

Ministry of agriculture of the Republic of Kazakhstan  
Kazakh agro technical university named after S.Seyfullin

Considered at the meeting of  
the Academic Council of  
the university  
Protocol №15 from 30.05.2019.

APPROVED  
The chairman of the Board of  
“Kazakh Agro Technical University  
named after S.Seyfullin”  
\_\_\_\_\_ A.K.Kurishbayev  
« \_\_\_\_\_ » \_\_\_\_\_ 2019.

**EDUCATIONAL PROGRAM**  
**«Technological machines and equipment»**

Code and classification of the field of education:

**6B07 Engineering, manufacturing and construction industries**

Code and classification of training areas:

**6B071 Engineering and engineering work**

Code in the International Standard Classification of Education:

**0710**

Qualification: **bachelor of technical sciences in the educational program**  
**"Technological machines and equipment"**

Duration of study: 4 years

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The team of authors approved by the order of JSC "KATU named after S.Seifullin" № 932-H from 12.12.2018

**Educational program «Technological machines and equipment»**

reviewed at the meeting of the department Technological machines and equipment protocol №09/2 from «09» 04. 2019,  
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## **1 Passport of the educational program**

### **1.1 The aim of the educational program**

The aim of the educational program (EP) is targeted integrated and high-quality training of competitive, highly qualified specialists who are ready to solve practical and theoretical tasks of professional activity in modern conditions of digitalization and technological re-equipment of existing sectors of the economy based on the development of skills and abilities necessary for the future specialist.

To achieve the goal of the educational program, the following tasks were formulated:

- providing social and humanitarian education on the basis of knowledge of the laws of the socio-economic development of society, the history of Kazakhstan, modern information technologies for the digitization of economic sectors, the state language, foreign and Russian languages, as means of interethnic communication.
- providing in-depth knowledge of natural science, technical and economic nature, as the foundation of vocational education.
- to ensure recognition of the level of training of specialists in other countries and a higher mobility of graduates in the changing conditions of the labor market;
- providing deep theoretical knowledge and practical experience in the field of technological machines and equipment.

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

**Relevance of EP.** The needs of the labor market in the conditions of industrialization of production and digitalization of industries in the framework of the State Program "Digital Kazakhstan" form new requirements in the direction of diversification and improvement of the quality of training. In this regard, the implementation of the program is aimed at the development of research and fundamental components in the preparation of bachelors of engineering and technology. The solution to this problem is possible when synchronizing educational programs with educational programs of leading foreign universities. The educational program was developed taking into account the recommendations of leading experts of advanced enterprises of the engineering industry, in accordance with the National Qualifications Framework and professional standards, agreed with the Dublin descriptors and the European Qualifications Framework, on the basis of the State Compulsory Higher Education Standard approved by order of the Minister of Education and Science of the Republic of Kazakhstan dated October 31 2018 (No. 604).

The feasibility of achieving the goal implies a systematic approach to the study of general education, basic and major disciplines, which will allow the graduate to successfully realize their capabilities and abilities in labor activities, as well as to form a qualitative basis for continuing education in leading magistracies in Kazakhstan and foreign universities.

The training of such specialists relies on the use of high potential of the technical faculty team, involves leading domestic and foreign teachers to the educational process, and also takes into account modern global trends in the development of technical education and the transition to a new technological level in accordance with the concept of Industry 4.0.

**Features of EP.** The educational program will respond to the needs of the digital economy with a focus on information analysis skills and the development of creative thinking. There will also be updated programs of digitalization of industries, taking into account the inclusion of STEM-elements (robotics, CNC machines, virtual reality, 3D-printing and others).

The program implements a fundamental classical university education with the preservation of academic traditions, using modern innovations of Kazakhstan and world practice in the field of training bachelors of engineering and technology. A systematic approach based on a combination of comprehensive training in the field of knowledge of the laws of socio-economic development of society, the history of Kazakhstan, modern information technologies, a foreign language, with a deep study of subjects of natural science, general technical and economic nature and the use of innovative educational technologies is used.

#### **Competitive advantages**

A professional infrastructure (educational resources) was created on the basis of KATU, which is necessary for the implementation of EP:

- on the recommendation of leading scientists of the University of California at Davis, the Agroengineering Platform was created, which includes the Production and Experimental Metalworking and Welding Shop and the Design Bureau, which are equipped with modern CNC machines;

- Kazakh-Chinese Center for Agricultural Mechanization;

- Laboratories: "Mechatronics, Robotics and 3D Printing", "Installation and Operation of Technological Machines", "Repair of Technological Machines", "Materials Science and Technology of Construction Materials";

- Circles: "Mechanical Engineering and Robotics", "Innovator", "Materaltanu, tekhnastarar zhne marketing."

It provides for the involvement of leading domestic and foreign teachers in the educational process. Over the past five years, academic professors from Germany, the USA, Bulgaria, Poland, Turkey, Malaysia, and Belarus have been invited to give lectures.

Thanks to direct agreements with partner universities and various international student exchange programs, students have the opportunity to study at foreign universities. As part of this educational program, students of multilingual groups and those who speak foreign languages have the opportunity to go to semester education at leading universities in Europe, the United States and other countries. Every year, about 3-5 students of the educational program leave for training and internships in various programs (International Credit Mobility; LOGO - Landwirtschaft and Oekologisches Gleichgewicht os Osteuropa; Weihenstephan-Triesdorf, etc.) to leading universities of the world, University of California at Davis ( UC Davis,

USA), Weihenstephan-Triesdorf University of Applied Sciences (Germany) and others.

As part of external academic mobility since 2011, 50 best second-year students are trained annually for a semester at the Belarusian State Agrarian Technical University.

At the end of the third year of study, students are sent as part of mechanized units to the leading farms of the agricultural sector for practical training.

Students of the educational program can simultaneously undergo military training at the military department of the university. Students acquire military occupational specialty in three areas:

VUS-261001 "Application of automobile divisions of units and formations of general-purpose purpose",

VUS-021000 "Combat use of combined arms units, units and formations",

MAS-590200 "Topographical work."

**The uniqueness of the EP.** A unique program combining classical technical education with innovations in the field of training modern specialists. The program provides for the use of elements of Industry 4.0 for the implementation of the event on technological re-equipment of basic sectors of the agricultural sector, includes the use of innovative educational technologies, methods and methods of education, contains relevant disciplines that reflect the latest trends in the engineering market and employers' requests.

Received a bachelor's degree gives the right to continue education in the magistracy of domestic and foreign universities.

After graduating from undergraduate degree graduates are in demand in the labor market of Kazakhstan and abroad.

**Partners of EP.** Partners for the development of OP are the University of California, Davis, the Union of Mechanical Engineers of Kazakhstan, KazNIIMESH, Agromashholding KZ, JSC, small and medium-sized businesses, and other engineering and manufacturing organizations.

The main stakeholders of the OP are:

1. PTS, students, parents, persons equal to them and relatives of students;
2. The Ministry of Agriculture of the Republic of Kazakhstan - the National Agrarian Research and Education Center;
3. The ALE "The Union of Mechanical Engineers of Kazakhstan";
4. Enterprises of engineering and agrarian industry;
5. Research institutes and research and production centers.

### **3 Competency model (portrait) of the graduate**

#### **3.1 Professional activities:**

- technological machines and equipment; power equipment; running equipment; work equipment; drive systems;
- motion control systems; operator life support systems; general housing to accommodate all parts of the machine;

- construction and maintenance materials;
- equipment for the manufacture, testing and disposal of technological machines;
- equipment for maintenance and repair of technological machines;
- instrumentation for the manufacture and operation of machines;
- equipment for automation of working processes of machines;
- equipment for the design of machines.

### **3.2 Types of professional activity:**

- settlement and design: collection and analysis of information source data for design; calculation and design of parts and assemblies in accordance with the technical specifications using modern design automation tools; development of design and working documentation, design of completed design work; control of the compliance of the developed projects and technical documentation with the standards, technical conditions and other regulatory documents; conducting a preliminary feasibility study of design calculations;

- production and technology: the organization of workplaces, their technical equipment, placement of technological equipment; monitoring compliance with technological discipline; maintenance of process equipment; organization of metrological support of technological processes, the use of standard methods of quality control of products; participation in the work on fine-tuning and mastering technological processes in the course of preparing the production of new products; evaluation of the innovative potential of new products; preparation of quality management documentation for technological processes at production sites; monitoring compliance with environmental safety;

- Experimental research: the study of scientific and technical information, domestic and foreign experience on the subject of the study; mathematical modeling of processes and objects on the basis of modern packages of computer-aided design and research; conducting experiments on a given methodology and analysis of their results; carrying out measurements and observations, compiling descriptions of the research, preparation of data for the compilation of surveys, reports and scientific publications; drawing up a report on the assignment, participation in the implementation of research and development results; organization of protection of intellectual property and research and development results as a commercial secret of the enterprise;

- organizational and managerial: organization of the transition to a new technological level in accordance with the concept of Industry 4.0; compilation of technical documentation (schedules, instructions, plans, estimates, applications for materials, equipment, etc.), as well as established reports on the approved forms; performance of work on standardization and preparation for certification of hardware, systems, processes, equipment and materials; organization of work of small groups of performers; planning staff and payroll; analysis of the costs and results of operations of production units; preparation of initial data for the selection and justification of scientific, technical and organizational decisions based on economic decisions;

preparation of documentation for the creation of an enterprise quality management system; carrying out organizational and planning calculations for the creation (reorganization) of production sites; development of operational work plans of primary production units;

- installation and commissioning: adjustment, adjustment, adjustment and experimental testing of equipment and software; installation, adjustment, testing and commissioning of prototypes of products, assemblies, systems and parts of products;

- service-operational: setup and maintenance of hardware and software; verification of the technical condition and residual life of the equipment, the organization of preventive inspections and repairs; acceptance and development of input equipment; preparation of applications for equipment and spare parts, preparation of technical documentation for repairs; coordination of personnel work for the integrated solution of innovative problems - from idea to mass production.

### **3.3 General educational competencies**

- providing social and humanitarian education on the basis of knowledge of the laws of socio-economic development of society, the history of Kazakhstan, modern information technologies with the introduction of elements of Industry 4.0, the state language, foreign and Russian languages, as means of interethnic communication;

- fluent monolingual oral, written and communication skills;

- the ability to not fluent communication with the second language;

- the ability to use communicative communication in different situations;

- basics of academic writing in the native language;

- basic mathematical thinking at the communication level - the ability to solve situational problems on the basis of the mathematical apparatus of algebra and the beginning of mathematical analysis.

### **3.4 Base competencies**

- providing in-depth knowledge of natural science, technical and economic nature, as the foundation of vocational education;

- a basic understanding of the scientific picture of the world with an understanding of the essence of the basic laws of science;

- Understanding of basic hypotheses, laws, methods, formulation of conclusions and assessment of errors.

### **3.5 Professional competencies**

- providing deep theoretical knowledge and practical experience in the field of technological machines and equipment;

- work on the preparation of technical documentation and the established reporting on the approved forms;

- conducting training and instruction in safety, labor and environmental protection;



- monitoring compliance with the requirements for the preparation of documentation on the quality management of technological processes at production sites;
- improving the design of technological machines and equipment using breakthrough technologies and capabilities;
- complex mechanization and automation of technological processes;
- establishment and maintenance of optimal operating modes of technological machines and equipment.

#### **4 Base of professional practice (educational, industrial, pre-diploma)**

Educational practice is carried out in educational and industrial workshops of the university, in the Metalworking and Welding Shop and in the relevant laboratories of the department.

The bases for the passage of industrial and pre-diploma practices of students are organizations, enterprises of the agro-industrial complex, production and social sphere, divisions of the management system of state enterprises, joint-stock companies and private firms. Practices are also conducted at research and production associations, research, design and design organizations, repair, machine-building plants, agricultural repair shops, etc.

The main bases of professional practice in the educational program are: Gomselmash Plant, Republic of Belarus; Akkol branch of Scientific and Production Center for Agroengineering LLP, Akkol, Akmola region; LLP "AgrotehNS", Astana", LLP" KB transport engineering "Astana, LLP" EuraziaGroupKazakhstan ", Astana; LLP "MVTU", Astana; LLP "Spare Railway", Astana; LLP "Kazakhstan-Czech Technology Center", Astana; Astana; JSC Stepnogorsk Bearing Plant; Kazakhmys Corporation JSC, Kazakhstan Agro Innovation Corporation LLP, Schuchinsky Boiler Mechanical Plant LLP, Schuchinsk, KAMAZ Engineering, Kokshetau.

## 5 The structure of the educational program

№	The name of the cycles and disciplines	Total complexity	
		In academic hours	In academic credits
1	2	3	4
<b>1</b>	<b>The cycle of general education (ООД)</b>	<b>1680</b>	<b>56</b>
1)	Compulsory components	1530	51
	Modern History of Kazakhstan	150	5
	Philosophy	150	5
	Foreign language	300	10
	Kazakh (Russian) language	300	10
	Information and communication technology (in English)	150	5
	The module of socio-political knowledge (sociology, political science, cultural studies, psychology)	240	8
	Physical education	240	8
2)	University Component (Basics of Economics and Law)	150	5
	Component of choice	-	-
<b>2</b>	<b>Cycle of basic disciplines (БД)</b>	<b>3360</b>	<b>112</b>
1)	<b>University component</b>	<b>1680</b>	<b>56</b>
	Mathematics	270	9
	Physics	210	7
	Descriptive Geometry and Engineering Graphics	180	6
	Engineering Mechanics (Static, Dynamics)	120	4
	Material mechanics	120	4
	Automation of drawings	120	4
	Automated design of mechanisms	150	5
	Fundamentals of design	150	5
	CNC system (Fundamentals of Mechatronics)	150	5
	Materials in engineering design	150	5
	Educational practice	60	2
2)	<b>Component of choice</b>	<b>1680</b>	<b>56</b>
	Chemistry	120	4
	Basics of wheeled and tracked vehicles	120	4
	Electrical Engineering	150	5
	Electric cars and drives	150	5
	Metal processing machines and welding equipment	270	9
	Metalworking Modeling	150	5

	Manipulators and robots	150	5
	Mechanization of livestock	150	5
	Design of mechanical assembly shops	150	5
	Agreecultural machines.	150	5
	Patent law	120	4
<b>3</b>	<b>Cycle of major disciplines (И/Д)</b>	<b>1800</b>	<b>60</b>
1)	<b>University component</b>	<b>1800</b>	<b>60</b>
	Heat engineering and thermodynamics basics	120	4
	Industrial Controllers	150	5
	Pneumatic and hydraulic drives	180	6
	Manufacturing processes (ТМС+КТОИ)	150	5
	Measuring systems (ВЗСТИ)	150	5
	Failure Analysis and Machine Repair	150	5
	Installation, testing and operation of technological machines	150	5
	Engineering economics	120	4
	Occupational Safety and Health	120	4
	Internship	510	17
2)	<b>Component of choice</b>	-	-
		-	-
<b>4</b>	<b>Additional types of study (ДВО)</b>	-	-
1)	Component of choice ( <i>military training and other types of learning activities determined by the student independently</i> )	-	-
<b>5</b>	<b>Final attestation</b>	<b>360</b>	<b>12</b>
1)	Writing and submitting a thesis (project) or preparing and passing a comprehensive exam	360	12
	<b>Total</b>	<b>7200</b>	<b>240</b>

### Appendix 1. Academic calendar\*\*\*

#### Академический календарь на 2019-2020 учебный год ПРОГРАММА по области образования 6В071 - ИНЖЕНЕРИЯ И ИНЖЕНЕРНОЕ ДЕЛО

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								
	26	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	2	9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24							
30	6	13	20	27	4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24	31	7	14	21	28	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	28								
			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																			
<b>направления подготовки "Механическая инженерия"/ "Технологические машины и оборудование"</b>																																																												
I	ПН	ПН	•	•	•	•	•	•	•	•	•	•	С	С	Зд	Зд/С	К	К	К	•	•	•	•	•	•	•	•	•	•	С	С	К	К	•/Уп	•/Уп	•/Уп	•/Уп	Уп/ПК	•/Уп	•/Уп	•/Уп	•/Уп	Уп/ПК	С	С	Уп/ЛК	Уп/ЛК	Л/К	Л/К	Л/К	Л/К	К	К	К	К					
II	К	К	•	•	•	•	•	•	•	•	•	•	С	С	Зд	Зд/С	К	К	К	•	•	•	•	•	•	•	•	•	С	С	К	К	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	С	С	Л/К	Л/К	Л/К	Л/К	Л/К	Л/К	К	К	К	К					
III	К	К	•	•	•	•	•	•	•	•	•	•	С	С	Зд	Зд/С	К	К	К	•	•	•	•	•	•	•	•	•	С	С	К	К	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	С	С	К/Л/ВС	К/Л/ВС	К/Л/ВС	К/Л/ВС	К/Л/ВС	К/Л/ВС	К/Л/ВС	К	К	К	К				
IV	К	К	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	•/Пр	С	С	Зд	Зд/С	К	К	К	•	•	•	•	•	•	•	•	•	С	С	•	•	•	•	•	С	Д	Д	Д	Д	ГЭК	ГЭК	ГЭК	ГЭК																
			<b>ПН</b>	- презентационная неделя											<b>Уп</b>	- учебная практика											<b>К</b>	- каникулы																																
			•	- теоретическое обучение											<b>Пп</b>	- педагогическая практика											<b>ВС</b>	- военные сборы																																
			<b>РК</b>	- рубежный контроль											<b>Пр</b>	- производственная практика											<b>Д</b>	- дипломное проектирование																																
			<b>С</b>	- сессия экзаменационная											<b>Тп</b>	- технологическая практика											<b>О</b>	- обзорные лекции																																
			<b>Л</b>	- летний семестр											<b>Пд</b>	- преддипломная практика											<b>ГЭК</b>	- государственные экзамены																																
			<b>Праздничные дни:</b>	<b>30 августа</b> - День Конституции											<b>8 марта</b> - Международный женский день																																													
				<b>21 августа</b> - Курбан Айт											<b>21, 22, 23 марта</b> - Наурыз мейрамы											<b>Всего недель:</b>	теоретическое обучение - 30 недель																																	
				<b>1 декабря</b> - День Первого Президента											<b>1 мая</b> - Праздник единства народа Казахстана												экзаменационная сессия - 4 недель																																	
				<b>16, 17 декабря</b> - День независимости											<b>7 мая</b> - День защитника Отечества												канукулы зимние - 3-4 недели																																	
				<b>1, 2 января</b> - Новый год											<b>9 мая</b> - День Победы												каникулы летние - 6-9 недель																																	
				<b>7 января</b> - Рождество Христово											<b>6 июля</b> - День столицы												летний семестр - 6 недель																																	

\*\*\* Рассматривается и утверждается в начале учебного года



24	ОТ	БД	ВК		Компьютерная графика	4	Экз	120		20	20		16	64							4					
25	КТ	БД	ВК		Автоматизированное проектирование механизмов	5	Экз/кп	150	10	20	20		20	80							5					
26	КТ	БД	ВК		Основы конструирования	5	Экз/кп	150	10	20	20		20	80								5				
27	ОТ	ПД	ВК		Теплотехника и основы термодинамики	4	Экз	120	20	20			16	64					4							
28	ОТ	БД	КВ	ЕС	<b>Электротехника/</b> Электротехника и основы электроники	5	Экз	150	20	10	20		20	80							5					
29	ОТ	БД	КВ	ЭЭО	<b>Электрические машины и приводы/</b> Автоматизированный электропривод	5	Экз	150	20	10	20		20	80								5				
30	ОТ	ПД	ВК	ЭЭО	Промышленные контроллеры	5	Экз	150	20	20	10		20	80								5				
31	ОТ	ПД	ВК		Пневматические и гидравлические приводы	6	Экз	180	20	20	20		24	96								6				
32	ОТ	БД	ВК		Система ЧПУ (Основы мехатроники)	5	Экз	150	20		30		20	80									5			
33	Проф	БД	КВ		<b>Металлообрабатывающие станки и сварочное оборудование/</b> Системы автоматизации и управления технологических процессов	4	Экз	120	10	10	20		16	64									4			
34	Проф	БД	КВ		<b>Металлообрабатывающие станки и сварочное оборудование/</b> Системы автоматизации и управления технологических процессов	5	Экз	150	20	10	20		20	80										5		
35	КТ	БД	КВ		<b>Моделирование металлообработки/</b> Тепловое и холодильное оборудование пищевого производства	5	Экз	150	20	10	20		20	80										5		
36	КТ	ПД	ВК		Производственные процессы (ТМС+КТОП)	5	Экз/кп	150	20	10	20		20	80											5	
37	Проф	БД	КВ		<b>Манипуляторы и роботы/</b> Подъемно-транспортные установки пищевых производств	5	Экз	150	20	10	20		20	80											5	
38	ОТ	БД	ВК		Материалы в инженерном проектировании	5	Экз	150	20	10	20		20	80					5							
39	ОТ	ПД	ВК		Измерительные системы (ВЗСТИ)	5	Экз	150	20	10	20		20	80							5					
40	Проф	ПД	ВК		Анализ отказов и ремонт машин	5	Экз/кп	150	20	10	20		20	80										5		
41	Проф	ПД	ВК		Монтаж, испытание и эксплуатация технологических машин	5	Экз	150	20	10	20		20	80											5	
42	БД	БД	КВ		<b>Механизация животноводства/</b> Машины и аппараты переработки продуктов животноводства	5	Экз	150	20		30		20	80									5			
43	КТ	БД	КВ		<b>Проектирование механосборочных цехов/</b> Проектирование предприятия технического сервиса	5	Экз	150	20		30		20	80											5	

44	БД	БД	КВ	Сельскохозяйственные машины/ Машины и аппараты переработки продуктов растениеводства	5	Экз	150	20	10	20		20	80								5					
45	Проф	БД	КВ	Патентное законодательство/ Основы патентоведения и профессионального творчества	4	Экз	120	20		20		16	64									4				
46	Орг-экон	ПД	ВК	Инженерная экономика	4	Экз	120	20		20		16	64											4		
47	Орг-экон	ПД	ВК	Охрана труда	4	Экз	120	20		20		16	64											4		
48	Проф	БД	ВК	Учебная практика	2		60									2										
49	Проф	ПД	ВК	Производственная практика	17		510										5				6	6				
52				Написание и защита дипломной работы (проекта)	12		360																	12		
<b>Итого</b>															<b>18</b>	<b>21</b>	<b>21</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>		
Общеобразовательные дисциплины (ООД)					<b>56</b>		<b>1680</b>	<b>130</b>	<b>30</b>	<b>560</b>	<b>0</b>	<b>192</b>	<b>768</b>	<b>0</b>	<b>9</b>	<b>21</b>	<b>12</b>	<b>2</b>	<b>6</b>	<b>1</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	
Обязательный компонент (ООД/ОК)					51		1530	110	30	530	0	172	688	0	9	21	12	2	6	1	0	0	0	0	0	
Компонент по выбору (ООД/ВК)					5		150	20	0	30	0	20	80	0	0	0	0	0	0	0	0	5	0	0	0	
Базовые дисциплины (БД)					<b>112</b>		<b>3360</b>	<b>400</b>	<b>260</b>	<b>440</b>	<b>0</b>	<b>440</b>	<b>1760</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>9</b>	<b>14</b>	<b>14</b>	<b>9</b>	<b>9</b>	<b>15</b>	<b>9</b>	<b>9</b>	<b>15</b>	
Компонент по выбору (БД/КВ)					56		1680	230	110	220	0	224	896	0	0	0	4	4	5	5	0	5	9	9	15	
Вузовский компонент (БД/ВК)					56		1680	170	150	220	0	216	864	0	9	0	5	10	9	4	9	10	0	0	0	
Профилирующие дисциплины (ПД)					<b>60</b>		<b>1800</b>	<b>180</b>	<b>100</b>	<b>150</b>	<b>0</b>	<b>172</b>	<b>688</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>10</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>11</b>	<b>5</b>	<b>8</b>
Компонент по выбору (ПД/КВ)					0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Вузовский компонент (ПД/ВК)					60		1800	180	100	150	0	172	688	0	0	0	0	4	0	10	11	0	11	11	5	
Итого по учебному плану					<b>240</b>		<b>7200</b>	<b>710</b>	<b>390</b>	<b>1150</b>	<b>0</b>	<b>804</b>	<b>3216</b>	<b>0</b>	<b>18</b>	<b>21</b>	<b>21</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	

### Appendix 3 Description of the disciplines of compulsory and university components

#### 1. Basic information about the discipline:

<b>1. Basic information about the discipline:</b>	
Name of the discipline	<b>Modern history of Kazakhstan (ГЭ)</b>
<b>2. Number of credits</b>	5
<b>3. Prerequisites:</b>	School basic knowledge
<b>4. Postrequisites:</b>	cultural studies, political science, philosophy, sociology
<b>5. Competencies:</b>	Demonstrate knowledge of the main periods of the formation of an independent Kazakhstan statehood; to relate the phenomena and events of the historical past with the general paradigm of the world-historical development of human society through critical analysis; master the techniques of historical description and analysis of the causes and consequences of the events of modern history of Kazakhstan; to propose a possible solution to contemporary problems based on an analysis of the historical past and reasoned information; analyze the security and importance of the modern Kazakh model of development; identify the practical potential of intercultural dialogue and respect for spiritual heritage; to substantiate the fundamental role of historical knowledge in the formation of Kazakhstan's identity and patriotism; form their own citizenship on the priorities of mutual understanding, tolerance and democratic values of modern society.
<b>6. Author of course</b>	Department of History of Kazakhstan
<b>7. General literature</b>	1.Современная история Казахстана . Учебник для студентов неисторических спец. (бакалавриата) высш. учеб. заведений / Б. Г. Аяган [и др.]. ; ред. Б. Г. Аяган ; Ин-т истории гос-ва М-ва образования и науки РК. – Алматы: Паритет, 2010, 2.Аминов Т.М. Современная история Казахстана. Учебное пособие. Алматы., 2017 г. 3.Назарбаев Н.А. Эра независимости.- Алматы: ҚАЗАқпарат, 2017. 4.Нуртазина Р.А. Национальная безопасность Республики Казахстан: учеб.пособие.- Алматы: Бастау, 2014 5.Ертлесова Ж. Реформы 90-х: интервью с ключевыми участниками событий. - Алматы, Атамұра. - 2016.
<b>8. Content of the discipline</b>	Introduction to the discipline; Kazakhstan on the way to Independence; stages of formation of the national state; Civil and political confrontation; Implementation of the Soviet model of state construction; Contradictions and consequences of Soviet reforms in Kazakhstan in the second half of the twentieth century; The policy of "perestroika" in Kazakhstan; Kazakhstan model of economic development; Social modernization is the basis of the well-being of society; Ethno-demographic processes and the strengthening of interethnic harmony; Socio-political development prospects and spiritual modernization; The policy of forming a new historical consciousness of the people of the Great Steppe; Kazakhstan is a state recognized by the modern world; N.A.Nazarbayev - a person in history; Formation of a united nation of the future.
Name of the discipline	<b>Philosophy</b>
<b>2. Number of credits</b>	5
<b>3. Prerequisites:</b>	Sociology, political science, cultural studies, psychology, modern history of Kazakhstan.



<b>4. Postrequisites:</b>	History and philosophy of science, philosophy of modern society.
<b>5. Competencies:</b>	Formation of openness of consciousness, understanding of our own national code and national identity, spiritual modernization, competitiveness, realism and pragmatism, independent critical thinking, the cult of knowledge and education.
<b>6. Author of course</b>	Department of Philosophy
<b>7. General literature</b>	1. Петрова В.Ф., Хасанов М.Ш. «Философия». – Алматы: Эверо, 2014. 2. Бертран Р. «История западной философии» – М.: Издатель Litres, 2018. – 1195 с. 3. Kenny A.«New History of Western Philosophy». Volume 1-4. – Oxford University Press, 2006 - 2010. (Кэнни Эй. «Нью истори оф Вестерн философи». Волум 1-4 – Оксфорд юниверсити пресс, 2006-2010)
<b>8. Content of the discipline</b>	The emergence and development of philosophy. Basics of philosophical understanding of the world. Consciousness, soul and language. Being. Ontology and metaphysics. Human philosophy and value world. “Magilik Yel” and “Ruhani Zagyr» are the philosophy of the new Kazakhstan.
Name of the discipline	<b>Foreign language</b>
<b>2. Number of credits</b>	10
<b>3. Prerequisites:</b>	Foreign language school course
<b>4. Postrequisites:</b>	Professionally-oriented foreign language
<b>5. Competencies:</b>	According to the results of mastering the program, the student, depending on the level of training, at the time of completion of the course, the student reaches the level B1- (IELTS 4.0-5.0) or B2- (IELTS5.5-6.0)
<b>6. Author of course</b>	Department of Foreign Language
<b>7. General literature</b>	1. Julie Lachance ((July 21, 2015). <i>Practice Makes Perfect Premium: Basic English</i> . McGraw-Hill Education; 2 edition 2. Chris Lele. (March 20, 2018) <i>The Vocabulary Builder Workbook: Simple Lessons and Activities to Teach Yourself</i> . Zephyros Press; Workbook edition 3. Deborah Capras (01 Jan 2015). <i>Small Talk : B1+</i> . HarperCollins Publishers 4. Mark Hancock (27 Apr 2017). <i>English Pronunciation in Use Intermediate Book with Answers and Downloadable Audio</i> . CAMBRIDGE UNIVERSITY PRESS 5. Katie Foufouti (28 Dec 2017). <i>Oxford Skills World: Level 4: Reading with Writing Student Book / Workbook</i> . Oxford University Press 6. Herbert Puchta, Jeff Stranks, Peter Lewis-Jones (31 Oct 2015). <i>Think</i> (SB+audio, WB+audio, TB, Tests – levels 1, 2, 3, 4). CAMBRIDGE UNIVERSITY PRESS 7. British National Corpus: <a href="http://www.natcorp.ox.ac.uk">http://www.natcorp.ox.ac.uk</a> 8. The Corpus of Contemporary American English (COCA): <a href="http://www.americancorpus">http://www.americancorpus</a> .
<b>8. Content of the discipline</b>	The course program is designed for the volume of teaching - 300 hours, of which: 90 hours - for auditory work and 180 hours - for independent work. The course

ends with a comprehensive exam. The course is designed for 2 semesters.	
Name of the discipline	<b>Kazakh (Russian) language</b>
<b>2. Number of credits</b>	10
<b>3. Prerequisites:</b>	School course of Russian language and literature
<b>4. Postrequisites:</b>	Professional Russian
<b>5. Competencies:</b>	Possess basic communication skills in Kazakh / Russian: understand, express, interpret concepts, thoughts, feelings, facts and opinions both verbally and in writing (listening, speaking, reading, writing) in the relevant range of social and cultural contexts. Competently execute business documentation and conduct business correspondence. Have an idea about working with scientific text.
<b>6. Author of course</b>	Department of Kazakh and Russian languages
<b>7. General literature</b>	1. Русский язык: учебное пособие для студентов казахских отделений университетов (бакалавриат) / под ред. К.К. Ахмедьярова, К.К. Жаркынбековой. – Алматы: Қазақ университеті, 2008. 2. Мухамадиев Х.С. Пособие по научному стилю речи. Русский язык. – Алматы: Казак университеты, 2009. 3. Федосюк М.Ю., Ладыженская Т.А., Михайлова О.А., Николина Н.А. Русский язык для студентов-нефилологов: учебное пособие. – М., 2000. – 256 с.
<b>8. Content of the discipline</b>	Language and its main functions. Speech: types and forms of speech. Functional-semantic types of speech. Functional speech styles. General characteristics of functional speech styles. The general concept of the scientific style of speech. Features of scientific style at the lexical, morphological, syntactic level. Text as the leading unit of verbal communication. Structural and semantic articulation of the text. Theme text. The structure and meaning of the text. Communicative tasks of the text. The role of sentences in the text. Text-forming sentence functions. Microtheme of the text. Progression of the text as an increase in its volume and amount of information. Compression as the main type of processing scientific text. The plan and its preparation in the scientific field. Types of plans. Teasing a scientific text. Compositional-semantic structure of the scientific text .. The outlining of the scientific text. Annotation of scientific texts. Types of annotations. The referencing of scientific texts. Types of abstracts. Review of scientific text. The structure of the scientific review. Feedback on the scientific work. Summary-conclusions. Oral culture (general concept). The norms of the culture of speech (Orphage, lexical, morphological, syntactic norms). Culture of speech behavior in the professional field. The quality of good (exemplary) speech. Improving the ethics of speech behavior (speech etiquette, business etiquette). Types of business communication (business conversation, telephone conversations)
Name of the discipline	<b>Information and communication technology (in English)</b>
<b>2. Number of credits</b>	5
<b>3. Prerequisites:</b>	Math, physics
<b>4. Postrequisites:</b>	Computer graphics, operating systems, computer networks, database theory.
<b>5. Competencies:</b>	As a result of studying this discipline, students will be able to:

	<ul style="list-style-type: none"> <li>- design and create simple websites;</li> <li>- to process vector and raster images;</li> <li>- create multimedia presentations;</li> <li>- use different social platforms for communication;</li> <li>- use various forms of e-learning to expand professional knowledge;</li> <li>- use various cloud services.</li> </ul>
<b>6. Author of course</b>	Department of Information and Communication Technologies
<b>7. General literature</b>	<p>1. Shynybekov D.A., Uskenbayeva R.K., Serbin V.V., Duzbayev N.T., Moldagulova A.N., Duisebekova K.S., Satybaldiyeva R.Z., Hasanova G.I., Urmashev B.A. Information and communication technologies. Textbook: in 2 parts. Part 1, 1st ed. - Almaty: IITU, 2017. - 588 p., ISBN 978-601-7911-03-4 (A textbook in English with the stamp of the Ministry of Education and Science of the Republic of Kazakhstan)</p> <p>2. Shynybekov D.A., Uskenbayeva R.K., Serbin V.V., Duzbayev N.T., Moldagulova A.N., Duisebekova K.S., Satybaldiyeva R.Z., Hasanova G.I., Urmashev B.A. Information and communication technologies. Textbook: in 2 parts. Part 1, 1st ed. - Almaty: IITU, 2017. - 588 p., ISBN 978-601-7911-04-1 (A textbook in English with the stamp of the Ministry of Education and Science of the Republic of Kazakhstan)</p> <p>3. Urmashev B.A. Information and communication technology: Textbook / B.A. Urmashev. – Almaty, 2016. - 410 p., ISBN 978-601-7940-02-7 (A textbook in English with the stamp of the Ministry of Education and Science of the Republic of Kazakhstan)</p> <p>4. Нурпеисова Т.Б., Кайдаш И.Н. ИКТ. Учебное пособие / Алматы, изд-во Бастау, 2017, 183 с.</p> <p>5. Nurpeisova T.B., Kaidash I.N. ICT, Almaty, Bastau, 2017. 241 p.</p>
<b>8. Content of the discipline</b>	The role of ICT in key sectors of social development. ICT standards. Introduction to computer systems. Computer systems architecture. Software. Operating Systems. Human-computer interaction. Database systems. Data analysis. Data management. Networks and telecommunications. Cybersecurity Internet technologies. Cloud and mobile technologies. Multimedia technology. Smart technology. E-technology. E-business. E-learning. E-government. Information technology in the professional field. Industrial ICT. ICT development prospects.
Name of the discipline	<b>Political Science and Sociology</b>
<b>2. Number of credits</b>	<b>4</b>
<b>3. Prerequisites:</b>	Basic school knowledge
<b>4. Postrequisites:</b>	Philosophy, history and philosophy of science
<b>5. Competencies:</b>	Formation of the ability of a critical understanding of the system of interpersonal relations in society, awareness of the nature of society, the system of its groups and institutions. Formation of the socio-humanitarian outlook as the basis for the modernization of public consciousness through knowledge of the laws and laws of world politics and modern political processes, as well as the formation of national and civic identity.

<b>6. Author of course</b>	Department of Philosophy
<b>7. General literature</b>	1. Назарбаев Н.А. «Взгляд в будущее: модернизация общественного сознания».-Астана, 2017 2. Биекенов К.У., Биекенова С.К., Кенжакимова Г.А. «Социология: Уч.пособие». – Алматы: Эверо,2016. – 584с. 3. «Социология. Основы общей теории: учебник» / Под ред. Г.В. Осипов, Л.Н. Москвичев. - 2-е изд., испр. и доп. - М.: Норма, 2015. - 912 с. 4. Macionis J. Society: The Basics. Pearson, 2016. (Масионис Джей. Соушети: Зе Байзикс. Пэрсон, 2016.) 5. Heywood A. Politics. - N.-Y.: Palgrave Macmillan, 2013. (Хэйуд Эй. Политикс. – Эн. – Уай.: Палграйв Макмилан, 2013)
<b>8. Content of the discipline</b>	Sociology in understanding the social world. Introduction to the theory of sociology. Sociological research. Social structure and stratification of society. Socialization and identity. Social change: the latest sociological debate. Political science as a science and academic discipline. The main stages of the formation and development of political science. Politics in the system of public life. Political power: the essence and mechanism of implementation. World politics and modern international relations.
Name of the discipline	<b>Culturology and psychology</b>
<b>2. Number of credits</b>	<b>4</b>
<b>3. Prerequisites:</b>	Basic school knowledge
<b>4. Postrequisites:</b>	Philosophy, history and philosophy of science
<b>5. Competencies:</b>	Development of the social and humanitarian worldview as the basis for the modernization of public consciousness through the formation of cultural identity, the ability to analyze and evaluate cultural situations based on an understanding of the nature of cultural processes, the specifics of cultural objects, the role of cultural values in intercultural communication. Increasing the general psychological culture, mastering the knowledge of the socio-psychological patterns of individual behavior in interpersonal communication necessary for the modernization of consciousness in accordance with the challenges of time in the context of the program of the Spiritual Revival of Kazakhstan, the Leader of the Nation N.A. Nazarbayev.
<b>6. Author of course</b>	Department of Philosophy
<b>7. General literature</b>	1. Джакупов С.М. «Введение в общую психологию». – А.: Қазак университеті, 2014 2. Руденко А.М. «Психология в схемах и таблицах»: учебное пособие. –М: Феникс, 2016. –379 с. 3.Нуржанов Б.Г., Ержанова А.М. «Культурология».-Алматы, 2011. 4.Жолдубаева А.К. «Культурология:практикум».-Алматы:Казну им. аль-Фараби, 2014.
<b>8. Content of the discipline</b>	The morphology of culture. The language of culture. Culture of nomads of Kazakhstan. Cultural heritage of the Turks. The formation of the Kazakh culture. Personality in the context of the formation of national consciousness in psychology. Interpersonal communication as a factor in the development of a harmonious personality of Kazakhstan. Technology effective interpersonal communication as the basis for the modernization of public consciousness.
Name of the discipline	<b>Physical education</b>

<b>2. Number of credits</b>	<b>8</b>
<b>3. Prerequisites:</b>	biology, anatomy, human physiology, hygiene, medical control, valeology, pedagogy, psychology
<b>4. Postrequisites:</b>	The program of the course “Physical Education” develops skills and abilities in the field of students' physical culture, forms the need to maintain a healthy lifestyle, preserve and promote health, improves the level of physical fitness for the implementation of their abilities in the process of daily activities
<b>5. Competencies:</b>	Ensuring a sufficient level of physical readiness of future professionals, a high level of efficiency; development of professionally significant physical and psychomotor abilities; possess methods and means of physical culture to increase the body's adaptation reserves and promote health; possess knowledge and skills of a healthy lifestyle, ways to preserve and promote health and use them to preserve health.
<b>6. Author of course</b>	Шкурков А.С., Сатбаев Е.К.
<b>7. General literature</b>	1. В.И. Ильинич. Физическая культура студента. Москва, 2001 г. 2. Г.Д. Иванов, А.К.Кульназаров. Физическое воспитание студентов. Алматы, 2002 г. 3. Теория и методика физического воспитания. Под общ. ред. А.П.Матвеева и Д.Новикова. М., 2005.
<b>8. Content of the discipline</b>	Formation of a positive attitude, interest and need for physical education and sports. Improving the physical health of students on the basis of increasing the arsenal of motor abilities, professional-applied and methodical readiness. Preparation and participation in mass sports and recreational events and competitions in sports, providing for the wide involvement of students in active physical education. Comprehensive use of physical culture and sports as a general physical training. Increase the level of physical and functional status. Preventive use of physical culture for health purposes. The acquisition by students of additional, necessary knowledge of the basics of psychological, pedagogical, medical and biological control according to the method and organization of independent exercise and "lifelong" sports.
Name of the discipline	<b>Basics of Economics and Law</b>
<b>2. Number of credits</b>	<b>5</b>
<b>3. Prerequisites:</b>	Mathematics, Political Science and Sociology,
<b>4. Postrequisites:</b>	Production Management, Patent Law, Investment Management
<b>5. Competencies:</b>	A. Knowledge of one’s rights and responsibilities, ability to work in a team, ability to scientifically analyze socially significant problems and processes, ability to use the basic provisions and methods of the humanities, social and economic sciences in various types of professional and social activities. V. to be able to use regulatory legal documents in his activity; the ability to apply basic knowledge in the field of economics, economic studies and social management, to apply basic knowledge in the field of economics, economic studies and social management. C. Ability to make judgments, assess ideas, draw conclusions, build your own argumentation, the ability to express and justify your position in the field of economics and from the point of view.
<b>6. Author of course</b>	-

<b>7. General literature</b>	1. Марченко М.Н. Теория государства и права. – М.: 2010. <i>2013ж.</i> 2. Артемьев А.И., Дорошенко М.Е. Анализ неравновесных состояний и процессов в макроэкономических моделях / М.Е. Дорошенко. – М.: ТЕИС, 2000. 3.Ефимова Е.Г. Экономическая теория в схемах, таблицах, графиках и формулах / Е.Г. Ефимова. – М.: Флинта, 2003.
<b>8. Content of the discipline:</b>	The application of theoretical knowledge to enhance and deepen knowledge of economics and law; knowledge of basic legal concepts, the main branches of Kazakhstan law; be able to make recommendations to improve the current economic and legal situation, must acquire the skills of economic and legal analysis for practical application.
Name of the discipline	<b>Mathematics</b>
<b>2. Number of credits</b>	9
<b>3. Prerequisites:</b>	School Mathematics
<b>4. Postrequisites:</b>	Descriptive Geometry and Engineering Graphics, Computer Graphics, Design Basics, Descriptive Geometry and Engineering Graphics, Automated Mechanism Design, CAD Technological Machines and Equipment, Machine and Tractor Park Operation, Machines and Equipment for Processing Agricultural Products
<b>5. Competencies:</b>	<p><b>Know and understand:</b></p> <ul style="list-style-type: none"> <li>- the basic concepts, definitions, formulas, theorems and methods for solving problems in sections of the program;</li> <li>- basics of discipline in the scope of the work program;</li> <li>- be able to apply this knowledge in practice;</li> <li>- apply the knowledge to solve applied problems;</li> <li>- master the methods of solving various types of problems, analyze theoretical data, use the knowledge gained in solving applied problems.</li> </ul> <p><b>Formation of practical skills:</b></p> <ul style="list-style-type: none"> <li>- design, create mathematical models and choose the most effective ways to solve problems.</li> <li>- master the skills of developing algorithms for solving applied problems.</li> <li>- develop logical and mathematical thinking for mathematical modeling in solving practical problems, use the achievements of fundamental science for the successful development of general theoretical and special disciplines in the specialty.</li> </ul>
<b>6. Author of course</b>	-
<b>7. General literature</b>	Высшая математика. Том 1. Гусак А.А. Минск. Тетро Системс, 2001 г. 2. Высшая математика. Том 2. Гусак А.А. Минск. Тетро Системс, 2001 г. 3. Н.С. Пискунов. Дифференциальное и интегральное исчисление. М. 1996. т. 1,2. 4. В.П. Минорский. Сборник задач по высшей математике. М. Наука. 2006. 5. В.С. Шипачев. Высшая математика, М 2005 6. В.П. Минорский. Сборник задач по высшей математике. М. Наука. 2006.

	<p>7. Основы математического анализа. Ильин В.А., Позняк Э.Г. Часть 1. М.Физматлит, 2005.</p> <p>8. Основы математического анализа. Ильин В.А., Позняк Э.Г. Часть 2. М.Физматлит, 2005</p> <p>9. Erwin Kreyszing, Herbert Kreyszing, Edward J. Norminton. Advanced Engineering Mathematics (International student version). Asia: John Wiley &amp; sons, 2011, 128 p.</p>
<p><b>8. Content of the discipline:</b> Fundamentals of mathematical analysis, the limit and continuity of the function, the foundations of differential and integral calculus. Fundamentals of linear algebra and analytic geometry. Determinants, matrices, systems of equations, equations of lines and surfaces. Vector algebra and vector analysis. Vectors, scalar, vector and mixed product of vectors. Invariance of the scalar product. Vectors in different coordinate systems. Problems leading to differential equations. Differential equations of the first order. Higher order differential equations. Equations that can be reduced in order. Application to solving physical problems.</p>	
Name of the discipline	<b>Physics</b>
<b>2. Number of credits</b>	7
<b>3. Prerequisites:</b>	School Physics
<b>4. Postrequisites:</b>	Electrical engineering and electronics fundamentals
<b>5. Competencies:</b>	<p>A. The formation of an understanding of the occurring physical phenomena, the ability to use in practice the scientific study of concepts about physical and mathematical processes in nature, about the methods and methods of their description, basic principles, laws and theories of classical and modern physics and mathematics.</p> <p>B. Obtaining practical skills of obtaining the necessary information, possession of techniques and methods for solving specific problems from various fields of physics and mathematics.</p> <p>C. The ability to allocate specific physical content in the applied tasks of the future specialty.</p>
<b>6. Author of course</b>	-
<b>7. General literature</b>	<p>1. Трофимова Т.И. Курс физики. – М.: 2011</p> <p>2. Детлаф А.А., Яворский Б.М. Курс физики. - М.: 2010.</p> <p>3. Р.И. Грабовский. Курс физики. – М.: ВШ., 1980, 2012.</p> <p>4. Мукашева А.К. и др. «Физика – 1» Учебно-методический комплекс для студентов инженерных специальностей. – Астана, 2009.</p>
<p><b>8. Content of the discipline</b> The application of theoretical knowledge to solve specific physical problems and situations. Analysis of the results of a physical experiment. Simulation of physical situations using a computer. Conducting a physical experiment, working with measuring devices. Calculation and processing of the data. Basic physical theories and principles, physical research methods, the basic laws and limits of their applicability.</p>	
Name of the discipline	<b>Descriptive Geometry and Engineering Graphics</b>
<b>2. Number of credits</b>	6

<b>3. Prerequisites:</b>	School course subjects drawing, mathematics
<b>4. Postrequisites:</b>	Computer graphics, design fundamentals, computer-aided design of mechanisms, CAD technology machines and equipment, an EX-machine-tractor fleet, machinery and equipment for processing agricultural products
<b>5. Competencies:</b>	A. Ability to use the solution of various positional, metric and combined tasks in the complex drawing and in the visual image. B. Acquisition of practical skills of work and reading, implementation of drawings in the specialty. C. In studying a course a student should know: - methods for obtaining images of elements of space on a plane or surface; - methods for solving spatial problems using images; - the requirement of standards ESKD, USTD and other systems related to the implementation of the drawings.
<b>6. Author of course</b>	-
<b>7. General literature</b>	1. Стандарты ЕСКД. Общие правила выполнения чертежей. 1984. 2. Мусалимов Т.К. Начертательная геометрия - Астана, 2006 г. 3. Мусалимов Т.К., Колбатыр С.А. Начертательная геометрия и техническое черчение. Астана: Фолиант, 2018. 4. Левицкий В.С. Курс машиностроительного черчения. – М.,1987. 5. Т.К.Мусалимов, С.Ә.Қолбатыр, Г.М.Алгартова. Сызба геометрия және инженерлік графика. Алматы: 2013. 6. Т.Мусалимов, С.Қолбатыр. Сызба геометрия және техникалық сызу. Астана: Фолиант, 2017. 7. Федоренко В.А., Шошин А.И. Справочник по машиностроительному черчению. – Л., 1983. 8. Машиностроительное черчение. Под ред. Вяткина Г.П. –М., 1985. 9. Михайленко В.Е., Пономарев А.М. «Инженерная графика» - К., 1985.
<b>8. Content of the discipline</b>	Teaching the future bachelor with the theoretical and practical basics of descriptive geometry and engineering graphics, the ability to solve spatial geometric engineering problems of a flat image of objects.
Name of the discipline	<b>Engineering Mechanics (Static, Dynamics)</b>
<b>2. Number of credits</b>	<b>4</b>
<b>3. Prerequisites:</b>	Physics, math
<b>4. Postrequisites:</b>	Technological machines and equipment for processing industries
<b>5. Competencies:</b>	A. To know the basic concepts and laws of mechanics in the form of axioms, theorems, principles arising from these laws, methods of studying equilibrium, skills necessary for further study of special engineering disciplines, as well as in his further professional activity directly in production. B. Ability to do in practice calculations for balance, determination of kinematic characteristics and dynamic analysis of mechanical systems. C. In the field of communication - the formation of the limits of admissibility of the adopted provisions on the balance and movement of mechanical systems. In the field of education - the ability to analyze the key problems of statics and kinetics of material objects.



<b>6. Author of course</b>	-
<b>7. General literature</b>	<ol style="list-style-type: none"> <li>1. Никитин Н.Н. Курс теоретической механики. М.: ВШ, - 2011. – 607с.</li> <li>2. Тарг С.М. Краткий курс теоретической механики, М.: ВШ, 2011. – 416с.</li> <li>3. Сборник заданий для курсовых работ по теоретической механике, под ред. А.А. Яблонского, М., ВШ, - 1985. – 384с. и посл. издания.</li> <li>4. Мещерский И.В. Сборник задач по теоретической механике. М., Наука, - 2012. – 448с. и другие издания.</li> <li>5. Сборник коротких задач по теоретической механике. Под ред. О.Э.Кепе. СПб. Лань, 2009.</li> <li>6. Бутенин Н.В., Лунц Я.Л., Меркин Д.Р. Курс теоретической механики. Т1,2. М., Наука, - 2012.</li> </ol>
<b>8. Content of the discipline</b>	Systems of forces and equilibrium conditions with an emphasis on engineering problems. Kinematics and kinetics of material points, a system of material points and solids; Application of these topics to engineering problems.
Name of the discipline	<b>Material mechanics</b>
<b>2. Number of credits</b>	<b>4</b>
<b>3. Prerequisites:</b>	Mathematics, physics, fundamentals of agricultural machinery, engineering mechanics, Descriptive geometry and engineering graphics
<b>4. Postrequisites:</b>	Theory and calculation of agricultural machinery, CAD technological machines and equipment, Basics of design, Mechanization of animal husbandry.
<b>5. Competencies:</b>	<p>A. As a result of studying this discipline, students should know and be able to apply the basic methods and principles for calculating structural elements for strength, rigidity and stability.</p> <p>B. To be able to use reference materials on the mechanical characteristics of materials. Based on the results of calculations, be able to make recommendations on the rational design of engineering structures.</p> <p>C. To have the skills to work on the calculation of structural elements for strength and stiffness for the simplest types of deformations (tension-compression in statically definable systems, shear, bending, torsion) and for some complex types of deformations (bending with torsion, eccentric compression, oblique bending), as well as acquire practical skills in the calculation of structural elements for stability in buckling. Have the skills to clearly express thoughts and opinions both verbally and in writing about the basic assumptions, hypotheses in the calculations of the strength, rigidity and stability of structural elements.</p>
<b>6. Author of course</b>	-
<b>7. General literature</b>	<ol style="list-style-type: none"> <li>1. Степин, П. А. Сопротивление материалов.: 6- издание, перер. и допол. / П.А. Степин. - М.: Высшая школа, 1979, 1983, 2010 - 312 с., - 303 с. - 320 с. :</li> <li>2. Межецкий, Г. Д. Сопротивление материалов: учебник / Г. Д. Межецкий, Г. Г. Загребин, Н. Н. Решетник. - 3-е изд., перераб. и доп. - М.: Издательско-торговая корпорация "Дашков и Ко", 2013. - 432 с.</li> <li>3. Писаренко Г.С. Сопротивление материалов: 4-е издание, перер. и допол. / Агарёв В.А. Квитка А.Л. Попков В.Г. Уманский Э.С.; Ред.Писаренко Г.С. –М. : "Вища школа", 2006г. - 696 с.</li> <li>4. Аркуша, А. И. Техническая механика. Теоретическая механика и сопротивление материалов : учебник для сред.проф. учеб. заведений / А. И. Аркуша. - 6-е изд., стер. - М. : Высшая школа, 2005. - 352 с.</li> </ol>

	<p>5. Аубакиров, Б. У. Инженерная механика :учеб.пособие / Б.У. Аубакиров, А.С. Бектегенова; МСХ РК. - Астана :КазАТУим.С.Сейфуллина, 2016. - 163 с.</p> <p>6. Аубакиров, Б. У. Лабораторный практикум по дисциплине сопротивление материалов :практикум / Б. У. Аубакиров, Н. Б. Оразбеков ; МСХ РК. - Астана :КазАТУим.С.Сейфуллина, 2015. - 98 с.</p>
<b>8. Content of the discipline</b>	Uniaxial load and deformation. General concepts of stress-strain states, strength conditions of materials. Shift. Torsion shafts. Bending beams. Bending deflections. Introduction to stiffness and stability. Experiments that illustrate the main hypotheses and verify the theoretical data used in the mechanics of materials using basic tools and methods for analyzing experimental stresses.
Name of the discipline	<b>Automation of drawings</b>
<b>2. Number of credits</b>	4
<b>3. Prerequisites:</b>	School course informatics, Information and communication technology
<b>4. Postrequisites:</b>	Basics of Design, Descriptive Geometry and Engineering Graphics, Automated Mechanism Design, CAD of Technological Machines and Equipment.
<b>5. Competencies:</b>	<p>A. Know the elements of descriptive geometry and engineering graphics, the basics of automation theory, drawing execution, know the capabilities and applications of the KOMPAS -3D system, the theoretical foundations and applied value of computer graphics, ways of displaying spatial forms on a plane, the capabilities of computer drawing design.</p> <p>B. To be able to use knowledge and concepts of computer graphics, determine the geometric shape of parts by their images, understand the principle of operation of the structure shown in the drawing, build images of simple objects, carry out and read technical product drawings, develop methodological and regulatory documents, technical documentation, apply principles and techniques for working with computer graphics application program - KOMPAS -3D.</p> <p>C. Possess the skills to solve practical problems of displaying graphical information (geometric modeling problems) using specialized software tools, skills in using the KOMPAS -3D program for creating drawings, illustrations for course and degree design.</p>
<b>6. Author of course</b>	-
<b>7. General literature</b>	<p>1. Большаков, В. П. Инженерная и компьютерная графика / В.П. Большаков, В.Т. Тозик, А.В. Чагина. - М.: БХВ-Петербург, 2013. - 288 с.</p> <p>2. Большаков, В.П. Инженерная и компьютерная графика / В.П. Большаков. - М.: БХВ-Петербург, 2004. - 132 с.</p> <p>3. Большаков, В.П. Инженерная и компьютерная графика. Практикум / В.П. Большаков. - М.: СПб: БХВ, 2004. - 592</p> <p>4. Инженерная 3D-компьютерная графика. Учебное пособие / А.Л. Хейфец и др. - М.: Юрайт, 2015. - 464 с.</p>
<b>8. Content of the discipline</b>	Application of theoretical knowledge for creating graphic images, displaying information, basics of working in modern graphic tools of interactive computer graphics (creating 2D images in Compass). To determine the geometric shape of parts from their images, the basis of solving the problems of geometric modeling of graphic information in interactive
Name of the discipline	<b>Automated design of mechanisms</b>

<b>2. Number of credits</b>	<b>5</b>
<b>3. Prerequisites:</b>	Mathematics, Physics, Descriptive Geometry and Engineering Graphics, Computer Graphics, Engineering Mechanics, Material Mechanics
<b>4. Postrequisites:</b>	Basics of designing, CAD of technological machines and equipment, Theory and calculation of agricultural machines.
<b>5. Competencies:</b>	A. Know and understand the nature of the acting forces on the links of the mechanism and methods of their analysis, modes of movement of mechanisms and methods of their regulation. B. To be able to carry out a structural analysis of mechanisms and machines. The ability to automate the use of computer applications for the analysis of mechanisms. C. To possess the methods of kinematic and dynamic studies of mechanisms as well as theoretical and application of CAD. Providing the necessary skills and abilities for the subsequent study of special engineering disciplines, as well as in further professional activities directly in production conditions.
<b>6. Author of course</b>	-
<b>7. General literature</b>	1. Теория механизмов и машин, Артоболевский И. И., 1988 г. 2. Теория механизмов и машин, Под ред. К.В. Фролова. М., 2004 г. 3. Курсовое проектирование по теории механизмов и механике машин / С. А. Попов, Г. А. Тимофеев, 2008 г. 4. Краткий курс теории механизмов, Нурғалиев Т.К., 2001 г.
<b>8. Content of the discipline</b>	The course "Automated Design of Mechanisms" presents the scientific basis for the construction of mechanisms, machines and devices, as well as the methods of their theoretical and experimental research. In the course of studying the course, course design is carried out on the theory of machines and mechanisms in order to obtain the necessary practical skills in applying the main provisions and conclusions of the theory to solving specific technical problems. The objective of the course is to provide knowledge about the structure of the main types of mechanisms, the kinematic and dynamic characteristics of mechanisms with rigid links, knowledge of the methods for determining the parameters of mechanisms according to the required conditions. The study of the discipline is accompanied by the use of computer application programs for the study of mechanisms.
Name of the discipline	<b>Design Basics</b>
<b>2. Number of credits</b>	<b>5</b>
<b>3. Prerequisites:</b>	Mathematics, Descriptive Geometry and Engineering Graphics, Computer Graphics, Engineering Mechanics (Statics, Dynamics), Materials Mechanics
<b>4. Postrequisites:</b>	CAD of technological machines and equipment, livestock mechanization, Machines and equipment for processing agricultural products, Theory and calculation of agricultural machines.
<b>5. Competencies:</b>	A. To be able to independently design the nodes of the machines of the desired destination for the given output data. Independently select reference literature, GOST, as well as graphic material (design prototypes) in the design. Take into account in the design requirements of manufacturability, efficiency, maintainability. Choose the most suitable materials for machine parts and use them

	<p>rationally. Perform calculations of parts and assemblies of machines, using reference books and GOST. Prepare graphic and text design documentation in full compliance with ESKD requirements, select a design model and carry out the necessary calculations in the design process and evaluate the performance of typical engineering products, select the most suitable materials for machine parts, use the software package on the computer when calculating and designing machine parts . To have the skills to calculate and design typical parts of transmission mechanisms, connections, supporting and bearing elements of machines.</p> <p>B. To know the Main criteria for the performance of machine parts and the types of their failures, the theory and calculation of machine parts and components. Typical design of parts and components of machines, their properties and applications. Fundamentals of automation of calculations and design of parts and components of machines, elements of computer graphics and design optimization.</p> <p>C. To be able to independently design the nodes of the machines of the desired destination for a given output among them to choose the best option with a rationale. Choose the most suitable material for machine parts and use them rationally. To issue graphic and text design documentation.</p>
<b>6. Author of course</b>	
<b>7. General literature</b>	<ol style="list-style-type: none"> <li>1. Иванов М.Н. Детали машин. – М.: Высшая школа, 2014. -408с.</li> <li>2. Решетов Д.Н. Детали машин. – М., Машиностроение.1989.</li> <li>3. Детали машин: учебник/Н.В. Гулиа, В.Г. Клоков; под. общ. ред. –М: Академия 2014.-416 с</li> <li>4. Чернавский А.С. Курсовое проектирование деталей машин. М.: Машиностроение, 2005.</li> <li>5. Шейнблит А.Е. Курсовое проектирование деталей машин. М.: Высш.шк, 2002.</li> </ol>
<b>8. Content of the discipline</b>	<p>The concepts of the basic criteria for the performance of machine parts and the types of their destruction. Fundamentals of the theory and calculation of parts and catch machines. Typical design of parts and components of machines, their properties and applications. Fundamentals of automating the calculation and design of parts and components, the study of general principles of design and engineering, construction of models and algorithms for calculating typical engineering parts, taking into account the main criteria for efficiency and developing design skills and technical creativity. - about typical methods of calculation and design of parts and units of machines. know: - the main criteria for the performance of machine parts and the types of their failures; - The basics of the theory and methodology for calculating typical parts and assemblies of machines; - typical designs of parts and assemblies of machines, their properties and applications; - the basics of automation of calculations and design of parts and components of machines, elements of computer graphics and design optimization.</p>
Name of the discipline	<b>CNC system</b>
<b>2. Number of credits</b>	5
<b>3. Prerequisites:</b>	Industrial Microcontrollers
<b>4. Postrequisites:</b>	Metalworking machines and welding equipment
<b>5. Competencies:</b>	<p>A. Have a notion about the classification of numerical control systems.</p> <p>B. Know the general principles of the construction of CNC systems and the tasks of control systems.</p>

<b>6. Author of course</b>	<b>Аджанов А.У</b>
<b>7. General literature</b>	1. Сосонкин В.Л., Мартинов Г.М. Системы числового программного управления: Учеб. пособие. - М.: Логос, 2005. - 296 с. 2. Современные системы ЧПУ и их эксплуатация: учебник для нач. проф. Образования / М.А. Босинзон; под ред. Б.И. Черпакова. - 2-е изд., стер. М.: Издательский центр «Академия», 2008.- 192 с.
<b>8. Content of the discipline</b>	Classification of control systems. PCNC system architecture. The problem of real time control systems. Problems of electroautomatic control. Building intermodular communication environment. Principles of building remote CNC terminals. Features of CNC architecture with STEP-NC. Realization of a geometric problem. Implementing a logical control problem. Control of electroautomatic machine tools with CNC. The implementation of the terminal task. Implementation of the diagnostic management problem.
Name of the discipline	<b>Materials in engineering design</b>
<b>2. Number of credits</b>	<b>5</b>
<b>3. Prerequisites:</b>	Mathematics, physics, theoretical mechanics, computing and programming; engineering graphics.
<b>4. Postrequisites:</b>	Installation and operation of technological machines, Mechanical Engineering, Reliability of technological machines, Repair of technological machines. When performing a design diploma project, it is necessary to know from which materials it is necessary to manufacture the structures under development, taking into account their physical and mechanical properties.
<b>5. Competencies:</b>	- know how to use in practice the concepts of materials science and materials processing technology in mechanical engineering, to understand its place in the system of other disciplines on the organization and management of production processes.
<b>6. Author of course</b>	Grishin A.N.
<b>7. General literature</b>	1. А.А.Черепашков, Н.В. Носов. Компьютерные технологии, моделирование и автоматизированные системы в машиностроении: Волгоград: Издательский Дом «Ин-Фолио», 2009. — 640 с. 2. Түсіпов, А. Материалдар кедергісінің есептер жинағы: Оқулық/ А. Түсіпов. - Алматы : ҚР жоғары оқу орындарының қауымдастығы, 2012. - 216 - (ҚР Білім және ғылым министрлігі). 3. Купцов А.М. Электротехника с элементами энергосбережения: Учебное пособие. – Томск: Изд-во НТЛ, 2003. – 344 с. 4. Аристова Л.И., Лукутин А.В.. Сборник задач по электротехнике: учебное пособие. – Томск: Изд-во ТПУ, 2010. – 107 с. 5. Кудинов В.А., Карташов Э.М. Техническая термодинамика. –М.; Высш.шк., 2000. –261 с.ил. 6. Денисенко В.И., Болдырева Л.П. ТОЭ1. Исследование линейных электрических цепей. Методические указания и задания к лабораторным работам для студентов специальности 5В0718 7. Ильинский Н.Ф., Козоменко В.Ф. Общий курс электропривода. – М.: Энергоатомиздат, 1992. 8. Москаленко В.В. Электрический привод. – М.: Мастерство: высшая школа, 2000. 9. Димов Ю.В. «Метрология, стандартизация, сертификация.» Питер 2010г. 10. Гришин А.Н. Режущий инструмент и металлорежущие станки. Уч.пособие, - Астана, КАТУ им.С.Сейфуллина, 2008г. 11. Кондрашова Р.Т. Курс лекций по дисциплине «Металлорежущие станки», - Астана, КАТУ имени С.Сейфуллина, 2010г.
<b>8. Content of the discipline</b>	The study of ferrous and non-ferrous metals and their alloys and non-metal; fundamentals of the theory of heat treatment of metals,

their alloys and parts of technological machines and equipment; fundamentals of foundry production and pressure treatment of metals and plastics; metal welding; the basics of the existing processes of raising parts from the workpiece; the theory of cutting instrumental materials, their physico-mechanical bases of machining; machine tools and tools for cutting.	
Name of the discipline	<b>Heat engineering and thermodynamics basics</b>
<b>2. Number of credits</b>	4
<b>3. Prerequisites:</b>	Mathematics, Physics, Electrical Machines and Drives
<b>4. Postrequisites:</b>	Profile disciplines
<b>5. Competencies:</b>	should: A. be able to: design, select and operate the necessary heat engineering equipment of the sectors of the national economy. B. know: heat engineering terminology, laws of production and conversion of energy, methods for analyzing the efficiency of heat utilization, as well as the principles of operation and designs of thermoelectric equipment; C. The ability to understand the methods of obtaining, converting, transmitting and using heat, as well as the principle of operation and laws of transformation and properties of thermal energy, as well as the processes of heat propagation and the theory of heat transfer.
<b>6. Author of course</b>	Umirzakov R.A.
<b>7. General literature</b>	1. Умирзаков Р.А. Учебно-методический комплекс по дисциплине «Теплотехника», Астана: КазАТУ им. С. Сейфуллина, 2015. 2. Теплотехника: учебник для вузов /В.Н. Луканин, М.Г. Шатров и др.; под ред. В.Н. Луканина. – М.: Высшая школа, 2000. – 671 с. 3. Буров А.Л. Тепловые двигатели: М., 2008.
<b>8. Content of the discipline</b>	The history of the development of heat engineering. The laws of obtaining and converting energy. Compressors, internal combustion engines, heat pumps. Heat conduction. Industrial heating devices and their classification. Heat exchangers.
Name of the discipline	<b>Industrial Microcontrollers</b>
<b>2. Number of credits</b>	5
<b>3. Prerequisites:</b>	Mathematics, Physics, Electrical Engineering, Electrical machines and drives
<b>4. Postrequisites:</b>	Pneumatic and hydraulic drives, CNC system (Fundamentals of mechatronics), Manipulators and robots
<b>5. Competencies:</b>	<ul style="list-style-type: none"> <li>• the ability to compose mathematical models of systems, their subsystems and individual elements and modules, including information, electromechanical, hydraulic, electrohydraulic, electronic devices and computer equipment;</li> <li>• the ability to develop design and project documentation of nodes and systems in accordance with existing standards and technical conditions;</li> <li>• the ability to plan the commissioning, maintenance and testing of individual modules and subsystems, to participate in organizing and conducting installation, commissioning and maintenance at existing facilities and experimental models, as well as in processing the results of experimental studies</li> </ul>
<b>6. Author of course</b>	<b>Sarsikeev E.Zh.</b>

<b>7. General literature</b>	<p>1. Сторожев, Владимир Васильевич Системотехника и мехатроника технологических машин и оборудования : монография / В. В. Сторожев, Н. А. Феоктистов. – Москва: Дашков и К, 2015. – 412 с.</p> <p>2. Шидловский, Станислав Викторович. Автоматическое управление. Перестраиваемые структуры / С. В. Шидловский. — Томск: Изд-во ТГУ, 2006. — 288 с.</p> <p>3. Медведев М.Ю. Программирование промышленных контроллеров: учеб. пособие / М.Ю. Медведев, В.Х. Пшихопов. – Москва: Лань, 2011. – 287 с.</p> <p>4. Стрижак П.А. Микропроцессорные контроллеры и средства управления: учебник / П.А. Стрижак, Д.О. Глушков; Национальный исследовательский Томский политехнический университет (ТПУ). – Томск: Изд-во ТПУ, 2010. – 144 с.</p>
<b>8. Content of the discipline</b>	<p>General information about controllers. Architecture and PLC types. Structure and device controllers ARIES. Programming and interface controllers ARIES. Additional modules ARIES. Installation of modules ARIES. Structure and device controllers SIEMENS. Programming and interface controllers SIEMENS. Additional modules SIEMENS. Installation of modules SIEMENS. Structure and design of Schneider Electric controllers. Programming and interface controllers Schneider Electric. Additional modules Schneider Electric. Installation of Schneider Electric modules. Designing automation systems.</p>
Name of the discipline	<b>Pneumatic and hydraulic actuators</b>
<b>2. Number of credits</b>	<b>6</b>
<b>3. Prerequisites:</b>	Physics
<b>4. Postrequisites:</b>	Metalworking machines and welding equipment. Hoisting machines, manipulators and robots.
<b>5. Competencies:</b>	<p>A. Know the basics of hydraulics, hydraulic drives, hydraulic machines, hydraulic equipment and working fluids.</p> <p>B. To be able to count and choose hydraulic and pneumatic drives.</p>
<b>6. Author of course</b>	<b>Ajanov A.U.</b>
<b>7. General literature</b>	С. Г. Ефимова, В. Т. Чупров. Гидравлика, гидро- и пневмопривод. Учебное пособие. Сыктывкар. СЛИ. - 2013.
<b>8. Content of the discipline</b>	<p>Hydrostatics. Hydrodynamics. Volumetric hydraulic actuators. Working fluid. Volumetric hydraulic machines. Hydraulic equipment. Determination of parameters and the choice of hydraulic drive and hydraulic equipment. Pneumatic actuators. Calculation of pneumatic drives.</p>
Name of the discipline	<b>Manufacturing processes (ТМС+КТОП)</b>
<b>2. Number of credits</b>	<b>5</b>
<b>3. Prerequisites:</b>	Theory of mechanisms and machines. Agreecultural machines. Agreecultural equipment
<b>4. Postrequisites:</b>	Diploma design
<b>5. Competencies:</b>	<p>Terms, definitions and concepts, indicators for assessing the quality of machines, technological characteristics of various types of production, errors of machining and methods for calculating them, the task of controlling the processing accuracy and reducing its errors, technological dimensional calculations, basing and bases in mechanical engineering, the impact of processing technology on the</p>

	formation of surface layer and performance of machine parts, setting processing allowances, performs technical rationing of production costs owls.
<b>6. Author of course</b>	<b>Magavin S.Sh.</b>
<b>7. General literature</b>	1. Базров Б.М. Основы технолдогии машиностроения – М.:Машиностроение, 2005 – 736 с. 2. Маталин А.А. Технология машиностроения. Учебник – СПб:ЛАНЬ, 2010 – 512 с. 3. Справочник технолога машиностроителя. Под.ред. А.Г.Косиловой и Р.М.Мещерякова. – М.:Машиностроение, 1999. Т.1 – 694 с.
<b>8. Content of the discipline</b>	The discipline “Production Processes” aims to instill in students a complex of knowledge and skills about the nature and basic laws of the influence of the technological system on the accuracy of processing performance, on the impact of processing technology on the formation of the surface layer and the performance of machine parts, to produce technological dimensional calculations, to correctly base and assign bases when installing parts in the process of machining and assembly, assign allowances for machining and carries out technological rationing consumption of productive resources.
Name of the discipline	<b>Measuring systems (ВЗСТИ)</b>
<b>2. Number of credits</b>	4
<b>3. Prerequisites:</b>	general education disciplines, general measurement theory, metrology, standardization, engineering graphics.
<b>4. Postrequisites:</b>	machine use, methods of quality control and management, qualimetry, control in standardization, metrology and certification, metrological assurance of production.
<b>5. Competencies:</b>	Know and understand the procedure for constructing a unified system of tolerances and landings, the theory of accuracy calculations. To be able to work with the main groups of measuring and control products, processes. To possess the rules of process control in the management of product quality based on regulatory and technical documentation. Acquire practical skills in the selection of measuring tools based on input information (accuracy, performance, etc.); be able to assess the metrological equipment of production, work on a system of tolerances and landings, designate standards for the accuracy of products.
<b>6. Author of course</b>	Ivanchenko A.V.
<b>7. General literature</b>	1.Сергеев А.Г., Латышев М.В., Терегеря В.В. Метрология, стандартизация, сертификация. Учебное пособие. – М.: 2003. –536 с. 2. Сергеев А.Г., Крохин В.В. Метрология: Учебное пособие для вузов. – М.: Колос, 2000. – 408 с. 3. Серый И.С. Взаимозаменяемость, стандартизация и технические измерения. – 2-е изд., перераб. и доп. М.: Агропромиздат., 1987. –367 с. 4. Иванов А.И. Технические измерения. Изд. 2-е, перераб. – М.: Колос, 1970. 5. Якушев А.И. и др. Взаимозаменяемость, стандартизация и технические измерения. Учебник для ВТУЗов. – М.: Машиностроение - 1987. – 352 с.. • 6. Допуски и посадки. Справочник в 2-х частях (под ред. Мягкова В.Д. и др.). Л.: Машиностроение, 1982
<b>8. Content of the</b>	The concept of measuring and control. . Metrological characteristics of SI. Principles of choice of SI. Limiting errors of the most



<b>discipline</b>	common universal measuring instruments. The concept of testing and control. Limit calibers. Rules of operation, setting SI, measurement methods. Device and operation of rod tools, micrometric and lever-mechanical tools. The use of SR in the repair industry and in the technical diagnostics of aggregates, assemblies and mechanisms of agricultural equipment. General principles of interchangeability. General principles for building a unified system of tolerances and landings (ESDP).
Name of the discipline	<b>Failure Analysis and Machine Repair</b>
<b>2. Number of credits</b>	<b>5</b>
<b>3. Prerequisites:</b>	higher mathematics, computer science, descriptive geometry and engineering graphics, physics, theoretical mechanics, fundamentals of heat engineering, fundamentals of heat engineering, construction of tractors for automobiles. CAD, OKDM, resistance of materials, electrical engineering
<b>4. Postrequisites:</b>	-
<b>5. Competencies:</b>	To be able to develop and implement measures for maintaining and restoring the reliability, efficiency and resource of SH equipment with minimal labor and costs. To be able to ensure the effective use of technological machines, through current repairs and maintenance. Identify the causes of faults, damage and failures of machines, equipment. and automation of technological and production processes and rules of safe work in the repair of machinery and equipment; organization of labor and production in repair and maintenance bases
<b>6. Author of course</b>	Mendaliev S.I.
<b>7. General literature</b>	1. Надежность и ремонт машин /Под ред.В.В. Курчаткина. - М.: Колос, 2000. - 776 с.: ил. 2. Кленин Н.И., Егоров В.Г. Сельскохозяйственные и мелиоративные машины.– М.: Колос, 2004.-464с. 3. Гуревич Л.А и др. Тракторы и сельскохозяйственные машины. – М.: Агропромиздат, 1986.-267 с. 4. Алиев Б. Тракторлар мен автомобильдер теориясы. - Алматы, 2005
<b>8. Content of the discipline</b>	The basis of wear parts, prediction of the causes of faults in the nodes, machines, on the progressive methods of their repair and restoration of the technology of repair of nodes, aggregates of machines, equipment.
Name of the discipline	<b>Монтаж, испытание и эксплуатация технологических машин</b>
<b>2. Number of credits</b>	<b>5</b>
<b>3. Prerequisites:</b>	Для эффективного освоения содержания дисциплины не обходимо знание дисциплин: математика; физика ; теоретическая механика; сопротивление материялов; основы технолгии машиностроения; надежность технологических машин; монтаж и эксплуатация технологических машин.
<b>4. Postrequisites:</b>	Испытание с/х техники;проектирование предприятий технического сервиса; дипломное проектирование
<b>5. Competencies:</b>	В результате изучения данной дисциплины студенты должны знать; - Причины возникновения неисправностей, повреждения и отказов машин, оборудования, методы их предупреждения выявления и устранения; - Соремненные прогрессивные методы монтажа машин, технологические процессы ремонта и установления деталей, узлов,

	<p>машин и оборудования в целом;</p> <ul style="list-style-type: none"> <li>- Вопросы механизации и автоматизации технологических и производственных процессов и правил безопасной работы при монтаже машин и оборудования;</li> <li>- Организацию труда и производства в подразделениях ремонтно-обслуживающей базы.</li> </ul>
<b>6. Author of course</b>	<b>Бабченко Л.А.</b>
<b>7. General literature</b>	<p>1. Батищев А.Н. и др. Монтаж, эксплуатация и ремонт технологического оборудования. – М:Колос. – 424 с.</p> <p>2. Баутин В.Н. и др. Монтаж оборудования перерабатывающих предприятий. – М:Росинформагротех, 2002. – 184 с.</p> <p>3.Беляев П.С. и др. Монтаж, эксплуатация и ремонт оборудования для переработки полимерных материалов. – Тамбов: Изд – во Тамб. Гос. Техн. Ун-та, 2006. – 92 с.</p>
<b>8. Content of the discipline.</b> Discipline "Installation and operation of technological machines." Wear and aging of technological machines and equipment, system of scheduled preventive maintenance of equipment, installation and operation of technological machines, methods and methods for monitoring and restoring machine parts.	
Name of the discipline	<b>Engineering economics</b>
<b>2. Number of credits</b>	<b>3</b>
<b>3. Prerequisites:</b>	Economic disciplines
<b>4. Postrequisites:</b>	Section of Economics in thesis design
<b>5. Competencies:</b>	<p>As a result of studying this discipline, students should:</p> <p>know and understand: the essence of scientific and technological progress and the concept of engineering economics; the essence of the main and working capital of the enterprise; fundamentals of enterprise resource management and labor motivation; technical and economic analysis of production development; ensuring the competitiveness of production.</p> <p>be able to: apply theoretical knowledge in practice; correctly assess the situation on the market; plan and predict;</p> <ul style="list-style-type: none"> <li>- correctly assess their capabilities; decide; participate in the development of an innovative strategy of the organization, plan and implement activities aimed at its implementation;</li> </ul> <p>own: enterprise management skills; management methods at the enterprise; methods of building long-term and short-term strategy of the enterprise.</p>
<b>6. Author of course</b>	Alenova K.T., Ernazarova A.K.
<b>7. General literature</b>	<p>1. В.В. Кочетов, А.А. Колобов, И.Н. Омельченко Инженерная экономика. Учебник. «МГТУ им. Н.Э. Баумана». 2005</p> <p>2. В.В. Кочетов, А.А. Колобов, И.Н. Омельченко Инженерная экономика. Учебник. Изд-во МГТУ, 2011</p> <p>3. А. В. Колышкин [и др.] ; под ред. А. В. Колышкина, С. А. Смирнова. Экономика предприятия: учебник и практикум для бакалавриата и специалитета М. : Издательство Юрайт, 2018. — 498 с.</p>

	4. Чалдаева, Л. А. Экономика предприятия : учебник и практикум для академического бакалавриата/Л. А. Чалдаева. — 5-е изд., перераб. и доп. — М. : Издательство Юрайт, 2015. — 435 с.
<b>8. Content of the discipline</b>	Scientific and technical progress and the concept of engineering economics. Production in a market environment. Fixed assets. Working capital Labor resources. Cost of production. Efficiency and quality of products. The system of technical and economic calculations. Characteristics of innovation. Evaluation of the effectiveness of innovation. Technical and economic analysis of the development of production. Ensuring the competitiveness of production. Taxation. Investment and innovation activities of the enterprise. Finance companies.
Name of the discipline	<b>Occupational Safety and Health</b>
<b>2. Number of credits</b>	<b>4</b>
<b>3. Prerequisites:</b>	Physics, mathematics, chemistry, biology, human anatomy (fundamentals), basic hygiene, basic measurement and standardization, basic health and safety.
<b>4. Postrequisites:</b>	Work practice, pre-diploma practice, thesis design.
<b>5. Competencies:</b>	A. Know and understand the decisions of the Government of the Republic of Kazakhstan, aimed at improving working conditions, life conditions, reducing injuries, morbidity, improving efficiency and productivity. B. Acquisition of practical skills in mastering methods of identifying and analyzing, working conditions and occupational safety, predicting and preventing accidents and occupational diseases at work. C. The ability to compare, formulate conclusions, build their own arguments, express and justify their position to create healthy and safe working conditions for workers in the agro-industrial production.
<b>6. Author of course</b>	-
<b>7. General literature</b>	1 Конституция Республики Казахстан от 30 августа 1995 года. 2 Трудовой кодекс Республики Казахстан от 23 ноября 2015 года, №251 – III ЗРК. 3 Зотов Б.И., Курдюмов В.И. Безопасность жизнедеятельности на производстве.- 2-е изд,-Москва: Колос С, 2004. 4 Шкрабак В.С., Луковников А.В. Безопасность жизнедеятельности в сельскохозяйственном производстве. – Москва: Колос С, 2004. 5 Хакимжанов Т.Е. Охрана труда: Учебное пособие для вузов.-Алматы: Эверо, 2006. 6 Охрана труда в электроустановках. /Под редакцией Б.А. Князевского. – Москва: 1981. 7 Кукин П.П., Лапин В.Л., Пономарев Н.Л., Сердюк Н.И. Безопасность жизнедеятельности. Безопасность технологических процессов и производств (ОТ). – Москва: Высшая школа, 2002. 8 Атаманюк В.Г., Ширшев Л.Г., Акимов Н.И. Гражданская оборона. – Москва: Высшая школа, 1986. 9 Безопасность жизнедеятельности: Учебник для вузов/С.В. Белов, А.В. Ильницкая, А.Ф. Козьяков и др.; под общей редакцией С.В. Белова. – Москва: Высшая школа, 1999. 10 Журавлев В.П., Пушенко С.Л., Яковлев А.М. Защита населения и территорий в чрезвычайных ситуациях. Москва: Изд-во АСВ/1999.

11 Зайцев В.П. Охрана труда в животноводстве. - Москва: Высшая школа, 1998.
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<p><b>8. Content of the discipline</b> preparation of highly qualified specialists with deep theoretical and necessary practical knowledge and skills in the field of RT. Fostering in students a sense of responsibility for protecting the personal health of employees that graduates of the Kazakh Agrotechnical University named after Seyfullin will have to work with. Development of civil activity in this state important for the Republic of Kazakhstan business.</p>
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## Appendix 4 Description of elective disciplines

Basic information about the discipline:

<b>1. Basic information about the discipline:</b>	
Name of the discipline	<b>Chemistry</b>
<b>2. Number of credits</b>	<b>4</b>
<b>3. Prerequisites:</b>	School chemistry
<b>4. Postrequisites:</b>	-
<b>5. Competencies:</b>	<p>A. The task of studying chemistry is that students accumulate a specific amount of knowledge on the discipline and form on this basis a logical “chemical” thinking that provides the future specialist with free orientation in the information flow and the ability to solve problems related to knowledge of chemistry.</p> <p>B. The knowledge gained in chemistry helps the future specialist of the agricultural sector to solve the problems of increasing crop yields, which are related to the study of the composition of the soil, the definition of macro- and microelements in them.</p> <p>C. After the chemical experiments performed, the student should further generalize the results obtained, draw a conclusion from the obtained data.</p>
<b>6. Author of course</b>	
<b>7. General literature</b>	<ol style="list-style-type: none"> <li>1. Князев А.А., Смарыгин С.Н. Неорганическая химия. М.: ВШ, 2002.</li> <li>2. Хомченко Г.П., Цитович И.К. Неорганическая химия. М.: ВШ, 1987.</li> <li>3. Глинка Н.Л. Задачи и упражнения по общей химии. М.: ВШ, 1987.</li> <li>4. Хомченко Г.П. Практикум по общей и неорг.химии. М.: ВШ, 1980.</li> <li>5. Кудайбергенова С.Ж., Букеева А.Б. УМК по Химии, КАТУ, 2009</li> <li>6. Артеменко А.И. Органическая химия. Издательство: "Высшая школа", 2007</li> <li>8. Кудайбергенова С.Ж. Органическая химия. КАТУ, 2009.</li> <li>9. Кудайбергенова С.Ж., Букеева А.Б. УМК по органической химии. КАТУ, 2011, 2014</li> <li>10. Юровская М.К., Куркин А.В. Основы органической химии. 2012</li> </ol>
<b>8. Content of the discipline</b>	Expansion and deepening of knowledge in the course of chemistry, the study of the theoretical foundations of chemistry, the basic concept of chemistry, the fundamentals of qualitative analysis, the formation of the concept of the role of chemistry.
Name of the discipline	<b>Basics of wheeled and tracked vehicles</b>
<b>2. Number of credits</b>	<b>4</b>
<b>3. Prerequisites:</b>	Physics, mathematics
<b>4. Postrequisites:</b>	Fundamentals of precision farming, Theory and calculation of agricultural machinery, Operation of machine and tractor fleet, Patent law

<b>5. Competencies:</b>	<p>A. To know the general structure and principle of operation of tractors, agricultural machines and automobiles, their impact on the soil and the environment; core technologies and ways of doing agricultural work in accordance with agrotechnical and zootechnical requirements, requirements for the implementation of mechanized operations in plant growing and animal husbandry, information on the preparation of machines for operation and their adjustment and rules of operation, ensuring the most efficient use of technical means, methods of quality control of operations performed; principles of automation of agricultural production.</p> <p>B. To be able to use in professional activities means of mechanization, electrification and automation of agriculture and technology for the use of electric energy in agriculture.</p> <p>C. To have knowledge of the design of wheeled and tracked vehicles, to evaluate the quality of work and the efficiency of the work of grain harvesting machines and agricultural machines in general, the repair and operation of wheeled and tracked vehicles, the work of grain harvesting and agricultural machinery, and to organize and evaluate the quality of their work. to identify and solve problems related to the design of wheeled and tracked vehicles, to predict ways to improve the designs of wheeled and tracked vehicles and expand their functionality.</p>
<b>6. Author of course</b>	-
<b>7. General literature</b>	<p>В.А. Воробьёв «Механизация и автоматизация сельскохозяйственного производства» М. Колос С, 2004, 540 с.</p> <p>2. А.А. Зангиев «Практикум по эксплуатации машинно-тракторного парка» М. Колос С, 2006, 317</p> <p>1. В.А. Федотов «Технология производства продукции растениеводства», М. Колос С, 201</p>
<b>8. Content of the discipline</b>	Classification of tractors and cars, tillage machines and tools. The design of wheel and tracked machines and SHT, Requirements for tillage tools and machines, the appointment of tillage tools and agricultural machines. Agrotechnical requirements for tillage, sowing, care and harvesting of crops. Fodder technology and quality requirements. Methods for cleaning herbs on Sep. Hand tools and the first units for the mechanization of work on the preparation of feed. The development of machines for mowing plants. Adaptations and mechanisms for further work on the hay: - rake; pick-ups; scraps; stackers Machines for harvesting pressed hay.
Name of the discipline	<b>Электротехника</b>
<b>2. Number of credits</b>	<b>5</b>
<b>3. Prerequisites:</b>	Математика, физика
<b>4. Postrequisites:</b>	-
<b>5. Competencies:</b>	<p>A. Knowledge and understanding of electrical terms, principle of operation, characteristics and parameters of semiconductor devices, transistor amplifiers, pulse, logic and digital devices.</p> <p>B. The practical application of knowledge of the theoretical foundations of electrical engineering, electronics and microprocessor technology, the ability to understand technical devices, diagrams, tables, tests and graphs of electronic devices.</p> <p>C. Ability to make judgments on the choice of processes included in the electrical series, the evaluation of the choice of electrical circuits,</p>

	electronic devices and appliances. Have appropriate judgment skills on the physical essences of the phenomena accompanying the process of AC and DC electricity conversion. To be able to evaluate ideas to form conclusions.
<b>6. Author of course</b>	-
<b>7. General literature</b>	<ol style="list-style-type: none"> <li>1. Бессонов Л.А. Теоретические основы электротехники. Электрические цепи. – М.: Гардарики, 2006.-701 с.</li> <li>2. Бессонов Л.А. Теоретические основы электротехники. Электромагнитное поле. – М.: Гардарики, 2013.-317 с.</li> <li>3. Демирчян К.С., Нейман Л.Р., Коровин Н.В., Чечурин В.Л. Теоретические основы электротехники. т.1, т.2 – СПб: Питер, 2004.- (т.1) 463 с., (т.2) 576 с.</li> <li>4. Демирчян К.С., Нейман Л.Р., Коровин Н.В., Чечурин В.Л. Теоретические основы электротехники. т.3 – СПб: Питер, 2013.-377 с.</li> </ol>
<b>8. Content of the discipline</b>	In the study of the discipline provided fundamental training of the student in the field of general electrical engineering and electronics; Compliance with the disciplines of "mathematics", "physics" and "chemistry" and continuity in the use of computers in the educational process is observed, familiarity with the core problems of obtaining, transmitting and converting electrical energy, basic provisions on the electric drive and the modern electronic database used in automatic circuits management, skills and concepts of professional terminology, mandatory for the solid mastery of subsequent disciplines and the practical use of the knowledge gained in solving professional tasks.
Name of the discipline	<b>Electric cars and drives</b>
<b>2. Number of credits</b>	6
<b>3. Prerequisites:</b>	Descriptive geometry and engineering graphics, school physics course, mathematics
<b>4. Postrequisites:</b>	-
<b>5. Competencies:</b>	<p>A. To be able to connect electrical machines to the electrical network, conduct tests on electrical machines and electric drives, calculate the working and mechanical characteristics of electrical machines, select the type and power of electric motors for electric drives for various operating modes, and calculate electro-mechanical transients of electric drives.</p> <p>B. To know the device and principles of operation of electric machines of alternating and direct currents, the fields of application of electric machines of alternating and direct currents, the basics of the theory of starting, braking and regulating the angular frequency of rotation of alternating and direct current motors, control circuits for electric drives and starting protection equipment in steady and unstable modes.</p> <p>C. The ability to understand the schemes and elements of the main equipment, secondary circuits, protection devices and automation of power facilities in accordance with the terms of reference using standard design automation tools, the ability to carry out installation, adjustment, testing and commissioning of power and electrical equipment.</p>
<b>6. Author of course</b>	<b>Sarsikeev E.Zh.</b>
<b>7. General literature</b>	<ol style="list-style-type: none"> <li>1.Бессонов Л.А. Теоретические основы электротехники. Электрические цепи. – М.: Гардарики, 2006.-701 с.</li> <li>2. Бессонов Л.А. Теоретические основы электротехники. Электромагнитное поле. – М.: Гардарики, 2003.-317 с.</li> </ol>

	3 Прянишников В.А. Электроника: Полный курс лекций. - СПб.: КОРОНА принт, Бином Пресс, 2006. - 416 с.
<b>8. Content of the discipline</b>	Fundamentals of intellectual property law. Types of objects of intellectual rights. International treaties. The history of Kazakhstani legislation on the protection of intellectual property. The system of sources of legal regulation of relations related to the protection of intellectual property. International Patent System. World Intellectual Property Organization (WIPO). International conventions on intellectual property. the order of registration and filing an application for an invention and utility model, the procedure for consideration of applications in the patent office; types of decisions of the patent office on applications; the rights and benefits of inventors; concept and types of licenses, the economy of inventions. Drawing up and submission of the application. Drawing up claims and utility models. Preparation of an application for an invention, utility model and industrial design. Examination of the application. Issuance of a patent or certificate. Effects of patents and copyright certificates issued before the introduction of modern patent law. The rights of authors of inventions, utility models and industrial designs. Patent rights and their protection. Content of patent rights. Duties of the patent holder.
Name of the discipline	<b>Metal processing machines and welding equipment</b>
<b>2. Number of credits</b>	<b>9</b>
<b>3. Prerequisites:</b>	Electrical engineering. Electric cars and drives. Industrial microcontrollers. Pneumatic and hydraulic actuators. The system of numerical control.
<b>4. Postrequisites:</b>	Metalworking Modeling
<b>5. Competencies:</b>	A. Know the device and the principle of operation of CNC metalworking machines, the technological equipment of CNC machines, and features of the development of technological processing processes for CNC machines. B. Be able to read electrical diagrams of CNC machines. B. Have an idea about the device and the principles of operation of plasma and laser cutting machines, bending and welding machines and CNC presses. D. Have the skills to troubleshoot CNC machines.
<b>6. Author of course</b>	<b>Ajanov A.U., Grishin A.N.</b>
<b>7. General literature</b>	1. Станки с ЧПУ: устройство, программирование, инструментальное обеспечение и оснастка [Электронный ресурс]: учеб. пособие / А.А. Жолобов, Ж.А. Мрочек, А.В. Аверченков, М.В. Терехов, В.А. Шкаберин. – 2-е изд., стер. – М. : ФЛИНТА, 2014. – 355 с. 2. Применение станков лазерной резки: учебное пособие / П.Г. Мазеин, М.Р. Ахметов, С.Р. Сайфутдинов. – Челябинск: Издательский центр ЮУрГУ, 2011. – 106 с. 3. Плазменная резка: методические указания / Сост. А. Д. Лычагин, А. П. Соколов. – Томск: Изд-во Том. гос. архит.- строит. ун-та, 2012. – 24 с. 4. Юрий Федорович Подольский Сварочные работы. Электродуговая. Газовая. Холодная. Термитная. Контактная сварка.
<b>8. Content of the discipline</b>	Classification of CNC machines. Features of building control systems. Features of the device drives. Feedback devices. Devices automatic tool changer CNC machines.



	Technological equipment of CNC machines. Features of the development of technological processes of processing for CNC machines. Precision machining on CNC machines. Device and principles of operation of plasma and laser cutting machines, bending and welding machines and CNC presses. Electrical diagrams of CNC machines. Troubleshooting CNC machines.
Name of the discipline	<b>Metalworking Modeling</b>
<b>2. Number of credits</b>	5
<b>3. Prerequisites:</b>	Metalworking machines and welding equipment
<b>4. Postrequisites:</b>	Electrical engineering and electronics fundamentals
<b>5. Competencies:</b>	A. Know the basics of processing programming on CNC machines. B. Be able to develop processing programs. C. Have the skills to download the program management and processing of parts. B. Have a presentation of CAM-systems for the development of CAM-systems in the development of control programs of control programs
<b>6. Author of course</b>	<b>Ajanov A.U. / Askarova A.A.</b>
<b>7. General literature</b>	1. Станки с ЧПУ: устройство, программирование, инструментальное обеспечение и оснастка [Электронный ресурс]: учеб. пособие / А.А. Жолобов, Ж.А. Мрочек, А.В. Аверченков, М.В. Терехов, В.А. Шкаберин. – 2-е изд., стер. – М. : ФЛИНТА, 2014. – 355 с. 2. Руководство по эксплуатации для станков с УЧПУ Fanuc 31. Файл: Fanuc-manual-B-64484RU-2_03.
<b>8. Content of the discipline</b>	Coordinate system of CNC machine. Methods of programming processing on CNC machines. Encoding and recording control programs. The format of the control program. The order of development of the control program. Development of the scheme of movement of cutting tools. Programming processing on machining centers. Features of the use of CAM-systems in the development of control programs.
Name of the discipline	<b>Manipulators and robots</b>
<b>2. Number of credits</b>	5
<b>3. Prerequisites:</b>	Electrical engineering. Electric cars and drives. Industrial microcontrollers. Pneumatic and hydraulic actuators.
<b>4. Postrequisites:</b>	
<b>5. Competencies:</b>	A. Know the device lifting machines. B. Have an idea about the device and control systems of industrial robots.
<b>6. Author of course</b>	Ajanov A.U.
<b>7. General</b>	1. Александров М.П. Грузоподъемные машины: Учебник для вузов. - М.: Изд-во МГТУ им. Н.Э.Баумана. - Высшая школа, 2000. -

<b>literature</b>	552 с. 2. Шахворостов, С.А. Роботы в системах автоматизации [Электронный ресурс] : учеб. пособие/ С.А. Шахворостов. – Электрон. текстовые дан. (1 файл: 6 МБ). – Красноярск: Научно-инновационный центр, 2016. – 110 с.
<b>8. Content of the discipline</b>	Classification of lifting machines, manipulators and robots. Construction of lifting machines. Load gripping devices. Elements of cargo and traction devices. Stops and brakes. Mechanisms for lifting and changing the boom. Movement mechanisms. Rotation mechanisms. Device manipulators and industrial robots. Drives of industrial robots. Robot control systems.
Name of the discipline	<b>Mechanization of livestock</b>
<b>2. Number of credits</b>	5
<b>3. Prerequisites:</b>	Physics; maths; general chemistry; basic animal husbandry; descriptive geometry and engineering graphics; computer graphics; material mechanics; engineering mechanics; automated design of mechanisms; basic engineering; fluid mechanics, gases and GPM; bio-measurement and measuring systems; thermodynamics; electric cars and drive.
<b>4. Postrequisites:</b>	Machines and equipment for processing agricultural products; pre-diploma practice, thesis design.
<b>5. Competencies:</b>	Know the zootechnical requirements for the mechanization of livestock; progressive technologies of production and preparation of feed, as well as factors affecting their quality; complexes of machines and technological equipment for the mechanization of technological, auxiliary and transport processes in animal husbandry and the basis for the design of production technological lines in animal husbandry, poultry farming and fur farming. From a position of a systematic approach, be able to correctly address the issues of mechanization of production processes on farms of various forms of ownership, design and complete production flow lines, manage installation and commissioning works, and evaluate the quality and efficiency of livestock mechanization tools. Possess the ability to assess the quality of work and the efficiency of using livestock machinery, compare, build your own arguments, express your position on the choice of technologies and technological equipment, principal ways of developing the mechanization of livestock production, the main issues of the technological process.
<b>6. Author of course</b>	Zaichko Grigory Anatolevich
<b>7. General literature</b>	1. Кирсанов В.В., Мурусидзе Д.Н., Некрашевич В.Ф., Шевцов В.В., Филонов Р.Ф. Механизация и технология животноводства. – М.: ИНФРА-М, 2014. - 584 с. 2. Коба В.Г., Брагинец Н.В., Мурусидзе Д.Н., Некрашевич В.Ф. Механизация и технология производства продукции животноводства. – М.: Колос, 1999. 3. Казаровец Н.Ф., Прищепов М.А., Абдыров А.М., Нукешев С.О., Мустафин Ж.Ж. Технологии и техническое обеспечение производства продукции животноводства. – Астана: КАТУ им. С. Сейфуллина, 2013. – 475 с.
<b>8. Content of the</b>	Production and technological characteristics of livestock enterprises. Mechanization; water supply of farms and pastures, preparation and

<b>discipline</b>	distribution of fodder and means of feed storage mechanization, milking farm animals, primary processing, milk processing, technological processes in sheep farming, technological processes in poultry farming, removal, transportation and preparation of manure for use. Machines and equipment for the preparation of feed and feed mixtures and the system for the formation of microclimate parameters in livestock buildings. Operation of machinery and equipment for livestock farms and the organization of their technical services. Technological bases for designing livestock breeding enterprises.
Name of the discipline	<b>Design of mechanical assembly shops</b>
<b>2. Number of credits</b>	5
<b>3. Prerequisites:</b>	Mathematicians, Physicists, Chemistry, Materials Resistance, Standardization, Certification and Metrology, Materials Science and Technology of Structural Materials, Theoretical Mechanics, Computer Aided Design, Economic Theory.
<b>4. Postrequisites:</b>	Must know the basic provisions and initial materials for designing the methodology of integrated calculations, the number of repair and servicing impacts, as well as be able to do the calculation of the complexity of repairs and technical services, the calculation of the annual volume of work on the technological equipment of the technical service enterprise, the calculation of the main parameters of the technical service enterprise.
<b>5. Competencies:</b>	<ul style="list-style-type: none"> <li>- choose the best option for the development and placement of the network of technical service facilities in the region;</li> <li>- to substantiate the composition of the repair and servicing enterprise or division and calculate its main parameters;</li> <li>- to calculate the number of employees, the number of jobs and choose the necessary technological equipment.</li> </ul>
<b>6. Author of course</b>	Ajanov Aitukan Uvlovovich
<b>7. General literature</b>	<ol style="list-style-type: none"> <li>1. Проектирование предприятия технического сервиса.: Учебное пособие./М.М.Мишин, П.Н.Кузнецов – Мичуринск: Изд – во МичГАУ, 2008. – 213 с.</li> <li>2. Варнапов В.В. Технический сервис машин с-х назначения/В.В.Варнапов. – М.:Колос, 2000. – 252 с.</li> </ol>
<b>8. Content of the discipline</b>	Repair and maintenance AIC. Types of enterprises and their characteristics. Organization of jobs. Fundamentals of the organization of repair and maintenance base, ways to improve it. General provisions and procedure for designing TCP. Specialization, concentration and cooperation of enterprises. Site selection for the construction of the enterprise. Planning capacity utilization. The optimal allocation of production resources. Calculation of the main indicators of technological solutions. The main provisions and initial materials for design. Fundamentals of calculation of technical service enterprises. Design of auxiliary production units. Features of the reconstruction and technical re-equipment of the PTS
Name of the discipline	<b>Agreecultural machines.</b>
<b>2. Number of credits</b>	5

<b>3. Prerequisites:</b>	Basics of precision farming, Basics of agricultural machinery, mathematics, physics, engineering mechanics, Descriptive geometry and engineering graphics Automated design of mechanisms
<b>4. Postrequisites:</b>	Operation of the machine and tractor park, Patent law, CAD of technological machines and equipment, Mechanics of materials, Design Basics.
<b>5. Competencies:</b>	<p>A. To know the basics of the methodology for calculating the parameters of machines, theory and calculation of technological and working processes, methods for substantiating the parameters of operating modes and designing both the main and auxiliary working bodies of machines provided that the specified indicators of the quality of the technological processes are met.</p> <p>B. To be able to design and conduct the calculation of the working bodies and the main mechanisms of agricultural machinery, calculate the cost price of the designed machine and evaluate the technical and economic performance indicators. To develop and design rational concepts of machines and technological complexes in accordance with the requirements of the technical specifications.</p> <p>C. To possess the skills of research and design work and learn how to develop and design new working bodies of the machine using ICT and their technological work processes. the skills of theoretical and experimental research of developed working bodies and agricultural machines.</p>
<b>6. Author of course</b>	-
<b>7. General literature</b>	<p>1. Акимов А.П. Выбор оптимального режима работы рабочих органов- движителей. // Вопросы теории и эксплуатации машинно-тракторного парка. - Пермь, 1974, - с. 107. (Сб. научн. тр./ Пермский СХИ).</p> <p>2. Босой Е.С., Верняев О.В. Теория, конструкция и расчет сельскохозяйственных машин. М.: Машиностроение, 1978. - 320 с</p> <p>3. Листопад Г.Е. Сельскохозяйственные и мелиоративные машины. М.: Аг-ропромиздат, 1986. - 688</p> <p>4. Лурье А.Б. Расчет и конструирование сельскохозяйственных машин. Л.: Машиностроение, 1977. 528 с</p>
<b>8. Content of the discipline</b>	<p>Methods for determining the forces acting on the working bodies, Requirements for the quality of technological operations performed by working bodies, Operational requirements, solution of mathematical models. Principles of execution of technological operations by the working body. The importance of combining operations for resource-saving technologies and the efficiency of the machine. The laws governing the calculation of working bodies. The relationship of the working bodies in the functional diagram of the machine or tool. Determination of the number of working bodies and their location on the frame of the machine for high-quality execution of the technological process. The movement of the processed materials in accordance with the purpose of the machine, the sequence of location of the working bodies of the determination of the performance of the designed machine, Processes during the transition of material from one working body to another Their impact on the reliability of the technological process. Display of the functional structure on the diagram of the designed machine. Functional indicators of machines and units. Economic feasibility of modernization</p>
Name of the discipline	<b>Patent law</b>
<b>2. Number of credits</b>	<b>3</b>
<b>3. Prerequisites:</b>	Descriptive geometry and engineering graphics, Computer graphics, Electric machines and drives, Dynamic processes in biological

	systems, livestock mechanization, CAD technological machines and equipment, Basics of design, Fundamentals of agricultural machinery.
<b>4. Postrequisites:</b>	Diploma design
<b>5. Competencies:</b>	<p>A. To be able to analyze the technical situation and find new technical solutions; own methods of enhancing creative thinking; to make applications for alleged inventions and utility models and to correspond with the patent office; conduct a patent search in the performance of course and degree design, as well as in research work. to make a report on scientific, technical and patent research with conclusions and recommendations on patent purity and patent ability of intellectual property objects.</p> <p>B. Know the basics of professional creativity; methods of enhancing creative thinking; planning inventive work in the Republic of Kazakhstan; concepts of invention and utility model. Laws on the protection of intellectual industrial property objects, on liability for violation of the rights of owners of security certificates to intellectual industrial property objects.</p> <p>S. To have the ability to decide, compare, formulate, draw conclusions, build your own arguments, express your position on the main issues of engineering systems modeling, professional creativity and patent science.</p>
<b>6. Author of course</b>	-
<b>7. General literature</b>	<p>1. Проведение патентных исследований [Электронный ресурс] : справ. пособие / А. Д. Ишков, А.В. Степанов ; под ред. А. Д. Ишкова. 2013. 132 с. - ISBN 978-5-9765-1793-6</p> <p>2. Меры защиты интеллектуальной собственности: О.Н. Журавлева. - М.: Альфа-М, 2014. - 192 с.: 60x90 1/16.</p> <p>3. Агамагомедова, С. А. Основы административного механизма защиты прав на объекты интеллектуальной собственности: трансграничный аспект [Электронный ресурс] : С. А. Агамагомедова. - Пенза : Изд-во ПГУ, 2013.</p> <p>4. Международное частное право: Учебник / М.М. Богуславский. - 6-е изд., перераб. и доп. - М.: Норма, 2009.</p>
<b>8. Content of the discipline</b>	<p>Fundamentals of intellectual property law. Types of objects of intellectual rights. The history of Kazakhstani legislation on the protection of intellectual property. The system of sources of legal regulation of relations related to the protection of intellectual property. International conventions on intellectual property. the order of registration and filing an application for an invention and utility model, the procedure for consideration of applications in the patent office; types of decisions of the patent office on applications; the rights and benefits of inventors; concept and types of licenses, the economy of inventions. Drawing up and submission of the application. Drawing up claims and utility models, utility models and industrial designs. Issuance of a patent or certificate. Effects of patents and copyright certificates issued before the introduction of modern patent law. The rights of authors of inventions, utility models and industrial designs. Patent rights and their protection. Content of patent rights. Duties of the patent holder.</p>

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Dean of the Department

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