CATALOG OF ELECTIVE DISCIPLINES

7M07 - Engineering, Manufacturing and Civil engineering
(Code and classification of the field of education)

7M071 - Engineering and engineering trades
(Code and classification of the direction of training)

0710
(Code in the International Standard Classification of Education)

M103 - Mechanics and metalworking
(Code and classification of the educational program group)

7M07103 - Technological machinery and equipment
(Code and name of the educational program)

Master
(Level of preparation)

set of 2023

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Chairman of the Academic Council Oralkanova I.A.

Food rheology

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

Short description of discipline
The discipline studies the basics of engineering rheology of food products, methods and instruments for determining the structural and mechanical properties of food products on the basis of control, regulation and management indicators of raw materials, finished products at the stage of technological processes, forms the knowledge, ability and skills of students in the field of structure of food masses.

Purpose of studying of the discipline
Formation of knowledge in the field of rheology (the science of deformation and flow of real bodies), the study of the basic properties of existing and new products, the establishment of patterns under the influence of various factors during the processing of products, the development of methods for calculating machines and apparatuses and practical recommendations for optimization, control and management of product quality at all stages of production.

Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON3 To determine the structural and mechanical characteristics of food products for their use in the calculations of technological equipment.

Learning outcomes by discipline
• Determines the structural and mechanical characteristics of food products for their use in the calculations of technological equipment
• Analyzes the nature of changes in the structural and mechanical characteristics of food masses during processing and makes recommendations for their regulation
• Develops methods and instruments for measuring and controlling the parameters of technological machines and their calculations for using the acquired knowledge in the study of other academic disciplines
• Demonstrates basic knowledge of modern problems in measuring and controlling the parameters of technological machines

Prerequisites
Basic and profile disciplines of the EP

Postrequisites
Final examination

Fundamentals of mathematical and computer modeling of technological processes

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

Short description of discipline
As a result of mastering the discipline "Fundamentals of mathematical and computer modeling of technological processes", a master`s student forms systematic knowledge in the field of methods of mathematical and computer modeling of technological processes and demonstrates knowledge of the main goals and stages of modeling, as well as varieties of mathematical and computer modeling, selects, builds and analyzes mathematical and computer models in various fields of activity.

Purpose of studying of the discipline
Getting organized knowledge in the field of principles of construction and use of mathematical models of manufacturing processes and design methods of modeling algorithms to implement mathematical models

Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON4 To characterize the latest theoretical, methodological and technological achievements of domestic and foreign science, as well as to consolidate practical skills, the application of modern methods of scientific research, processing and interpretation of experimental data in dissertation research.

Learning outcomes by discipline
• Develops methods and instruments for measuring and controlling the parameters of technological machines and their calculations for using the acquired knowledge in the study of other academic disciplines
• Demonstrates basic knowledge of modern problems in measuring and controlling the parameters of technological machines

Prerequisites
Basic and profile disciplines of the EP

Postrequisites
Final examination

Heat and mass transfer

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

Short description of discipline
The student gets the necessary basic theoretical knowledge of the laws of heat conduction, convective heat transfer, mass transfer, radiation, and also gets acquainted with the features of thermal power plants, applies the basic laws of heat conduction, convective heat transfer, radiation in the thermal calculations of food industry devices. Carries out experiments in laboratory conditions, is able to confirm by engineering calculations compliance of thermal equipment to the conditions of the technological process.

Purpose of studying of the discipline
obtain extensive knowledge of the fundamental laws, laws and methods of analysis and calculation of heat and mass transfer processes, running away skills characterization of heat and mass transfer processes of thermal power equipment and apparatus.
Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON4 To characterize the latest theoretical, methodological and technological achievements of domestic and foreign science, as well as to consolidate practical skills, the application of modern methods of scientific research, processing and interpretation of experimental data in dissertation research.
Learning outcomes by discipline
• Demonstrate the application of the main methods of obtaining, converting, transporting and using heat in heat engineering installations and systems
• Distinguishes between the basic concepts of measurement theory, physical quantities and units of measurement and general laws and rules of measurement
Prerequisites
Basic and profile disciplines of the EP
Postrequisites
Final examination

Methods and devices of measurement and control of parameters of technological machines

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

Short description of discipline
The student at the end of the discipline knows the basic concepts of the theory of measurement, physical quantities and measurement units and general laws and rules of measurement. Can choose methods for determining the errors of technical measurements, identified under the influence of different parameters (fluctuations in external temperature, the impact of different types of fields, etc.). Has skills to use the obtained knowledge for practical purposes.
Purpose of studying of the discipline
To train undergraduates in various measurement methods and instruments, to teach them to determine the errors and accuracy classes of the measuring instruments used, as well as to replace some measuring instruments with others suitable for technical parameters.
Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON4 To characterize the latest theoretical, methodological and technological achievements of domestic and foreign science, as well as to consolidate practical skills, the application of modern methods of scientific research, processing and interpretation of experimental data in dissertation research.
Learning outcomes by discipline
• Develops methods and instruments for measuring and monitoring the parameters of technological machines and their calculations for using the acquired knowledge in the study of other academic disciplines
• Demonstrates basic knowledge of modern problems in measuring and controlling the parameters of technological machines
Prerequisites
Bachelor
Postrequisites
Final examination

Modern equipment for separation of liquid heterogeneous systems

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

Short description of discipline
As a result of mastering the discipline, undergraduates will form competencies aimed at acquiring the knowledge necessary to study the classifications and properties of heterogeneous systems, types of basic methods of separation of heterogeneous systems, the basic principles of calculation of separation processes; device the main typical equipment for separating heterogeneous systems by precipitation and filtration, ways to intensify separation processes and improve the efficiency of the device.
Purpose of studying of the discipline
Acquisition of knowledge necessary for the formation of the undergraduate scientific and methodological approaches to solving professional issues in the separation of liquid heterogeneous systems.
Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON8 Distinguish between the main types of equipment for pressing food raw materials, the basics of kinetics and dynamics of the technological process of pressing and perform calculations of machines for pressing food raw materials.
Learning outcomes by discipline
• Recognizes the classification and operating principle of technological equipment for separating liquid heterogeneous systems
• Demonstrates basic knowledge and skills in the engineering and technology of liquid inhomogeneous systems and their separation methods
Prerequisites
Basic and profile disciplines of the EP
Postrequisites
Final examination

For non-Newtonian fluids

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

Short description of discipline
Formation of knowledge on the discipline and the ability to apply them to future specialists in further work activities. Obtaining information about rheology of non- Newtonian liquids, rheological bases of food products research, the influence of rheological properties of food products on technological processes, structural and mechanical characteristics of non-Newtonian liquids, viscous flow, mixing and transportation, basic principles of intensification of processes of formation of food products.

Purpose of studying of the discipline
Formation of undergraduates knowledge of the discipline "For non-Newtonian fluids." Ability to apply the acquired knowledge to the future specialist in further employment.

Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON5 To recognize the classification and the principle of operation of technological equipment for the separation of liquid heterogeneous systems.

Learning outcomes by discipline
• Recognizes the classification and operating principle of technological equipment for separation of liquid heterogeneous systems
• Demonstrates basic knowledge and skills in the technique and technology of liquid heterogeneous systems and their separation methods

Prerequisites
Bachelor

Postrequisites
Final examination

Machines for machining raw materials of animal origin

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

Short description of discipline
The discipline is aimed at acquiring the knowledge necessary for the formation of a master`s scientific methodological approaches to address professional issues in the study of machine designs for mechanical processing of raw materials of animal origin and to draw up technological schemes and perform the main tasks of mechanization of technological flows of food production, knowledge of the principles of coordination of flow lines.

Purpose of studying of the discipline
Acquisition of knowledge necessary for the formation of scientific and methodological approaches in solving professional issues in the study of machine designs for mechanical processing of raw materials of animal origin.

Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON7 Analyze equipment for processing raw materials of animal and vegetable origin.

Learning outcomes by discipline
Compares the main methods of mechanization of food production process flows
Draw up a scheme for mechanization of technological flows of food production and perform the necessary calculations

Prerequisites
Bachelor

Postrequisites
Final examination

The mechanization of the process streams of food production

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

Short description of discipline
The discipline considers the problem of ensuring quality food mankind as a whole, the development of food branches of the national economy n, as well as the theoretical basis of food technology and the impact of various methods of mechanical processing in the transformation of raw materials for basic food humanity in semi-finished and finished products on the quality of the finished product.

Purpose of studying of the discipline
Acquisition of knowledge necessary for the formation of scientific and methodological approaches in solving professional issues in the field of choosing the optimal variant of the technological process and modernization of the flow-mechanized line with an increase in the quality of manufactured products.

Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON6 Demonstrate knowledge of structures, the principle of operation, the main technical characteristics of technological machines and equipment.

Learning outcomes by discipline
Compares the main methods of mechanization of technological flows of food production

Draw up schemes for the mechanization of technological flows of food production and perform the necessary calculations

Prerequisites

Bachelor

Postrequisites

Final examination

Modern machines for grinding food raw materials

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

Short description of discipline

The discipline is aimed at studying the structure of equipment for grinding food raw materials, performing the main tasks and improving the general knowledge of modern machines for grinding. The course deals with the theory of the crushing process, machines for medium and fine crushing, their classification, the structure of industrial meat grinders, the methodology of technological accounting of meat grinders and the device of machines for types of crushing.

Purpose of studying of the discipline

Improvement of knowledge about the structure of machines for grinding food raw materials, performing basic tasks and machines for modern grinding.

Learning Outcomes

ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON7 Analyze equipment for processing raw materials of animal and vegetable origin.

Learning outcomes by discipline

-Study of the structure of equipment for grinding food raw materials.
-Methodology for technological accounting of meat grinders and design of machines for types of crushing.

Prerequisites

Bachelor

Postrequisites

Final examination

Food processing by pressing

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

Short description of discipline

Determination of effective ways to intensify the pressing process in food production, organization and design of research objects. Description of the pressing process through mixed processes based on a system of mathematical modeling of effective distribution of raw materials. Description of the dependence of intensification of the pressing process by means of ratios of various design and defined parameters.

Purpose of studying of the discipline

Study of theoretical and practical ways to intensify the pressing process using related processes, effective methods of food production in medium and small industries.

Learning Outcomes

ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON8 Distinguish between the main types of equipment for pressing food raw materials, the basics of kinetics and dynamics of the technological process of pressing and perform calculations of machines for pressing food raw materials.

Learning outcomes by discipline

• Distinguishes between the main types of equipment for pressing food raw materials, the basics of kinetics and dynamics of the technological process of pressing and performs calculations of machines for pressing food raw materials
*• * Demonstrates basic knowledge in the field of technological machines for pressing food raw materials and skills with techniques for using theoretical knowledge in solving typical project tasks of the course*

Prerequisites

Machines for machining raw materials of animal origin

Postrequisites

Final examination

Modern equipment for food packaging

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

Short description of discipline

Master`s students will acquire theoretical and practical knowledge of technological automatic machines used in the food industry for packaging of food products and study the main types and kinds of technological machines designed for packaging and packaging in related branches of the food industry. Consideration of these types of equipment is based on the study of equipment from the perspective of the generality of the basic and target mechanisms.

Purpose of studying of the discipline

Getting students the knowledge necessary for further study of special disciplines about modern equipment for food packaging, effective

use of automated equipment.

Learning Outcomes

ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON4 To characterize the latest theoretical, methodological and technological achievements of domestic and foreign science, as well as to consolidate practical skills, the application of modern methods of scientific research, processing and interpretation of experimental data in dissertation research.

Learning outcomes by discipline

Classifies calculations and principles of operation of modern equipment in grain processing

Prerequisites

The mechanization of the process streams of food production

Postrequisites

Final examination

The theoretical basis of mechanical processing of food products

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

Short description of discipline

As a result of mastering the discipline, the student will receive the necessary basic theoretical knowledge on the basics of food processing by mechanical processes, and will also be able to get acquainted with the features of mechanical processes in food production and apply the basic laws of force in the mechanical calculations of food production devices. Conducts experiments in laboratory conditions, has the opportunity to confirm by engineering calculations the compliance of the equipment for machining with the conditions of the technological process and production requirements.

Purpose of studying of the discipline

The study of the theoretical foundations of the mechanical process of food processing, familiarization of undergraduates with the theoretical foundations of the mechanical process, the acquisition in practice of knowledge and experience in this area.

Learning Outcomes

ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON7 Analyze equipment for processing raw materials of animal and vegetable origin.

Learning outcomes by discipline

Draws up schemes of mechanization of technological flows of food production and perform the necessary calculations

Prerequisites

Fundamentals of mathematical and computer modeling of technological processes

Postrequisites

Final examination

Modern equipment in grain processing

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

Short description of discipline

The discipline forms the knowledge of technological processes and equipment for processing, storage of grain. The objectives of the discipline includes the formation of graduate students qualitative scientific approach at all stages of grain production, preparation of flour, cereals and mixed fodder, studying the properties of raw materials, teaching its processing in optimal conditions with quality and minimum costs for the production of units of mass of the finished product.

Purpose of studying of the discipline

To reveal the basics of knowledge in the field of technological equipment and machines of the grain processing industry

Learning Outcomes

ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON4 To characterize the latest theoretical, methodological and technological achievements of domestic and foreign science, as well as to consolidate practical skills, the application of modern methods of scientific research, processing and interpretation of experimental data in dissertation research.

Learning outcomes by discipline

Classifies calculations and principles of operation of modern equipment in grain processing

Prerequisites

The mechanization of the process streams of food production

Postrequisites

Final examination

Theory and technique of scientific experiment

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

Short description of discipline

The course is aimed at acquainting undergraduates with the theoretical and practical sections of scientific experiment and the formation of practical knowledge and experience in this area. The knowledge acquired in the courses contributes to the ability and readiness to

study the theory and technique of scientific practice. Also receive information on theoretical and practical methods of food production processes, similarity theory, types of modeling and their purpose.

Purpose of studying of the discipline

Introduction of doctoral students with the theory and technique of scientific experiment, the acquisition of knowledge and skills in this area in practice.

Learning Outcomes

ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON4 To characterize the latest theoretical, methodological and technological achievements of domestic and foreign science, as well as to consolidate practical skills, the application of modern methods of scientific research, processing and interpretation of experimental data in dissertation research.
ON9 Apply the theory and technique of scientific experiment; understand the relationship of the theory and technique of scientific experiment with other sciences, the ability to manage technical activities, skills in using the theory and technique of scientific experiment.

Learning outcomes by discipline

Demonstrates knowledge of structures, the principle of operation, the main technical characteristics of technological machines and equipment

Prerequisites

Technological machines and equipment –development prospects

Postrequisites

Final examination

Theory and technique of mixing

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

Short description of discipline

Mastering the discipline contributes to the formation of the student scientific and methodological approaches to solving professional problems related to this area. When studying the discipline the main sections are considered: mixers, media coming to mixing, the purpose and methods of mixing, types of mixers, their choice, the calculation of power per working period, the limiting equation of mixing, grapho-analytical calculation of the mixer.

Purpose of studying of the discipline

Acquiring the knowledge required for the formation of a student scientific-methodological approaches in addressing professional issues in the theory and technique of mixing.

Learning Outcomes

ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON5 To recognize the classification and the principle of operation of technological equipment for the separation of liquid heterogeneous systems.

Learning outcomes by discipline

Demonstrates basic knowledge in the field of mixing theory and techniques used in the meat and dairy and food industries.

Prerequisites

Machines for machining raw materials of animal origin

Postrequisites

Final examination

Methods of processing food raw materials

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

Short description of discipline

The course generalizes knowledge of undergraduates to form optimal scientific and methodological solutions in the consideration of professional tasks in the field of food production. Forms an idea of experimental and theoretical methods of research of various processes, synthesis of these methods, forming similarity theory, composition of types of hydromechanical processes and their general purpose, disperse and heterogeneous systems, technological problems of mixing processes, filtration, sedimentation

Purpose of studying of the discipline

The purpose of this course is to acquire the knowledge necessary for the formation of scientific and methodological approaches in solving professional issues in the field of food technology.

Learning Outcomes

ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON7 Analyze equipment for processing raw materials of animal and vegetable origin.

Learning outcomes by discipline

Demonstrates basic knowledge in the field of processing of food raw materials used in the meat and dairy and food industries.

Prerequisites

Basic and profile disciplines of the EP The theoretical basis of mechanical processing of food products

Postrequisites

Final examination

Equipment in biotechnology

Discipline cycle	Profiling discipline

Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline
The course introduces undergraduates to the main equipment used in food biotechnological industries, with technological assessment of the quality of raw materials and basic calculations of biotechnological industries and prepares undergraduates for research activities related to the creation and operation of machines and devices of food biotechnological industries, as well as teaches the use of knowledge gained as a result of fundamental training for solving problems related to technological equipment.

Purpose of studying of the discipline
The purpose of this course is to acquire the knowledge necessary for the formation of scientific and methodological approaches in solving professional issues in the field of biotechnology equipment.

Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON6 Demonstrate knowledge of structures, the principle of operation, the main technical characteristics of technological machines and equipment.

Learning outcomes by discipline
• Defines the main types of equipment used in biotechnology
• Has the skills and techniques of using theoretical knowledge in solving typical project tasks of the course

Prerequisites
Basic and profile disciplines of the EP Bachelor

Postrequisites
Final examination

Theoretical basis hydromechanical processing of foodstuffs

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

Short description of discipline
This discipline is designed to familiarize undergraduates with the theoretical foundations of hydromechanical processes and obtain practical knowledge and experience in this area. Forms the ability and readiness of students to study hydromechanical processes of food processing. Gives an understanding of the driving force, technological purpose, composition of hydromechanical processes such as mixing, filtration and sedimentation. Explains the conditions, methods and purpose of mixing and blending.

Purpose of studying of the discipline
The purpose of this course is to acquire the knowledge necessary for the formation of scientific and methodological approaches in solving professional issues in the field of food technology.

Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON5 To recognize the classification and the principle of operation of technological equipment for the separation of liquid heterogeneous systems.

Learning outcomes by discipline
• Recognizes the classification and principle of operation of hydromechanical processes
• Demonstrates basic knowledge and skills in the technique and technology of hydromechanical processes

Prerequisites
Methods and devices of measurement and control of parameters of technological machines

Postrequisites
Final examination

Fluid dynamics and heat and mass transfer

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

Short description of discipline
This discipline teaches to know the physical properties of liquids and gases, the basic laws of hydrogasodynamics and heat and mass transfer, to apply the acquired knowledge in conducting research, to conduct calculations of processes and phenomena used in the food industry. To master the laws of hydrogasodynamics, the basics of energy conversion, the laws of thermodynamics and heat and mass transfer.

Purpose of studying of the discipline
The purpose of the discipline - study of the laws of fluid dynamics and fundamentals of energy conversion, the laws of thermodynamics and heat and mass transfer.

Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON4 To characterize the latest theoretical, methodological and technological achievements of domestic and foreign science, as well as to consolidate practical skills, the application of modern methods of scientific research, processing and interpretation of experimental data in dissertation research.
ON5 To recognize the classification and the principle of operation of technological equipment for the separation of liquid heterogeneous systems.

Learning outcomes by discipline

Demonstrates basic knowledge and skills on the physical properties of liquid and gas, the basic laws of hydro-gas dynamics and heat and mass transfer

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

Final examination

Technique and technology for separation of liquid heterogeneous systems

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

Short description of discipline

As a result of mastering the discipline, undergraduates will form competencies aimed at acquiring the knowledge necessary to study the classifications and properties of heterogeneous systems, types of basic methods of separation of heterogeneous systems, the basic principles of calculation of separation processes; device the main typical equipment for separating heterogeneous systems by precipitation and filtration, ways to intensify separation processes and improve the efficiency of the device.

Purpose of studying of the discipline

Modern equipment for the separation of liquid inhomogeneous systems is a technical science, readable for undergraduates, studying the main process patterns in the experimental study of new designs of centrifugal equipment, in particular, experimental separators and centrifuges and the further development of the theory of centrifugal separation.

The widespread use of machines and apparatuses for centrifugal separation in various industries requires a specialist to have deep knowledge in the field of this type of technological equipment. A modern specialist must not only be able to manage certain production processes in accordance with the requirements of technology, but must also ensure their optimal implementation at a high technical level that would meet the latest scientific achievements in this field.

Learning Outcomes

ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.

ON5 To recognize the classification and the principle of operation of technological equipment for the separation of liquid heterogeneous systems.

Learning outcomes by discipline

- Have an idea of chemical, physico- chemical, structural - mechanical, colloidal processes in the technology of separation of inhomogeneous liquid systems

- The ability to apply the acquired knowledge for theoretical and practical purposes.

Prerequisites

Basic and profile disciplines of the EP Technological machines and equipment –development prospects

Postrequisites

Final examination

Technical thermodynamics

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

Short description of discipline

The study of the discipline assumes mastering the methods of thermodynamics for the analysis of physical and chemical phenomena in order to ensure the reliable and effective operation of heat exchange equipment, modern methods of analysis and calculation of thermodynamic processes and cycles of ideal and real gas, equilibrium and phase shifts of thermodynamic systems, equilibrium conditions of isolated homogeneous systems, variable thermodynamic conditions.

Purpose of studying of the discipline

obtaining extensive knowledge about the fundamental laws, patterns and methods of analysis and calculation of thermodynamic processes, developing practical skills in determining the characteristics of heat and mass transfer processes of thermal power devices and apparatuses.

Learning Outcomes

ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.

ON4 To characterize the latest theoretical, methodological and technological achievements of domestic and foreign science, as well as to consolidate practical skills, the application of modern methods of scientific research, processing and interpretation of experimental data in dissertation research.

ON5 To recognize the classification and the principle of operation of technological equipment for the separation of liquid heterogeneous systems.

Learning outcomes by discipline

Demonstrates basic knowledge of technical thermodynamics

Analysis and calculation of thermodynamic processes and cycles

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

Final examination

Equipment for pulse and vibration cutting of food raw materials

Discipline cycle	Profiling discipline
Course	2

Credits count	5
Knowledge control form	Examination

Short description of discipline
In the process of studying the course a graduate receives knowledge necessary for the formation of scientific and methodological approaches to the solution of professional problems in the field of membrane processes and technologies in the food industry, as well as for practical application and in the implementation of master`s projects. Reveals the basics of knowledge in the field of technological equipment and machinery.

Purpose of studying of the discipline
General characteristics of dairy equipment. Tanks of the dairy industry. Technological and thermal calculations. The device of pumps of the dairy industry. General information about homogenization. General information about the separation process, classification of separators.

Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON6 Demonstrate knowledge of structures, the principle of operation, the main technical characteristics of technological machines and equipment.

Learning outcomes by discipline
Have an understanding of modern problems, possess the skills and techniques of using this knowledge for theoretical and practical purposes

Prerequisites
Modern equipment for food packaging

Postrequisites
Final examination

Modern methods of scientific research

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

Short description of discipline
The study of the discipline "Modern methods of scientific research" forms the application of modern methods of research work, consolidates knowledge to develop optimal scientific and methodological solutions when solving problems. The necessary information is given on typical optimization problems, basic approaches to their solution, classification of optimization problems, examples of mathematical models, problems of resource analysis and sequence of work when making optimal decisions.

Purpose of studying of the discipline
collection of the latest theoretical, methodological and technological achievements of domestic and foreign science, as well as consolidation of practical skills, application of modern methods of scientific research, processing and interpretation of experimental data in dissertation research.

Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON4 To characterize the latest theoretical, methodological and technological achievements of domestic and foreign science, as well as to consolidate practical skills, the application of modern methods of scientific research, processing and interpretation of experimental data in dissertation research.

Learning outcomes by discipline
• Classifies calculations and principles of action in modern research methods

Prerequisites
Fundamentals of mathematical and computer modeling of technological processes

Postrequisites
Final examination

Physical methods of processing foods

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

Short description of discipline
As a result of mastering the discipline, students form ideas about the physical methods of food processing, as well as about engineering physico-chemical mechanics (engineering rheology). He will also gain deeper knowledge about the physical methods of processing raw matter, electrophysical methods of processing food, their characteristics and features, processing food with infrared rays, high-frequency processing, electroflotation and electrostatic processing.

Purpose of studying of the discipline
Gaining knowledge about physical methods of food processing, an Engineering Physics - Mechanics (engineering rheology).

Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON5 To recognize the classification and the principle of operation of technological equipment for the separation of liquid heterogeneous systems.

Learning outcomes by discipline
• Demonstrates basic knowledge in the field of physical methods of food processing used in the meat and dairy and food industries.

Prerequisites
Basic and profile disciplines of the EP Machines for machining raw materials of animal origin

Postrequisites
Final examination

Impulse cutting of food raw materials

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

Short description of discipline
The discipline is designed to study food raw materials with the basics of cutting, on various qualitative indicators in the grinding of food raw materials and food products, knowledge of crushing modes, consideration of bone raw materials as an object of mechanical processing, crushing solids, cutting, separation zone study, pulse crushing and the task of studying the mechanical properties of bone using pulse cutting process.
Purpose of studying of the discipline
obtaining by undergraduates the knowledge necessary for the formation of scientific and methodological approaches to solving professional problems in the field of membrane processes of pulsed cutting of food raw materials
Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON6 Demonstrate knowledge of structures, the principle of operation, the main technical characteristics of technological machines and equipment.
Learning outcomes by discipline
• Have an understanding of modern problems, possess skills and techniques for using this knowledge for theoretical and practical purposes
Prerequisites
Technological machines and equipment –development prospects
Postrequisites
Final examination

Catering equipment

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

Short description of discipline
The course "Catering equipment" presents the types of technological equipment widely found in catering enterprises, as well as the main processes currently used in the field of catering, types of installations for separation, sorting, separation, cutting, molding, etc., problems and the state of technical improvement of equipment, basic requirements for mechanical equipment and information about general usage issues.
Purpose of studying of the discipline
Obtaining by students of the master`s program, theoretical and practical knowledge about technological machines and other equipment used in public catering.
Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON6 Demonstrate knowledge of structures, the principle of operation, the main technical characteristics of technological machines and equipment.
Learning outcomes by discipline
• learn the basic concepts and definitions concerning the device of technological equipment of public catering;
• know the basic structure and designs of the main types of machines and other technological equipment and, above all, the device of the working bodies of equipment used in public catering;
• to know the basic laws of the main technological processes, to possess the skills and techniques of using the acquired knowledge for theoretical and practical purposes;
• be able to use the acquired knowledge to carry out technological calculations in the design and design of technological equipment.
Prerequisites
Basic and profile disciplines of the EP The mechanization of the process streams of food production
Postrequisites
Final examination

Fundamentals of inventive activity

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

Short description of discipline
The discipline improves the knowledge of students on the formation of scientific and methodological knowledge for solving professional problems arising in the performance of inventive works. Students are familiarized with the basics of protection of individual and industrial intellectual objects under the legislation of the Republic of Kazakhstan, neighboring and far abroad countries, the specificity and structure of patent documents, the structure of the characteristics of inventions, identification data.
Purpose of studying of the discipline
The study of the basics, types, methods and methods of scientific research and inventive activity.

Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON4 To characterize the latest theoretical, methodological and technological achievements of domestic and foreign science, as well as to consolidate practical skills, the application of modern methods of scientific research, processing and interpretation of experimental data in dissertation research.
Learning outcomes by discipline
• Demonstrates basic knowledge in the field of inventive activity
• Compiles patents
Prerequisites
Basic and profile disciplines of the EP
Postrequisites
Final examination

Food packaging machines

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

Short description of discipline
Obtaining theoretical and practical knowledge of technological machines used in the food industry for packaging of food products and studying the main types and kinds of technological machines designed for packaging and packaging in related branches of the food industry. This is about is designed to study the equipment from the standpoint of the commonality of the basic and target mechanisms.
Purpose of studying of the discipline
The purpose of the discipline is to obtain the basics of knowledge in the field of automatic machines, production lines of food production and other devices for processing, feeding, moving and packaging of food products necessary for further study of special disciplines and practical activities in the specialty
Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON6 Demonstrate knowledge of structures, the principle of operation, the main technical characteristics of technological machines and equipment.
ON8 Distinguish between the main types of equipment for pressing food raw materials, the basics of kinetics and dynamics of the technological process of pressing and perform calculations of machines for pressing food raw materials.
Learning outcomes by discipline
• Demonstrates basic knowledge in the field of packaging and packaging used in the meat and dairy and food industries.
Prerequisites
Basic and profile disciplines of the EP
Postrequisites
Final examination

Bases of simulation of technological processes

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

Short description of discipline
The discipline gives undergraduates the basic concepts necessary to solve professional problems arising in the field of modeling processes in food production, consolidates the necessary basic knowledge, such as the classification of models, building a mathematical model of food production processes, computer model technology, methods of random patterns, analysis of modeling results, methods of modeling of continuous systems and simulation of production processes.
Purpose of studying of the discipline
Obtaining systematized knowledge in the field of principles of construction and use of mathematical models
of production processes and methods of development of modeling algorithms for the implementation of mathematical models.
Learning Outcomes
ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON4 To characterize the latest theoretical, methodological and technological achievements of domestic and foreign science, as well as to consolidate practical skills, the application of modern methods of scientific research, processing and interpretation of experimental data in dissertation research.
Learning outcomes by discipline
• Demonstrates methods of occurrence of random patterns, analysis of modeling results, modeling methods
Prerequisites
Basic and profile disciplines of the EP Fundamentals of mathematical and computer modeling of technological processes
Postrequisites
Final examination

Fundamentals of scientific research

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

Short description of discipline

The discipline improves the undergraduates` ideas on the formation of scientific and methodological knowledge to solve professional problems arising in the field of scientific research. Provides information on the study and analysis of food processing processes, planning practice, research, methods of analysis of results and processing of experimental data, results in science and production, the basics of scientific research, physical models and experiments, improvement of mathematical and physical models.

Purpose of studying of the discipline

Development of students ` skills in research activities; familiarization of students with scientific knowledge, their readiness and ability to conduct research.

Learning Outcomes

ON2 Choose the necessary research methods, modify existing ones and develop new methods based on the tasks of a particular study.
ON4 To characterize the latest theoretical, methodological and technological achievements of domestic and foreign science, as well as to consolidate practical skills, the application of modern methods of scientific research, processing and interpretation of experimental data in dissertation research.

Learning outcomes by discipline

• Demonstrates scientific and methodological knowledge, the principle of operation, the main technical characteristics of technological machines and equipment

Prerequisites

Methods and devices of measurement and control of parameters of technological machines

Postrequisites

Final examination