Ministry of Agriculture of the Republic of Kazakhstan
NCJSC «S.Seifullin Kazakh agrotechnical research university»

Consired
at the meeting of the university
Academic council
Report № 16
Dated from «29» 05 2023 y.

APPROVE
Chairman of the Board - Rector,
Academician of the NAS of the RK
NCJSC «S.Seifullin Kazakh
agrotechnical research university»
_____ Tireuov K.M
«___» _____2023 y.

# EDUCATIONAL PROGRAMME
## developed together with the Northwestern University of Agriculture and Forestry (People's Republic of China) as part of double degree education

7M07201 - «Food technology»

Code and classification of educational area: 7M07 Engineering, process and construction industry

Code and classification of field of study: 7M072 –Production and processed line

Code in International standard classification of education: 0720

Awarded degree/qualification: master of methods and technology by educational program 7M07201 - «Food technology»

Duration of study: 2year

Astana 2023

Authoring team:

1. Kakimov M.M., CES, Associated Professor, Head of the Department of Food Technology and processing products of NCJSC «S.Seifullin Kazakh agrotechnical research university»;

2. Liu Shin (Xin Lu), PhD, CES, Professor, Dean of Food Science, Northwest A & F University (China);

3. Zhakupova G.N., CES, acting professor of the Department of Food Technology and processing productsof S.Seifullin Kazakh Agrotechnical Universities;

4. Igenbaev A.K., Ph.D., acting Associate Professor of the Department of Food Technology and processing productsof S.Seifullin Kazakh Agrotechnical Universities;

5. Mustafayeva A.K., CES, acting Associate Professor of the Department of Food Technology and processing products of S.Seifullin Kazakh Agrotechnical Universities;

6. Bolkenov B.T., PhD student, University of California, UCDavis;

7. Kozhevnikov V.N., executive director of the Association of Legal Entities "Dairy Union of Kazakhstan";

8. Sauer I.A., Chairman of the Board of the association of individual entrepreneurs and legal entities in the form of the association "Meat and Dairy Union of Kazakhstan";

9. Nevzorov K.G., President of the Association of Legal Entities "Oil and Fat Union of Kazakhstan";

10. Iskakova A.B., General Director of «BAYAN Production Company» LLP;

11. Akshoraeva G.D., 2nd year doctoral student, educational program 8D07201 – "Food Technology";

12. Tolepbergen A., 2nd year master's student, educational program 7M07201 – "Food Technology".

**Educational program "Technology of food products"**considered at the meeting of the the Department of Food Technology and processing products

report № 8 from 20.04.2023 y.

approved by the Faculty Council

report № 17 from 28.04.2023 y.

Content

## 1Passport of educational programme

### 1.1The purpose of educational programme

The purpose of the educational program "Food technology" for undergraduates profile direction is to instill management skills, training of leading specialists in the field of technology of dairy and meat products, as well as managers of the food industry. **The specialized direction of the graduate course** implements educational programs of postgraduate training for the food and processing industries with in-depth professional training. The profile direction of the magistracy is a one-and-a-half-year program, which is aimed at professional specialization in the chosen field.

**Tasks of EP:**

- theoretical training, including the study of basic and core disciplines;
- professional (industrial) practice;
- experimental research work, including the implementation of the master's thesis.
- conducted in compliance with the basic problems of occupation for which defends thesis;
- to form the ability to analyze the scientific information, highlight the problematic aspects and the ability to apply this knowledge in practice;
- - to form undergraduates professional skills and competencies that contribute to the solution of theoretical and practical aspects of the most promising trends in agriculture, knowledge and application of the requirements of the program 4.0 Industry.

### 1.2 Educational outcome (codes)

**ON 1**- To apply the acquired knowledge of the theoretical and methodological foundations of higher school pedagogy, vocational education in the implementation of educational activities

**ON 2**- Have the ability to communicate to solve problems of interpersonal and intercultural interaction

**ON 3**- Possess the skills for written and oral professional communication in one of the foreign languages

**ON 4**- Be ready to lead a team in the field of their professional activities, tolerantly perceiving social, ethnic, confessional and cultural differences

**ON 5**- Have the skills to plan and develop innovative technologies for the processing industry and food production based on scientific achievements;

**ON 6**- To acquire skills and abilities to develop new methods and means of designing information systems based on modern technologies, to develop and study theoretical and experimental models of objects in the food and processing industry in order to introduce information technologies

**ON 7**- To apply knowledge of methodology and methods of experimental research in production and scientific activities

**ON 8**- Possess theoretical and practical fundamentals of waste-free technologies and technologies of deep processing of raw materials in the production systems of the food and processing industry.

## 2. General characteristics of the educational program (relevance, features, competitive advantages, uniqueness, stakeholders, etc.)

The food industry of the Republic of Kazakhstan is one of the strategic sectors of the economy, so ensuring a high level of its development, improving the efficiency of the food processing industry is the most important task at the moment.

In this regard, the training of competitive specialists who have successfully mastered modern educational programs on technologies of food and processing industries and management of enterprises that are able to independently develop modern food technologies and engage in management activities is one of the urgent tasks in the Republic of Kazakhstan.

**The peculiarity** of the EP is that it is a mirror image of the program of the University of California Davis (USA), and was created within the framework of the State program of industrial and innovative development of Kazakhstan for 2015-2019, together with professors of the University of Davis and taking into account the recommendations of leading industry experts. It is to improve the organization of work of undergraduates by consolidating theoretical knowledge and practical skills on the basis of its own scientific and experimental platform for the production and processing of agricultural products. Training is carried out through the use of video cameras installed in classrooms and in production and experimental workshops**.**

The EP also provides for the possibility of training in multilingual groups and dual technology, i.e. the theoretical part of the classes takes place in the classrooms of the University, and practical classes are held on the basis of industrial enterprises. Currently, dual technology training is widely practiced with LPP «JFOOD KAZAKHSTAN».

**Competitive** advantages of the EP is to prepare graduates of a magistracy on directions "Technology of food products" which will provide the degree of adaptation of graduates to market conditions and willingness to change the profession and also for further improvement obtained at the University of education, EP developed taking into account modern requirements of knowledge of graduates of both technology and management. In addition, graduates have the opportunity to test the results of scientific research in their own departments of the University. The master's degree means the annual, half yearly and biennial training. The advantages provided by this program is that the undergraduate has the right to choose the best terms of training, taking into account his employment and career growth, as well as interest in scientific and pedagogical direction.

**The uniqueness** of the proposed educational program for a large part of the masters who studied on the technology of food and processing industries is to obtain the qualification of "Food Technology" gives a real opportunity to find in the market of skilled labor appropriate professional niche, both in the field of technology of food and processing industries , and in the management structure in the sectors of food and processing industry. The uniqueness of this educational program is that the undergraduate is given the right to choose a specialization.

Introduction to the educational process of the proposed program will position graduates as **stakeholders**, whose actions, knowledge and competencies will demonstrate the success of this program. Skateholders of EP are: the Ministry of agriculture of RK (Department of production and processing of livestock and crop production), the accredited OPS and IL, NCE RK "Atameken", the enterprises of the food and processing industry, research institutes and centers

For complex management of quality and safety of food products, ensuring competitiveness and efficiency of activity at the expense of increase of trust and loyalty of consumers, decrease in costs of the enterprise on elimination of consequences of release of substandard and dangerous production creation of modern management systems is necessary.

The educational program "food Technology" will prepare students for innovation in the industry, learn how to manage new ideas and apply knowledge to create a new business.

## 3 Competence-based model (pattern) of a graduate student

### 3.1 Areas of professional activity

The educational program "Food Technology" covers the food and processing industry, educational organizations, design, experimental research organizations, enterprises of various forms and types of ownership, new methods of collection and analysis of scientific and technical information, new technologies and products, types of food ingredients, as well as areas of management, as middle and senior managers.

There is a great demand among employers for specialists with practical skills in food production, Analytics, quality assurance, Economics and business management.

Graduates of the master's program will be in demand in many companies, from small and medium-sized companies to large corporations, universities as teachers, doctoral students and research institutes. Graduates can also work in technology innovation centers, innovative food companies, or government agencies.

The University provides a solid Foundation of knowledge and skills that are needed to start your professional career interest, create, manage and grow your business.

### 3.2 Types of professional activity:

Master students of the educational program "Food Technology" can perform the following types of professional activities:

- management, organization and control of technological processes in the food and processing industry;
- improvement of technological operations and participation in the development of resource-saving technological processes in the development of new types of products; analysis of technical equipment and production activities of enterprises, taking into account the requirements of ecology, labor protection.
-management of labor collectives, adoption of managerial decisions; analysis of technical and economic indicators of enterprises and marketing activities;
- development and design of technological schemes for food and processing industries and reconstruction of existing enterprises;
- study and analysis of scientific and technical information, domestic and foreign experience in the food industry; experimental studies to improve the quality of raw materials, finished products of the relevant branches of food products;
- activities in the field of education.

### 3.3 General educational competencies:

-improve and develop your intellectual level;

-collect data, process them using modern information technologies; interpret the results obtained to form judgments on scientific problems;

-independently apply methods and means of cognition, training and self-control to acquire new knowledge and skills;

-freely use literature and business written and oral speech in the state language of the Republic of Kazakhstan, create and edit texts for professional purposes, speak a foreign language as a means of business communication;

-know the methods of scientific research and academic writing and apply them in the field of study;

-understand the importance of the principles and culture of academic integrity.

**3.4 Core competencies:**

- demonstrate developing knowledge and understanding in the field of study, based on advanced knowledge of this field, in the development and (or) application of ideas in the context of the study;

- apply at a professional level their knowledge, understanding and abilities to solve problems in a new environment, in a broader interdisciplinary context;

- to collect and interpret information for the formation of judgments, taking into account social, ethical and scientific considerations;

- clearly and unambiguously communicate information, ideas, conclusions, problems and solutions, both to specialists and non-specialists;

- learning skills necessary for independent continuation of further education in the studied area.

**3.5 Professional competence**

Master, who mastered the educational program of the specialty should:

1) have a performance:

- professional competence of a higher school teacher;

- contradictions and socio-economic consequences of globalization processes;

- on modern methods of management in food processing enterprises;

- methods of planning and management

- ensuring the production of high-quality competitive products that meet the established standards and norms

2) know:

- implementation of educational and pedagogical activity on credit technology of training;

- methods of teaching professional disciplines;

- use of modern information technologies in the educational process;

3) be able:

-integrate the knowledge gained in different disciplines to solve research problems in new unfamiliar conditions;

- by integrating knowledge to make judgments and decisions based on incomplete or limited information;

- apply interactive teaching methods;

-to carry out information-analytical and information-bibliographic work with the involvement of modern information technologies;

- creative thinking and creative approach to solving new problems and situations;

- to apply the advanced domestic and foreign experience in the field of production technology, to develop and participate in the implementation of measures to improve production efficiency aimed at reducing material consumption, reducing labor intensity, increasing labor productivity.

- summarize the results of research and analytical work in the form of a dissertation, scientific article, report, analytical note, etc.;

4) have skills:

- implementation of educational and pedagogical activity on credit technology of training;

- use of modern information technologies in the educational process;

- expanding and deepening the knowledge necessary for daily professional activities and continuing education in doctoral studies.

5) be competent:

- in the implementation of research projects and research in the professional field;

- in ways to ensure continuous updating of knowledge, skills and abilities

## 4. The base-line of passaged professional internships

Masters, who have mastered this educational program, have an advantage when applying for a job as a technologist, a master of food and processing enterprises of various forms of ownership, a technician-technologist in production, a laboratory chemist in a production laboratory, a specialist in research institutions and Universities, standardization and certification centers, to work in the public service system. After obtaining a master's degree in technical Sciences, it is possible to continue training in doctoral studies, and then provides for the defense of the thesis with the award of the degree of doctor of PhD.

Students have the opportunity to go to foreign research internships in leading universities in Europe, USA and other countries. Scientific training is carried out in the partner universities, within the framework of cooperation agreements with world leading universities: including the University of Angers (Universitéd'Angers, France), University of California Davis (UCDavis, USA), University of applied Sciences Weihenstephan-Triesdorf (Germany), Krakow Agricultural University (Poland), Northwest University of agriculture and forestry, Yangling, Shaanxi (China), Belarusian state agrarian technical University.

For the passage of professional practices undergraduates provided experimental manufactories of Department in the direction of food and processing industry: "Manufactory for the production of meat products", "Manufactory for the production of dairy products", "Manufactory for the production of vegetable oils" and "Manufactory for the production of food (mini-bakery)". There is also agreement about the internship in the following companies: Zarechnoye village, LLP "Molprodukt" Petropavlovsk city, "LLP KazGerKus", Akmola region, Stepnyak city, LLP "Dedov", Karaganda region,Aktas village, LLP "BAYAN Company," Zhezkazgan city. In the direction of "Food Management" in LLP Group of companies "Akmol holding" and LLP Novokubanskoe, LLP "Astyk".

**5. The structure of the educational program of master's degree in scientific and pedagogical direction**

| № п/п | Name of cycles of disciplines and activities | Total labor intensity | |
|---|---|---|---|
| | | In academic hours | In academic credits |
| 1 | 2 | 3 | 4 |
| 1. | **Theoretical study** | 1920 | 64 |
| 1.1 | **Cycle of basic disciplines (BD)** | 1050 | 35 |
| 1) | **Academic component (AC):** | **600** | **20** |
| | including: | | |
| | Pedagogics of higher school | 90 | 3 |
| | Management psychology | 150 | 5 |
| | History and philosophy of science | 150 | 5 |
| | Foreign language (professional) | 150 | 5 |
| | Pedagogical practice | 60 | 2 |
| 2) | **Cycle of basic disciplines (CC)** | **450** | **15** |
| | Biotechnological bases of food production / Food safety control and quality standards | 150 | 5 |
| | Food safety: inspection, sanitation and HACCP / Microbiological methods of food quality control | 150 | 5 |
| | Scientific basis of food production / Nutritionology | 150 | 5 |
| 1.2 | **Cycle of major disciplines (MD)** | **1590** | **53** |
| 1) | **Academic component (AC)** | | |
| | Modern equipment of food production | 150 | 5 |
| | Business planning in the storage and processing of agricultural products | 150 | 5 |
| | Modeling of food production processes | 150 | 5 |
| | Research practice | 390 | 13 |
| 2) | **Component of choice (CC)** | | |
| | Modern technologies for the production of meat and dairy products / Innovative storage technology of processing plant products / Progress in science and technology in the field of grain and oil | 150 | 5 |
| | Principles for developing formulations of new types of food products / Technical systems for the production of products of deep processing of vegetable raw materials and biofuels / Progress in | 210 | 7 |

| | | | |
|---|---|---|---|
| | fruit and vegetable processing | | |
| | Waste-free production technology of meat and dairy products / Promising technologies of deep processing of vegetable raw materials and the production of biofuels | 240 | 8 |
| | Methods for assessing the quality of processing products / Methods for analyzing products of deep processing of vegetable raw materials and biofuels / Progress in the production of animal origin products | 150 | 5 |
| 3) | Research work of a master student, including internship and master's thesis (SRWM) | 720 | 24 |
| 4) | Scientific-research work | 720 | 24 |
| 5) | Design and defense of master's thesis (D&DMTh) | 240 | 8 |
| 6) | **Final attestation (FA)** | **240** | **8** |
| 7) | **Total** | **3600** | **120** |

## Annex 1. Academic calendar

**Approve**
Chairman of the Academic Council
NJSC "Seifullin KATIUS "
_____ Tireuov K.M.
«29» 05 2023 y.

**ACADEMIC CALENDAR**
for 2023-2024 academic year
by levels of training
(MASTER)

| | | |
|---|---|---|
| 1 | Presentation week, registration for disciplines | 1 course August 28 - 31 |
| **2** | **I semester** | **September 1 - December 15** |
| ***3*** | ***Constitution day*** | ***August 30*** |
| 4 | Knowledge Day | September 1 |
| ***5*** | ***Republic Day*** | ***October 25*** |
| ***6*** | ***Independence Day*** | ***December 16*** |
| 7 | Exam session | December 18 - 29 |
| 8 | Passing FX | December 18 -29 |
| ***9*** | ***New Year's Holiday*** | ***January 1, 2*** |
| 10 | Holidays | January 1-26 |
| **11** | **II semester** | **January 29 to May 10** |
| ***12*** | ***International Women's Day*** | ***March 8*** |
| ***13*** | ***Holiday Nauryz*** | ***March 21,22,23*** |
| ***14*** | ***Holiday of unity of the people of Kazakhstan*** | ***May 1*** |
| ***15*** | ***Defender of the Fatherland Day*** | ***May 7*** |
| ***16*** | ***Victory Day*** | ***May 9*** |
| 17 | Exam session | from May 13 to May 24 |
| 18 | Passing FX | May 13 - 31 |
| 19 | Registration for the summer semester | May 27 - 31 |
| 20 | Final examination | until June 30 |
| 21 | Summer semester | from June 3 to July 12 |
| 22 | Holidays | from May 27 to August 31 |
| ***23*** | ***Capital Day*** | ***July 6*** |
| | Practice* | |

Approved by the Academic Council of NJSC «S. Seifullin KATIU», protocol № 16, 29.05. 2023 y.

***Note:*** If it coincides with a weekend or a holiday, the lesson begins on the next working day.

* Types and terms of professional practice are determined by the working Curriculum of Educational Programs.

**Appendix 1 to the Academic Calendar**

**Approved by the Academic Council of the NJSC "S.Seifullin KATIUS", Protocol №16, of 26.05.2023 y.**

**Schedule of the educational process for the 2023-2024 academic year for the educational program of the Technical faculty**

**MASTER**

| Courses | September | | | | | October | | | | | November | | | | December | | | | January | | | | | February | | | | Mart | | | | April | | | | May | | | | | June | | | | July | | | | August | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 28 | 4 | 11 | 18 | 25 | 2 | 9 | 16 | 23 | 30 | 6 | 13 | 20 | 27 | 4 | 11 | 18 | 25 | 1 | 8 | 15 | 22 | 29 | 5 | 12 | 19 | 26 | 4 | 11 | 18 | 25 | 1 | 8 | 15 | 22 | 29 | 6 | 13 | 20 | 27 | 3 | 10 | 17 | 24 | 1 | 8 | 15 | 22 | 29 | 5 | 12 | 19 | 26 |
| | 1 | 8 | 15 | 22 | 29 | 6 | 13 | 20 | 27 | 3 | 10 | 17 | 24 | 1 | 8 | 15 | 22 | 29 | 5 | 12 | 19 | 26 | 2 | 9 | 16 | 23 | 1 | 8 | 15 | 22 | 29 | 5 | 12 | 19 | 26 | 3 | 10 | 17 | 24 | 31 | 7 | 14 | 21 | 28 | 5 | 12 | 19 | 26 | 2 | 9 | 16 | 23 | 30 |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 |
| 7M07201 "Food technology" (2 years) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I | PW | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U TR | -/U/ TR | -/U TR | -/U TR | E/P | E/P | H | H | H | H | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | E/P | E/P | P/TD/H | H/S | H/S | H/S | H/S | H/S | H/S | H | H | H | H | H | H | H |
| II | H | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | -/U | E/P | E/P | H | H | H | H | RP | RP | RP | RP | RP | RP | RP | RP | RP | U | U | U | U | U | U | U | U | U | FE | FE | FE | FE | | | | | | | | |
| 7M07201 "Food technology" (2 years) (winter reception) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| III | H | U | U | U | U | U | U | U | U | U | U | U | U | U | FE | FE | FE | FE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Conventions

| | |
|---|---|
| **PW** | Presentation week |
| **●** | Theoretical training |
| **TD** | Enrollmentin disciplines |
| **E** | Examination session |
| **P** | passing FX |
| **H** | holidays |
| **MT** | Military training |
| **S** | Summer semester |
| **FE** | Final examination |
| **EP** | Educational practice |
| **IP** | industrial practice |
| **CP** | production and clinical practice |
| **PP** | production and technological practice |
| **U** | Undergraduate practice |
| **TP** | Teaching practice |
| **RP** | Research practice |
| **U** | undergraduate research work |
| **ER** | experimental research work of a master student |
| **DR** | Doctoral research work |

# Annex 2 Working curriculum

| № пп | The name of the module | Thecycleofdiscipline | Disciplinecomponent | Codeofdiscipline | Nameofdiscipline | ECTS credits | Type of control | Volume in hours | | | | | | Distribution of academic hours by semester/trimester/ quarter | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Total | Auditorium | | | Extracurricular | | 1 | 2 | 3 | 4 |
| | | | | | | | | | Lectures | Practical lessons | Laboratory lessons | IWSL | IWS | | | | |
| | | **BD** | **AC** | | | **35** | | | | | | | | | | | |
| 1 | Social and pedagogical Sciences | BD | AC | Ped 5203 | Pedagogyofhighereducation | 3 | exam | 90 | 15 | 15 | | 15 | 45 | 3 | | | |
| 2 | | BD | AC | Psi 5204 | Managementpsychology | 5 | exam | 150 | 15 | 30 | | 30 | 75 | 5 | | | |
| 3 | | BD | AC | IFN5201 | History and philosophy of science | 5 | exam | 150 | 15 | 30 | | 30 | 75 | 5 | | | |
| 4 | | BD | AC | IYaP5202 | Foreign language (professional) | 5 | exam | 150 | | 45 | | 30 | 75 | 5 | | | |
| | | BD | AC | PP5208 | Pedagogicalpractice | 2 | | 60 | | 60 | | | | 2 | | | |
| | | **BD** | **CC** | | | **20** | | | | | | | | | | | |
| 5 | Quality management and biotechnological bases of food products | BD | CC | BOPP6202 | Biotechnological bases of food production / Food safety control and quality standards | 5 | exam | 150 | 15 | | 30 | 30 | 75 | 5 | | | |
| 6 | | BD | CC | BPPISN6204 | Food safety: inspection, sanitation and HACCP / Microbiological methods of food quality control | 5 | exam | 150 | 15 | | 30 | 30 | 75 | | 5 | | |
| 7 | | BD | CC | NOPPP 5301 | Scientific basis of food production / Nutritionology | 5 | exam | 150 | 15 | | 30 | 30 | 75 | | 5 | | |
| | | **BD** | | | | **15** | | | | | | | | | | | |
| | | **MD** | **AC** | | | **53** | | | | | | | | | | | |
| 8 | Scientific and theoretical basis of technology food | MD | AC | SOPP6302 | Modern equipment of food production | 5 | exam | 150 | 15 | 30 | | 30 | 75 | | 5 | | |
| 9 | | MD | AC | BPPHOSP5303 | Business planning at the enterprises of storage and processing of agricultural products | 5 | exam | 150 | 15 | 30 | | 30 | 75 | | 5 | | |
| 10 | | MD | AC | MPPPP6304 | Modeling of food production processes | 5 | exam | 150 | 15 | 30 | | 30 | 75 | | 5 | | |
| | | Research practice | RP | IP6305 | Research practice | 9 | pass/faile xam | 390 | | 390 | | | | | | | 13 |
| | | **MD** | **CC** | | | **28** | | | | | | | | | | | |
| 11 | High-tech food production | MD | CC | STPMMP6301 | Modern production technologies of meat and dairy products/Innovative storage technology of processing plant products / Progress in science and technology in the field of grain and oil | 5 | exam | 150 | 15 | 30 | | 30 | 75 | | | 5 | |
| 12 | | MD | CC | PTGPRSPB5306 | Technical systems for the production of products of deep processing of plant raw materials and biofuels/Principles for developing formulations of new types of food products / Progress in fruit and vegetable processing | 7 | exam | 210 | 15 | 60 | | 30 | 105 | | | 7 | |
| 13 | | MD | CC | MAPGPRSB5307 | Promising technologies of deep processing of vegetable raw materials and the production of biofuels/Waste-free production technology of meat and dairy products | 8 | exam | 240 | 15 | 60 | | 45 | 120 | | | 8 | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | | MD | CC | TSPPGPRSB 5308 | Methods of analysis of products of deep processing of plant raw materials and biofuels/Methods for assessing the quality of processing products / Progress in the production of animal origin products | 5 | exam | 150 | 15 | | 30 | 30 | 75 | | | 5 | |
| | | **MD** | | | | ***25*** | | | | | | | | | | | |
| | Research work of a master student, Including internship and master's thesis (SRWS) | | | NIRMVVMD 601 | | 24 | pass/faile xam | 720 | | 720 | | | | 5 | 5 | 5 | 9 |
| | ***Scientific-research work*** | | | | | ***24*** | | | | | | | | | | | |
| | Design and defense of master's thesis (D&DMTh) | | | OZMD601 | | 8 | pass/faile xam | 240 | | 240 | | | | | | | 8 |
| | ***Final attestation (FA)*** | | | | | ***8*** | | | | | | | | | | | |
| | **Total** | | | | | **120** | | **3600** | **195** | **1770** | **120** | **420** | **1095** | **30** | **30** | **30** | **30** |

**Annex 3. Matrix of achievability of the formed learning outcomes in the educational program with the help of academic disciplines.**

| № | Name of the discipline | Brief description of the discipline | Number of credits | The formed educational outcome | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
| **Cycle of basic disciplines. Academic component** | | | | | | | | | | | |
| 1 | Pedagogics of higher school | The role of public life, science and education, current trends in the development of scientific knowledge; methodology of pedagogical research in solving relevant scientific issues; laws, laws and principles of teaching in higher education in the process of organizing scientific work; psychology of cognitive activity of undergraduates in the educational process; psychological methods and means of increasing efficiency and improving the quality of education | 3 | + | | | | | | | |
| 2 | Psychology of management | During the study of the discipline "Psychology of management" will be considered the conceptual apparatus of management psychology, the head and the teamthe psychology of the order, the person as the subject and the object of management, psychology of criticism, psychotypes of subjects of communication, psychological technique persuasive influence. | 5 | | + | | | | | | |
| 3 | History and philosophy of science | In the process of studying the discipline "History and philosophy of science" undergraduates will be acquainted with the structure of scientific knowledge, with the methods of scientific research, with the functions of scientific theories and laws; will develop ideas about the criteria of scientific, style of scientific thinking. | 5 | | | | + | | | | |
| 4 | Foreign language | The content of the discipline "Foreign language" | 5 | | | + | | | | | |

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| | (professional) | is aimed at mastering the future masters of foreign language for professional and academic purposes at a professional level, which will freely operate the scientific and conceptual apparatus of the specialty, to expand the scientific and information base, to master the skills of interpretation of scientific information, arguments, beliefs, scientific controversy, academic writing. | | | | | | | | | |
| **Cycle of basic disciplines. Cycle of basic disciplines** | | | | | | | | | | | |
| 5 | Biotechnological bases of food production | General biotechnological scheme of production of microbial synthesis products. Preparation of enzyme preparations and their application in the food industry. Deep processing of grain raw materials to produce organic acids, alcohols, servants, amino acids, vitamins. Deep processing of animal products. The use of lactic acid bacteria in the production of cheese, dairy products, conservation. Deep processing of meatand fish products. Microbial-protein | 5 | | | | | + | | | |
| 6 | Food safety: inspection, sanitation and HACCP | Concepts of food safety. Law of the Republic of Kazakhstan on food safety. Basic concepts, principles and characteristics of the HACCP system. HACCP quality system in the world practice. The system of ensuring food safety on farms. Development and implementation of HACCP for meat and dairy enterprises. Risk analysis in the Implementation of HACCP | 5 | | | | | | | + | |
| 7 | Scientific basis for food production | The subject of the course is the theoretical and practical basis of technology of food production from raw materials of plant and animal origin, necessary for the effective operation and but specialty, the study of the requirements for raw materials processing methods, skills in the | 5 | | | | | + | | | |

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| | | organization and management of technological processes of food production and the solution of the problems. | | | | | | | | | |
| 8 | Microbiological methods of food quality control | The influence of microorganisms, technological modes, conditions of processing and storage of raw materials on the quality of food products. Modern achievements of microbiology and biotechnology in the food industry. Research of microorganisms and enzyme preparations improving biotechnological processes in food production. Specialized theoretical and practical knowledge for microbiological research. Modern methods of microbiological analysis of food products. | 5 | | | | | + | | | |
| 9 | Food safety control and quality standards | The discipline "Food safety control and quality standards" provides knowledge about pollutants of raw materials and food products, safety standards, skills in preventing the accumulation of pollutants in food products. Basic knowledge about food additives: classification, rationing, control. Labeling of food products. Studies the components of natural food that adversely affect the body and their influence of culinary techniques and technological processes of food processing. | 5 | | | | | | | + | |
| 10 | Nutritionology | State policy in the field of healthy nutrition of the population of the Republic of Kazakhstan. Fundamentals of evidence-based nutrition and healthy nutrition, principles of children's, herodietic, preventive and curative nutrition. Qualitative and quantitative analysis of diets, physiological needs for energy and nutrients, a sociological survey on diet and nutrition regime. The plan of correction of the diet and diet, the | 5 | | | | | + | | | |

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| | | implementation of the correction plan, the basic principles of a healthy diet and adequate physical activity. Prevention of food poisoning. Optimization of diets of various population groups. | | | | | | | | | |
| **Cycle of major disciplines. Academic component** | | | | | | | | | | | |
| 11 | Modern equipment for food production | The course of technological equipment provides for the study of modern forms of production organization. Study of engineering problems of food production and machine-hardware solutions. Equipment for the preparation of raw materials, semi-finished products and basic production operations. Development of technological equipment for heat and mass transfer. | 5 | | | | | | + | | |
| 12 | Business planning in the storage and processing of agricultural products | Selection of the enterprise development strategy and its reflection in business plans. Basic requirements for the development of business plans. Principal models of the business plan. Development section of the business plan "production Plan". Preparing to develop a business plan. The method of developing a marketing plan. Determination of production and sales of products (services). Evaluation of the use of resources. Planning for staffing requirements. Balance sheet fore cast | | | | | | + | | | |
| 13 | Modeling of processes of food production | Basic concepts of mathematical modeling. Theoretical foundations and mathematical modeling of grain separation and grinding processes. Theoretical basis and mathematical modeling of the processes of salting meat. Mathematical modeling and optimization of nutrient conservation during sterilization. Theoretical basis and mathematical modeling of | 5 | | | | | | | + | |

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| | | raw material storage processes | | | | | | | | | |
| **Cycle of major disciplines. Component of choice** | | | | | | | | | | | |
| 14 | Modern technologies for the production of meat and dairy products | Analysis of domestic and foreign scientific and technical literature on the technology of processing, storage and processing of meat, dairy and fish products using computer tools. Possession of information technologies in the process of studying the properties of plant and animal raw materials, semi-finished products and products from plant and animal raw materials. | 5 | | | | | | + | | |
| 15 | Innovative storage technology of processing plant products | To study the issues of creating innovative technology for processing, storage and processing of cereals, legumes and oilseeds; physiological, biochemical and microbiological changes occurring in grain during storage. Special attention in this subject is focused on solving topical issues of disinsection, hydrothermal, ultrasonic, laser, desiccation, thermal radiation, electromagnetic, ozone and ion technologies at grain processing enterprises. | 5 | | | | | + | | | |
| 16 | Progress in science and technology in the field of grain and oil | To study and analyze the results of a study of the achievements and prospects for the development of processing of grain and oil and fat industries. Acquaintance with modern technologies for the production of grain and oil, methods of their processing, storage and transportation. Determination of grain and oil quality indicators; nutritional value and their importance for human health and nutrition. The study of scientific research and technological advances in the field of genetic modification, the development of new varieties of grain and oil, technologies for their processing. | 5 | | | | | | + | | |
| 17 | Technical systems for the | Classification of equipment for deep processing | 7 | | | | | | | | + |

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| | production of products of deep processing of vegetable raw materials and biofuels | of raw materials and products of biofuel production. Equipment for mechanical separation and mixing of raw materials and products of biofuel production; Equipment for filtration and flotation of raw materials and products of biofuel production. Equipment for concentration and purification of raw materials and products of biofuel production. Equipment for fermentation of raw materials in the production of biofuels | | | | | | | | |
| 18 | Principles for developing formulations of new types of food products | The study of new areas of scientific research, which allows developing the formulation of complex multicomponent products with a given set of qualitative and quantitative indicators, using the basic principle of the theory of balanced nutrition. Increasing competition in the commodity and food markets leads to the need to constantly expand the range of products by adjusting existing prescription compositions and developing new recipes. | 7 | | | | | | + | | |
| 19 | Progress in fruit and vegetable processing | Studying the latest developments in fruit and vegetable processing, including new processing technologies, preservation, packaging and transportation methods. The study of quality indicators of vegetables and fruits, methods of their control, the production of high-quality processed products. A study of the nutritional value of vegetables and fruits and their role in nutrition. Recent scientific and technological advances, including the development of new varieties, genetic modification and other innovative technologies. | 7 | | | | | | + | | |
| 20 | Promising technologies of deep processing of | The main groups of raw materials sources. Secondary resources of deep processing of plant | 8 | | | | | | | | + |

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| | vegetable raw materials and the production of biofuels | raw materials and biofuel production. The use of industrial waste to produce energy. Production of liquid and gaseous biofuels. Methane and hydrogen fermentation. Technology of biogas production-methane and hydrogen. Technology of production of bioethanol and biodiesel. The technological scheme of bioenergy plants | | | | | | | | | |
| 21 | Waste-free production technology of meat and dairy products | When studying the discipline, undergraduates study modern principles of waste-free and resource-saving processing technology in obtaining high-quality and safe products from secondary resources of dairy and meat products. The study of their ways of identifying the progress of production at the present stage and obtaining new theoretical and practical scientific solutions. | 8 | | | | | | | | + |
| 22 | Methods for analyzing products of deep processing of vegetable raw materials and biofuels | Theoretical issues of quality assessment of raw materials and finished products. Terms and definitions. Organization of laboratory control. Classification of compounds present in products. Classification of methods for studying the properties of raw materials and finished products. General principles of analysis and sample preparation. Organoleptic methods for assessing the quality of products. Instrumental methods for the study of rheological properties. Physico-chemical methods of studying the composition and properties of raw materials and products | 5 | | | | | | | + | |
| 23 | Methods for assessing the quality of processing products | The study of modern methods for assessing the quality of raw materials and processed products, the principles of analytical instruments, interstate regulations for food processing. Skills in assessing the quality of raw materials, semi- | 5 | | | | | | | + | |

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| | | finished products and finished products, certification, requirements for quantitative and qualitative storage of products and ways to reduce natural loss and losses in storage areas, methods and modes of storage of livestock products. | | | | | | | | | |
| 24 | Progress in the production of animal origin products | An overview of recent developments in the production of animal products, methods of feeding and management of livestock, and aspects of animal health and nutrition. The study of quality criteria, methods of control of products of animal origin, and the production of high quality products. Studying the latest scientific and technological advances in the production and processing of meat, dairy products, eggs and other animal products. The current state and future development of the production of animal products. | 5 | | | | | | + | | |

Chairman of the FSAQ of the Technical Faculty Mendaliyeva S.I

Head of Department Food technology and processing products Kakimov M.M.

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