Ministry of Agriculture of the Republic of Kazakhstan
Kazakh Agrotechnical University named after S.Seifullin

Considered
at the meeting of the Academic
Council of the University
Protocol No. 19
from "31" 08 2022 y.

I APPROVE
Chairman of the Management Board
NAO "Kazakh Agrotechnical
University named after S.Seifullin"
"05" 09 2022 y.

EDUCATIONAL PROGRAM
7M07106 Mechanical Engineering

Field of education: 7M07 Engineering, manufacturing and construction industries
Direction of personnel training: 7M071 Инженерия и инженерное дело
Code in the International Standard Classification of Education: 0710
Degree/qualification awarded: master of technical sciences in the educational program 7M07106 Mechanical Engineering
Duration of study: 2 years

Nur-Sultan 2022

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The team of authors was approved by the order of the NAO "KATU named after S.Seifullin" No. 932-N dated 12.12.2018 (amended by Order No. 515-N dated 04.10.2022)

The educational program 7M07106- Mechanical Engineering

was considered at the meeting of the Department of Technological Machines and Equipment
Protocol No. 20 of June 27, 2022.,

approved by the Academic Council of the Faculty for Quality
Protocol No. 10 (E) dated June 29, 2022.

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1 Passport of the educational program

1.1 Purpose of the educational program

Formation in students of general cultural (general scientific, social and personal, instrumental) and professional competences in the field of design, production and technical operation of machines and apparatuses of food production in the agroindustrial complex with the training of qualified specialists who are able to analyze the work and explore these technical objects, develop their advanced designs with a choice optimal solutions with high technological reliability, comparable with the performance of foreign samples.

Objectives of the educational program:

- provide an individual educational trajectory of learning in accordance with the specialization chosen by undergraduates;
- to provide a full-fledged and high-quality scientific and pedagogical education, to form professional competence, to deepen theoretical and practical, as well as individual training of undergraduates in the field of technical regulation.
- to ensure the development of disciplines that guarantees professional mobility of fundamental courses at the intersection of sciences;
- to contribute to the acquisition of skills of participation in scientific events of various levels, the continuation of scientific training in doctoral studies;
- to ensure the acquisition of the necessary amount of knowledge in the field of university pedagogy and psychology and the acquisition of teaching experience at a university.

1.2 Educational outcome

EO 1. To study the basic provisions of pedagogy and psychology. Apply effective learning technologies; solve psychological and pedagogical problems. Determine the mechanisms, patterns of developmental learning and the psychological basis for diagnosing the level and quality of knowledge acquisition

EO 2. Present the basics of scientific research methodology. Apply the means of collecting, processing experimental data and analyzing the results. Make a review of literary information, formulate the results of business written and oral speech in the state and foreign languages.

EO 3. Express the ability for abstract thinking, analysis, synthesis; taking into account the factors affecting the facility and identify priority areas for technical renovation.

EO 4. Develop technologies for processing raw materials, apply the basics of automation of technological processes and quality control of processed products, create new types of equipment.

EO 5. Choose methods and means of measurement and control of the parameters of the operation of technological machines, carry out diagnostic control of technical objects.

EO 6. Apply computer application programs in modeling objects, develop working documentation for samples of mechatronic robotic systems

EO 7. Create analog models of hydraulic drives, systems, processes and objects; apply computer technologies for design and diagnostics.

EO 8. Formulate methodologies for the design, production, maintenance and repair of modern technological machines and create new structural materials in food industries.

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

The relevance of the educational program. The need to revise the role of agricultural universities, based on updating the curriculum in order to transform them into centers for disseminating the most advanced knowledge and best practices in the agro-industrial complex, is especially relevant.

The educational program "Mechanical Engineering" was developed jointly with professors of the University of California, Davis (USA) in accordance with the National Qualifications Framework and professional standards, agreed with the Dublin descriptors and the European Qualifications Framework, based on the State Compulsory Standard of Higher Education, approved on October 31, 2018 year (No. 604).

The total number of credits for this educational program is 120 credits, of which: the total number of credits for theoretical training - 73 credits, for practical training (pedagogical, research) - 11 credits, undergraduate research work, including the completion of a master's thesis - 24 credits, final certification - 12 credits, including a comprehensive examination in the specialty - 4 credits and registration and defense of a master's thesis - 8 credits.

A feature of the educational program is the consolidation of theoretical knowledge by conducting laboratory and practical classes on the basis of our own training workshops and laboratories within the university. In order to exchange scientific and pedagogical experience in the framework of cooperation with foreign universities, the EP provides for scientific internships and research practice, within the framework of academic mobility, both in universities, research institutes and industrial enterprises of Kazakhstan, and the possibility of its passage by undergraduates on the basis of foreign universities.

Competitive advantages of the educational program. A professional infrastructure (educational resources) has been created on the basis of KATU:

- Production and experimental shop for metalworking and welding;
- Kazakh-Belarusian training and production center;
- Pavilion Kazakh-Chinese center of agricultural mechanization;
- Laboratory "Applied Robotics";
- Laboratory "Mechatronics";
- Laboratory "Materials Science and TCM";
- Laboratory "Installation and operation of technological machines";
- Training workshops.

The presence of a modern laboratory and technical base and constantly updated research laboratories, highly qualified teaching staff is the basis for the formation of strong advanced knowledge by undergraduates, the ability to conduct research in promising science-intensive areas in accordance with Industry 4.0 and 5.0 programs.

The uniqueness of the educational program is determined by the competencies that a master who has completed education under this program will have:

- implementation on the basis of mutually beneficial strategic partnership with employers and all interested parties of an agreed range of levels and forms of continuous professional education, providing for each student the opportunity to form an individual educational trajectory, taking into account further professional, career and personal growth.

- increasing the efficiency and effectiveness of scientific research, more complete use of the scientific potential of the university to improve the quality of training of specialists, the implementation of the principle of learning through scientific research at all stages of training;

- training of specialists and scientists with the necessary competencies and innovative thinking.

- introduction of new educational technologies and principles of organization of the educational process, ensuring the effective implementation of innovative models of continuous education and problem-based learning, including the use of modern information and communication technologies.

- monitoring of **targeted training** and employment of graduates.

The main **stakeholders of the educational program** are:

1. Teaching staff, leading specialists of industrial enterprises and agro-industrial complex associations;
2. Department of technical and innovative development of the Ministry of industrial and innovative development of the Republic of Kazakhstan;
3. Ministry of Agriculture of the Republic of Kazakhstan;
4. Machine-building enterprises of any profile;
5. Design organizations of the machine-building direction;
6. Research institutes and research and production centers.

3 Competence model (portrait) graduate

3.1 Areas of professional activity:

- production and psychological-pedagogical activities in organizations of secondary, higher and additional professional education in technical and agricultural areas, research, design organizations and in production;
- research activities in the field of education and in production in the field of advanced training of employees in accordance with specialization;
- educational, managerial and production activities in accordance with the qualification of the master of technical sciences;
- material production in design and design institutions; production and repair enterprises; dealer centers of firms; transport organizations, etc.

3.2 Types of professional activity:

Types of professional activity:

- production-technological and organizational-managerial;
-design and research;
-pedagogical.

Tasks of professional activity:

- development of technical specifications for the design and manufacture of devices, machines, drives, systems, non-standard equipment;
- research and analysis of the causes of marriage and evaluation of the economic efficiency of technological equipment;
- technical control in the design, manufacture, testing and operation of process equipment;
- planning and carrying out research works of a theoretical and applied nature;
- preparation of scientific and technical reports, reviews and publications based on the results of research;
- development of advanced structures, machines and devices and examination of design and technological developments;
- carrying out technical calculations for projects and developing methodological and normative-technical documentation, proposals for its implementation.

- analysis of the achievements of scientific and technological progress in the field of agricultural engineering;
introduction of modern technologies in the production of technological machines and equipment;

3.3 General education 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 Basic 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 competencies:

- develop technical specifications for the design and manufacture of machines, drives, systems and non-standard equipment; physical and mathematical models of the studied machines, drives, devices, processes, phenomena and objects related to the professional field; methods and organize experiments with the analysis of their results;
- organize work on the implementation of architectural supervision in the manufacture, installation, adjustment, testing and commissioning of manufactured technical objects.

4. Base of professional practice:

Pedagogical practice is carried out in classrooms and laboratories of the department. The bases for the research practices of undergraduates are organizations, enterprises of the agro-industrial complex, the manufacturing sector, subdivisions of the management system of state enterprises. It also applies to research and production associations, scientific, design and design organizations, repair, machine-building plants, agricultural repair enterprises, etc.

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

№ p/p	Name of cycles of disciplines and activities	General labor intensity	
		in academic hours	in academic credits
1	2	3	4
1.	**Theoretical training**	**2520**	**84**
1.1	**Cycle of basic disciplines (DB)**	**1050**	**35**
1)	**University component (VC):**	**600**	**20**
	History and philosophy of science	150	5
	Foreign language (professional)	150	5
	Pedagogy of higher education	90	3
	Psychology of management	150	5
	Teaching practice	60	2
2)	**Component of choice (CV)**	**450**	**15**
	English for Academic Purposes	60	2
	Foreign language for academic purposes		
	Automated diagnostics of technological machines	150	5
	Diagnostics of technological systems		
	Research Methodology	90	3
	Organization and planning of scientific research and innovation activities		
	Technological equipment for processing industries	150	5
	Technologies and equipment of modern mechanical engineering		
1.2	**Cycle of major disciplines (PD)**	**1470**	**49**
1)	University component (VC)	**540**	**18**
	Scientific foundations of applied programs and modeling of technological machines and equipment	150	5
	Design of technological machines and equipment	120	4
2)	Research practice	**270**	**9**
3)	Component of choice (CV)	**930**	**31**
	Materials science in food production	150	5
	Modern structural materials and protective coatings in mechanical engineering		
	Methods and instruments for measuring and controlling the parameters of technological machines	150	5

	Digital methods and means for measuring the parameters of technological machines		
	Fundamentals of technical repair and maintenance of technological machines and equipment	120	4
	Progressive methods of repair of technological machines and equipment		
	Robotic complexes and automation of food raw materials processing	90	3
	Modern automation technologies		
	Modern equipment for water supply and ventilation of food production	120	4
	Innovative drives of machines and equipment in mechanical engineering		
	Modern equipment for food processing	150	5
	Modern equipment and means of mechanization of production processes of technological machines		
	Technology for processing food and agricultural products	150	5
	Modern technologies of machine-building production		
2	Research work	**720**	**24**
1)	Research work of a master student, including an internship and a master's thesis (NIRM)	720	24
3	Additional types of training (VET)	**-**	**-**
4	Final certification (FA)	**360**	**12**
1)	Registration and defense of a master's thesis (OiZMD)	360	12
	Total	**3600**	**120**

Annex 1. Academic calendar

Approved
Deputy Chairman of the Board for
Academic Affairs - Rector
_____ A.Abdyrov
"___" _____ 2022

ACADEMIC CALENDAR

for 2022-2023 academic year
in areas of Master's training

Beginning of 1st trimester		**1 September**
1	Presentation week	from 1 September to September 2 **(from August 29 to September 2 for 1 course)**
2	***Constitution day***	***30 August***
3	***The day of knowledge***	***1 September***
4	Examination session	from 14 to 25 November
5	***The day of the First President***	***of 1 December***
6	FX delivery	from 14 November to 9 December
7	***Independence day***	***16 December***
8	Holidays	from 28 November to 31 December
9	***The New year's holiday***	***January 1,2,3***
Beginning of 2nd trimester		**1 January**
10	***Christmas***	***7 January***
11	***International Women's Day***	***on 8 March***
12	***Nauryz holiday***	***21,22,23 March***
13	Examination session	from March 13 to 24 March
14	FX delivery	from March 13 to 31 March
15	Holidays	from March 27 to March 31
Beginning of 3rd trimester		***1 April***
16	***Holiday of Unity of Nations of Kazakhstan***	***1 May***
17	***Defender is day***	***7 may***
18	***Victory Day***	***9 may***
19	Examination session	from 12 June to 23 June
20	Holidays	from 26 June to 31 August
21	FX delivery	from 12 June to 30 June
22	Enrollment for a trimester	from 26 June to 30 June
23	Final examination	until June 30
24	Summer trimester	from 3 June to 11 August
25	***Capital Day***	***6 July***

Note: If it concurs with a weekend or a holiday, study begins on the next working day.

Deputy Director of the Department
of Academic Affairs _____ A.Sh.Imasheva

График учебного процесса на 2022-2023 учебный год для образовательных программ и специальностей магистратуры технического факультета

Курс	Сентябрь					Октябрь				Ноябрь					Декабрь				Январь					Февраль				Март				Апрель				Май					Июнь				Июль				Август			
	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
	29	5	12	19	26	3	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23	30	6	13	20	27	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21
	2	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16	23	30	6	13	20	27	3	10	17	24	3	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25
		1	2	3	4	5	6	7	8	9	10								1	2	3	4	5	6	7	8	9	10				1	2	3	4	5	6	7	8	9	10											
7М07106 Механическая инженерия (2 года)																																																			
I	ПН	·/Н	·/Н	·/Н	·/Н	·/Н	·/Н	·/Н	·/Н	·/Н	·/Н	С/ ЗС	С/ ЗС	ЗС/ К	ЗС/ К	К	К	К	·/Н/ Ип	·/Н/ Ип	·/Н/ Ип	·/Н/ Ип	·/Н/ Ип	·/Н/ Ип	·/Н/ Ип	·/Н/ Ип	·/Н/ Ип	·/Н/ Ип	С/ ЗС	С/ ЗС	ЗС/ К	·/Н/ Пп	·/Н/ Пп	·/Н/ Пп	·/Н/ Пп	·/Н/ Пп	·/Н/ Пп	·/Н/ Пп	·/Н/ Пп	·/Н/ Пп	·/Н/ Пп	С/ ЗС	С/ЗС	ЗЛ/ ЗС/К	Л/К	Л/К	Л/К	Л/К	Л/К	Л/К	К	К
II	К	·/Н	·/Н	·/Н	·/Н	·/Н	·/Н	·/Н	·/Н	·/Н	·/Н	С/ ЗС	С/ ЗС	ЗС/ К	ЗС/ К	К	К	К	·/Н/ Ип	·/Н/ Ип	·/Н/ Ип	·/Н/ Ип	·/Н/ Ип	·/Н/ Ип	·/Н/ Ип	·/Н/ Ип	·/Н/ Ип	·/Н/ Ип	С/ ЗС	С/ ЗС	ЗС/ К	Н	Н	Н	Н	Н	Н	Н/М Д	Н/М Д	Н/М Д	МД	МД	ИА	ИА								

ПН - презентационная неделя
· - теоретическое обучение
ЗС- сдача FX
С - сессия экзаменационная
Л - летний семестр
ЗЛ - запись на летний семестр

Н - Научно-исследовательская работа магистранта, включая выполнение магистерской проекта
Ип - исследовательская практика
Пп - педагогическая практика
Пр - производственная практика
Э - Экспериментально-исследовательская работа магистранта

К - каникулы
МД - написание магистерской диссертации
ИА - Итоговая аттестация

Праздничные дни:
30, 31 августа - День Конституции
1 сентября - День знаний
1 декабря - День Первого Президента
16, 17 декабря - День независимости
1, 2, 3, 4 января - Новогодние праздники
7 января - Рождество
8 марта - Международный женский день
21, 22, 23 марта - Наурыз мейрамы
1, 2 мая - Праздник единства народа Казахстана
7 мая - День защитника Отечества
9 мая - День Победы
6 июля - День Столицы

Всего недель:
теоретическое обучение - 30 недель
экзаменационная сессия - 3-4 недели
каникулы зимние - 3 недели
каникулы весенние - 1 неделя
летний семестр - 6 недель

Annex 2. Working curriculum.

Год поступления: 25-05-2022

Шифр модуля	Наименование модуля	Цикл дисциплины	Компонент дисциплины	Код дисциплины	Наименование дисциплины	Академические кредиты	Контроль по академическим периодам				Объем в часах							Распределение кредитов по академическим периодам					
							Экзамены	Дифференцированный зачет(практика)	Дифференцированный зачет(курсовая)	Практика/НИР	Всего	Аудиторные	в т.ч.			СРМП	СРМ	1 курс			2 курс		
													Лекции	Практические	ЛПЗ			1	2	3	4	5	6
																		Недель в академическом периоде					
																		10	10	10	10	10	10
Модули специальности/образовательной программы																							
1	Педогогика и психология	БД	ВК	PVSH 5202	Педагогика высшей школы	3	3				90	30	20	10		12	48			3			
2		БД	ВК	PU 5203	Психология управления	5	3				150	50	20	30		20	80			5			
3	Базовые дисциплины	БД	КВ	ADTM 5206	Автоматизированная диагностика технологических машин	5	1				150	50	20	30		20	80	5					
4		БД	КВ	DTS 5213	Диагностика технологических систем																		
5		БД	КВ	MNI 5207	Методология научных исследований	3	1				90	30	10	20		12	48	3					
6		БД	КВ	OPNIID 5214	Организация и планирование научно-исследований и инновационной деятельности																		
7	Общественно-политический	БД	ВК	IFN 5201	История и философия науки	5	3				150	50	30	20		20	80			5			
8	Научно-технологический	ПД	ВК	NOPPMTMO 6307	Научные основы прикладных программ и моделирования технологических машин и оборудования	5	4				150	50	20	30		20	80				5		
9		ПД	КВ	SKMZPM 5312	Современные конструкционные материалы и защитные покрытия в машиностроении	5	2				150	50	20	30		20	80		5				
10		ПД	КВ	MPP 5309	Материаловедение в пищевом производстве																		
11		ПД	КВ	TPPSP 6305	Технология переработки пищевой и сельскохозяйственной продукции	5	4				150	50	20	30		20	80				5		
12		ПД	КВ	STMP 6317	Современные технологии машиностроительного производства																		
13	Конструкторско-технологический	ПД	ВК	PTMO 6301	Проектирование технологических машин и оборудования	4	5				120	40	20	20		16	64					4	
14		ПД	КВ	RKAPPS 5306	Роботизированные комплексы и автоматизация переработки пищевого сырья	3	1				90	30	10	10	10	12	48	3					
15		ПД	КВ	STA 5314	Современные технологии автоматизации																		
16		ПД	КВ	MPIKPTM 6308	Методы и приборы измерения и контроля параметров технологических машин	5	5				150	50	20	30		20	80					5	
17		ПД	КВ	CMSIPTM 6318	Цифровые методы и средства измерения параметров технологических машин																		
18		ПД	КВ	SODPPP 5302	Современное оборудование для переработки пищевой продукции	5	2				150	50	20	30		20	80		5				
19		ПД	КВ	SOSMPPTM 5316	Современное оборудование и средства механизации процессов производства технологических машин																		
20		ПД	КВ	SODVVPP 6303	Современное оборудование для водоснабжения и вентиляции пищевого производства	4	4				120	40	20		20	16	64				4		
21		ПД	КВ	IPMOM 6315	Инновационные приводы машин и оборудования в машиностроении																		
22		БД	КВ	TOPPP 5209	Технологическое оборудование процессов перерабатывающих производств	5	1				150	50	20	30		20	80	5					
23		БД	КВ	TOSM 5211	Технологии и оборудование современного машиностроения																		
24		ПД	КВ	OTROTMO 6304	Основы технического ремонта и обслуживания технологических машин и оборудования	4	5				120	40	20	20		16	64					4	
25		ПД	КВ	PMRTMO 6313	Прогрессивные методы ремонта технологических машин и оборудования																		

26	Другие виды обучения	БД	ВК	PP 5208	Педагогическая практика	2					60									2			
27		ПД	ВК	IP 5310	Исследовательская практика	5					150								5				
28		ПД	ВК	IP 6311	Исследовательская практика	4					120											4	
29	Языковой	БД	ВК	IYaP 5204	Иностранный язык (профессиональный)	5	3				150	50		50		20	80			5			
30		БД	КВ	IYaDAC 6215	Иностранный язык для академических целей	2	4				60	20		20		8	32				2		
31		БД	КВ	AYaDAC 6210	Английский язык для академических целей																		
Научно-исследовательская работа (НИР)																							
32	Научно-исследовательская работа	НИР	ОК	NIRMVVMD 5501	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации	4					120							4					
33		НИР	ОК	NIRMVVMD 5502	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации	4					120								4				
34		НИР	ОК	NIRMVVMD 5503	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации	1					30									1			
35		НИР	ОК	NIRMVVMD 6504	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации	4					120										4		
36		НИР	ОК	NIRMVVMD 6505	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации	3					90											3	
37		НИР	ОК	NIRMVVMD 6506	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации	8					240												8
Итого теоретического обучения						73	51	0	0	0	2190	730	290	410	30	292	1168						
ДВО	**Дополнительные виды обучения**					35					1050												
ПП	Педагогическая практика					2		3		3	60												
ПИ	Исследовательская практика					9		2, 5		5	270												
НИРМ	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации					24				1, 2, 3, 4, 5, 6	720												
ИА	**Итоговая аттестация**					12					360												
	Оформление и защита магистерской диссертация					12				6	360												
	Итого					120					3600	730	290	410	30	292	1168						

Год поступления: 25-05-2021

Шифр модуля	Наименование модуля	Цикл дисциплины	Компонент дисциплины	Код дисциплины	Наименование дисциплины	Академические кредиты	Контроль по академическим периодам				Объем в часах							Распределение кредитов по академическим периодам					
													в т.ч.			СРМП	СРМ	1 курс			2 курс		
																		1	2	3	4	5	6
																		Недель в академическом периоде					
							Экзамены	Дифференцированный зачет(практика)	Дифференцированный зачет(курсовая)	Практика/НИР	Всего	Аудиторные	Лекции	Практические	ЛПЗ			10	10	10	10	10	10
					Общие модули																		
1	Языковой модуль	БД	ВК	IYaP 5204	Иностранный язык (профессиональный)	5	3				150.0	50.0		3/50		1/20	5/80			5.0			
2		БД	КВ	AYaDAC 6208	Английский язык для академических целей	2	4				60.0	20.0		1/20		0/8	2/32				2.0		
3	общественно- политический	БД	ВК	IFN 5201	История и философия науки	5	3				150.0	50.0	2/30	1/20		1/20	5/80			5.0			
4	Педагогика и психология	БД	ВК	PVSH 5202	Педагогика высшей школы	3	3				90.0	30.0	1/20	0/10		0/12	3/48			3.0			
5		БД	ВК	PU 5203	Психология управления	5	3				150.0	50.0	2/30	1/20		1/20	5/80			5.0			
6	Дополнительные виды обучения	БД	ВК	PP 5205	Педагогическая практика	2					60.0									2.0			
					Модули специальности/образовательной программы																		
7	Базовые дисциплины	БД	КВ	ADTM 5206	Автоматизированная диагностика технологических машин	5	1				150.0	50.0	1/20	2/30		1/20	5/80	5.0					
8		БД	КВ	MNI 5207	Методология научных исследований	3	1				90.0	30.0	0/10	1/20		0/12	3/48	3.0					
9		БД	КВ	TOPPP 5209	Технологическое оборудование процессов перерабатывающих производств	5	1				150.0	50.0	1/20	2/30		1/20	5/80	5.0					
10		ПД	КВ	TPPSP 6308	Технология переработки пищевой и сельскохозяйственной продукции	5	4				150.0	50.0	1/20	2/30		1/20	5/80				5.0		
11	Механизация технологических процессов в системе точного земледелия	ПД	КВ	MPIKPTM 6303	Методы и приборы измерения и контроля параметров технологических машин	5	5				150.0	50.0	1/20	2/30		1/20	5/80					5.0	
12	Научно-технологический	ПД	КВ	MPP 5309	Материаловедение в пищевом производстве	5	2				150.0	50.0	1/20	2/30		1/20	5/80		5.0				
13	Проектирование технологических машин и оборудования	ПД	ВК	PTMO 6302	Проектирование технологических машин и оборудования	4	5				120.0	40.0	1/20	1/20		1/16	4/64					4.0	
14	Конструкторско-технологический	ПД	ВК	RKAPPS 5306	Роботизированные комплексы и автоматизация переработки пищевого сырья	3	1				90.0	30.0	0/10	0/10	0/10	0/12	3/48	3.0					
15		ПД	ВК	SODPPP 5307	Современное оборудование для переработки пищевой продукции	5	2				150.0	50.0	1/20	2/30		1/20	5/80		5.0				
16		ПД	ВК	NOPPMTMO 6301	Научные основы прикладных программ и моделирования технологических машин и оборудования	5	4				150.0	50.0	1/20	2/30		1/20	5/80				5.0		
17		ПД	ВК	OTROTMO 6311	Основы технического ремонта и обслуживания технологических машин и оборудования	4	5				120.0	40.0	1/20	1/20		1/16	4/64					4.0	
18		ПД	КВ	SODVVPP 6310	Современное оборудование для водоснабжения и вентиляции пищевого производства	4	4				120.0	40.0	1/20		1/20	1/16	4/64				4.0		
19	Дополнительные виды обучения	ПД	ВК	IP 5304	Исследовательская практика	5					150.0								5.0				
20		ПД	ВК	IP 6305	Исследовательская практика	4					120.0											4.0	
					Научно-исследовательская работа (НИР)																		
21	Исследовательская практика	НИР	ОК	NIRMVVMD 5501	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации	4					120.0							4.0					
22		НИР	ОК	NIRMVVMD 5502	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации	4					120.0								4.0				
23		НИР	ОК	NIRMVVMD 5503	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации	1					30.0									1.0			
24		НИР	ОК	NIRMVVMD 6504	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации	4					120.0										4.0		
25		НИР	ОК	NIRMVVMD 6505	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации	3					90.0											3.0	
26		НИР	ОК	NIRMVVMD 6506	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации	8					240.0												8.0
Итого теоретического обучения						73	17	0	0	0	3240	730	300	400	30	292	1168						
ДВО	**Дополнительные виды обучения**					35					1050.0												
ПП	Педагогическая практика					2		3		3	60												
ПИ	Исследовательская практика					9		2, 5		5	270												
НИРМ	Научно-исследовательская работа магистранта, включая выполнение магистерской диссертации					24				1, 2, 3, 4, 5, 6	720												
ИА	**Итоговая аттестация**					12					360.0												
	Оформление и защита магистерской диссертация					12				6	360												
	Итого					120					3600	730	300	400	30	292	1168						

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

	Name of discipline	Short description of discipline	Quantity loans	Formed learning outcomes							
				ON 1	ON 2	ON 3	ON 4	ON 5	ON 6	ON 7	ON 8
		Cycle of basic disciplines University component									
1	Pedagogy of higher education	Fundamentals of higher education pedagogy. The subject and tasks of higher education pedagogy. Methodology and methods of pedagogical research in higher education. Didactics of higher education. Pedagogical process in higher education. Laws, patterns and principles of learning. Methods, forms and means of teaching in higher education. The current state of higher education in the Republic of Kazakhstan. Professional development of a teacher of higher education. The process of education in higher education. The purpose of education as a pedagogical problem. Teaching and educational team as a form of functioning of a holistic pedagogical process.	3	v	v						
2	Psychology of management	Introduction to the psychology of management. The conceptual apparatus of the psychology of management. Leader and team. Conflicts in the workforce. managerial communication. Decision making technology. The concept of subject and object of control. Head and leader. Psychology of order. Personality as a subject and object of management. Democratic style of leadership and its features. Psychology of criticism. Psychotypes of subjects of communication. Psychological technique of persuasive influence. Psychological problems of selection of leading personnel. Psychological problems of training and retraining of leading personnel. Selection and placement of personnel. Personnel rotation. Certification and staff turnover.	5	v		v					
3	History and philosophy	The structure and functions of scientific knowledge, methods of	5		v	v					

	of science	science in their professional activities; differences between ideological, political, religious constructions from scientific concepts. Means and methods of modern science, analysis of philosophical and ideological, epistemological, logical and methodological issues, the style of scientific thinking.									
4	Foreign language (professional)	Language of professional and academic purpose at an advanced level, scientific and conceptual apparatus of the specialty, scientific information base, interpretation of scientific information, argumentation, persuasion, scientific controversy, academic writing.	5		v						
5	Teaching practice	Pedagogical practice is organized in order to develop undergraduate skills in developing a training course, independently conducting seminars and practical training sessions, as well as gaining experience in organizational and educational work.	2								
		Cycle of basic disciplines Elective component									
6	Foreign language for academic purposes	Use of a foreign language in professional and scientific activities, possession of public speaking skill, conducting discussion, the ability to work with information from various sources, edit texts of professionally content in a foreign language.	2		v						
7	English for Academic Purposes	Comprehensive theoretical-linguistic, practical and informational-analytical training in order to perform functions related to the use of a foreign language in professional and scientific activities: possession of public speech skills, discussion, the ability to work with information from various sources, edit texts of professionally significant content in a foreign language language.	2		v						
8	The automated diagnostics of technological machines	The choice of technical means for measuring and controlling the parameters of technological machines, depending on their design and operating conditions. Estimation of accuracy and reliability of measuring instruments. Types of testing of technological machines: control, research, parametric, acceptance, diagnostic, resource, etc. Evaluation of the technical condition of technological machines based on test results. Scientific principles improvement of diagnostics of technological machines.	5					v			
9	Diagnostics of technological systems	Formation of theoretical and practical knowledge on working with diagnostic equipment for various technological systems in	5					v			

		mechanical engineering, software for diagnosing technological equipment. As a result of studying the discipline, undergraduates will have an idea about the main problems and methods for solving problems to ensure control and diagnostics of technological equipment; know and be able to use devices, equipment for testing and diagnostics, software and mathematical software for computer diagnostics, the sequence of diagnostic studies and algorithms for processing the information received.									
10	Methodology of scientific study	Methodology of scientific research. General scientific methods of economic research. Statistical and economic methods of research. Balance method of research, economic and mathematical modeling and method of development of target programs. Computational-constructive and experimental methods of scientific research. Functional-cost and expert research methods. Information support of scientific research. Scientific style of writing and philological support for the design of scientific work. Methods of preparation and registration of the master's thesis.	3		v	v					v
11	Organization and planning of scientific research and innovation activities	Methodological foundations of scientific knowledge; Planning of research work; Scientific information: search, accumulation, processing; Technical and intellectual creativity and its legal protection; General requirements for research work; Implementation of scientific research and its effectiveness; Methods of planning and conducting an experiment, the technique of setting up experiments and the methodology of their accompanying observations; Conditions for conducting, modeling, processing experimental data.	3		v	v					v
12	Technological equipment for processing industries	Machines and devices are components of technological complexes. Organization of machine technologies for food products. Machines and devices - converters of food environments. Equipment for conducting mechanical and hydromechanical processes (washing, cleaning and separation, calibration and sorting, grinding and enrichment of bulk raw materials, molding, separation and mixing of liquid inhomogeneous food media). Equipment for conducting heat and mass transfer processes.	5				v				v
13	Technologies and	Formation of knowledge and skills and knowledge in the field of	5				v				v

	equipment of modern mechanical engineering	modern problems of science and technology for the production of machine-building products, which are necessary in a market economy and intense competition among machine-building enterprises that produce technological machines and equipment. Knowledge of modern problems in the technology of production of machine-building products will allow future specialists - to have information about ensuring the performance of technological machines and equipment, about innovative technologies, equipment and tools used in the production of machines, develop knowledge of new design and technological solutions in the production of machines; in the field of efficiency of high technologies in mechanical engineering; technological support for the production of products of the required quality, ensuring the competitiveness of products.									
		Cycle of profile disciplines University component									
14	Scientific foundations of applied programs and modeling of technological machines and equipment	Modeling of technological machines and equipment. Classification, structure and functionality of CAD/CAM systems. Principles of choosing a CAD/CAM system for an enterprise. Principles of functioning of modern CAD systems. General classification and examples of CAD/CAM/CAE packages, their purpose. CAE automated analysis systems. The composition and capabilities of modern high-level systems on the example of Pro / ENGINEER. Development of UE in CAD/CAM systems.	5					v	v		
15	Technological machine and equipment of design	Analysis of domestic and foreign designs of machines for the processing complex of food production. Normative-technical documentation. Stages of development of design and technological documentation. The principle of minimum size and material consumption. Manufacturability of a design, durability reliability and durability. Manufacturing, testing and development of prototypes. Fundamentals of computer-aided design of machine and equipment structures, mathematical and software, parameters and characteristics.	4					v			v
16	Research practice	Research practice is a form of professional training of undergraduates for scientific, pedagogical and scientific activities,	9								

		which is a type of practical activity of undergraduates related to conducting scientific research within the framework of the chosen topic of research work.									
		Cycle of profile disciplines Elective component									
17	Material science in food industry	Classification and properties of construction materials. The main stages of the process of obtaining blanks and machine parts. Surface finishing methods: grinding, superfinishing, honing, shevenging. Electrophysical and electrochemical methods of metal processing. Production of products by powder metallurgy. Anticorrosive and wear-resistant coatings of construction materials. Cermet products. The structure of the materials and the requirements for them. Technologicalpropertiesofmaterials.	5				v				v
18	Modern equipment and means of mechanization of production processes of technological machines	Studying the basic principles of automatic control of technological processes; basic principles of metrological support of technological processes; standard methods of product quality control; equipment used for mechanization and automation of technological processes, the specifics of quality control methods for products and objects in the field of professional activity, analysis of the causes of violations of technological processes and the development of measures to prevent them.	5				v				v
19	Methods and tools for measurement and control of technological machines	Methods and instruments for measuring and controlling processing processes and parameters of technological machines and equipment for food production. The main provisions of the differentiated process of subsurface mineral fertilization in the system of precision agriculture. Methodsandtechnicalmeansofmeasurementandprocesscontrol.	5				v	v			
20	Digital methods and means for measuring the parameters of technological machine	Formation of skills in the field of digital methods and measuring instruments. Make a choice of measuring systems for monitoring and regulating the parameters of technological processes, assess the reliability and economic efficiency of the selected measuring system. Calculates the parameters of the elements of measuring systems, in the verification and adjustment of measuring instruments for research and operation in industrial conditions	5				v	v			
21	Fundamentals of	Development of technological documentation, modernization of	4					v			v

	technical repair and maintenance of technological machine and equipment	operating technological equipment and repair of machinery and equipment The ability to organize the process of exploitation of food processing complexes, the ability to make plans, programs, schedules, the ability to apply information technology to repair food processing complexes									
22	Progressive methods of repair of technological machines and equipment	The purpose of the discipline: the study of methods for modeling technological processes of repair and operation using SolidWorks computer-aided design tools. Conduct an analysis and establish the causes of damage to parts, design a technological process for the manufacture and repair of technological machines and equipment, develop schedules for the repair of mechanical equipment	4					v			v
23	Robotic systems and automation complexes of processing food raw materials	Automation objects of processing production. Robotic technological complex, its composition, control device, equipment equipment. Programming of working cycles of the machine, modes of the technological process and auxiliary functions. Automation of typical technological processes in the meat and dairy industry. Automationschemesfortheprocessingoffoodrawmaterials.	3				v		v		
24	Modern automation technologies	Considers innovative projects and technologies in energy and mechanical engineering; information technologies in science and education; information technologies and automation in technical systems and management; technology and processing of organic and inorganic materials; innovative technologies and automation in the construction of buildings and structures; current problems and trends in the socio-economic development of management and education.	3				v	v			
25	Modern equipment for water supply and ventilation systems of food production	General characteristics of water supply and ventilation systems in food production. Classification and principle of operation of technological machines. Volumetric water pressure and ventilation systems. Auxiliary equipment. Regulating equipment. Calculation of parameters of machines for water supply and ventilation of food production. Determination of equipment performance: power, process performance, efficiency. Fundamentals of automation of the processes of water supply and ventilation of food production.	4				v			v	
26	Innovative drives of machines and equipment	Purpose - forms knowledge, skills in the field of operation, maintenance and assessment of the technical condition of drives of	4				v			v	

	in mechanical engineering	industrial machines; about the features of innovative designs, layout and operating modes of mechanical, hydraulic and pneumatic drives in mechanical engineering									
27	Modern equipment for food processing	Classification of machines and equipment for processing industries, Structural elements of machines. Connection details and the main types of mechanisms. Instrumental and technological schemes of food processing industries. Technological equipment for the preparation of products for the main production operations, equipment for crushing and grinding of raw materials and semi-finished products. Equipment for the mechanical separation of processed products. Equipment for processing products and semi-finished compound.	5				v	v			v
28	Modern equipment and means of mechanization of production processes of technological machines	Studying the basic principles of automatic control of technological processes; basic principles of metrological support of technological processes; standard methods of product quality control; equipment used for mechanization and automation of technological processes, the specifics of quality control methods for products and objects in the field of professional activity, analysis of the causes of violations of technological processes and the development of measures to prevent them.	5				v	v			v
29	Technology of processes of agricultural and food products	Equipment for processing of crop production: for cleaning, washing, grinding, sorting. Devices for hydrothermal and heat processing of grain. Equipment for the production of animal feed. Fundamentals of technology for processing and storage of livestock products: the production of milk and dairy products, canning, storage and processing of meat, the production of sausages and meat semi-finished products. Calculationoftechnologicalindicatorsandmachineparameters	5				v				v
30	Modern technologies of machine-building production	A feature of modern mechanical engineering is the tightening of the operational characteristics of machines, high requirements for the quality of manufacture and their reliability. This requires the use of modern, environmentally friendly, high-performance technological equipment that ensures high processing accuracy.	5				v				v