

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

Considered at the meeting
of the Academic Council
of the University
Protocol № 15 from «30» 05 2019 y.



CONFIRM

Chairman of the JSC "S.Seifullin
Kazakh Agrotechnical University"

A.Kurishbayev

05 2019 y.

EDUCATIONAL PROGRAM

«Agroengineering»

Code and classification of the field of education:

6B08 Agriculture and bioresources

Code and classification of training areas:

6B087- «Agroengineering»

Code in the International Standard Classification of Education:

6B08

Degree: Bachelor of Agriculture in the educational program «Agroengineering»

Form of training: full-time

Duration of study: 4 years

Nur-Sultan, 2019

The author's team:

1. Kaspakov Yesenaly Zhaksylykovich Ph.D., Associate Professor, Head of the Department KATU named after S.Seifullin.
2. Yeskhozhin Kayrat Jadygerovich Candidate of Technical Sciences, Associate Professor of the Department, S.Seifullin KATU.
3. Askarov Nurzhan Kuralovich senior lecturer of the department, KATU named after S. Seifullin.
4. Sauer I. And the general director of Agrofirma Rodina LLP
5. Prokop G. G. General director of Shakhterskoye LLP
6. Seitkazinov A. A. Executive Director of TNK Agrofirma LLP
7. Baimoldin E. K. Executive Director of JSC «KAZROSTSERVICE»
8. Ziyaev K. I. Deputy Chairman of JSC «Atameken Agro» AK
9. Sabelfeld V. K. director JSC «Agromashholding KZ»

The team of authors was approved by the order of JSC «KATU named after S.Seifullin» № 932-N dated 12.12.2018.

Educational program «Agroengineering»

Educational program «Agroengineering»

considered at the meeting of the Department «Agricultural machinery and Technology» protocol № 7 from «27» 01 2019 y.,

approved by the Council of the Technical Faculty

protocol № 9 «18» 02 2019 y.

Dean of the Technical
Faculty



Nukeshev S.O.

Head of the Department
«Agricultural Machinery
and Technology»



Kaspakov E.Zh

Content

№	Name of the component	Page
1.	Passport of the educational program	4
2.	General characteristics of the educational program	4
3.	Competence model (portrait) graduate	7
4.	The base of passing professional practices	10
5.	Structure of the educational program	11
6.	Appendix 1. Academic Calendar	14
7.	Appendix 2. Working curriculum	15
8.	Appendix 3. Description of the disciplines of compulsory and university components	19
9.	Appendix 4. Description of elective component disciplines	40

1 Passport of the educational program

The purpose of the educational program «Agroengineering» - preparation of competitive, fundamentally educated and harmoniously developed graduates for production, technological and design activities in the field of modern technologies of maintenance, storage, design of technological processes, repair and restoration of machine parts and agricultural machinery based on modern methods and technical means, automation of technological processes in the production, storage and processing of crop and livestock products, in compliance with the requirements of environmental protection and production safety, taking into account the needs of the regional labor market.

To achieve the EP goal , it is necessary:

1. To develop independent thinking, the ability to self-development and self-education for the development of new professional knowledge and skills, continuous professional self-improvement.

2. To provide conditions for strengthening citizenship, independence, initiative, culture of thinking, development of creative abilities, responsibility, communication taking into account the individual and personal characteristics of the student.

3. To form a positive motivation of students for educational activities in order to fulfill the social order of the society for the development and formation of in-demand personnel in the labor market, who possess the theoretical and practical basics of technological processes of crop production, robotics and information technology in agricultural areas.

4. Focusing on production and technological and design activities in the field of modern technologies of maintenance, storage, repair and restoration of machine parts and the design of technological processes of maintenance and repair of agricultural machinery based on modern methods and technical means.

5. Develop the ability to organizational and managerial activities related to the collective solution of complex engineering tasks on interdisciplinary topics, including in an international team.

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

The relevance of the educational program «Agroengineering» is designed on the basis of a modular system of studying disciplines and consists of forming general cultural and professional competencies, a qualified specialist with a higher technical education.

The educational program was developed jointly with university professors, heads of leading agro-industrial and manufacturing enterprises and professional standards agreed with the Dublin descriptors and the European Qualifications Framework, based on the State Mandatory Standard of Higher Education approved by the Order of the Minister of Education and Science of the Republic of

Kazakhstan dated October 31, 2018 (№. 604) and the Standard curriculum of the specialty in the field of training 6B085-Agroengineering.

The educational program includes theoretical training of 240 credits and practical training of 21 credits. At the same time, the student must master 56 credits or 1680 hours in general education disciplines, 112 credits or 3360 hours in basic disciplines and 60 hours in specialized disciplines.

A feature of the educational program is the consolidation of theoretical knowledge, on the basis of KATU, a high-quality professional infrastructure (educational resources) has been created, necessary for the implementation of OP:

- Scientific and experimental campus of the University (with an area of 12,000 hectares)
- Kazakh-Belarusian Personnel Training and Retraining Center;
- Kazakh-Chinese Agricultural Mechanization Center;
- Kazakh-German Precision Farming Center «Class»;
- Precision Farming Center of the company «John Deer»;
- Laboratory of 3-D visualization and modeling;
- Pavilion of tractors, combines and agricultural machinery;
- Animal husbandry mechanization laboratories;
- GIS Technology Center;
- Design Bureau;
- Workshop with metal cutting and welding equipment;
- Robotics Laboratory;
- Laboratory of fuel and lubricants;
- Reading and computer rooms.

In addition, teaching staff in the educational process, together with bachelors, takes an active part in the implementation of the National Program for the Digitalization of agriculture.

The uniqueness of the EP is; within the framework of this educational program, students who speak foreign languages (English, German, French, etc.) have the opportunity to go to semester studies at leading universities in Europe, the USA and the EAEU. Every year about 25 students of this educational program travel on academic mobility for semester training and internship in various programs (International Credit Mobility; LOGO - Landwirtschaft und Oekologisches Gleichgewicht mit Osteuropa, etc.) to the leading universities of the world, such as the University of Angers (Universite d'Angers, France), the University of Applied Sciences Weienstephan-Triesdorf (Germany), the Belarusian State Agrarian Technical University (Belarus), etc., etc.

The availability of a modern material and technical base and qualified teaching staff allows not only to gain good knowledge, but also to engage in scientific research in order to develop intellectual growth and further admission to master's and doctoral studies at the department.

Practice-oriented training is being implemented (obtaining working professions at junior courses: tractor driver-machinist of category «A», «B», «D»;

car mechanic, electric welder, etc.), students also train in the summer as part of labor detachments at leading agricultural and industrial enterprises.

Students of this educational program can simultaneously undergo military training at the military department of the university, which is an attractive offer especially for the male half. Students acquire a military accounting specialty in three areas: VUS-261001 «Application of automotive units of units and formations of combined-arms purpose», VUS-021000 «Combat use of combined-arms units, units and formations», VUS-590200 «Topographic works».

Students also have access to a social package of services and goods, such as accommodation in student dormitories, purchase of goods from a social pharmacy and a grocery store, meals in canteens located on the main campus of the university, individual unlimited access to the electronic library system and electronic information and educational environment of the organization from anywhere via the Internet, containing publications on the main subjects studied and educational and methodical literature formed in agreement with the copyright holders.

The competitive advantages of this educational program are the following:

- highly qualified and relatively young teaching staff (about 70% settled down);
- training is conducted in three languages (state, Russian and English);
- dual training technology has been introduced (some classes are held at the factory);
- Programs have been widely implemented: international credit mobility, external and internal mobility of the Ministry of Education and Science of the Republic of Kazakhstan.
- close communication with employers and graduates of the educational program has been established;
- Students are provided with the opportunity to master the disciplines of their choice;
- 100% provision of a hostel for living during training;
- the presence of a military department and a medical center;
- availability of a social pharmacy and a store for students.

The main stakeholders of the E+P are:

1. Teaching staff, doctoral students, parents, persons equated to them and relatives of doctoral students;
2. Ministry of Agriculture of the Republic of Kazakhstan – Management of organic products and technical regulation;
3. Enterprises of the food and processing industry;
4. Research institutes and research and production centers;
5. Consulting companies for education and training;
6. Farms and peasant farms;
7. Plants, factories and plants;
8. Patent Office.

3 Competence model (portrait) graduate

3.1 Areas of professional activity

The sphere of professional activity of the bachelor of the educational program «Agroengineering» are various agricultural formations (firms, enterprises, farms), design and engineering organizations, machine-technological stations (MTS), social and entrepreneurial complexes (SEC), processing and supplying enterprises and factories, organizations of technical service of agricultural machinery, fleets, district, regional and republic agricultural management bodies (civil service).

3.2 Types of professional activity

Graduates of the Agroengineering educational program can hold positions of engineers, mechanics, managers, designers, leading specialists of agricultural management bodies, various agricultural formations, machine-technological stations, service and dealer centers of equipment manufacturing plants, logistics systems, social and entrepreneurial complexes, processing and supplying enterprises and factories, design and design organizations, organizations of technical operation of transport and technological machines, fleets, district, regional and republican agricultural management bodies.

The graduate of the educational program «Agroengineering» is focused on the following learning outcomes:

- perform calculation and technological work to substantiate the system of machinery and equipment for the production, storage and processing of agricultural products;
- to carry out installation, adjustment and operation, maintenance, repair of technological and electrical equipment;
- to monitor compliance with technological discipline and proper operation of machines and technological equipment;
- develop projects of technical service enterprises in agriculture and organize independent and collective research work, search for innovative solutions in the engineering and technical field of agriculture;
- the ability and willingness to organize high-performance use and reliable operation of complex technical systems for the production, storage, transportation and primary processing of crop and livestock products at the enterprises of the agro-industrial complex (hereinafter referred to as the agro-industrial complex);
- analyze the production activities of enterprises, take measures to improve production efficiency, reduce the consumption of material and energy resources and increase labor productivity using modern information technologies;

3.3 General education competencies

Graduates who have mastered the educational program «Agroengineering» possess the following general educational competencies:

- understand the content of any information, express thoughts, feelings, opinions in written and oral forms (listening, speaking, reading and writing);
- develop and apply mathematical ways of thinking (logic, spatial thinking, etc.) in their professional activities;
- the ability to use the basics of natural science knowledge and methodology to identify production problems and solve professional tasks;
- the ability to independently acquire with the help of information technology and use in practice and confidently use modern information technologies for work, leisure and communication;
- have theoretical and practical knowledge, the competitiveness of graduates in the labor market and the fastest possible employment in the specialty, as well as further professional growth;
- possess the basics of economic knowledge, have scientific ideas about management, marketing, finance; know and understand the goals and objectives of state regulation of the economy; plan and manage projects to achieve professional goals;
- to know the traditions and culture of the peoples of Kazakhstan; to be aware of the attitudes of tolerant behavior of the individual and the prevention of domestic racism, xenophobia, extremism; to possess high spiritual qualities.

3.4 Basic competencies

A graduate of the educational program «Agroengineering» must be competent:

- in matters of labor legislation, labor protection and environmental safety standards and regulations, industrial sanitation and fire protection, the use of legislative and regulatory acts of the Republic of Kazakhstan in force in agriculture;
- in the application of new energy- and resource-saving technologies in the field of mechanization, electrification of agriculture and processing enterprises;
- in the management of agricultural machinery, adjustment of technological equipment of enterprises for the production and processing of products of the industry and agrotechnical service;
- in the use of computer technology in the development of projects of agricultural enterprises and service centers;
- in the organization of complex mechanization in agriculture and processing enterprises.

A bachelor in the field of training «Agroengineering» must solve the following professional tasks in accordance with the types of professional activity:

- soil fertility management of precision farming technology;

- intensive resource-saving technologies of cultivation of agricultural crops;
- adaptation of agricultural production to meteorological risks.

3.5 Professional competencies

Bachelors of «Agroengineering» should possess the following key competencies:

- be able to carry out maintenance and repair of machinery and equipment using the latest diagnostic methods and tools, technical and technological modernization of agricultural production;

- be able to control the production and processing of agricultural products and assess the conditions and consequences of organizational and managerial decisions;

- be able to organize work in the complex mechanization of crop and livestock enterprises and the use of new energy and resource-saving technologies;

- assess the economic and social conditions of entrepreneurial activity and develop business plans for the creation and development of new organizations in the areas of activity;

- be able to design an organizational structure, to carry out the distribution of powers and responsibilities based on their delegation;

- participate in the development of the human resource management strategy of organizations, plan and implement activities aimed at its implementation and form their own judgments on the development of modern technologies;

- be able to use the laws and methods of mathematics, natural sciences, humanities and economics in solving standard and non-standard professional tasks and possess various methods of conducting scientific research and developing academic writing in the field of agricultural mechanization;

- be able to analyze and calculate in the development of design and estimate documentation for the construction of agrotechnical service enterprises, in scientific research and design developments of working bodies and machine components, drawing up technological maps for the production, storage and processing of agricultural products.

4 The base of passing professional practices

Professional practice is an integral part of bachelor's degree preparation and is aimed at consolidating theoretical knowledge gained during university studies, acquiring practical skills and competencies, as well as mastering best practices. The completion of educational, industrial and pre-graduate practices provided for in the educational program is mandatory for the student.

The total number of credits in practice is 21 credits, in academic hours - 630.

The main types of professional practice are; introductory practice, educational practice with theoretical training, industrial practice, pre-graduate practice.

The purpose of the training practice is to acquire primary professional competencies, including the consolidation and deepening of theoretical knowledge gained in the course of training, obtaining the first skills of the processes of mechanization of agricultural machinery. The educational practice is conducted on the basis of the Scientific and Experimental campus of the University using the latest agricultural equipment, which are objects of future professional activity.

The purpose of professional practice is to consolidate the theoretical knowledge gained and acquire practical skills and experience to identify and formulate the professional competencies of a future specialist.

The pre-graduate practice is aimed at developing practical skills in the development of technological maps for the cultivation and storage of agricultural products, familiarization with the forms of work and the study of the activities of a particular enterprise; acquisition of skills in organizing the work of structural units; mastering methods of quality control of products; acquisition of practical experience of the technologist of the enterprise, as well as preparation for the performance of final qualifying work in food production enterprises.

The largest employers and objects of professional practice for students of the educational program are; Scientific and production centers of grain farming named after A.I. Baraev, LLP «North Kazakhstan Agricultural Experimental Station», LLP «Baiserke-Agro», JSC «Atameken-Agro», LLP «Agrocenter Astana», LLP «Agrofirma "Rodina"», Eurasia Group LLP, Akkol branch of KazNIIMESH LLP, Akmola Phoenix LLP, Izhevsk PC, TNK LLP, Shakhterskoye LLP, STAGRO LLP, etc.

5 Structure of the educational program

№	Name of cycles and disciplines	Total labor intensity	
		in academic hours	in academic credits
1	2	3	4
1	Cycle of general education disciplines (GED)	1680	56
1)	Required component	1530	51
	Modern history of Kazakhstan	150	5
	Philosophy	150	5
	Foreign language	300	10
	Kazakh (Russian) language	300	10
	Information and Communication Technologies (in English)	150	5
	Module of socio-political knowledge (sociology, political science, cultural studies, psychology)	240	8
	Physical Culture	240	8
2)	Component of choice	150	5
	Occupational safety and the basics of life safety	150	5
	Fundamentals of Economics and Law	150	5
2	Cycle of basic disciplines (BD)	3360	112
	Professionally-oriented foreign language	90	3
	Electric machines and drives	120	4
	Heat engineering	120	4
	Fundamentals of animal husbandry	90	3
	Fundamentals of agronomy	90	3
	Fundamentals of precision farming	90	3
	Automated design of mechanisms	120	4
	Agricultural machines	120	4
	Engineering mechanics (statics, dynamics)	150	5
	Mechanics of materials	150	5
	Design basics	120	4
	Fundamentals of robotics	120	4
	Patent law	120	4
	Production management	90	3
	Fundamentals of design and construction of agricultural machinery and equipment	150	5
	Hydropneumatic machines and drives	90	3
	Mechanization of harvesting and storage of agricultural products	120	4
	Materials in engineering design	120	4

	Mathematics	270	9
	Chemistry	120	4
	Physics	150	5
	Descriptive geometry and engineering graphics	180	6
	Automating the execution of drawings	120	4
	Fundamentals of the design of wheeled and tracked vehicles	120	4
	Measuring systems	120	4
	Technology of structural materials	120	4
	Failure analysis and repair of machines	120	4
1)	University component	1650	55
1	Mathematics	270	9
2	Chemistry	120	4
3	Physics	150	5
4	Descriptive geometry and engineering graphics	180	6
5	Fundamentals of the design of wheeled and tracked vehicles	120	4
6	Materials in engineering design	120	4
7	Fundamentals of precision farming	120	4
8	Engineering mechanics (statics, dynamics)	150	5
9	Mechanics of materials	150	5
10	Fundamentals of design and construction of agricultural machinery and equipment	150	5
11	Mechanization of harvesting and storage of agricultural products	120	4
2)	Component of choice	1710	at least 57
1	Computer graphics/ CAD of technological machines and equipment	120	4
2	Foreign language	180	6
3	Professionally-oriented foreign language	60	2
4			
5	Electric machines and drives/ Electrical Engineering and Fundamentals of Electronics	90	3
6	Heat engineering /Fundamentals of energy saving	120	4
7	Failure analysis and repair of machines/ Reliability and repair of machines	120	4

8	Measuring systems/ Interchangeability, standardization and technical measurements	120	4
9	Fundamentals of animal husbandry	120	4
10	Fundamentals of Agronomy / Fundamentals of crop production	120	4
11	Design basics	120	4
12	Fundamentals of Robotics / CNC Systems/Robotic machines and equipment in animal husbandry	120	4
13	Patent legislation / Fundamentals of Patenting and professional creativity	120	4
14	Automated design of mechanisms	120	4
15	Production management/ Engineering economics /Management and operation of agricultural equipment.	120	4
3	Cycle of profile disciplines (PD)	1800	60
	Tractors and cars	150	5
	Agrotechnological machines	120	4
	Agricultural machines	180	6
	Operation of the machine and tractor fleet	270	9
	Fundamentals of the theory and calculation of the internal combustion engine/internal combustion engine and promising alternatives	120	4
	Fuel, lubricants and technical fluids /Pneumatic and hydraulic drives	90	3
	Technical service in agriculture / TMO for primary processing-storage of animal products	90	3
	Mechanization of animal husbandry /Technologies and means of mechanization of animal husbandry	150	5
1)	University component	1800	60
1	Tractors and cars	150	5
2	Agrotechnological machines	120	4
3	Agricultural machines	180	6
4	Operation of the machine and tractor fleet	270	9
2)	Component of choice		
1	Fundamentals of the theory and calculation of the internal combustion engine/ internal combustion engine and promising alternatives	120	4
2	Fuel, lubricants and technical fluids / Pneumatic and hydraulic drives	90	3
3	Technical service in agriculture / TMO for primary processing-storage of animal products	90	3
4	Mechanization of animal husbandry / Technologies and means of mechanization of animal husbandry	150	5

Additional types of training			
1	Educational practice	60	2
2	Production practice	510	17
3	Pre-graduate practice	60	2
1)	Component of choice: Military training		
5	Final certification	360	12
1)	Writing and defending a thesis (project) or preparing and passing a comprehensive exam	360	12
	Итого	7200	240

The training period is 4 years

6. Updating of the EP, on the basis of Protocol № 9 of 26.05.2019, the MS of the University made adjustments to the competence of the EP;

1. The student's competencies formed as a result of mastering the discipline «Professional oriented foreign language»:

- Know the technique of preparing for writing (free writing, brainstorming), making a plan

-to form the skills of written scientific communication and the ability to express ideas in writing and to argue them;

-teach methods of structuring academic papers;

-prepare for writing essays, articles and annotations the design of term papers;

- to form the ability to freely and argumentatively express thoughts on a scientific problem in the field of agricultural mechanization;

- Be able to analyze and evaluate written works of various levels, including both their own and other people's texts.

Appendix 1. Academic Calendar***

Appendix 2. Working Curriculum

№ пп	Наименование модуля	Цикл дисциплины	Компонент дисциплины	Код дисциплины	Наименование дисциплины	Кредиты ECTS	Виды контроля	Объем в часах						Распределение объема учебных часов по семестрам/триместрам/кварталам																													
								Всего	Аудиторные				Внеаудиторные		1	2	3	4	5	6	7	8	9	10	11	12																	
									Лекции	Практические занятия	Лабораторные занятия	Другое (практика)	СРО П	СРО																													
1	Общеобразовательный	ООД	ВК	KRYa	Казахский (русский) язык	10	эк.	300		100			40	160	3	3	4																										
2		ООД	ВК	Yа1101	Иностранный язык	10	эк.	300		100			40	160	4	3	3																										
5		ООД	ВК	SIKG	Современная история Казахстана	5	ГЭ	150	20	30			20	80		5																											
6		ООД	ВК	SIKG	Политология и социология	4	эк.	120	20	20			16	64			4																										
7		ООД	ВК	PS	Философия	5	эк.	150	20	30			20	80							5																						
8		ООД	ВК	ИКТ	Информационно-коммуникационные технологии	5	эк.	150	20		30		20	80	5																												
9		ООД	ВК	PS-KY	Культурология и психология	4	эк.	120	20	20			16	64							4																						
		Итого ООД ВК					43	7	1290	110	290	30		212	688																												
10		ООД	КВ	ОЕР	Основы экономики и права																																						
	ООД	КВ	ОТБГ	Охрана труда и безопасность жизнедеятельности	5	эк.	150	20	30			20	80							5																							
	Итого ООД КВ					5	1	150	20	30			20	80																													

		Итого ООД ВК / КВ				56	8	1680	130	560	30		232	768													
11	Электротехнический	БД	КВ	ESS	Электрические машины и приводы	4	эк.	120	20	20			16	64							4						
		БД	КВ	EOE	Электротехника и основы электроники																						
12		БД	КВ	ТТ	Теплотехника	4	эк.	120	20	20			16	64								4					
		БД	КВ	ОЕР	Основы энергосбережения																						
13	Сельскохозяйственный	БД	КВ	POIYa22 01	Профессионально-ориентированный иностранный язык	3	эк.	90		30			12	48								3					
13		БД	КВ	ShM	Сельскохозяйственные машины	4	эк.	120	20	20			16	64								4					
15		БД	КВ	GPMP 2203	Гидравлические и пневматические машины и приводы	3	эк.	90	10	20			12	48									3				
16		БД	КВ	OG	Основы животноводства	3	эк.	90	10	20			12	48										3			
		БД	КВ	TPPRZh	Технология производство продуктов растениеводства и животноводства																						
17		БД	КВ	OA	Основы агрономии	3	эк.	90	10	20			12	48										3			
		БД	КВ	OR	Основы растениеводства																						
18		БД	ВК	OTZ	Основы точного земледелия	4	эк.	120	20		20			16	64										4		
19		Расчетно - проектный	БД	КВ	APM	Автоматизированное проектирование механизмов	4	эк.	120	20	20			16	64									4			

		БД	КВ	КG3DM	Компьютерная графика и 3D моделирование																				
20		БД	ВК	IM	Инженерная механика (статика, динамика)	5	эк.	150	20		30		20	80									5		
21		БД	ВК	MM	Механика материалов	5	эк.	150	20		30		20	80									5		
22		БД	ВК	OPCShM	Основы проектирование и конструирование сельскохозяйственных машин	5	эк.	150	20	10	20		20	80										5	
23		БД	КВ	OK	Основы конструирования	4	кп/эк.	120	20		20		16	64										4	
		БД	КВ	DM	Детали машин																				
24		ПД	ВК	TRSHM	Теория и расчет сельскохозяйственных машин	5	кп/эк.	150	20	10	20		20	80							5				
25		ПД	КВ	OTRDV S	Основы теории и расчета двигателя внутреннего сгорания	5	эк.	150	20	20	10		20	80										5	
		ПД	КВ	DVSPA	ДВС и перспективные альтернативы																				
26		ПД	ВК	EMTP	Эксплуатация машинно-тракторного парка	5	кп/эк.	150	20	10	20		20	80										5	
	Организация производства	БД	КВ	PM	Производственный менеджмент	3	эк.	90	10	20			12	48										3	
		БД	КВ	IE	Инженерная экономика																				
27		БД	КВ	PZ	Патентное законодательство	4	эк.	120	20	20			16	64											4
		БД	КВ	OPiPT	Основы патентоведения и профессионального																				

		БД	КВ	BSTI	Взаимозаменяемость, стандартизация и технические измерения																						
40		БД	ВК	MDPBS	Материалы в инженерном проектировании (Технология конструкционных материалов)	4	эк.	120	20	20		16	64							4							
41		ПД	КВ	TSMG	Топливо, смазочные материалы и технические жидкости	4	эк.	120	20		20	16	64								4						
		ПД	КВ	STSDSh T	Современные технологии и средства диагностирования сельскохозяйственной техники																						
42	Эксплуатационный	ПД	ВК	ТА	Тракторы и автомобили	5	кп/ эк	150	20	20	10	20	80													5	
43		ПД	ВК	АтМ	Механизация животноводства	5	кп/ эк	150	20	20	10	20	80													5	
44		ПД	ВК	ЕМТР	Эксплуатация машинно-тракторного парка	5		150	20	30		20	80													5	
45		ПД	КВ	TSSH	Технический сервис в СХ	5	эк.	150	20	20	10	20	80														5
		ПД	КВ		Проектирование и организация технического сервиса																						
46		ПД	КВ	АтМ	Агротехнологические машины	4	эк.	120	20	10	10		16	64												4	
		ПД	КВ	ТОППСП	Технологии и оборудование по переработке сельскохозяйственной продукции																						
47		БД	КВ	AORM	Анализ отказов и ремонт машин	4	эк.	120	20	20			16	64													4

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

1. Basic information about the discipline:	
Name of the discipline	Kazakh (Russian) language
2. Number of credits	10
3. Prerequisites:	School course Kazakh and Russian
4. Post-requirements:	Professional Kazakh (Russian) language
5. Competencies:	Possess basic communication skills in Kazakh/Russian: to understand, express, interpret concepts, thoughts, feelings, facts and opinions both orally and in writing (listening, speaking, reading, writing) in an appropriate range of social and cultural contexts. Competently draw up business documentation and conduct business correspondence. Have an idea of working with a scientific text.
6. Author of the course	-
7. Basic literature	<ol style="list-style-type: none"> 1. Abduova B.S., Asanova U.O. Kazakh tili: Orys tildi toptarga arналған oku kuraly. -Astana, 2017. -282b. 2. Aitbayeva B.M. Kazakh tili (B1 degeii) okulygy. – Kagandy, 2014. – 205b. 3. Bozbayeva-Hung A.T., Balabekov A.K., Dosmambetova G.K., Salikhova B.O., Khazimova A.Zh. Kazakh tili: orta degeige arналған okulyk. Ul'tyik testileu ortalygy. Astana: 2017. 4. Russian: a textbook for students of Kazakh departments of universities (bachelor's degree) / edited by K.K. Akhmedyarov, – Almaty: Kazakh University, 2008. 5. Mukhamadiev H.S. Handbook of scientific style of speech. Russian language. – Almaty: Kazakh Universities, 2009. 6. Fedosyuk M.Yu., Nikolina N.A. Russian for non-philology students: a textbook. – M2000. – 256 p.
8. The content of the discipline.	Language and its main functions. Speech: types and forms of speech. Functional and 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 division of the text: The structure and meaning of the text. Communicative tasks of the text. The role of the sentence in the text. Text-forming functions of the sentence. Microtheme of the text. The progression of the text as an increase in its volume and amount of information. Compression as the main type of scientific text processing. The plan and its preparation in the scientific field. Types of plans. The thesis of a scientific text. Compositional and semantic structure of a scientific text. Taking notes of a scientific text. Annotation of scientific texts. Types of annotations. Referencing of scientific texts. Types of abstracts. Reviewing a scientific text. The structure of the scientific review. Review of scientific work. Summary-conclusions. Culture of oral speech (general concept). Norms of speech culture (orthographic, lexical, morphological, syntactic norms). The culture of speech behavior in the professional sphere. The qualities of good (exemplary) speech. Improving the ethics of speech behavior (speech etiquette, business etiquette). Types of business communication (business conversation, telephone conversations)

1. Basic information about the discipline:	
Name of the discipline	Foreign language
2. Number of credits	10
3. Prerequisites:	School course Kazakh and Russian
4. Post-requirements:	Professional foreign language, English (optional)
5. Competencies:	<p>According to the results of the development of the program , the student has the following competencies:</p> <ol style="list-style-type: none"> 1) systematizes the conceptual foundations of understanding the communicative intentions of the partner, the authors of texts at this level; 2) compares and selects forms and types of speech/communication corresponding to the communicative intention with a logical construction adequate to the type of speech; 3) adequately expresses his own communicative intentions with the correct selection and appropriate use of appropriate language tools, taking into account their compliance with the socio-cultural norms of the language being studied; 4) classifies the levels of use of real facts, references to authoritative opinion; speech behavior is communicatively and cognitively justified; 5) identifies patterns of development of a foreign language, paying attention to the study of stylistic originality; 6) knows the techniques of linguistic description and analysis of the causes and consequences of events in texts of a scientific and social nature; 7) expresses in a foreign language possible solutions to modern problems based on the use of reasoned information; 8) evidently uses language material with reasoned language means sufficient for this level, corrects mistakes in a timely manner and independently with 75% of error-free statements ; 9) knows the strategy and tactics of constructing a communicative act, correctly intonation forms speech, relying on lexical sufficiency within the framework of speech topics and grammatical correctness.
6. Author of the course	Department of Foreign Languages
7. Basic literature	<ol style="list-style-type: none"> 1 McMillan Dictionary of Contemporary English. - McMillan, 2010. 2 R. Harrison, S. Philpot, L. Curnick. New Headway Academic Skills. Reading, Writing, and Study Skills. Oxford University Press. - 2009. 3. ArlineBurgmeier, Lawrence J. Zwier, Bruce Rubin, Kent Richmond. Inside Reading. The Academic Word List in Context. Pre-Intermediate to Advanced. Oxford. - 2009. 4. Murphy Raymond. Essential Grammar in Use. Intermediate. Cambridge University Press. – 2010. 5. British National Corpus: http://www.natcorp.ox.ac.uk

6. The Corpus of Contemporary American English (COCA): <http://www.americancorpus.com>.

8. The content of the discipline. Level A1-B1 (1 semester) 1 Greeting. My family. My house. Food. Purchase. Man and his health. Sports in a person's life. Leisure. Native country and THIS. Daily schedule. World map. Environmental protection.. My education. Famous universities of the world. Modern studies and modern gadgets.

Level A1-B1(2sester) Family in modern society. Family budget. Types of housing. Modern design.

Organization of recreation, Travel, travel agency, Spiritual revival. State and political structure. State and political structure. Holidays. The education system in Kazakhstan. The education system in SIYA. Future profession. Advantages and disadvantages of various professions. The relevance of the chosen profession.

Level A2-B1 (1 semester) 1. Me and my family. A modern young family. Relations between representatives of different generations. My home is my fortress. Man and his health. Sports in a person's life. Leisure and hobbies Native country and THIS. Native country and the country/countries of the language being studied, geographical location, climate, weather, capital. Sights of the cities of Kazakhstan and the country of the studied language. Customs and Traditions. Traditions and customs of the country of the language being studied. Cultural and national holidays. My education. Education. Future profession.

Level A2-B1 (1 semester) Family in modern society, the budget of a young family and the main expenditure items. Housing construction; types of housing

1. Modern design; architecture; Cultural and historical background of national symbols of countries. Political structure, branches of the economy.

National, state, professional and other holidays. Historical significance of these holidays

2. The education system in the Republic of Kazakhstan and in SIYA. The choice of university, specialty, enrollment standards, educational trajectory, individual curriculum. Future profession, professional competence. The demand for selected professions in the labor market.

Level B1-B2 (1 Semester) Family in modern society. The budget of a young family. Types of housing (urban, rural house, apartment).

1. Modern design. Vacation planning. Tourism; recreation and recreation; entertainment. Spiritual rebirth (Rukhanizhangyru)

2. Cultural and historical background of the national symbols of the Republic of Kazakhstan and SIYA. The state structure, legal institutions of the Republic of Kazakhstan and SIYA. Branches of the economy of the Republic of Kazakhstan and SIYA. Kazakhstan: Festive rituals, cultural projects.

Traditions and customs. These are: Festive rituals, cultural projects. Traditions and customs.

Level B1B2 (2nd Semester) Man and Nature. Environmental problems. Scientific and technological progress. Scientific and technological progress.

1. World mass media. Advertisement. Art, music, literature of the Republic of Kazakhstan and the country of the studied language. Outstanding cultural figures of the country of the studied language. The education system in the Republic of Kazakhstan. The education system in the country of the language being studied. Choosing a university.

2. Professional competencies. Advantages and disadvantages of the chosen profession. The demand for the chosen profession in the labor market.3.

1. Basic information about the discipline:	
Name of the discipline	Modern history of Kazakhstan
2. Number of credits	5
3. Prerequisites:	School basic knowledge
4. Post-requirements:	cultural studies, political science, philosophy, sociology
5. Competencies:	<p>Be able to demonstrate knowledge of the main periods of the formation of independent Kazakh statehood; correlate phenomena and events of the historical past with the general paradigm of the world-historical development of human society through critical analysis.</p> <p>Master the techniques of historical description and analysis of the causes and consequences of events in the modern history of Kazakhstan; offer a possible solution to modern problems based on the analysis of the historical past and reasoned information.</p> <p>The ability to analyze the security and significance of the modern Kazakh model of development; to determine 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; to form their own civic position on the priorities of mutual understanding, tolerance and democratic values of modern society.</p>
6. Author of the course	Department of History of Kazakhstan
7. Basic literature	<ol style="list-style-type: none"> 1. Modern history of Kazakhstan [Text] : textbook for students of non-historical spec. (bachelor's degree) higher. studies. institutions / B. G. Ayagan [et al.]. ; ed. B. G. Ayagan ; Institute of History of the State of the Ministry of Education and Science of the Republic of Kazakhstan. – Almaty: Rarity, 2010, 2. Aminov T.M. Modern history of Kazakhstan. Study guide. Almaty., 2017 3. Nazarbayev N.A. The Era of independence.- Almaty: KAZak-parat, 2017. 4. Nurtazina R.A. National security of the Republic of Kazakhstan: studies.stipend.- Almaty: Bastau, 2014 5. Ertlesova Zh . Reforms of the 90s: interviews with key participants of the events. - Almaty, Atamura.- 2016.
8. Content of the discipline:	<p>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 – the basis of the well-being of society; Ethnodemographic processes and strengthening of interethnic harmony; Socio-political prospects for development 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 is a personality in history; The formation of a nation of a unified future.</p>

1. Basic information about the discipline:	
Name of the discipline	Political Science and Sociology
2. Number of credits	3
3. Prerequisites:	Modern history of Kazakhstan, school course, Geography, Law
4. Post-requirements:	-
5. Competencies:	Formation of the ability to critically understand the system of interpersonal relations in society, awareness of the nature of society, the system of its groups, institutions. The formation of a socio-humanitarian worldview 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.
6. Author of the course	Department of Philosophy
7. Basic literature	1. N.A. Nazarbayev "A look into the future: modernization of public consciousness".-Astana, 2017 2. Biekenov K.U., Biekenova S.K., Kenzhakimova G.A. "Sociology: Textbook". – Almaty: Evero, 2016. - 584s. 3. "Sociology. Fundamentals of General Theory: Textbook" / Edited by G.V. Osipov, L.N. Moskvichev. - 2nd ed., ispr. and add. - M.: Norm, 2015. - 912 p. 4. Macionis J. Society: The Basics. Pearson, 2016. (Masionis Jay. Sousheti: Ze Baziks. Parson, 2016.) 5. Heywood A. Politics. - N.-Y.: Palgrave Macmillan, 2013. (Heywood Hey. Politics. – En. – Wye.: Palgrave Macmillan, 2013)
8. The content of the discipline.	Sociology in the understanding of 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 discussions. 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.

1. Basic information about the discipline:	
Name of the discipline	Information and communication technologies
2. Number of credits	5
3. Prerequisites:	School course of computer science, Mathematics
4. Post-requirements:	Computer graphics, Computer-aided design of mechanisms, Modeling of engineering systems of systems, Mechanization of animal husbandry, Agricultural machines
5. Competencies:	As a result of studying this discipline, students will be able to: - design and create simple websites;

	<ul style="list-style-type: none"> - to process vector and raster images; - create multimedia presentations; - use various social platforms to communicate; - use various forms of e-learning to expand professional knowledge; - use various cloud services.
6. Author of the course	Department of Information and Communication Technologies
7. Basic literature	<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.,</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. Nurpeisova T.B., Kaidash I.N. ICT, Almaty, Bastau, 2017. 241 p.</p>
8. Content of the discipline:	The role of ICT in key sectors of society development. Standards in the field of ICT. Introduction to computer systems. Architecture of computer systems. Software. Operating systems. Human-computer interaction. Database systems. Data analysis. Data management. Networks and telecommunications. Cybersecurity. Internet technologies. Cloud and mobile technologies. Multimedia technologies. Smart technologies. E-technologies. Electronic business. E-learning. Electronic government. Information technologies in the professional sphere. Industrial ICT. Prospects for the development of ICT.

1. Basic information about the discipline:	
Name of the discipline	Philosophy
2. Number of credits	5
3. Prerequisites:	School course of law, economics, geography
4. Post-requirements:	-
5. Competencies:	<p>A. To understand philosophy as a form of self-knowledge of one's people and the spiritual core of its culture.</p> <p>B. To know philosophy as a teaching about the nature of wisdom, the ways of its cognition and acceleration in life, as well as the methodology and method of solving cognitive, ideological, spiritual tasks of a person.</p>

	C. The ability to compare, formulate conclusions, build their own argumentation, express and justify their position on philosophy.
6. Author of the course	-
7. Basic literature	1. Petrova V.F., Khasanov M.S. "Philosophy". – Almaty: Evero, 2014. 2. Bertrand R. "History of Western Philosophy" – Moscow: Publisher Liters, 2018. – 1195 p. 3. Kenny A.«New History of Western Philosophy». Volume 1-4. – Oxford University Press, 2006 - 2010. ((Kenny Hey. "New History of Western Philosophy". Volum 1-4 – Oxford University Press, 2006-2010)
8. The content of the discipline.	The emergence and development of philosophy. Fundamentals of philosophical understanding of the world. Consciousness, soul and language. Genesis. Ontology and metaphysics. The philosophy of man and the value world. "Mangilik El" and "Rukhani zhangyru" - the philosophy of new Kazakhstan.

1. Basic information about the discipline:	
Name of the discipline	Cultural studies and psychology
2. Number of credits	5
3. Prerequisites:	School course of law
4. Post-requirements:	Philosophy, history and philosophy of Science
5. Competencies:	The development of a socio-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. Improving the general psychological culture, mastering the knowledge of socio-psychological patterns of personality behavior in interpersonal communication, necessary for the modernization of consciousness in accordance with the challenges of the time in the context of the program of Spiritual revival of Kazakhstan by the Leader of the Nation N.A. Nazarbayev.
6. Author of the course	Department of Philosophy
7. Basic literature	1. Dzhakupov S.M. "Introduction to general psychology". – A.: Kazakh University, 2014 2. Rudenko A.M. "Psychology in diagrams and tables": textbook. –Moscow: Phoenix, 2016. -379 p. 3. Nurzhanov B.G., Yerzhanova A.M. "Cultural studies".-Almaty, 2011. 4.Zholdubaeva A.K. "Cultural studies:practicum".-Almaty:Kaznu named after Al-Farabi, 2014.
8. Content of the discipline.	Morphology of culture. The language of culture. Culture of nomads of Kazakhstan. Cultural heritage of the Turks. 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 a Kazakhstani. Technologies of effective interpersonal communication as a basis for the modernization of public consciousness.

1. Basic information about the discipline:	
Name of the discipline	«Physical culture»
2. Number of credits	8
3. Prerequisites:	biology, anatomy, human physiology, hygiene, medical control, valeology, pedagogy, psychology
4. Post-requirements:	The program of the course «Physical culture» develops the skills and abilities in the field of physical culture of students, forms the needs for maintaining a healthy lifestyle, maintaining and strengthening health, improves the level of physical fitness to realize their abilities in the process of daily activities
5. Competencies:	Ensuring a sufficient level of physical readiness of future specialists, a high level of working capacity; development of professionally significant physical and psychomotor abilities; possess methods and means of physical culture to increase the adaptive reserves of the body and strengthen health; possess knowledge and skills of a healthy lifestyle, ways to preserve and strengthen health and use them to preserve health.
6. Author of the course	Shkurkov A.S., Satbaev E.K.
7. Basic literature	1. V.I. Ilyinich. Physical education of the student. Moscow, 2001 2. G.D. Ivanov, A.K.Kulnazarov. Physical education of students. Almaty, 2002 3. Theory and methodology of physical education. Under the general editorship of A.P.Matveev and D.Novikov. M., 2005.
8. Content of the discipline. Formation of a positive attitude, interest and need in physical education and sports. Improving the physical health of students on the basis of increasing the arsenal of motor abilities, professional, applied and methodological readiness. Preparation and participation in mass physical culture and recreation events and competitions in sports, providing for the broad involvement of students in active physical education. Complex use of physical culture and sports by the type of general physical training. Improving the level of physical and functional condition. Preventive use of means of physical culture for health purposes. Acquisition by students of additional, necessary knowledge on the basics of psychological, pedagogical, medical and biological control according to the methodology and organization of independent physical exercises and "lifelong" sports.	

1. Basic information about the discipline:	
Name of the discipline	Fundamentals of precision farming
2. Number of credits	4
3. Prerequisites:	Fundamentals of agronomy, School course of chemistry, biology
4. Post-requirements:	Agricultural machines, Operation of the machine and tractor fleet, Agrotechnological machines

5. Competencies:	Be able to use modern GIS technologies during land management design, create electronic field maps using GIS, global positioning system and GPS equipment; 6 - carry out accurate sowing and cultivation; - identify the condition of crops, determine yields during harvesting using yield counters; - differentially apply fertilizers and plant protection products in accordance with the microstructure of the soil cover and the condition of crops using GPS devices To know global positioning systems and GPS equipment; – regulation of the production process of plants by microperiods of organogenesis using self-adjusting automated means based on electronic control systems; The device and operation of course indicators and thrusters of various brands. Principles of operation and characteristics of terrestrial and space components of precision farming systems; The main modern precision farming systems and their classification; Possess: - skills of practical work on conducting on-farm land management Principles of operation and characteristics of ground and space components of precision farming systems;
6. Author of the course	
7. Basic literature	1. Truflyak E.V. Precision agriculture / E.V. Truflyak, E.I. Trubilin.- Lan St. Petersburg, 2017. - 376 p 2. Balabanov V. Navigation technologies in agriculture. Coordinate agriculture. Study guide – 2013
8. Content of the discipline.	Introduction to precision farming technologies; - study of agricultural machines for precision farming technologies; study of the latest laboratory equipment, GPS systems that ensure the implementation of precision farming technologies; Conducting an analysis of the economic efficiency of parallel and automated driving systems and the formation of practical skills to work with GIS technologies.

1. Basic information about the discipline:	
Name of the discipline	Engineering Mechanics (Statics, Dynamics)
2. Number of credits	5
3. Prerequisites:	Physics, Mathematics, Descriptive Geometry and Engineering graphics, Computer graphics
4. Post-requirements:	Mechanics of materials, Mechanization of animal husbandry, Agricultural machines, Computer-aided design of mechanisms
5. Competencies:	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 the subsequent study of special engineering disciplines, as well as in his further professional activity directly in production conditions. B. The ability to make calculations on equilibrium in practice, the determination of kinematic characteristics and dynamic analysis of mechanical systems. C. In the field of communication - the formation of the limit of the acceptability of the accepted provisions on

	equilibrium and movement of mechanical systems. In the field of training – the ability to analyze the key problems of statics and kinetics of material objects.
6. Author of the course	-
7. Basic literature	<ol style="list-style-type: none"> 1. Nikitin N.N. Course of theoretical mechanics. M.: High School, - 2011. – 607s. 2. Targ S.M. Short course of theoretical mechanics, M.: High School, 2011. – 416s. 3. Collection of assignments for term papers on theoretical mechanics, edited by A.A. Yablonsky, M., High School, - 1985. – 384s. and post. editions. 4. Meshchersky I.V. Collection of problems in theoretical mechanics. M., Nauka, - 2012. – 448s. and other publications. 5. Collection of short problems in theoretical mechanics. Edited by O.E.Kepe. SPb. Lan, 2009. 6. Butenin N.V., Lunts Ya.L., Merkin D.R. Course of theoretical mechanics. T1,2. M., Nauka, - 2012.
8. The content of the discipline.	Systems of forces and equilibrium conditions with an emphasis on engineering tasks. Kinematics and kinematics of material points, systems of material points and solids; Application of these topics to engineering problems.

1. Basic information about the discipline:	
Name of the discipline	Mechanics of materials
2. Number of credits	5
3. Prerequisites:	Mathematics, Physics, Fundamentals of Wheeled and Tracked Vehicles, Engineering Mechanics, Descriptive Geometry and Engineering Graphics, Engineering Mechanics (Statics, Dynamics), Computer Graphics, Measuring Systems, Technology of Structural Materials
4. Post-requirements:	Agricultural machines, Fundamentals of design, Mechanization of animal husbandry. Modeling of engineering systems of systems
5. Competencies:	<p>A. As a result of studying this discipline, students should know and be able to apply the basic methods and principles of calculating structural elements for strength, rigidity and stability.</p> <p>B. Be able to use reference materials on the mechanical characteristics of materials. Be able to make recommendations on the rational design of engineering structures based on the results of calculations.</p> <p>C. Possess the skills of calculating structural elements for strength and rigidity 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, off-center compression, oblique bending), as well as acquire practical skills in calculating structural elements for stability with longitudinal bending. Possess the skills to clearly express thoughts and</p>

	opinions both orally and in writing about the basic assumptions, hypotheses in calculations for strength, rigidity and stability of structural elements.
6. Author of the course	-
7. Basic literature	<p>1. Mezhetsky, G. D. Resistance of materials: textbook / G. D. Mezhetsky, G. G. Zagrebin, N. N. Reshetnik. - 3rd ed., reprint. and additional - M.: Publishing and Trading Corporation "Dashkov and Co.", 2013. - 432 p.</p> <p>2. Pisarenko G.S. Resistance of materials: 4th edition, repr. and add. / Agarev V.A. Kvitka A.L. Popkov V.G. Umansky E.S.; Ed.Pisarenko G.S. –M. : "Vischa school", 2006 - 696 p</p> <p>3. Arkusha, A. I. Technical Mechanics. Theoretical mechanics and resistance of materials : a textbook for the medium of professional studies. institutions / A. I. Arkusha. - 6th ed., ster. - M. : Higher School, 2005. - 352 p.</p> <p>4. Aubakirov, B. U. Engineering mechanics : textbook.manual / B.U. Aubakirov, A.S. Bektegenova; Ministry of Agriculture of the Republic of Kazakhstan. - - Astana : KazATU named after S.Seifullin, 2016. - 163 p.</p> <p>5. Aubakirov, B. U. Laboratory workshop on the discipline resistance of materials: practicum / B. U. Aubakirov, N. B. Orazbekov ; Ministry of Agriculture of the Republic of Kazakhstan. - - Astana : KazATU named after S.Seifullin, 2015. - 98 p.</p>
8. Content of the discipline:	Uniaxial load and deformation. General concepts of stress-strain states, conditions of strength of materials. Shift. Torsion of shafts. Bending of beams. Deflections of beams during bending. Introduction to rigidity and stability. Experiments that illustrate the main hypotheses and test the theoretical data used in the mechanics of materials using the basic tools and methods of analysis of experimental stresses.

1. Basic information about the discipline:	
Name of the discipline	Mathematics
2. Number of credits	9
3. Prerequisites:	School math course
4. Post-requirements:	Descriptive geometry and Engineering graphics, Computer graphics, Mechanics of Materials, Engineering Mechanics, Fundamentals of Design, Descriptive geometry and Engineering graphics, Computer-aided design of mechanisms, Computer graphics, OPERATION of A TRACTOR FLEET, TRACTORS AND AUTOMOBILES, AGRICULTURAL MACHINERY,
5. Competencies:	A. Be able to use in practice scientific research concepts and methods of mathematics, the study of general and particular methods of mathematical description of natural phenomena. Application of mathematical methods, definitions, theorems, rules, mathematical methods and practical application. Be able to develop and apply mathematical ways of thinking in their professional activities; able to use basic natural science knowledge and

	<p>methodologies to identify production problems and solve professional problems.</p> <p>B. To know the basic definitions, theorems, rules, mathematical methods and practical applications, to acquire practical skills in solving problems on all topics of the course provided by the program, to develop the ability and ability to independently supplement their education.</p> <p>C. Possess practical skills of applying the basics of mathematical apparatus to solve theoretical and applied problems, the ability to translate the solution of practical problems into the language of logic, mastering techniques and methods for solving specific problems from various fields of physics, as the basis of the ability to solve professional problems in the field of theory of machines and mechanisms, familiarization with modern scientific equipment, the formation of skills of conducting a physical experiment.</p>
6. Author of the course	-
7. Basic literature	<p>Higher mathematics. Volume 1. Gusak A.A. Minsk. Tetrasystems, 2001</p> <p>2. Higher mathematics. Volume 2. Gusak A.A. Minsk. Tetrasystems, 2001</p> <p>3. V.P. Minorsky. Collection of problems in higher mathematics. M. Nauka. 2006.</p> <p>5. V.S. Shipachev. Higher Mathematics, M 2005</p> <p>6. V.P. Minorsky. Collection of problems in higher mathematics. M. Nauka. 2006.</p> <p>7. Fundamentals of mathematical analysis. Ilyin V.A., Poznyak E.G. Part 1. M.Fizmatlit, 2005.</p> <p>8. Fundamentals of mathematical analysis. Ilyin V.A., Poznyak E.G. Part 2. M.Fizmatlit, 2005</p>
8. Content of the discipline.	<p>Fundamentals of mathematical analysis, limit and continuity of function, fundamentals 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 allow lowering the order. Application to solving physical problems.</p>

1. Basic information about the discipline:	
Name of the discipline	General chemistry
2. Number of credits	4
3. Prerequisites:	School chemistry course
4. Post-requirements:	Fuel, lubricants and technical fluids, Fundamentals of agronomy, Heat engineering
5. Competencies:	A. The task of studying chemistry is for students to accumulate a specific amount of knowledge on the discipline and form on this basis a logical "chemical" thinking that provides a future specialist with free orientation in the information

	<p>flow and the ability to solve problems related to knowledge of chemistry.</p> <p>B.The acquired knowledge in chemistry helps future specialists of the agricultural industry to solve the problems of increasing crop yields, which are associated with the study of soil composition, the determination of macro- and microelements in them.</p> <p>C. After the chemical experiments done, the student should further summarize the results obtained, draw a conclusion from the data obtained.</p>
6. Author of the course	
7. Basic literature	<ol style="list-style-type: none"> 1. Knyazev A.A., Smarygin S.N. Inorganic chemistry. M.: HSE, 2002. 2. Glinka N.L. Tasks and exercises in general chemistry. M.: HSE, 1987. 3. Kudaibergenova S.Zh., Bukeeva A.B. UMK in Chemistry, KATU, 2009 5. Artemenko A.I. Organic chemistry. Publishing house: "Higher School", 2007 6. Kudaibergenova S.J. Organic chemistry. KATU, 2009. 7. Kudaibergenova S.Zh., Bukeeva A.B. UMK on organic chemistry. KATU, 2011, 2014 8. Yurovskaya M.K., Kurkin A.V. Fundamentals of organic chemistry. 2012
8. The content of the discipline.	Is the expansion and deepening of knowledge in the course of chemistry, the study of the theoretical foundations of chemistry, the basic concept of chemistry, the basics of qualitative analysis, the formation of the concept of the role of chemistry.

1. Basic information about the discipline:	
Name of the discipline	Physics
2. Number of credits	5
3. Prerequisites:	School Physics Course
4. Post-requirements:	Electrical engineering and fundamentals of electronics, Heat Engineering, Fuel lubricants and technical fluids, Modeling of engineering systems of systems, Fundamentals of Theory and Calculation of internal combustion Engine, Agricultural machinery, Tractors and automobiles
5. Competencies:	<p>A.Formation of an understanding of the occurring physical phenomena, the ability to use in the practice of scientific research concepts of physical and mathematical processes in nature, 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, knowledge of techniques and methods of solving specific problems from various fields physics and mathematics.</p> <p>C. The ability to identify specific physical content in the applied tasks of the future specialty.</p>

6. Author of the course	-
7. Basic literature	<ol style="list-style-type: none"> 1. Trofimova T.I. Course of physics. – M.: 2011 2. Detlaf A.A., Yavorsky B.M. Kypc physics. - M.: 2010. 3. R.I. Grabovsky. Course of physics. – M.: High School, 1980, 2012. 4. Mukasheva.K. et al. "Physics – 1" Educational and methodical complex for students of engineering specialties. – Astana, 2009.
8. Content of the discipline. 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 instruments. Calculation and processing of the received data. Basic physical theories and principles, physical research methods, basic laws and limits of their applicability.	

1. Basic information about the discipline:	
Name of the discipline	Descriptive geometry and engineering graphics
2. Number of credits	7
3. Prerequisites:	School course of subjects drawing, mathematics
4. Post-requirements:	Automation of drawings, Computer-aided design of mechanisms, Modeling of engineering systems. Fundamentals of Design, Systems, Patent law, Computer graphics, Tractors and automobiles, Electrical Engineering and fundamentals of electronics, Fundamentals of the theory and calculation of the internal combustion engine, Agricultural Machinery,
5. Competencies:	<p>A. The ability to use the solution of various positional, metric and combined tasks in a complex drawing and in a visual image.</p> <p>B. The acquisition of practical skills in working and reading, performing drawings in the specialty.</p> <p>C. The ability to compare, compile design documentation for the design and construction of transport equipment and technology facilities. In the field of communication - to cope with problems that allow for several solutions, which is typical for the professional activities of technical workers. In the field of training – the ability to analyze the key problems of working with various drawing and measuring tools and devices, i.e., the technique of drawing. As a result of studying the course, the student should know: – methods for obtaining images of space elements on a plane or surface; – methods of solving spatial problems with the help of images; – the requirement of the standards of ESKD, ESTD and other systems related to the execution of drawings.</p>
6. Author of the course	-
7. Basic literature	<ol style="list-style-type: none"> 1. Musalimov T. K. initial geometry-Astana, 2006. 2. Musalimov T. K., Kolbatyr S. A. initial geometry and technical geometry. Astana: Folio, 2018. 3.T. K. Musalimov, S. A. Kolbatyr, G. M. Algartova. Descriptive geometry and engineering graphics. Almaty: 2013.

	4. T. Musalimov, S. Kolbatyr. Descriptive geometry and technical drawing. Astana: Folio, 2017. 5. mechanical grinding. "No," I said. Vyatkina G. P.-Moscow, 1985.
8. Content of the discipline. Teaching the future bachelor the theoretical and practical basics of descriptive geometry and engineering graphics, the ability to solve spatial geometric problems of an engineering nature on flat images of objects.	

1. Basic information about the discipline:	
Name of the discipline	Fundamentals of the design of wheeled and tracked vehicles
2. Number of credits	4
3. Prerequisites:	Physics, mathematics
4. Post-requirements:	Fundamentals of precision agriculture, Agricultural machines, Operation of machine and tractor fleet, Automation of drawings, Automated design of mechanisms, Modeling of engineering systems. Fundamentals of Design, Systems, Patent Law, Tractors and automobiles, Electrical Engineering and Fundamentals of electronics, Fundamentals of Theory and Calculation of the internal combustion Engine.
5. Competencies:	A. To know the general structure and principle of operation of tractors and cars, information about the preparation of machines for work and operating rules that ensure the most effective use of technical means. B. To be able to plan and implement measures to maintain the operability of wheeled and tracked vehicles when using them for their intended purpose. C. To know the device of the main components of wheeled and tracked vehicles, their the relationship, loading modes and have an idea about the design of wheeled and tracked vehicles.
6. Author of the course	-
7. Basic literature	1. Gurevich A.M. Construction of tractors and cars: Textbooks and studies. manual for students of higher educational institutions / A.M.Gurevich, A.K.Bolotov, V.I.Sudnitsyn. – M.: Agroprom. published. 1989.-368 p.; ill. 2. B.M. Telman, M.V. Moskvin Agricultural tractors and cars. Book 2 Chassis and equipment. – M.: Agroprom. Published. 1987- 335s. 3.D.N.Vyrubov Internal combustion engines: design and strength calculation of piston and combined engines / S.I.Efremov, N.A.Ivashchenko et al.; - 4th edition, reprint. and additional - M.: 1984-324s.
8. Content of the discipline: General arrangement of wheeled and tracked vehicles. Purpose, classification, principles of operation of mechanisms and systems of wheeled and tracked vehicles and engines. Design features of engine mechanisms and systems. Basic adjustment parameters. Design features of transmissions, running gear of steering controls. Internal combustion engine systems. Electrical equipment. Hydraulic systems. Working and additional equipment. Controls of wheeled and tracked vehicles.	

1. Basic information about the discipline:	
Name of the discipline	Tractors and cars
2. Number of credits	5
3. Prerequisites:	Physics; mathematics; descriptive geometry and engineering graphics; computer graphics; engineering mechanics; computer-aided design of mechanisms; fundamentals of design; Fuel, lubricants and technical fluids; heat engineering; electric machines and drive. Fundamentals of the theory and calculation of the internal combustion engine., Operation of the machine and tractor fleet.
4. Post-requirements:	Mechanics of materials; Patent legislation, Operation of the machine and tractor fleet
5. Competencies:	Know about the operation of internal combustion engine mechanisms and systems; methods and procedure for thermal and dynamic calculation of internal combustion engines; methods and procedure for calculating engine performance. Be able to calculate and build an engine indicator diagram; analyze it; carry out calculations to determine the effective performance of engines; carry out kinematic and dynamic calculations of individual components and mechanisms. own: the ability to evaluate the quality of work and the efficiency of internal combustion engines; the ability to compare, formulate conclusions, build their own arguments, formulate conclusions about the use of specific equipment, express and justify their position regarding the disadvantages or advantages of a particular node, unit, system.
6. Author of the course	-
7. Basic literature	1 Sagyndyk T.Zh. Tractors and cars. study guide .-Almaty: Lanter Trade LLP, 2018. – 210 b. 2. Gurevich A.M. Tractors and automobiles. – M.: Kolos, 1983. 3 Yakovenko I.F. Fundamentals of theory and calculation of internal combustion engines. - textbook - Astana, KATU, 2012.
8. Content of the discipline:	Summary of the discipline: thermodynamic and actual cycles of internal combustion engines; analysis of intake, compression, expansion and exhaust processes; analysis of gorenje processes in engines with spark ignition and ignition from compression; main indicators characterizing the operation of internal combustion engines; engine characteristics; kinematics, dynamics and balancing of engines; analysis of ways to improve internal combustion engines. Study of the theory and calculation of vehicle engines. Determination of operational and economic indicators of internal combustion engines of transport equipment. The unity and diversity of engines of transport equipment, their importance for the national economy of the country. Analysis of the operation of internal combustion engines of transport equipment. The current state and prospects of development of various internal combustion engines.

1. Basic information about the discipline:	
Name of the discipline	Agrotechnological machines
2. Number of credits	4
3. Prerequisites:	Fundamentals of precision agriculture, mathematics, physics, engineering mechanics, Descriptive geometry and engineering graphics, Computer-aided design of mechanisms, Mechanization of animal husbandry
4. Post-requirements:	Operation of the machine and tractor fleet, Patent legislation, Mechanics of materials, Fundamentals of design.
5. Competencies:	<p>A. Know the technological processes, purpose, device and adjustment and malfunctions of machines. Methods of substantiation and calculation of the main parameters and modes of operation of working bodies and mechanisms, aggregates. The basics of ensuring their safe operation.</p> <p>B. Be able to independently master the designs and technological processes of new agrotechnological machines and complexes, choose the optimal technology, adjust the machines to a given operating mode and manage it. Identify shortcomings, and correctly implement them in practice</p> <p>C. Possess the ability to choose the right technological machine in accordance with agro-technical requirements for this technological process, configure and ensure normal conditions for their functioning.</p>
6. Author of the course	-
7. Basic literature	<p>1. Agricultural machinery. Practicum / N.V. Kalashnikova, R.A. Bulavintsev, Yu.A. Yudin; Edited by N.V. Kalashnikova. – Eagle, 2007. – 350s: ill.</p> <p>2. Strikunov, N.I. Production lines for post-harvest grain processing: textbook / N.I. Strigunov, S.V. Likanov, B.T. Tarasov.- Barnaul: AGAU Publishing House, 2010. - 92 p.</p> <p>3. Koba V.G., Braginets N.V., Murusidze D.N., Nekrashevich V.F. Mechanization and technology of livestock production. – M.: Kolos, 2000.</p> <p>4. Kazarovets N.F., Prishchepov M.A., Abdyrov A.M., Nukeshev S.O., Mustafin Zh.Zh. Technologies and technical support of livestock production. – Astana: S. Seifullin KATU, 2013. – 475 p.</p>
8. Content of the discipline:	Technologies and means of mechanization of crop production and animal husbandry. Technologies and machines for sowing and cultivation, care of crops, harvesting of agricultural crops, post-harvest processing and storage of crops, reclamation machines Technologies and equipment for keeping farm animals. Machines and equipment for the preparation and distribution of feed. Feed storage equipment. Mechanization of milking of farm animals. Mechanization of primary milk processing. Mechanization of sheep shearing and primary wool processing. Mechanization of animal slaughter and processing of skins. Mechanization of water supply for farms and pastures. Equipment and system for the formation of microclimate parameters in livestock premises. Animal care equipment. Cleaning, transportation, disposal of manure and manure. The use of technological equipment on farms and the organization of technical service.

1. Basic information about the discipline:	
Name of the discipline	Theory and calculation of agricultural machines
2. Number of credits	5
3. Prerequisites:	Mathematics, physics, engineering mechanics, Descriptive geometry and engineering graphics Computer-aided design of mechanisms
4. Post-requirements:	Operation of the machine and tractor park, Patent legislation, Fundamentals of precision agriculture, Mechanics of materials, Agrotechnological machines, Operation of the machine and tractor park, Fundamentals of design.
5. Competencies:	<p>A. To know the basics of the device of agricultural machines and methods of calculating the parameters of machines, the theory and calculation of technological and working processes, methods for justifying 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 technological processes are provided.</p> <p>B. Be able to design and calculate the working bodies and basic mechanisms of agricultural machines. Develop and design rational schematic diagrams of machines and technological complexes in accordance with the requirements of the terms of reference.</p> <p>C. Possess the skills of adjusting the schematics and calculation methods of working bodies and machines and justify the functional scheme of the machine taking into account the interaction of working bodies.</p>
6. Author of the course	-
7. Basic literature	<ol style="list-style-type: none"> 1. Agricultural machinery and technologies: a textbook for universities / ed. I.A. Spitsyn.- M.: KolosS, 2006.- 647 p.: fig 2. Klenin, N.I. Agricultural and reclamation machines: textbook for universities / N.I. Klenin. – M.: Koloss, 2008. – 293 p. 3. Khalansky, V.M. Agricultural machines: textbook / V.M. Khalansky, I.V. Gorbachev. – M.: Koloss. -2003. – 624 p.
8. The content of the discipline:	The device and the principle of operation of the CIRCUITS. Agrotechnical requirements, the technological process in field cultivation, the study of the basics of the methodology for calculating the parameters of machines, determining the forces acting on the working bodies. Determination of the number of working bodies and their location on the machine frame theory and calculation of technological and working processes. Calculation of the main design parameters of the working bodies of agricultural machines.

1. Basic information about the discipline:	
Name of the discipline	Operation of the machine and tractor fleet
2. Number of credits	10
3. Prerequisites:	Physics; Mathematics; General Chemistry; fundamentals of animal husbandry; descriptive geometry and engineering graphics; Computer graphics; mechanics of materials; engineering mechanics; computer-aided design of mechanisms; fundamentals of design; Electric machines and drive, Technical service in agricultural production, Fuel, lubricants and technical fluids
4. Post-requirements:	Mechanization of animal husbandry, Failure analysis and repair of machines, Patent legislation, Mechanization of animal husbandry, Agrotechnological machines, Labor protection, Production management.
5. Competencies:	<p>To know: the composition of the agricultural machinery park and the ways of its rational use; the system of assessments and evaluation indicators of machines and machine technologies; -the basics of aggregating machines, their technical and technological maintenance; -the methodology of operational and technological evaluation of the unit; -the basics of operational technology and rules for the production of mechanized works; the basics of designing industrial technology of mechanized production and the formation of a machine and tractor fleet;- the system of engineering and technical service; -fundamentals of designing maintenance facilities for machines and service enterprises;</p> <p>Be able to: depending on the adopted crop cultivation technologies, make a choice of energy resources and technological machines for completing machine-tractor units;- design and calculate the engine yard; -to organize the storage of agricultural machinery taking into account zonal features; to organize the scheme of transportation of agricultural goods; -to evaluate the technical and economic efficiency of engineering solutions; -to develop the operational technology of mechanized work, to design mechanized production lines.Proficiency (For language disciplines)</p>
6. Author of the course	Candidate of Technical Sciences, Associate Professor Chernyavsky Alexander Ivanovich
7. Basic literature	<p>1. Bazhenov S.P. Fundamentals of operation and repair of cars and tractors. Textbook for students. higher. studies. institutions/S.P.Bazhenov et al. 5th ed., ster. Publishing center "Academy", 2011, 336 p.</p> <p>2. Operational properties of mobile units/ Tutorial/ Kostyuchenko in N.V., Plaksin A.M.; Edited by A.M.Plaksin. - Astana: S. Seifullin KATU, 2009. - 204 p.</p> <p>3. Bazhenov S.P. Fundamentals of operation and repair of cars and tractors. Textbook for students. higher. studies. institutions/S.P.Bazhenov et al. 3rd ed., ster. Publishing center "Academy", 2008, 336 p.</p>
8. Content of the discipline. Students acquisition of theoretical knowledge and practical skills on the following topics: selection of machines and machine technologies; acquisition, adjustment of testing of agricultural aggregates; technology and organization of mechanized works, their technical and transport maintenance; formation and use of machinery of agricultural producers; organization of engineering and technical agrotechnical service and management of a service enterprise in the conditions of Northern Kazakhstan. The use of agricultural machinery is a system of organizational, technical, technological and other measures carried out during the operation of a fleet of machines or a separate unit	

1. Basic information about the discipline:	
Name of the discipline	Materials in engineering design
2. Number of credits	4
3. Prerequisites:	Information and communication technologies, Descriptive geometry and engineering graphics, Mathematics, Physics, Chemistry, Agricultural machinery,
4. Post-requirements:	Fundamentals of design, Computer-aided design of mechanisms, Automation of drawings, Modeling of engineering systems. Fundamentals of Design, Mechanics of materials, Tractors and automobiles, Electrical Engineering and fundamentals of electronics, Failure analysis and repair of machines
5. Competencies:	<p>A. To know the basic concepts, methods, methods and means of giving the source materials the necessary shapes, sizes and operational properties, as well as the parameters of optimal processing of structural materials</p> <p>B. To be able to determine the parameters of economical processing of structural materials:</p> <ul style="list-style-type: none"> - to use the features of technological processes used in the production, operation and repair of aircraft and AD; - reasonably choose the technological modes of processing; - determine the quality of welded, soldered and adhesive joints; - use computer technology in the preparation of programs for machine tools with numerical control. <p>C. Possess the skills to select materials for metal structures necessary for the development of course and diploma projects; - knowledge and skills necessary to justify the choice of rational methods of heat treatment and hardening, increasing wear resistance and corrosion resistance of steels and alloys.</p>
6. Author of the course	
7. Basic literature	<p>1. Chumachenko Yu.T. et al. Materials science./Yu.T. Chumachenko, G.V. Chumachenko. - Rostov n/A: Phoenix, 2007. - 320s. MO RF</p> <p>2. Materials science and technology of metals: Studies for universities / Edited by G.P.Fetisov. – 6th ed., supplement – M.: Higher School, 2008. – 880s. Ministry of Education of the Russian Federation</p> <p>3. Arzamasov B.N., Makarova V.N., Mukhin G.G., etc. Materials Science. - M.: Publishing House of Bauman Moscow State Technical University, 2001</p> <p>4. Rybyev I.A. Building materials science. –ed. 2nd, corrected. - M.: Higher School, 2004. -701s. Ministry of Defense of the Russian Federation</p>
8. Content of the discipline:	Characteristic properties of metals, the influence of carbon and permanent (technological) impurities on the properties of steel. Alloying elements in steel. Structural classes of alloy steels. Defects in the crystal structure of metals, Mechanical properties and structural strength determined by static and dynamic tests, Technology of heat treatment of steel, Structural steels and alloys, Polymer materials. Plastics. Rubber, Glass. Powder, composite, ceramic materials, Defects in the crystal structure of metals, Polymorphic modifications of carbon and boron nitride. Wood. Semiconductor materials

1. Basic information about the discipline:	
Name of the discipline	Mechanization of harvesting and storage of agricultural products
2. Number of credits	4
3. Prerequisites:	Mathematics, Physics, Chemistry, Agricultural machinery, Fundamentals of tracked and wheeled vehicles, Mechanization of animal husbandry, Theory and calculation of agricultural machinery.
4. Post-requirements:	Patent legislation, diploma design
5. Competencies:	<p>be able to: - perform work related to harvesting and storage of agricultural products and care for them; to choose the most rational modes of product storage, taking into account its quality and purpose; – to determine the possible purpose of products for the most rational use and sale; – to evaluate the effectiveness of post-harvest processing and storage of products, to determine the unit costs of product refinement and storage.</p> <p>to know: -fundamentals of agronomy: soils and their fertility, plant living conditions, tillage, plant nutrition, fertilizers and their application, crop rotations and their classification, irrigation of crops and land drainage;</p> <p>- the main pests and diseases of the studied crops, modern means of protection against pests and diseases and methods of improving the planting material;</p> <p>-technology of harvesting and storage of agricultural products.</p>
6. Author of the course	
7. Basic literature	<p>1. Technology of storage, processing and standardization of crop production: textbook for students of institutions of higher education in agronomic specialties / G. A. Zholik [et al.]; rec.: V. I. Kochurko, N. N. Petyushev. – Minsk: IVC of the Ministry of Finance, 2014.</p> <p>2. Organization of processing of agricultural products and agricultural service. Course of lectures: studies.- meth. manual / I.I. Degtyarevich, V.A. Karpov. – Grodno: GGAU, 2010.</p>
8. Content of the discipline.	Technological equipment for harvesting and mechanical processing and storage of agricultural raw materials and semi-finished products by joining and molding. Technological equipment for conducting heat and mass transfer processes. Technological equipment for electrophysical processing of raw materials and semi-finished products. Machinery and equipment for grain processing. Machines and equipment for processing fruit and vegetable products. Machines, apparatuses and equipment for processing sunflower seeds and soybeans. Machines, apparatuses and equipment for milk processing, organization of the main modes and methods of storage of raw materials and products; – organization of the main technological processes of processing; – organization of the sale of agricultural products and products of its processing; Harvesting machines and devices for processing, processing and storage of agricultural products.

Appendix 4. Description of elective component disciplines

1. Basic information about the discipline:	
Name of the discipline	Occupational health and safety
2. Number of credits	5
3. Prerequisites:	Operation of the machine and tractor fleet, Mechanization of animal husbandry, The basics of the device of wheeled and tracked vehicles, Agricultural machines, Tractors and automobiles. Technical service in agriculture Fundamentals of robotics.
4. Post-requirements:	Diploma design
5. Competencies:	<p>As a result of studying this discipline, students should have an idea about:</p> <ul style="list-style-type: none"> - the basic principles of protecting people in emergency situations; - modeling of various emergencies; - organizational foundations for ensuring the safety of life: techniques and methods for improving the stability of the functioning of economic facilities in emergencies and preparedness for emergency response. <p>To know:</p> <ul style="list-style-type: none"> - theoretical foundations of human life safety in the environment; - legal and regulatory and technical bases of life safety; - anatomical and physiological consequences of traumatic, harmful and damaging factors on a person; - methods of forecasting emergencies and eliminating their consequences. <p>Be able to:</p> <ul style="list-style-type: none"> - develop measures to improve the safety and environmental friendliness of production activities; - plan and implement measures to increase the sustainability of production activities of economic entities; - plan measures to protect production personnel and the public in emergency situations; - take part in carrying out rescue and other urgent work in the aftermath of an emergency.
6. Author of the course	
7. Basic literature	
8. Content of the discipline: Occupational risks at the workplace, production site, enterprise, taking into account the hazardous factors of the production environment, labor process; requirements of labor legislation, rules and norms of labor protection at the workplace, production site, enterprise using knowledge of production processes; requirements of labor legislation. The Labor Code of the Republic of Kazakhstan and other regulatory legal acts containing labor law norms related to labor organization (internal labor regulations, regulations on vacations, regulations on business trips, etc.).	

1. Basic information about the discipline:	
Name of the discipline	Fundamentals of Economics and Law
2. Number of credits	5
3. Prerequisites:	Mathematics, Political Science and Sociology,
4. Post-requirements:	Production Management, Patent Law, Investment Management
5. Competencies:	<p>A. Knowledge of their rights and obligations, 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.</p> <p>B. be able to use regulatory legal documents in their activities, ability to apply basic knowledge in the field of economics, economic studies and social management, apply basic knowledge in the field of economics, economic studies and social management.</p> <p>C. The ability to make judgments, evaluate ideas, formulate conclusions, build their own arguments, the ability to express and justify their position in the field of economics and from the point of view.</p>
6. Author of the course	
7. Basic literature	<p>1. Marchenko M.N. Theory of State and law. – M.: 2010. 2013j.</p> <p>2. Artemyev A.I., Doroshenko M.E. Analysis of nonequilibrium states and processes in macroeconomic models / M.E. Doroshenko. – M.: TEIS, 2000.</p> <p>3. Efimova E.G. Economic theory in schemes, tables, graphs and formulas / E.G. Efimova. – M.: Flint, 2003.</p>
8. Content of the discipline:	Basic scientific and theoretical concepts of economics; patterns of development of economic processes; the main concepts created during the long evolution of economic thought; principles of functioning of the market mechanism, self-regulation and state influence on the economy; to be guided by the current legislation; to systematize knowledge about the essence and forms of manifestation of economic phenomena and processes. The main categories of law; The main provisions of the current legislation of the Republic of Kazakhstan.

1. Basic information about the discipline:	
Name of the discipline	Agricultural machines
2. Number of credits	4
3. Prerequisites:	physics (school course); mathematics (school course) mathematics; engineering mathematics; physics; chemistry
4. Post-requirements:	tractors and automobiles; agrotechnological machines; machine use; production operation of the machine and tractor fleet diploma design
5. Competencies:	<p>Be able to - choose machines to perform specific jobs; - prepare machines for work and select energy resources for them; - organize the work of machines and evaluate the quality of their work.</p> <p>Know - principles of classification, labeling and general arrangement of agricultural machinery; - purpose, device, workflow, technological adjustments and main technical characteristics of machines; - preparation for work, the basics of aggregation and the organization of the work of basic machines.</p> <p>Possess the skills of adjusting the schematics and calculation methods of working bodies and machines and justify the functional scheme of the machine taking into account the interaction of working bodies.</p>
6. Author of the course	-
7. Basic literature	1. Agricultural machinery and technologies: a textbook for universities / ed. I.A. Spitsyn.- M.: KolosS, 2006.- 647 p.: fig 2. Klenin, N.I. Agricultural and reclamation machines: textbook for universities / N.I. Klenin. – M.: Koloss, 2008. – 293 p. 3. Khalansky, V.M. Agricultural machines: textbook / V.M. Khalansky, I.V. Gorbachev. – M.: Koloss. -2003. – 624 p.
8. Content of the discipline.	Technology, technological process, technological operation, technological means. Technological means and technologies for tillage, fertilization, sowing and planting, care of crops, harvesting and post-harvest processing of crops, production of reclamation works. Technological complexes. Technological means for crop production: device, adjustment and aggregation.

1. Basic information about the discipline:	
Name of the discipline	Hydropneumatic machines and drives
2. Number of credits	3
3. Prerequisites:	Mathematics, Physics, Descriptive geometry and Engineering Graphics, Engineering Mechanics, Computer-aided design of mechanisms, Agricultural machines, Fundamentals of Tracked and Wheeled vehicles
4. Post-requirements:	Fundamentals of design, Patent law, Mechanics of materials, Theory and calculation of CCM, Tractors and automobiles.
5. Competencies:	<p>As a result of studying this discipline, students should: have an idea: - about the current state of hydropneumatic engineering for technological machines;</p> <p>– about the achievements of science and technology in the CIS and abroad in the field of hydro-pneumatic engineering;</p> <p>to know: - purpose, scope, principle of operation, design of various types of hydropneumatic machines and drives and the main directions of their further constructive improvement;</p> <p>- fundamentals of the theory and calculation of hydropneumatic systems of technological equipment;</p> <p>- features of the designs of hydraulic pneumatic machines.</p> <p>be able to: - apply the laws of hydraulics to solve practical problems;</p> <p>- to carry out the selection of hydraulic equipment for the specified technological conditions.</p> <p>acquire practical skills: – calculation and selection of hydropneumatic machines and drives;</p> <p>– development of hydraulic schemes of hydraulic pneumatic drives of technological machines;</p> <p>– selection of the necessary hydraulic equipment.</p>
6. Author of the course	
7. Basic literature	<p>1. Bashta T.M., Rudnev S.S., Nekrasov B.B., etc. Hydraulics, hydraulic machines and hydraulic drives / Moscow: Mashinostroenie, 2010</p> <p>2. Design of hydro and pneumatic systems. Textbook (for students of the specialty "Hydraulic machines, hydraulic drives and hydropneumatics"). Baku. AGNA, 2004</p> <p>3. Ryndin V. V., Ibragimova G. E. Hydraulics and hydraulic pneumatic drive: an educational and methodological guide to the course work / V. V. Ryndin, G. E. Ibragimova. – Pavlodar : Kereku, 2015.</p>
8. Content of discipline.	1 Basic definitions and classification of hydropneumatic machines and drives. 2. Structural and functional features of hydrodynamic machines and drives and their place in the structures of technological machines and production systems. 3. Schematic solutions of the main functional groups. 4. Methods of regulating hydraulic drives. 5. Hydraulic power amplifiers 6. Tracking hydraulic pneumatic actuators. 7. Elements of manual and automatic control. 8. Devices of hydro- and pneumatic automation systems, hydraulic computing devices. 9. Auxiliary devices of hydraulic drives

1. Basic information about the discipline:	
Name of the discipline	Professionally-oriented foreign language
2. Number of credits	2
3. Prerequisites:	Foreign language
4. Post-requirements:	Diploma design
5. Competencies:	To know a foreign language to the extent necessary to obtain professional information from foreign sources and to communicate at a professional level; business and professional vocabulary of a foreign language to the extent necessary for communication, reading and translation of foreign language texts of general and professional orientation; to be able to use a foreign language in interpersonal communication and professional activity; to express their thoughts freely and adequately during a conversation and understand the interlocutor's speech in a foreign language; conduct written communication in a foreign language, compose business letters; apply methods and means of cognition for intellectual development, professional competence improvement; possess the skills to express their thoughts and opinions in interpersonal, business and professional communication in a foreign language.
6. Author of the course	Imasheva A.Sh.
7. Basic literature	1. Obratsov, P.I. Design and construction of professionally oriented learning technology / P.I. Obratsov, A.I. Akhulkova, O.F. Chernichenko. – Orel, 2005. – 61s. 2. Galskova, N.D. Modern methods of teaching a foreign language: a teacher's manual. Moscow: ARKTI Gloss, 2000. 165 p. 3. Constable, George; Somerville, Bob (2003). A Century of Innovation: Twenty Engineering Achievements That Transformed Our Lives, Chapter 7, Agricultural Mechanization. Washington, DC: Joseph Henry Press. ISBN 0-309-08908-5. 4. Sinyavskaya E.B., Tynkova O.I., Ulanovskaya E.S. Educational and methodological complex for technical universities. – M., 1999.
8. The content of the discipline.	Characteristics of the content of special agricultural engineering disciplines for students in a foreign (English) language. Personal development and career prospects. Business correspondence (resumes, business letters); design of articles for magazines. Technological processes and equipment in animal husbandry and crop production.

1. Basic information about the discipline:	
Name of the discipline	Electric machines and drives
2. Number of credits	3
3. Prerequisites:	Descriptive geometry and engineering graphics, school physics course, mathematics
4. Post-requirements:	Mechanization of animal husbandry, Heat engineering, Technical service in Agricultural machinery, Tractors and automobiles, Agrotechnological machines. Operation of the machine and tractor fleet, Fundamentals of robotics.
5. Competencies:	<p>A. Be able to connect electric machines to the electrical network, conduct tests of electric machines and electric drives, calculate the operating and mechanical characteristics of electric machines, choose the type and power of electric motors of electric drives for various operating modes, perform calculations of electromechanical transients of electric drives.</p> <p>B. To know the structure and principles of operation of alternating and direct current electric machines, the scope of application of alternating and direct current electric machines, the basics of the theory of starting, braking and regulating the angular speed of alternating and direct current motors, control circuits of electric drives and start-up equipment, the difference between the features of the electric drive in steady and unsteady modes.</p> <p>C. The ability to understand the circuits and elements of the main equipment, secondary circuits, protection devices and automation of electric power facilities in accordance with the terms of reference with the use of standard design automation tools, the ability to carry out installation, adjustment, testing and commissioning of electric power and electrical equipment.</p>
6. Author of the course	
7. Basic literature	<p>1. Bessonov L.A. Theoretical foundations of electrical engineering. Electric circuits. – M.: Gardariki, 2006.-701 p.</p> <p>2. Bessonov L.A. Theoretical foundations of electrical engineering. Electromagnetic field. – M.: Gardariki, 2003.-317 p.</p> <p>3 Pryanishnikov V.A. Electronics: A complete course of lectures. - St. Petersburg: KORONA print, Binom Press, 2006. - 416 p.</p>
8. Content of the discipline.	Application of theoretical knowledge and methods for calculating steady-state processes in linear DC and AC circuits of a three-phase circuit of symmetrical and asymmetric mode and electronic devices and devices. Concepts of judgments on the physical entities of phenomena accompanying the process of converting alternating and direct current electricity.

1. Basic information about the discipline:	
Name of the discipline	Heat engineering
2. Number of credits	4
3. Prerequisites:	Mathematics, Physics, Electric machines and drives
4. Post-requirements:	Specialized disciplines, Agrotechnological machines. Mechanization of animal husbandry, Tractors and automobiles, Fundamentals of the theory and calculation of the internal combustion engine
5. Competencies:	Be able to: design, select and operate the necessary heat engineering equipment of the branches of the national economy. To know: thermal engineering terminology, laws of energy production and conversion, methods for analyzing the efficiency of heat use, as well as the principles of operation and designs of thermoelectric equipment; The ability to understand the methods of obtaining, converting, transferring 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.
6. Author of the course	Umirzakov R.A.
7. Basic literature	1. Umirzakov R.A. Educational and methodological complex on the discipline "Heat engineering", Astana: KazATU named after S. Seifullin, 2015. 2. Heat engineering: textbook for universities / V.N. Lukanin, M.G. Shatrov et al.; edited by V.N. Lukanin. – Moscow: Higher School, 2000. – 671 p. 3. Burov A.L. Heat engines: M., 2008.
8. The content of the discipline:	The history of the development of heat engineering. The laws of obtaining and converting energy. Compressors, internal combustion engines, heat pumps. Thermal conductivity. Industrial heating devices and their classification. Heat exchangers.

1. Basic information about the discipline:	
Name of the discipline	Fundamentals of animal husbandry
2. Number of credits	3
3. Prerequisites:	School biology course, Information and communication technologies, Chemistry.
4. Post-requirements:	Mechanization of animal husbandry, Agrotechnological machines
5. Competencies:	<p>A.be able to: organize uninterrupted, full-fledged and economical feeding of various types of farm animals; prepare rations, determine the quality and stocks of feed; create the necessary conditions for raising young animals at different ages; carry out zoohygenic and preventive measures;</p> <p>V. to know: the physiological processes of digestion occurring in the body of animals and poultry; the specifics of feeding and keeping animals of different species; ways to create a solid food base and full-fledged feeding of animals; sex and age groups of individual animal species; technology of rearing repair young; the experience of advanced farms that have introduced modern technologies with high efficiency of animal products production.</p> <p>With. The ability to keep records of the productivity of farm animals. possess: technical concepts and terms; technologies of scientific analysis, use and updating of knowledge on the basics of animal husbandry</p>
6. Author of the course	agricultural machinery and technology
7. Basic literature	<p>1. Boyarsky L.G. Feed technology and full-fledged feeding of farm animals / L.G. Boyarsky. - Rostov n/A: Phoenix, 2001. - 516s.</p> <p>2. Izilov Yu.S. Practicum on cattle breeding / Yu.S. Izilov. - M.: KolosS, 2009. - 183 p.</p> <p>3. Kazarovets N.V. Organization and technology of livestock production / N.V. Kazarovets - Mn.: IVC of the Ministry of Finance, 2008. - p.</p> <p>4. Lushchenko A.E. Breeding of farm animals: a course of lectures / A.E. Lushchenko et al. - - Krasnoyarsk: FGOU VPO KSTU, 2009. - p.</p>
8. Content of the discipline.	Technology of production of certain subsectors of animal husbandry: cattle breeding, horse breeding, camel breeding, sheep breeding, pig breeding, poultry breeding, rabbit breeding. Biological features and productivity of different animal species, characteristics of breeds bred in Kazakhstan and abroad, their use for the production of a particular type of product in the country, modern technologies of herd reproduction and rearing of young animals.

1. Basic information about the discipline:	
Name of the discipline	Fundamentals of agronomy
2. Number of credits	3
3. Prerequisites:	School biology course, Information and communication technologies, Chemistry.
4. Post-requirements:	Fundamentals of precision agriculture, Agricultural machines, Operation of machine and tractor fleet, Agrotechnological machines
5. Competencies:	<p>A. be able to: determine the types, varieties and varieties of cultivated plants, the peculiarities of growing individual crops, taking into account their biological characteristics, calculate the seeding rates; apply various methods of reproduction of soil fertility;</p> <p>B. To know: Technology of tillage for winter and spring crops; to carry out agrotechnical methods of soil protection from erosion, production and economic characteristics of the main crops; technologies of cultivation of the main agricultural crops; origin, composition and basic properties of the soil, methods and methods of its processing and classification and the principle of constructing crop rotations;</p> <p>C. The ability to find ways and means to increase soil fertility; to carry out work against pests and diseases of crops, to organize measures to combat them and methods of protection against them.</p>
6. Author of the course	agricultural machinery and technology
7. Basic literature	<ol style="list-style-type: none"> 1. Gataulina G.G. Technology of crop production. - M.: KolosS, 2005. - 447s. 2. Gataulina G.G., Obedkov M.G. Workshop on crop production. - M.: Kolos, 2000. – 215s. 3. Korenev S.V., Fedotov V.A., Crop production. – M.: Kolos With, 2003. – 368 p. 4. Lykov A.M., Korotkov A.A., Bazdyrev G.N., Safonov A.F. Agriculture with soil science. – M.: Kolos, 2000. – 430 p 5. Tretyakov N.N., Yagodin B.A., et al. Fundamentals of agronomy: Textbook. – M.: Academy, 2010. – 340 p.
8. The content of the discipline.	Technologies for the production of agricultural crops. Soil fertility, its significance, types and ways of increasing. Morphological, biological features and technology features of cultivation of field, vegetable and fruit and berry crops cultivated in the Republic of Kazakhstan

1. Basic information about the discipline:	
Name of the discipline	Computer-aided design of mechanisms (Theory of mechanisms and machines)
2. Number of credits	4
3. Prerequisites:	Mathematics, Physics, Descriptive Geometry and Engineering Graphics, Computer Graphics, Engineering Mechanics, Mechanics of Materials
4. Post-requirements:	Fundamentals of design, CAD of technological machines and equipment, Agricultural machines, Computer-aided design of mechanisms, Patent legislation.
5. Competencies:	<p>A. To know and understand the nature of the forces acting on the links of the mechanism and methods of their analysis, modes of movement of mechanisms and methods of their regulation.</p> <p>V. To be able to carry out structural analysis of mechanisms and machines. The ability to apply computer applications to analyze mechanisms in an automated manner.</p> <p>C. To possess the methods of kinematic and dynamic research of mechanisms both theoretical and the use of Sav Providing the necessary skills and abilities for the subsequent study of special engineering disciplines, as well as in further professional activity directly in production conditions.</p>
6. Author of the course	-
7. Basic literature	<ol style="list-style-type: none"> 1. Theory of mechanisms and machines, ed. by K.V. Frolov, M., 2004. 2. Course design on theoretical mechanism and mechanics of machines / S. A. Popov, G. A. Timofeev, 2008 3. A short course of Theory mechanics, Nurgaliev T.K., 2001
8. The content of the discipline; The course "Computer-aided design of mechanisms" sets out the scientific foundations of the construction of mechanisms, machines and devices, as well as methods of their theoretical and experimental research. Creating a template and developing formatting for electrical circuits in the PCAD Schematic circuit editor. Design methods. Aspects and hierarchical levels of design. The design process. The composition and principles of CAD construction. The main provisions of automation of development and execution of design graphic documentation. Automation of design engineering.	

1. Basic information about the discipline:	
Name of the discipline	Fundamentals of design and construction of agricultural machinery
2. Number of credits	5
3. Prerequisites:	Mathematics, Descriptive geometry and Engineering graphics, Computer Graphics, Engineering Mechanics (Statics, Dynamics), Mechanics of Materials
4. Post-requirements:	Mechanization of animal husbandry, Agricultural machines. Theory and calculation of CCM, Patent legislation, Labor protection, Modeling of engineering systems, diploma design.
5. Competencies:	<p>Be able to independently design the components of agricultural machines of the required purpose according to the specified output data, select reference literature, GOST standards,. Draw up graphic and textual design documentation in full compliance with the requirements of the ESCD, choose a design model and carry out the necessary calculations in the process of designing and evaluating the performance of standard mechanical engineering products, choose the most suitable materials for machine parts, use a package of computer applications for calculating and designing machine parts.</p> <p>To know the main criteria for the operability of machine parts and the types of their failures, the theory and calculation of machine parts and assemblies. Typical designs of machine parts and assemblies, their properties and applications. Fundamentals of calculation automation and design of machine parts and assemblies, elements of machine graphics and design optimization.</p> <p>Possess the ability to independently design the nodes of the SAHM of the required purpose according to the specified output data, among them choose the best option with a logical justification. Choose the most suitable material for machine parts and use them efficiently. Draw up graphic and text design documentation.</p>
6. Author of the course	
7. Basic literature	<ol style="list-style-type: none"> 1. Ivanov M.N. Details of machines. – M.: Higher School, 2014. -408s. 2. Details of machines: textbook/N.V. Gulia, V.G. Klovov; pod. general ed . –M: Academy 2014.-416 s 3. Chernavsky.S. Course design of machine parts. M.: Mechanical Engineering, 2005. 4. Sheinblit A.E. Course design of machine parts. M.: Higher School, 2002.5.
8. The content of the discipline;	<p>Concepts of the main criteria for the operability of machine parts and types of their destruction. Fundamentals of theory and calculation of machine parts and assemblies. Typical designs of machine parts and assemblies, their properties and applications. Fundamentals of automation of calculation and design of parts and assemblies, study of general principles of design and construction, construction of models and algorithms for calculations of typical machine-building parts, taking into account the main performance criteria and development of design skills and technical creativity. Presentation- about the design of standard parts and assemblies of general machine-building application; - about typical methods of calculation and design of machine parts and assemblies. to know: - fundamentals of theory and methods of calculation of typical machine parts and assemblies; - typical designs of machine parts and assemblies, their properties and applications; - fundamentals of calculation automation and design of machine parts and assemblies, elements of machine graphics and design optimization.</p>

1. Basic information about the discipline:	
Name of the discipline	Fundamentals of robotics
2. Number of credits	4
3. Prerequisites:	Mathematics, Physics, Descriptive Geometry and Engineering Graphics, Computer graphics,
4. Post-requirements:	Mechanization of animal husbandry, Agricultural machines. Patent legislation, Labor protection, Modeling of engineering systems of systems, Fundamentals of Design, Engineering Mechanics (Statics, Dynamics), Mechanics of Materials, Computer-aided design of mechanisms, Measuring systems.
5. Competencies:	<p>Be able to develop sections of modernization projects or the creation of production facilities related to robotics; - have the skills to participate in the development of robotics projects. To program modern industrial robots and robotic complexes, to use software and equipment controlled by it, and to choose robotic systems acceptable in their technical characteristics as automation tools for specific technological processes;;</p> <p>Know the software used in the design and operation of robotic industries; advantages of using robots and robotic systems in industry; Device, classification, purpose, principles of operation of new advanced equipment – industrial robots, fundamentals of methods for developing projects of robotic industries</p> <p>Master the methodology of choosing robots and robotic systems for specific processes and productions, modern information technologies for designing robotic productions. The ability to provide technical equipment for workplaces with the placement of technological equipment, the ability to master the equipment being introduced</p>
6. Author of the course	
7. Basic literature	<p>1. Kuryshkin, N. P. Fundamentals of robotics : textbook. manual / N. P. Kuryshkin ; KuzSTU. – Kemerovo, 2012. – 168 p. http://library.kuzstu.ru/meto.php?n=90828&type=utchosob:common</p> <p>2. Konyukh, V. L. Fundamentals of robotics : textbook. manual V. L. Konyukh ; Rostov n/A : Publishing house "Phoenix", 2008. – 281 p.</p> <p>3. Klimov, A. S. Robotic technological complexes and automatic lines in welding : textbook. manual 2nd ed., ispr. and add. – St. Petersburg: Publishing House "Lan", 2011. – 240 p. http://e.lanbook.com/view/book/1804/</p>
8. The content of the discipline:	The structure of industrial robot manipulators, the system of cyclic software control of robots, Evaluation of the accuracy of positioning of a robot with a cyclic control system, Programming of the robot on a computer simulator GPS,

1. Basic information about the discipline:	
Name of the discipline	Fundamentals of the theory and calculation of the internal combustion engine
2. Number of credits	5
3. Prerequisites:	Physics; Mathematics; descriptive geometry and Engineering Graphics; computer graphics; Engineering Physics; Mathematics; Descriptive Geometry and Engineering Graphics; Computer Graphics; engineering Mechanics; computer-aided design of mechanisms; Fuel, Lubricants and Technical fluids; Measuring Systems; Electrical machines and drive, Heat Engineering, Computer Graphics, Fundamentals of Wheeled and Tracked vehicles. energy mechanics; computer-aided design of mechanisms; Fuel, lubricants and technical fluids; Measuring systems; Electric machines and drive, Heat engineering, Computer graphics, Fundamentals of wheeled and tracked vehicles.
4. Post-requirements:	Tractors and automobiles, Mechanics of materials; Patent legislation, Fundamentals of design, Modeling of engineering systems of systems, Operation of the machine and tractor fleet, Technical service in the agricultural sector
5. Competencies:	<p>be able to: calculate and build the traction characteristics of a tractor and analyze it; perform calculations and build the dynamic characteristics of a car and analyze it. know the methods and procedure of tractor and car traction calculation; methods and procedure for calculating and constructing tractor traction characteristics and dynamic characteristics of the car; methodology, equipment, instruments and tools for laboratory and field tests of tractors and cars, allowing to evaluate the technical and economic performance of machines.</p> <p>possess: the ability to formulate conclusions about checking the work of a tractor and a car and their potential capabilities; the ability to compare, build their own arguments, express and justify their position regarding the disadvantages or advantages of the work of a tractor, unit or car.</p> <p>acquire practical skills: in the field of communication – the formation of a sense of tolerance, patriotism and respect for the profile of the specialty. The ability to master and constantly improve your horizons in the knowledge of the</p>
6. Author of the course	
7. Basic literature	<ol style="list-style-type: none"> 1. Kutkov G.M. Tractors and cars. Theory and technological properties. – M.: Kolos, 2004. 2. Yakovenko I.F. Fundamentals of theory and calculation of internal combustion engines. - textbook - Astana, KATU, 2012. 3. Yakovenko I.F. et al. Traction tests of tractors. - Astana, 2004. 4. Sagyndyk T.J. Fundamentals of theory and calculation of internal combustion engines. -Astana: FOLIANT, 2016.- 160 b.
8. Content of the discipline:	Traction balance of tractor and car; traction balance equation; general dynamics of wheeled tractors and cars; general dynamics of tracked tractors; traction dynamics and fuel efficiency of tractor; tractor power balance equation; traction dynamics and fuel efficiency of car; dynamic characteristics of car; braking dynamics of tractor and car; lateral stability; cross-country ability of cars and tractors; smooth running.

1. Basic information about the discipline:	
Name of the discipline	Patent law
2. Number of credits	4
3. Prerequisites:	Descriptive geometry and engineering graphics, Computer graphics, Electric machines and drives, Mechanization of animal husbandry, Modeling of engineering systems of systems, Fundamentals of design, Fundamentals of the device of wheeled and tracked vehicles, Agricultural machines., Tractors and automobiles, Computer graphics
4. Post-requirements:	Diploma design
5. Competencies:	<p>A. Be able to analyze the technical situation and find new technical solutions; possess methods of activating creative thinking; make applications for alleged inventions and utility models and correspond with the patent office; conduct a patent search when performing course and diploma design, as well as in research work. prepare 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. To know the basics of professional creativity; methods of activating creative thinking; planning of inventive work in the Republic of Kazakhstan; concepts of invention and utility model. Laws on the protection of objects of intellectual industrial property, on responsibility for violation of the rights of owners of certificates of protection for objects of intellectual industrial property.</p> <p>C. Possess the ability to solve, compare, formulate, draw conclusions, build their own arguments, express their position on the main issues of modeling engineering systems, professional creativity and patenting.</p>
6. Author of the course	-
7. Basic literature	<p>1. Conducting patent research [Electronic resource] : reference. manual / A.D. Ishkov, A.V. Stepanov ; edited by A.D. Ishkov. 2013. 132 p. - ISBN 978-5-9765-1793-6</p> <p>2. Measures of intellectual property protection: O.N. Zhuravleva. - M.: Alfa-M, 2014. - 192 p.: 60x90 1/16.</p> <p>3. Agamagomedova, S. A. Fundamentals of the administrative mechanism for the protection of intellectual property rights: cross-border aspect [Electronic resource] : S. A. Agamagomedova. - Penza : Publishing House of PSU, 2013.</p>
8. Content of the discipline:	Fundamentals of intellectual property law. Types of intellectual property rights objects. The history of the development of Kazakhstan's 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 issues. the procedure for registration and filing of an application for an invention and utility model, the procedure for reviewing applications in the patent office; types of decisions of the patent office on applications; rights and benefits of inventors; the concept and types of licenses, the economics of inventions. Preparation and submission of the application. Drafting of the claims and utility model, utility model and industrial design. Issuance of a patent or certificate. The validity of patents and copyright certificates issued before the introduction of modern patent legislation. The rights of the authors of inventions, utility models and industrial designs. Patent rights and their protection. The content of patent rights. Duties of the patent holder.

1. Basic information about the discipline:	
Name of the discipline	Production management
2. Number of credits	3
3. Prerequisites:	Mathematics, Operation of the machine and tractor fleet, Mechanization of animal husbandry, Fundamentals of Precision Agriculture, Fundamentals of Economics and Law
4. Post-requirements:	Operation of the machine and tractor fleet, Mechanization of animal husbandry, Labor protection.
5. Competencies:	As a result of studying this discipline, students should: Be able to use in practice the ability to plan the production activities of the organization, develop corporate, competitive and functional strategies for the development of the organization. To know the basics of production management in the formation of the socio-economic system; production management in the enterprise management system; the content and structure of the production management system; market strategy in production management. Possess the methodology of forecasting promising ways to solve problems; economic justification of effective projects Ability to set goals and formulate tasks related to the implementation of professional functions.
6. Author of the course	-
7. Basic literature	1. Belyaev, A.M. Production management: Textbook for bachelors / I.N. Ivanov, A.M.- M.: Yurayt, 2013. - 574 p. 2. Shemyakina, T.Yu. Production management: quality management (in construction): Textbook / T.Yu. Shemyakina, M.Yu. Selivokhin. - M.: Alfa-M, SIC INFRA-M, 2013. 3. Alexandrova, A.V. Strategic management: Textbook / N.A. Kazakova, A.V. Alexandrova, S.A. Kurashova, N.N. Kondrashova. - M.: SIC INFRA-M, 2013. - 320 p. 4. Production management: a textbook / E. M. Gainutdinov, L. I. Podderegina. – Minsk: Higher School, 2010. – 319, p. 5. Production management: textbook / E. M. Karpenko, S. Y. Komkov. – Gomel: GSTU, 2010. – 519 p.
8. Content of the discipline:	Introduction to production management. Designing a new product. Management of innovative projects. Types of production processes. Production cycle. Production capacity. Placement of enterprises. The production structure of the enterprise. Organization of production by in-line methods. Organization of production maintenance. Product quality strategy. Production inventory management. Production planning and organization of product sales. Formation of production programs. Operational production management.

1. Basic information about the discipline:	
Name of the discipline	Computer graphics
2. Number of credits	4
3. Prerequisites:	School course of subjects computer science, Information and communication technologies
4. Post-requirements:	Fundamentals of Design, Descriptive geometry and Engineering Graphics, Computer-aided design of mechanisms, Fundamentals of Design, Systems, Patent legislation, Tractors and automobiles, Agricultural machinery
5. Competencies:	<p>A.To know the elements of descriptive geometry and engineering graphics, the basics of the theory of automation, the execution of drawings, to know the possibilities and applications of the COMPASS -3D system, the theoretical foundations and applied value of computer graphics, ways of displaying spatial forms on a plane, the possibilities of computer execution of drawings.</p> <p>B. Be able to use the knowledge and concepts of computer graphics, determine the geometric shape of parts from their images, understand the principle of operation of the structure shown in the drawing, build images of simple objects, execute and read drawings of technical products, develop methodological and regulatory documents, technical documentation, apply principles and techniques of working with the computer graphics application program - COMPASS -3D.</p> <p>C. Possess the skills of solving practical problems of displaying graphic information (geometric modeling problems) using specialized software tools, skills in using the COMPASS -3D program to create drawings, illustrations for course and diploma design.</p>
6. Author of the course	
7. Basic literature	<ol style="list-style-type: none"> 1. Bolshakov, V. P. Engineering and computer graphics / V.P. Bolshakov, V.T. Tozik, A.V. Chagina. - M.: BHV-Petersburg, 2013. - 288 p. 2. Bolshakov, V.P. Engineering and computer graphics / V.P. Bolshakov. - M.: BHV-Petersburg, 2004. - 132 c. 3. Bolshakov, V.P. Engineering and computer graphics. Practicum /. - Moscow: SPb: BHV, 2004. - 592 4. Engineering 3D computer graphics. Textbook / A.L. Heifets et al. - M.: Yurayt, 2015. - 464 p.
8. The content of the discipline;	The application of theoretical knowledge to create graphic images, display information, the basics of working in modern graphic means of interactive computer graphics (creating 3D images in Compass).to determine the geometric shape of parts based on their images, the basics of solving problems of geometric modeling of graphic information in interactive graphic packages.

1. Basic information about the discipline:	
Name of the discipline	Measuring systems/ Interchangeability, standardization and technical measurements
2. Number of credits	4
3. Prerequisites:	Information and communication technologies, Technology of structural materials, Agricultural machinery, Descriptive geometry and engineering graphics, Fundamentals of the theory and calculation of the internal combustion engine, Mechanics of materials
4. Post-requirements:	Fundamentals of design, Computer-aided design of mechanisms, Automation of drawings, Modeling of engineering systems. Fundamentals of design, Tractors and automobiles, Electrical Engineering and fundamentals of electronics, Failure analysis and repair of machines
5. Competencies:	To know and understand the procedure for building a unified system of tolerances and landings, the theory of precision calculations. Be able to work with the main groups of measuring instruments and control of products, processes. Possess the rules of process control in product quality management based on regulatory and technical documentation. Acquire practical skills in choosing measuring instruments based on input information (accuracy, productivity, etc.); be able to assess the metrological equipment of production, work according to the system of tolerances and landings, assign standards of accuracy of products. .
6. Author of the course	Ivanchenko A.V.
7. Basic literature	1. Sergeev A.G., Latyshev M.V., Teregerya V.V. Metrology, standardization, certification. Textbook. – M.: 2003. - 536 p 2. Sergeev A.G., Krokhin V.V. Metrology: Textbook for universities. – M.: Kolos, 2000. – 408 p. 3. Yakushev A.I. et al. Interchangeability, standardization and technical measurements. Textbook for Universities. – M.: Mechanical Engineering - 1987. – 352 p.
8. The content of the discipline.	The concept of measuring and control tools. . Metrological characteristics of SI. Principles of SI selection. Marginal errors of the most common universal measuring instruments. The concept of testing and control. Limit calibers. Operating rules, SI settings, measurement methods. Construction and operation of rod tools, micrometric and lever-mechanical tools. The use of SI in repair production and in technical diagnostics of aggregates, assemblies and mechanisms of agricultural machinery. General principles of interchangeability. General principles of building a unified system of admissions and landings (ESDP).

1. Basic information about the discipline:	
Name of the discipline	Fuel, lubricants and technical fluids
2. Number of credits	4
3. Prerequisites:	Physics, Chemistry, Mathematics, Fundamentals of wheeled and tracked vehicles.
4. Post-requirements:	Tractors and cars, Operation of the machine and tractor fleet, Technical service in the agricultural sector, Failure analysis and repair of machines, Measuring systems, Fundamentals of the theory and calculation of the internal combustion engine, Mechanics of materials.
5. Competencies:	<p>Know the requirements for fuels, lubricants and special liquids. Properties, assortment, conditions and applications and changes in parameters during operation, transportation and storage. Methodology and equipment for determining the basic properties of fuels and lubricants. Measures to prevent environmental pollution when using fuels and lubricants.</p> <p>Be able to select the appropriate grades and brands of fuel, lubricants and special fluids for the equipment in operation, technically competently select grades and brands of fuels and lubricants during the operation of equipment, carry out quality control of fuels and lubricants.</p> <p>Possess the ability to compare grades and brands of fuels, lubricants, form conclusions about their use in the operation of specific equipment, build your own argumentation.</p> <p>The formation of a sense of tolerance, respect and compliance with legislation regulating activities in the field of the use of SCI.</p>
6. Author of the course	
7. Basic literature	<ol style="list-style-type: none"> 1. Vasilyeva L.S. Automotive operational materials: Textbook for universities. – Moscow: Nauka – Press, 2003.- 421s. 2. Ostrikov V.V. Fuel, lubricants and technical fluids. Study guide. Ulyanovsk State Agricultural Academy, 2009 3. Safonov A.S., Ushakov A.I., Oreshenkov A.V. The quality of automobile fuels. NPICC St. Petersburg, 2006 4. Kholmanov V.M. Diagnostics and restoration of engine oil. Ulyanovsk State Agricultural Academy, 2006 5. Kirichenko N.B. Automotive operational materials. The workshop. Moscow, 2004
8. Content of the discipline:	Types of fuels used in agriculture, General information about oil and the production of petroleum products, Operational properties. Additives to motor oils. Synthetic oils. Domestic classification of motor oils by viscosity and performance properties. Classification of motor oils by SAE viscosity, General information. Operational properties. Ultimate strength and effective viscosity. Mechanical, thermal, colloidal and chemical stability. Classification of lubricants. Antifriction, preservation sealing and rope lubricants. The range of lubricants. Quality control of lubricants. The influence of the chemical composition of oil on the quality indicators of fuel and lubricants. The main methods of obtaining fuels and oils from oil. Preparation of commercial grades of fuels and lubricants. Raw materials based methods of obtaining alternative fuels. The influence of the quality of fuel and lubricants on the technical and economic indicators of road transport and the technical operation of road transport.

1. Basic information about the discipline:	
Name of the discipline	Technical service in agriculture
2. Number of credits	5
3. Prerequisites:	Fundamentals of wheeled and tracked vehicles, Tractors and automobiles, Agricultural Machinery, Heat engineering, Fuel lubricants and technical fluids, Fundamentals of Agronomy, Fundamentals of Animal Husbandry.
4. Post-requirements:	Mechanization of animal husbandry, Failure analysis and repair of machines, Patent legislation, Mechanization of animal husbandry, Agrotechnological machines, Labor protection, Production management
5. Competencies:	A. To know and understand the place of PBX in the agro-industrial complex. Dealer firms of engineering and technical support of commodity producers. Normative documents of technical use of machines. B. Be able to use knowledge in practice. To carry out the use of technology and equipment for the organization and performance of agrotechnical services in the enterprises of the agro-industrial complex. C. Possess the ability to give suggestions, evaluate ideas and draw conclusions, determine the profitability of the organization of service, the use of material and technical base and equipment in agro-industrial enterprises and enterprises of agrotechnical service to give suggestions to eliminate deficiencies in technical service in the agro-industrial complex.
6. Author of the course	-
7. Basic literature	1 Alliluyev V.A. et al. Technical operation of the machine and tractor park./V.A. Alliluyev, A.D. Ananyin, V.I. Mikhlin. - M.: Agropromizdat, 1991.-367 p., il. 2 Varnakov V.V. et al. Technical service of agricultural machinery/. V.V. Varnakov, V.V. Streltsov, V.P. Popov, V.F. Karpenkov. – M.: Kolos, 2000.-256 p., ill. 3 Yudin M.I., Stukopin P.I., Shirai O.G. Organization of repair and maintenance production in agriculture: textbook /KGAU. - Krasnodar, 2002.-944 p.
8. Content of the discipline.	The discipline "Technical service in agriculture" considers the importance of PBX in the agro-industrial complex. Theoretical foundations of technical support of machine use. The condition of the machines, technical properties and malfunctions. Planning and preventive maintenance system of machines. Technical diagnostics and evaluation of machines for workability. Organization of machine storage and its technologies. Providing machines with top-lubricants. Organization of agrotechnical service. The place of agrotechnical service in the system of the agro-industrial complex. Organizational types of engineering, technical and material support for the enterprise of the agro-industrial complex. Dealer types of engineering and technical support of commodity producers. Organization of branded technical service. Features of technical service in farm (peasant) farms. Machine-technological station (MTS). The structure of MTS, the organization of its work and the sequence of its action. Leasing type of lease of agricultural machinery. Agroengineering marketing. Certification.

1. Basic information about the discipline:	
Name of the discipline	Mechanization of animal husbandry
2. Number of credits	5
3. Prerequisites:	Physics; Mathematics; about General Chemistry; Fundamentals of Animal husbandry; descriptive geometry and engineering graphics; Computer graphics; mechanics of materials; engineering mechanics; Heat engineering, computer-aided design of mechanisms; fundamentals of design; Measuring instruments; Electrical machines and drive, Failure analysis and repair of machines.
4. Post-requirements:	Pre-graduate practice, diploma design.
5. Competencies:	<p>To know the zootechnical requirements for the means of mechanization of animal husbandry; advanced technologies for the 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 basics of designing production production lines in animal husbandry, poultry and animal husbandry.</p> <p>Be able to correctly solve the issues of mechanization of production processes on farms of various forms of ownership from the standpoint of a systematic approach, design and complete production lines, manage installation and commissioning works and evaluate the quality and effectiveness of livestock mechanization tools.</p> <p>Possess the ability to evaluate the quality of work and the efficiency of the use of livestock farming machines, compare, build their own arguments, express their position on the choice of technologies and technological equipment, the principal ways of development of mechanization of livestock production, the main issues of the technological process.</p>
6. Author of the course	
7. Basic literature	<p>1. Kirsanov V.V., Murusidze D.N., Nekrashevich V.F., Shevtsov V.V., Filonov R.F. Mechanization and technology of animal husbandry. – M.: INFRA-M, 2014. - 584 p.</p> <p>2. Nurtaev Sh.N. Malsharuashylygyn mekhanikalandyru zhane elektrlendiru.– Almaty, 2012 -493 b.</p> <p>3. Kazarovets N.F., Prishchepov M.A., Abdyrov A.M., Nukeshev S.O., Mustafin Zh.Zh. Technologies and technical support of livestock production. – Astana: S. Seifullin KATU, 2013. – 475 p.</p>
8. Content of the discipline: Production and technological characteristics of livestock enterprises.Mechanization; water supply of farms and pastures, harvesting and distribution of feed and means of mechanization of feed storages, milking of farm animals, primary processing, milk processing, technological processes in sheep breeding, 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 a system for the formation of microclimate parameters in livestock premises.Operation of machinery and equipment of livestock farms and organization of their technical service.Technological foundations of the design of livestock enterprises.	

1. Basic information about the discipline:	
Name of the discipline	Failure analysis and repair of machines
2. Number of credits	4
3. Prerequisites:	Physics; Mathematics; general chemistry; fundamentals of animal husbandry; descriptive geometry and engineering graphics; Heat engineering, Computer graphics; mechanics of materials; engineering mechanics; computer-aided design of mechanisms; fundamentals of design; electric machines and drive. Technology of structural materials.
4. Post-requirements:	Mechanization of animal husbandry, Operation of the machine and tractor fleet, Labor protection, Modeling of engineering systems of systems
5. Competencies:	Be able to develop and implement measures to maintain and restore the reliability, operability and resource of agricultural machinery with minimal labor and money. Be able to ensure the effective use of technological machines, through ongoing repairs and maintenance. Identify the causes of malfunctions, damages and failures of machinery and equipment. and automation of technological and production processes and rules of safe operation during the repair of machinery and equipment; organization of labor and production in repair and maintenance bases
6. Author of the course	
7. Basic literature	<ol style="list-style-type: none"> 1. Reliability and repair of machines / Edited by V.V. Kurchatkin. - M.: Kolos, 2000. - 776 p.: ill. 2. Klenin N.I., Egorov V.G. Agricultural and reclamation machines. – M.: Kolos, 2004.-464s. 3. Gurevich L.A. et al. Tractors and agricultural machines. – M.: Agropromizdat, 1986.-267 p. 4. Aliev B. Traktorlar men automotive theory. - Almaty, 2005
8. The content of the discipline.	Fundamentals of wear of parts, forecasting the causes of malfunctions in nodes, machines, on progressive ways to repair them and restore the technology of repair of nodes, aggregates of machines, equipment. The main indicators of machine reliability. Evaluation of machine durability indicators.