Intellectual property protection Food safety of raw materials and products

Simulation modeling systems

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline examines simulation modeling systems. Tasks, functions, subject of study of simulation modeling, model. Types of simulation modeling. Narrowly specialized, multi-purpose. Advantages and disadvantages. Use of simulation models. Procedure for constructing simulation modeling. Definition of the question; statement of the question under study and formulation of research objectives. Creation of the model. Data preparation: identification, specification and data collection. Model demonstration. Verification. Validation. Strategic and tactical planning. Experimentation. Analysis of results. Implementation, documentation.
Purpose of studying of the discipline
Mastering knowledge in the field of simulation systems
Learning Outcomes
ON3 Develop and improve technological processes for the production of food products of plant and animal origin.
Learning outcomes by discipline
- classifies simulation systems and current directions of their use in scientific research;
- carries out the selection of types of simulation systems for solving scientific problems
- applies simulation systems in scientific research activities

Prerequisites
Green skills technologies in food engineering Development of technology for products for gerodietetic nutrition
Postrequisites
Innovative technologies processing - meat, milk, fish Modern technologies for processing vegetables, fruits, grain Intellectual property protection

Technology of protein texturates

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course covers advanced technologies and processing methods for creating textured protein products. Topics include protein sources, methods of producing concentrated protein products, extrusion techniques, protein aggregation/gel formation, and texturing methods. Emphasis is placed on understanding the mechanisms of structure formation, texturing principles, and applications in meat analogs, extruded high moisture content products, and other structured vegetable proteins.

Purpose of studying of the discipline
Mastering knowledge in the field of protein texturate technology
Learning Outcomes
ON2 To use scientific and methodological approaches in the development and improvement of food production technology with the use of modern progressive techniques in the field of food products.
ON5 Develop measures to improve technological processes for food production
Learning outcomes by discipline
- studies the basics of protein texturate production technology
- analyzes medical and biological requirements for raw materials, protein texturates
- uses modern technologies to obtain protein texturates

Prerequisites
Green skills technologies in food engineering Development of technology for products for gerodietetic nutrition
Postrequisites
Innovative technologies processing - meat, milk, fish Modern technologies for processing vegetables, fruits, grain Intellectual property protection

Technology of artificial food products

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course examines technologies for the production of artificial or synthetic food products. Topics include plant- based meat alternatives, cultured proteins, in vitro meat technologies, molecular gastronomy techniques, and new sources of ingredients such as microalgae. Emphasis is placed on raw material sourcing, processing methods, product formulation and regulatory aspects of artificial food production.
Purpose of studying of the discipline
Acquisition of knowledge in the field of technology for the production of artificial food products, methods for determining quality indicators and control rules.
Learning Outcomes
ON3 Develop and improve technological processes for the production of food products of plant and animal origin.
ON5 Develop measures to improve technological processes for food production
Learning outcomes by discipline
- studies the basics of artificial food production technology
- analyzes medical and biological requirements for raw materials, artificial food products
- uses modern technologies to produce artificial food products

Prerequisites
Green skills technologies in food engineering Development of technology for products for gerodietetic nutrition
Postrequisites
Innovative technologies processing - meat, milk, fish Modern technologies for processing vegetables, fruits, grain Intellectual property protection

Fundamental and applied research in science

Discipline cycle	Profiling discipline
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
This course explores the principles and practices of basic and applied research in scientific disciplines. Topics include exploring fundamental questions, theory development, translational research, product/ process innovation, modeling techniques, and the fundamentals of research commercialization. Emphasis is placed on understanding the complementary roles of basic and applied research to advance food science knowledge and develop effective solutions.
Purpose of studying of the discipline
Develop knowledge of fundamental and applied research methods
Learning Outcomes
ON3 Develop and improve technological processes for the production of food products of plant and animal origin.
ON5 Develop measures to improve technological processes for food production
Learning outcomes by discipline
- conduct research to address practical challenges
- implement innovations in food science
- assess the commercial potential of research
Prerequisites
Modern methods of analysis of food raw materials and products Green skills technologies in food engineering Development of technology for products for gerodietetic nutrition
Postrequisites
Innovative technologies processing - meat, milk, fish Modern technologies for processing vegetables, fruits, grain Intellectual property protection Food safety of raw materials and products

Genetically modified food products, methods of genetic engineering

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline examines genetically modified products. Concept, subject of research. Specifics of manufacturing genetically modified organisms abroad and in neighboring countries, risks during cultivation and methods of genetic engineering. Identification. Methods of detecting transgenic organisms in food products. Modern aspects of safety of genetically modified ingredients in food products. Problems of food consumption and dangerous risks to human health, their impact on food security of countries.

Purpose of studying of the discipline

Develop knowledge of GMOs, their creation methods, and safety aspects

Learning Outcomes

ON3 Develop and improve technological processes for the production of food products of plant and animal origin.
ON5 Develop measures to improve technological processes for food production

Learning outcomes by discipline

- apply genetic engineering methods.
- evaluate GMO safety.
- develop measures to ensure food security.

Prerequisites

Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research

Postrequisites

Final examination

Intellectual property protection

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline considers issues related to the protection of intellectual property objects, in particular, the issues of patenting discoveries, the procedure for creating and introducing applications for the issuance of a patent for discoveries, a useful sample, the rules for completing license agreements. The legislation of the Republic of Kazakhstan. The basic concepts and definitions are given, the methodology for determining the index of sections of the International Patent System, the performance of patent research is given. The requests submitted to the application data for patenting discoveries in Kazakhstan are outlined.

Purpose of studying of the discipline

Acquiring knowledge in the field of intellectual property protection

Learning Outcomes

ON6 Conduct control and identification of raw materials, finished products, and protect intellectual property rights

Learning outcomes by discipline

- studies modern trends in the development of legal protection of intellectual property; the basics of protecting official and commercial secrets
- uses legal, economic and technical methods of protection against violations in the field of intellectual property
- applies the legal and economic foundations of licensed trade; types of contracts and agreements in the field of transfer of intellectual property objects

Prerequisites

Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research

Postrequisites

Final examination

Quality control and safety of food raw materials

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline examines quality control and safety of raw materials and food products. They study the dangers of microbiological and viral occurrence, contamination with xenobiotics, substances from plant and animal husbandry compounds, natural components of food products, genetically modified sources, control of the use of bioactive and food concentrates. Indicators, quality control tools and methods. Quality management. Important quality control methods. Regulatory documents on quality.

Purpose of studying of the discipline

Mastering knowledge in the field of quality control and safety of food raw materials

Learning Outcomes

ON4 Design and implement complex studies to analyze the quality characteristics of food products. Apply methodological principles for performing laboratory studies using modern equipment
ON6 Conduct control and identification of raw materials, finished products, and protect intellectual property rights
ON8 Apply professional knowledge and skills in implementing the tasks of innovative policy in the field of food security

Learning outcomes by discipline
- understand the main types and sources of hazards (microbiological, chemical, physical), have knowledge of the regulatory framework, study quality indicators and methods of controlling the safety of raw materials and food products
- apply monitoring techniques, analyze test results, identify and interpret contamination
- evaluate quality, utilize tools and techniques, ensure compliance with standards, improving product safety and quality
Prerequisites
Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research
Postrequisites
Final examination

International law in intellectual property

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline examines international law in intellectual property. Studies the subject, object, sequence and type of application of intellectual property rights. The agreements and the pact are international. Legislation of the Union of Europe. European regulations, the sequence of their compilation and study, the difference in the regulation of the rights of authors from abroad. Comparisons of the systems of legal norms of the far abroad, the preservation of the authors` powers on an international scale, disputes and the sequence of their approval between states are presented.
Purpose of studying of the discipline
Gaining knowledge in the field of international intellectual property law
Learning Outcomes
ON6 Conduct control and identification of raw materials, finished products, and protect intellectual property rights
Learning outcomes by discipline
- uses modern information and legal systems in the field of intellectual property; the main provisions of international legislation in the field of intellectual property
- applies in practical activities the main legislative and administrative acts on issues of protection and use of intellectual property abroad
- implements approaches and mechanisms for resolving conflicts of interest in the field of intellectual property
Prerequisites
Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research
Postrequisites
Final examination

Fundamentals of HACCP

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The concept of HACPP. Objects of HACPP regulation. Basic principles. Risk study. Establishing points during raw material supply, ingredient selection, processing, storage, transportation, warehousing, and sales. Entering critical limits for each point. Entering monitoring procedures. Creating corrective actions. Studying and entering verification procedures. Studying and entering registration data procedures. Procedure for entering food safety. Preliminary stages of HACPP. Benefits of using HACPP.
Purpose of studying of the discipline
Develop knowledge of HACCP principles for product safety
Learning Outcomes
ON4 Design and implement complex studies to analyze the quality characteristics of food products. Apply methodological principles for performing laboratory studies using modern equipment
ON6 Conduct control and identification of raw materials, finished products, and protect intellectual property rights
ON8 Apply professional knowledge and skills in implementing the tasks of innovative policy in the field of food security
Learning outcomes by discipline
- use HACCP for product safety assurance
- conduct risk analysis
- control monitoring and data registration processes
Prerequisites
Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research
Postrequisites
Final examination

Patenting

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline considers patent and licensing work. The system and specifics of patent documents. Classification of inventions. Patent information research. The Patent Office of Kazakhstan. Types of patent search. The use of patent information in the creation and development of new technology. Assessment of the technical level of the technical solution. Patent purity of products. Discovery of discoveries in created scientific and technical documents. responsibility for non-compliance with patent rights, the formation of patent licensing activities and inventive work at the enterprise.
Purpose of studying of the discipline
Acquiring knowledge in the field of patent law
Learning Outcomes
ON6 Conduct control and identification of raw materials, finished products, and protect intellectual property rights
Learning outcomes by discipline
- uses modern information and legal systems to conduct various types of patent searches, including on the Internet
- conducts patent research in order to ensure patent purity and patentability of new design solutions and to determine the technical level indicators of the designed products
- creates formulas and descriptions of the invention (utility model), industrial design and trademark and files applications for the invention and utility model
Prerequisites
Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research
Postrequisites
Final examination

Food safety of raw materials and products

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline considers national and international points of view of the harmlessness of raw materials and products. The main varieties and methods of contamination of food products with various substances, toxins of natural origin from the external environment, the probable danger of using organisms modified with the help of genes, microelectronics based on mini-particles, the possible risk of enriching food with useful substances without controlling important signs of food harmlessness, the planned ways of its supply are shown.
Purpose of studying of the discipline
Acquisition of knowledge about the main food toxicants, their degree of danger to the human body, methods and techniques for monitoring the safety indicators of food raw materials and food products
Learning Outcomes
ON4 Design and implement complex studies to analyze the quality characteristics of food products. Apply methodological principles for performing laboratory studies using modern equipment
ON6 Conduct control and identification of raw materials, finished products, and protect intellectual property rights
ON8 Apply professional knowledge and skills in implementing the tasks of innovative policy in the field of food security
Learning outcomes by discipline
- controls technological parameters, modes and compliance with the correct operation of technological equipment
- organizes control over the conduct of tests during the assessment of the safety of food raw materials and food products in production laboratories
- applies methods of chemical and ecological analysis, assessment of the quality of food raw materials and food products and control of the content of various xenobiotics in them
Prerequisites
Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research
Postrequisites
Final examination

Modern technologies for processing vegetables, fruits, grain

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline examines the current state, development prospects, practical issues of processing vegetables, fruits, grain. Stone fruits: promising areas. Plant protection. Modern methods. Processing methods: biochemical, chemical, physical, mechanical: preservation, shock freezing, drying, ozonation; treatment with radiation, in pulsed electric fields, using high pressure, membrane technologies, concentrated freezing, frying in a vacuum, vacuum, "smart" packaging. Storage features.
Purpose of studying of the discipline
Train in processing methods for plant raw materials to improve quality and storage
Learning Outcomes
ON2 To use scientific and methodological approaches in the development and improvement of food production technology with the use of modern progressive techniques in the field of food products.
ON6 Conduct control and identification of raw materials, finished products, and protect intellectual property rights
ON7 Process current production information, analyze the received data and use them in product quality management.

Learning outcomes by discipline
- apply modern methods for plant raw material processing.
- optimize storage processes.
- develop resource-saving technologies.
Prerequisites
Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research
Postrequisites
Final examination

Technology of biologically active substances and biologically active additives

Discipline cycle	Profiling discipline
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline
The discipline considers the production process of extracting bioactive substances and their concentrates. Studies the production process of extracting bioactive substances from dietary fibers and fats, enzyme preparations, organic compounds of various chemical nature, water- and fat- soluble. Systematization, definition, modern production process of extraction of bioactive substances concentrates. Description of the characteristic, distinctive properties, advantages, disadvantages and the role of probiotics. Symbiotic drugs. The use of bioactive substance concentrates in the manufacture of food.
Purpose of studying of the discipline
Mastering the production, classification, quality assessment and rational use of bioactive substances and dietary supplements, including probiotics and synbiotics.
Learning Outcomes
ON2 To use scientific and methodological approaches in the development and improvement of food production technology with the use of modern progressive techniques in the field of food products.
ON6 Conduct control and identification of raw materials, finished products, and protect intellectual property rights
ON7 Process current production information, analyze the received data and use them in product quality management.
Learning outcomes by discipline
- understand the theoretical basis of production, classification and isolation of bioactive substances
- carry out complex analysis of technological processes for obtaining their concentrates, assess quality and control parameters
- to apply effective methods of using probiotic and synbiotic additives, providing an increase in the nutritional value, safety and functional properties of food products, using modern technologies and scientifically based and innovative approaches
Prerequisites
Technology of artificial food products Modeling of technological processes of food production Organization and planning of experiments Methodology of scientific research
Postrequisites
Final examination