

**MINISTRY OF AGRICULTURE OF THE REPUBLIC OF KAZAKHSTAN
"NJSC "S. SEIFULLIN KAZAKH AGROTECHNICAL UNIVERSITY"**

Approve
NJSC "Saken Seifullin Kazakh
Deputy Chairman of the Management
Board Academic Activity-Rector
_____ A.M Abdyrov.
« _____ » _____ 2021.

CATALOG OF ELECTIVE COURSES

For students in groups of educational programs

6B087-Agroengineering

Nur-Sultan, 2021

**MINISTRY OF AGRICULTURE OF THE REPUBLIC OF KAZAKHSTAN
"NJSC "S. SEIFULLIN KAZAKH AGROTECHNICAL UNIVERSITY"**

Brief description of elective disciplines of the educational program

Veterinary sanitary examination of livestock and poultry farming products

1	Name of course	Labor protection and basics of life safety
2	Code of course	OTOBZh 2118
3	Cycle of course	GER
4	Amount of credits	5
5	Level of preparation	Undergraduate studies
6	Department	Agrarian Technique and Technology
7	Year	2
8	Prerequisites	Course geography, ecology.
9	Postrequisites	Production practice, design of food production enterprises / design of plant raw materials processing and biofuel production enterprises, diploma project (work).
10	Course summary	Content of the discipline: formation of knowledge in the field of man-made impact of agro-industrial enterprises on the environment. Ideas on the main sources of pollution, the composition of pollutants and their quantitative assessment. Determination of the degree of anthropogenic environmental pollution. Determination of Environmental Quality at different environmental levels. Research of methods of Environmental Control and monitoring of environmental pollution. Research of the main directions of greening and optimizing the consumption of agro-industrial resources
11	Learning outcomes	Fundamentals of human life safety in the Environment-Legal and regulatory and technical bases of life safety, participation in the implementation of rescue and other urgent works in the elimination of the consequences of an emergency.

1	Name of course	Basics of economics and law
2	Code of course	OEP 2119
3	Cycle of course	GER
4	Amount of credits	5
5	Level of preparation	Undergraduate studies
6	Department	Economy
7	Year	2
8	Prerequisites	1. School course fundamentals of law. 2. Mathematics 3. Political science and Sociology
9	Postrequisites	1. Fundamentals of business activity 2 Economics and management 3. Diploma design
10	Course summary	1. Fundamentals of social production and forms of social economy 2. The mechanism of functioning of the market system 3. Production, costs and income of the company 4. National economy. Economic growth and market economy instability 5. Inflation and unemployment-a manifestation of economic instability. 6. Financial and monetary system in the national economy and economic security. 7. Fundamentals of the theory of State and law 8. Fundamentals of constitutional law 9. Fundamentals of administrative, civil, labor, family, and criminal law 10. Economic and legal aspects of land market regulation.
11	Learning outcomes	Mastering the basics of economics and law, procedures for creating small and medium-sized businesses in agriculture and the field of agrotechnical services

1	Name of course	Professionally-oriented Foreign Language
2	Code of course	POIYa 2217
3	Cycle of course	BS
4	Amount of credits	3
5	Level of preparation	Undergraduate studies
6	Department	Foreign Languages
7	Year	2
8	Prerequisites	Foreign language
9	Postrequisites	Diploma design
10	Course summary	Characteristics of the content of special disciplines of the agricultural engineering direction 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
11	Learning outcomes	Know a foreign language to the extent necessary to obtain professional information from foreign sources and communicate at a professional level; business and professional vocabulary of a foreign language to the extent necessary for communication, reading and translating foreign-language texts of general and professional orientation;

1	Name of course	Computer graphics
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2	Code of course	KG 2218
3	Cycle of course	BS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Technical Mechanics
7	Year	2
8	Prerequisites	School course of subjects computer science, Information and communication technologies
9	Postrequisites	Fundamentals of design, descriptive geometry and engineering graphics, computer-aided design of mechanisms, fundamentals of design, systems, patent legislation, agricultural machines
10	Course summary	Application of theoretical knowledge for creating graphic images, displaying 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.
11	Learning outcomes	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, develop methodological and regulatory documents, technical documentation, apply the principles and techniques of working with a computer graphics application program. COMPASS-3D

1	Name of course	Computer-aided design technology machines
2	Code of course	STM 2219
3	Cycle of course	BS
4	Amount of credits	4

5	Level of preparation	Undergraduate studies
6	Department	Technological Machines and Equipment
7	Year	2
8	Prerequisites	Course of subjects computer science, Information and communication technologies
9	Postrequisites	Fundamentals of design, descriptive geometry and engineering graphics, computer-aided design of mechanisms, fundamentals of design, systems, patent legislation, agricultural machines
10	Course summary	Application of theoretical knowledge for creating graphic images, displaying 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. Theory and calculation of agricultural machinery
11	Learning outcomes	Knowledge of the unified system of design documentation(ESKD), GOST standards, technical documentation and reference literature; - - draw up technological and other technical documentation in accordance with the requirements of GOST, accuracy classes and their designation in drawings and graphic construction and modeling of parts in 3D, CorelDRAW graphic editors, COMPASS

1	Name of course	Draft execution automation.
2	Code of course	AVCh 2241
3	Cycle of course	BS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Technical Mechanics
7	Year	2
8	Prerequisites	1.Descriptive geometry and engineering graphics. 2.Fundamentals of construction of agricultural machinery. 3.Technology of Structural Materials.
9	Postrequisites	1. Modeling of Engineering Systems 2. Theory of machine mechanisms 3. Technical service in the field of agro-complex 4. Technological equipment for processing agricultural products

10	Course summary	1.General principles of mutual exchange. The essence of standardization. 2.Precision machining in the production and restoration of machine parts. 3. System of departures and landings; 4.Selection and calculation of the standard for planting flat joints. 5.Feedings and landings of vibration bearings. 6-8. transfers and landings 9. Metrology. 10. basic technical measurements. 11. Universal and special measuring instruments. 12-15.calculation of Dimensional circuits.
11	Learning outcomes	The ability to compare, formulate a problem statement, build your own solution method.

1	Name of course	Measuring Systems
2	Code of course	IS 3227
3	Cycle of course	BS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Technical Mechanics
7	Year	3
8	Prerequisites	1. Descriptive geometry and engineering graphics. 2. Physics. 3. Chemistry. 4. Agricultural machinery, 5. Information and communication technologies. 6. Technology of structural materials.
9	Postrequisites	1. Modeling of engineering systems 2. Theory of machine mechanisms 3. Operation of the machine and tractor fleet 4. Technological equipment for processing agricultural products
10	Course summary	1. General principles of interchangeability. The essence of standardization. 2. Precision machining in the manufacture and restoration of machine parts. 3. System of tolerances and fitments of smooth cylindrical joints. 4. Calculation and selection of landings, quality-smooth connections 5. Tolerances and fitments of rolling bearings. 6-8. Tolerances and fitments of key and spline joints. 9. Metrology. 10. Fundamentals of technical measurements. 11. Universal and special measuring instruments. 12-15.Calculation of dimensional chains.

11	Learning outcomes	Preparation of design and estimate documentation, calculation of design development in the field of AGRICULTURE possession of the theoretical foundations of modern mathematical methods for solving stationary, non-stationary problems, problems with the distribution of parameters over space, time
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1	Name of course	Interchangeability of standardization and technical measurements
2	Code of course	VSTI 3228
3	Cycle of course	BS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Standardization, Metrology and Certification
7	Year	3
8	Prerequisites	1.Descriptive geometry and engineering graphics. 2.Fundamentals of construction of agricultural machinery. 3. Techno-logic of Structural Materials.
9	Postrequisites	1. Modeling of Engineering Systems 2. Theory of machine mechanisms 3. Technical service in the field of agro-complex 4. Technological equipment for processing agricultural products
10	Course summary	1.General principles of mutual exchange. The essence of standardization. 2.Precision machining in the production and restoration of machine parts. 3. System of departures and landings; 4.Selection and calculation of the standard for planting flat joints. 5.Feedings and landings of vibration bearings. 6-8. Transfers and landings 9. Metrology. 10. Basic technical measurements. 11. Universal and special measuring instruments. 12-15.Calculation of Dimensional circuits.
11	Learning outcomes	Knowledge of the theoretical foundations of modern mathematical methods for solving stationary, non-stationary problems, problems with the distribution of parameters over space and time

1	Name of course	Fuel lubricants and technical operation
2	Code of course	TSMTZh 3310
3	Cycle of course	AS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Transport Equipment and Technologies
7	Year	3
8	Prerequisites	1. Information and communication technologies. 2. Physics. 3. Chemistry. 4.fundamentals of construction of wheeled and tracked machines.
9	Postrequisites	1. Machine use 2. Tractors and cars 3. Fundamentals of the theory of internal combustion engines
10	Course summary	1-3. Types of fuel, properties and gorenje 4-5.Operational properties and use of diesel fuel. 6. Operational properties and use of gaseous fuels 7. Performance properties and use of lubricants for agricultural machinery 8-9.The influence of various factors on the change in the quality of oil in the engine. Classification and brand of oils. 10-11. Performance properties and application of transmission and other oils. 12-13. Performance properties and application of greases. 14-15. Operational properties and application of special fluids for agricultural machinery.
11	Learning outcomes	It is technically competent to select grades and brands of fuel and lubricants and technical liquids, to carry out quality control, to analyze and evaluate the operational properties of fuel and lubricants, to organize the implementation of measures for the collection of used oils for regeneration

1	Name of course	Fundamentals of agronomy
2	Code of course	OA 2215
3	Cycle of course	BS
4	Amount of credits	3
5	Level of preparation	Undergraduate studies
6	Department	Agriculture and Plant Growing
7	Year	2
8	Prerequisites	1. Information and communication technologies. 2. Chemistry. 3. Agricultural machinery
9	Postrequisites	3. Agricultural machinery 4. Machine use 5. Agrotechnological machines in animal husbandry 6. Operation of the machine and tractor fleet
10	Course summary	1. Land resources of the Republic of Kazakhstan. 2-3. Soil fertility, its significance, types and ways of increasing it. 4. Weed plants and control measures. 5. Introduction and development of crop rotations. 6. Methods and techniques of tillage. 7-8. Pairs, meaning, types and techniques of their processing. 9. Minimization of tillage. 10-12. Criteria for assessing the quality of tillage. 13-15. Morphological, biological features and features of the technology of cultivation of field, vegetable and fruit and berry crops cultivated in the Republic of Kazakhstan
11	Learning outcomes	Be able to determine the types and varieties of agricultural crops; apply the basic agrotechnical methods of growing crops and the main methods of cultivating the soil and increasing its fertility; classification and the principle of building crop rotations; the main types of weeds, pests and diseases of agricultural crops, methods of protection against them

1	Name of course	Fundamentals of crop production
2	Code of course	OR 2216
3	Cycle of course	BS
4	Amount of credits	3
5	Level of preparation	Undergraduate studies
6	Department	Agriculture and Plant Growing
7	Year	2
8	Prerequisites	1. Information and communication technologies. 2. Chemistry. 3. Agricultural machinery
9	Postrequisites	1. Agricultural machinery 2. Machine use 3. Agrotechnological machines in animal husbandry 4. Operation of the machine and tractor fleet
10	Course summary	1. Land resources of the Republic of Kazakhstan. 2-3. Soil fertility, its significance, types and ways of increasing it. 4. Weed plants and control measures. 5. Introduction and development of crop rotations. 6. Methods and techniques of tillage. 7-8. Pairs, meaning, types and techniques of their processing. 9. Minimization of tillage. 10-12. Criteria for assessing the quality of tillage. 13-15. Morphological, biological features and features of the technology of cultivation of field, vegetable and fruit and berry crops cultivated in the Republic of Kazakhstan
11	Learning outcomes	Be able to determine the types and varieties of agricultural crops; apply the basic agrotechnical methods of growing crops and the main methods of cultivating the soil and increasing its fertility; classification and the principle of building crop rotations; the main types of weeds, pests and diseases of agricultural crops, methods of protection against them

1	Name of course	Agrecultural machines
2	Code of course	SM 2240
3	Cycle of course	BS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Agrarian Technique and Technology
7	Year	2
8	Prerequisites	Fundamentals of the device of wheeled and tracked vehicles.
9	Postrequisites	1. Agricultural machinery 2. Agrotechnological machines 3. Machine use
10	Course summary	1 Methods and technologies for harvesting grain crops; 2. General structure and operating principle of grain harvesters; 3. Tillage; 4. Application of fertilizers; 5. Seeding and planting; 6. Care of crops and cleaning of agricultural crops; 7. Post-harvest processing of the crop 8. Adjustment and aggregation; 9. Production of land reclamation works. 10. Organization and quality control of basic agricultural machines
11	Learning outcomes	Mastering skills in the device and adjustment of agricultural machines and the composition of aggregates.

1	Name of course	Hydropneumatic machines and drives
2	Code of course	GMP 2220

3	Cycle of course	BS
4	Amount of credits	3
5	Level of preparation	Undergraduate studies
6	Department	Operating Electra Equipment
7	Year	2
8	Prerequisites	1. Fundamentals of the device of wheeled and tracked vehicles. 2. Fuel, lubricants and technical fluids. 3 Agricultural machines. 4. Physics. 5. Chemistry.
9	Postrequisites	1. Machine use 2. Tractors and cars 3. Fundamentals of the theory of internal combustion engines 4. Operation of the machine and tractor fleet
10	Course summary	1-2. Hydraulic installations, their classification and application in agricultural production. 3-4. Thermodynamic parameters of the gas state and processes. 5. The first and second laws of thermodynamics. 6.. Water vapor and moist air. 7. Cycles of heat engines and installations. 8..Heat and power plants. 9. Heating, ventilation and hot water supply of industrial and municipal buildings. 10. The use of heat in protected ground structures.
11	Learning outcomes	Know the basic laws of hydrostatics, kinematics and dynamics of moving flows; the main provisions of the theory of similarity of hydrodynamic and heat exchange processes; the principles of operation of hydraulic machines and systems, their application; types and characteristics of pumps and fans

1	Name of course	Fundamentals of animal husbandry
2	Code of course	OZh 3226
3	Cycle of course	BS
4	Amount of credits	3
5	Level of preparation	Undergraduate studies
6	Department	Technology and Processing of Livestock Production

7	Year	3
8	Prerequisites	1. Information and communication technologies. 2. Chemistry. 3. Fundamentals of the device of agricultural machines. 4. Fundamentals of agronomy.
9	Postrequisites	1. Mechanization of animal husbandry 2. Operation of the machine and tractor fleet
10	Course summary	1. Studying the basics of animal husbandry course. 2-3. Breeding, feeding, and keeping animals of different species. 4-7. Technology of production of products of separate subsectors of animal husbandry: cattle breeding, horse breeding, camel breeding, sheep breeding, pig breeding, poultry breeding, rabbit breeding. 8-15. 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.
11	Learning outcomes	Master the basics of technologies for the production of livestock and beekeeping products; - principles of providing livestock with high-quality feed and technologies for harvesting and storing feed; - rules for the preparation of rations for farm animals

1	Name of course	Fundamentals of robotics
2	Code of course	OR 2221
3	Cycle of course	BS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Technological Machines and Equipment
7	Year	2
8	Prerequisites	Mathematics, Physics, Descriptive Geometry and Engineering Graphics, Computer Graphics,
9	Postrequisites	Mechanization of animal husbandry, Agricultural machinery. Patent law, Labor protection, Modeling of engineering systems of Systems, Fundamentals of Design, Engineering Mechanics (Statics, Dynamics), Mechanics of Materials,

10	Course summary	The structure of industrial robot manipulators, the system of cyclic software control of robots, The evaluation of the positioning accuracy of the robot with a cyclic control system, the programming of the robot on a GPS computer simulator
11	Learning outcomes	Master the methodology of selecting robots and robotic systems for specific processes and productions, modern information technologies for designing robotic productions

1	Name of course	Computer-Aided Mechanism Design
2	Code of course	APM 2222
3	Cycle of course	BS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Technical Mechanics
7	Year	2
8	Prerequisites	1. Descriptive geometry and engineering 2. Agricultural machinery. 3. Information and communication technologies. 4. Technology of construction materials. graphics 5. Mathematics
9	Postrequisites	1. Agricultural machinery 2. Basic design and machine parts 3 Theory of machine mechanisms 4 Interchangeability standardization and technical measurements 5 Diploma design 6 Automation of drawing execution 7 Engineering design
10	Course summary	1. Basic concepts of the course, types, sections, sections, remote elements. 2. Split and all-in-one connections. Detailing and sketching. 3. Assembly drawing and general view. 4. Methods of flat graphic construction and modeling of parts in 3D. 5. Coreldraw graphics editors, COMPASS. 6. Ways to transform the drawing. .Mutual intersection and sweep of surfaces. Axonometric projections. 7. Unified system of Design documentation (ESCD). 8. Types of products and design documents. Geometric constructions. 9. Design of drawings. Connections. Assembly drawings and general view drawing. 10. Reading and detailing a general view drawing

11	Learning outcomes	Preparation of design and estimate documentation, calculation of design development in the field of agriculture
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1	Name of course	CNC system (Fundamentals of Mechatronics)
2	Code of course	SChOM 2223
3	Cycle of course	BS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Technological Machines and Equipment
7	Year	2
8	Prerequisites	Agricultural machines, CAD of technological machines, Hydropneumatic machines and drives
9	Postrequisites	Measuring systems, Engineering mechanics (Statics, Dynamics), Mechanics of materials
10	Course summary	Classification of control systems. Architecture of PCNC systems. A real-time problem in the management system. Problems of electromechanical control. Creating an inter-module communication environment. Principles of building remote CNC terminals. Features of the architecture of CNC systems with STEP-NC. Implementation of a geometric problem. Implementation of logical management tasks. Control of electrical automation of machine tools with SBP. Implementation of the terminal task. Implementation of the diagnostic task of the Department.
11	Learning outcomes	A. to have an idea of the classification of digital software management systems.

1	Name of course	Mechanical Design
2	Code of course	OK 4233
3	Cycle of course	BS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Technical Mechanics
7	Year	4
8	Prerequisites	1. Mathematics. 2. Engineering mathematics. 3. Information and communication technologies. 4. Technology of construction materials. 5. System modeling. 6. Descriptive geometry and engineering graphics.
9	Postrequisites	1. Machine use 2. Operation of the machine and tractor fleet 3. Reliability and repair of machines 4. Diploma design
10	Course summary	1. Fundamentals of evaluating the performance and reliability of machines. 2. Economic fundamentals of designing machinery and equipment. 3. Gears. 4. Bevel gears. 5. Worm gears. 6. Chain drives. 7. Belt drives, friction gears and variators. 8. Axles and shafts. 9. Bearings. 10. Couplings. 11. Connections. Keyed and toothed, welded, threaded and riveted joints 12. Springs. 13. Body parts. 14. Computer-aided design of machine parts. 15. Execution of design documentation
11	Learning outcomes	To form the knowledge and skills of graduates to independently solve the issues of calculation and design of general-purpose parts with the implementation of the necessary drawings

1	Name of course	Machine parts
2	Code of course	DM 4238
3	Cycle of course	BS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Technical Mechanics
7	Year	4
8	Prerequisites	1. Mathematics. 2. Engineering mathematics. 3. Information and communication technologies. 4. Technology of construction materials. 5. System modeling. 6. Descriptive geometry and engineering graphics.
9	Postrequisites	1. Machine use 2. Operation of the machine and tractor fleet 3. Reliability and repair of machines 4. Diploma design
10	Course summary	1. Fundamentals of evaluating the performance and reliability of machines. 2. Economic fundamentals of designing machinery and equipment. 3. Gears. 4. Bevel gears. 5. Worm gears. 6. Chain drives. 7. Belt drives, friction gears and variators. 8. Axles and shafts. 9. Bearings. 10. Couplings. 11. Connections. Keyed and toothed, welded, threaded and riveted joints 12. Springs. 13. Body parts. 14. Computer-aided design of machine parts. 15. Execution of design documentation
11	Learning outcomes	To form the knowledge and skills of graduates to independently solve the issues of calculation and design of general-purpose parts with the implementation of the necessary drawings

1	Name of course	Basics of the theory and calculation of the internal combustion engine
2	Code of course	OTRDVS 4313
3	Cycle of course	AS
4	Amount of credits	5
5	Level of preparation	Undergraduate studies
6	Department	Agrarian Technique and Technology
7	Year	4
8	Prerequisites	1. Fundamentals of the device of wheeled and tracked vehicles. 2. Mathematics. 3. Engineering mathematics. 4. Physics. 5. Tractors and cars. 6. Reliability and repair of machine
9	Postrequisites	1. Technical service in the agro-industrial complex 2. Operation of the machine and tractor fleet 3. Reliability and repair of machines 4. Technologies and equipment for processing agricultural products
10	Course summary	1. Thermodynamic cycles of internal combustion engines. 2. The actual cycles of the internal combustion engine. 3. Indicator and effective indicators of the working cycle. 4. Increasing the power and fuel efficiency of tractor engines. 5-6. Kinematics and dynamics of the crank mechanism 7. Balancing the engines. 8. Engine characteristics. traction balance of the tractor and the car. 10. General dynamics of wheeled and tracked vehicles. 11-12. Traction dynamics and fuel efficiency of the tractor and car. 13. Brake dynamics of the tractor and the car. 14. Handling of wheeled and tracked vehicles. 15. Stability, cross-country ability and smoothness of the tractor and car.
11	Learning outcomes	The ability to demonstrate knowledge of the theoretical foundations of working processes in power machines, apparatuses and installations, the ability to participate in computational and experimental studies, to process and analyze the results

1	Name of course	Internal Combustion Engines and Future Alternatives
2	Code of course	DVSPA 4314
3	Cycle of course	AS
4	Amount of credits	5
5	Level of preparation	Undergraduate studies
6	Department	Agrarian Technique and Technology
7	Year	4
8	Prerequisites	1. Fundamentals of the device of wheeled and tracked vehicles. 2. Mathematics. 3. Engineering mathematics. 4. Physics. 5. Tractors and cars. 6. Reliability and repair of machines
9	Postrequisites	1. Technical service in the agro-industrial complex 2. Operation of the machine and tractor fleet 3. Reliability and repair of machines 4. Technologies and equipment for processing agricultural products
10	Course summary	1. Thermodynamic cycles of internal combustion engines. 2. The actual cycles of the internal combustion engine. 3. Indicator and effective indicators of the working cycle. 4. Increasing the power and fuel efficiency of tractor engines. 5-6. Kinematics and dynamics of the crank mechanism. 7. Balancing the engines. 8. Engine characteristics. traction balance of the tractor and the car. 10. General dynamics of wheeled and tracked vehicles. 11-12. Traction dynamics and fuel efficiency of the tractor and car. 13. Brake dynamics of the tractor and the car. 14. Handling of wheeled and tracked vehicles. 15. Stability, cross-country ability and smoothness of the tractor and car.
11	Learning outcomes	The ability to demonstrate knowledge of the theoretical foundations of working processes in power machines, apparatuses and installations, the ability to participate in computational and experimental studies, to process and analyze the results

1	Name of course	Electric machines and drives
2	Code of course	EMP 3224
3	Cycle of course	BS

4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Operating Electra Equipment
7	Year	3
8	Prerequisites	1. Electronics and microprocessor technology. 2. Physics. 3. Fundamentals of the device of wheeled and tracked vehicles. 4. Agricultural machinery.
9	Postrequisites	1 Theoretical foundations of electrical engineering 2 Agrotechnological machines of animal husbandry 3 Operation of the machine and tractor fleet
10	Course summary	1. Purpose and scope of use of voltage transformers. 2. EMF. of the transformer windings. 3. The device of DC machines. 4. Armature reaction in DC machines. Switching in DC machines and its manifestation. 5. Asynchronous motors. Design of the stator and rotor of an asynchronous motor. 6. The principle of converting electrical energy into mechanical energy by an asynchronous motor. 7. Purpose, type and structure of synchronous machines. 8. Definition of the concept of electric drive. 9. Fundamentals of electric drive dynamics. 10. Mechanical characteristics of production mechanisms. 11. Natural mechanical characteristic
11	Learning outcomes	Circuits and basic electrical and switching equipment; know the purpose, element base, characteristics and adjustment properties of electric drives with DC and AC motors. make a selection of electrical equipment: electrical devices, machines, electric drive.

1	Name of course	Electrical engineering and bases of electronics
2	Code of course	EOE 3225
3	Cycle of course	BS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Radio Engineering, Electronics and Telecommunication
7	Year	3

8	Prerequisites	1. Electronics and microprocessor technology. 2. Physics. 3. Fundamentals of the device of wheeled and tracked vehicles. 4. Agricultural machinery.
9	Postrequisites	1 Theoretical foundations of electrical engineering 2 Agrotechnological machines of animal husbandry 3 Operation of the machine and tractor fleet
10	Course summary	1. Purpose and scope of use of voltage transformers. 2. EMF. of the transformer windings. 3. The device of DC machines. 4. Armature reaction in DC machines. Switching in DC machines and its manifestation. 5. Asynchronous motors. Design of the stator and rotor of an asynchronous motor. 6. The principle of converting electrical energy into mechanical energy by an asynchronous motor. 7. Purpose, type and structure of synchronous machines. 8. Definition of the concept of electric drive. 9. Fundamentals of electric drive dynamics. 10. Mechanical characteristics of production mechanisms. 11. Natural mechanical characteristic
11	Learning outcomes	Circuits and basic electrical and switching equipment; know the purpose, element base, characteristics and adjustment properties of electric drives with DC and AC motors. make a selection of electrical equipment: electrical devices, machines, electric drive.

1	Name of course	Fundamental of energy saving
2	Code of course	OE 3229
3	Cycle of course	BS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Operating Electra Equipment
7	Year	3
8	Prerequisites	1. Physics. 2. Fundamentals of wheeled and tracked machines. 3. Agricultural machinery
9	Postrequisites	1. Mechanization of Animal Husbandry 2. Agrotechnological machines in Animal Husbandry
10	Course summary	1. Fuel and energy resources. 2. Rational use of electricity. 3. Rational use of thermal energy. 4. Rational use of water. 5. Improving energy efficiency in production. 6. Improving energy efficiency in agriculture. 7. Improve transport energy efficiency. 8. Energy saving measures in everyday life. 9. Non-traditional renewable energy sources.

11	Learning outcomes	Use modern methods of installation, adjustment of machines and installations, maintenance of operating modes of electrified and automated technological processes directly related to agricultural facilities
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1	Name of course	Heating
2	Code of course	Tep 3230
3	Cycle of course	BS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Power System
7	Year	3
8	Prerequisites	1. Electrical engineering and the basics of electronics 2. Electric machines and electric drive 3 Basics of energy saving
9	Postrequisites	1. Agricultural machinery 2. Machine use agrotechnological machines in animal husbandry
10	Course summary	1-2. History of heat engineering development. The equation of state of the gas. Thermal system and equation. 3-5. Laws of energy production and conversion. 6-7. Thermodynamic processes and cycles. 8-9. Compressors, internal combustion engines, heat pumps. Thermal conductivity. 10-12. Types of heat exchange. 13-15. Industrial heating devices and their classification. Heat exchangers.
11	Learning outcomes	Be able to apply the laws of thermodynamics and heat transfer in the study of related disciplines and in subsequent professional activities

1	Name of course	Engineering economics
2	Code of course	IE 4231
3	Cycle of course	BS
4	Amount of credits	3
5	Level of preparation	Undergraduate studies
6	Department	Economy
7	Year	4
8	Prerequisites	1. Mathematics. 2. Fundamentals of economics and law.
9	Postrequisites	Diploma design
10	Course summary	1 An enterprise as an object of economic management, the main link of the economic system 2 The fixed capital of the enterprise 3 Working capital of the enterprise 4 Labor resources of the enterprise 5 Remuneration of labor at the enterprise 6 Production and sales costs 7 Financial results of the enterprise 8 Economic efficiency of the enterprise 9 Entrepreneurship: concept, essence, main types and organizational forms 10 State support for entrepreneurship and its infrastructure 11 Financing of entrepreneurial activity 12 Business planning in the system of entrepreneurial activity 13 Risks in entrepreneurial activity 14 Organization of business transactions. Responsibility of business entities 15 Termination of entrepreneurial activity
11	Learning outcomes	The ability to apply the basic methods of financial management for asset valuation, working capital management, investment decisions, financing decisions, the formation of a dividend policy and capital structure, including when making decisions related to operations on world markets in the context of globalization

1	Name of course	Production management
2	Code of course	PM 4232
3	Cycle of course	BS
4	Amount of credits	3
5	Level of preparation	Undergraduate studies
6	Department	Management
7	Year	4
8	Prerequisites	1. Mathematics. 2. Fundamentals of economics and law 3. Operation of the machine and tractor fleet.
9	Postrequisites	1. Enterprises and entrepreneurship 2. Diploma design
10	Course summary	1. Characteristics of the organization and management activities. 2. The evolution of managerial thought. 3. Internal and external environment of the organization. 4. Business social responsibility and manager ethics 5. Communications. 6. Making management decisions. 7. Planning. 8. Organization as a management function. 9. Motivation. 10. Control. 11. Group dynamics. 12. Leadership: power and influence. 13. Leadership styles. 14. Conflict and stress management. 15. Change management.
11	Learning outcomes	Ability to work in a team, to perceive social, ethnic, confessional and cultural differences with tolerance

1	Name of course	Patent Law
2	Code of course	PZ 4236
3	Cycle of course	BS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Agrarian Technique and Technology
7	Year	4
8	Prerequisites	1. Descriptive geometry and engineering graphics. 2. The basics of the device of wheeled and tracked vehicles. 3. The basics of the device of agricultural machines.
9	Postrequisites	1. Diploma design 2 Organization of scientific research and patenting
10	Course summary	1 The basics of professional creativity. 2 Methods for identifying inventions. 3 Main methods of activating creative thinking. 4 Patent Law of the Republic of Kazakhstan. 5 Objects of patent law and the conditions of their patentability. 6 Utility models. 7 Industrial designs. 8 Registration of patent rights. 9 The claim of the invention. 10 Patent and licensing work in the Republic of Kazakhstan. 11 The economics of the invention. 12 Rules for working with scientific, technical and patent literature. 13 Selection of the object of the invention or utility model. 14 Patent search. (Patent research). 15 The structure and methodology of compiling a description of the alleged invention "Object-device".
11	Learning outcomes	Possess the basic provisions of the legal protection of the results of intellectual activity, know the features, signs, types and conditions of patentability of intellectual property objects in the field of patent law, know the grounds for the emergence and principles of protection of industrial property objects, know the features of the emergence of patent rights of the authors of an invention, utility model or industrial design, be able to distribute these rights to the types of

1	Name of course	Basics of patenting and professional creative
2	Code of course	OPPT 4237
3	Cycle of course	BS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Agrarian Technique and Technology
7	Year	4
8	Prerequisites	1. Descriptive geometry and engineering graphics. 2. The basics of the device of wheeled and tracked vehicles. 3. The basics of the device of agricultural machines.
9	Postrequisites	1. Diploma design 2 Organization of scientific research and patenting
10	Course summary	1 The basics of professional creativity. 2 Methods for identifying inventions. 3 Main methods of activating creative thinking. 4 Patent Law of the Republic of Kazakhstan. 5 Objects of patent law and the conditions of their patentability. 6 Utility models. 7 Industrial designs. 8 Registration of patent rights. 9 The claim of the invention. 10 Patent and licensing work in the Republic of Kazakhstan. 11 The economics of the invention. 12 Rules for working with scientific, technical and patent literature. 13 Selection of the object of the invention or utility model. 14 Patent search. (Patent research).
11	Learning outcomes	Possess the basic provisions of the legal protection of the results of intellectual activity, know the features, signs, types and conditions of patentability of intellectual property objects in the field of patent law, know the grounds for the emergence and principles of protection of industrial property objects, know the features of the emergence of patent rights of the authors of an invention, utility model or industrial design, be able to distribute these rights to the types of

1	Name of course	Reliability and repair of machinery
2	Code of course	NRM 4234
3	Cycle of course	BS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Technological Machines and Equipment
7	Year	4
8	Prerequisites	1.Theory of machine mechanisms. 2. Agricultural machinery 3. Technology of Structural Materials. 4. Fundamentals of wheeled and tracked machines
9	Postrequisites	Diploma design
10	Course summary	1.Basic Concepts and definitions of reliability theory as a science. 2.Methods of testing machines for reliability. 3.Improve the reliability of the machines. 4.Technology of basic work in machine repair. 5. Delayed work and their requirements. 6.Technological process of restoration of machine parts and equipment. 7.Features of the technology of restoring parts by welding and melting. 8.Technology of restoration of parts by means of electrolytic coatings and plastic deformations. 9.Features of technological processes of engine repair. 11-12.Features of technological processes for repairing power transmission, roadway, control mechanisms, cabs and housings. 13-14.Features of repair of special technological equipment. 15.principles of Organization of repair enterprises.
11	Learning outcomes	Know the production processes of repair and modernization of agricultural machinery, transport and technological machines and equipment in agriculture, modern technological processes for restoring machine parts

1	Name of course	Failure Analysis and Machine Repair
2	Code of course	AORM 4235
3	Cycle of course	BS
4	Amount of credits	4

5	Level of preparation	Undergraduate studies
6	Department	Technological Machines and Equipment
7	Year	4
8	Prerequisites	1. The theory of mechanisms and machines. 2. Agricultural machines. 3. Interchangeability standardization and technical measurements. 4. Technology of structural materials. 5. Agricultural machines. 6. The basics of the device of wheeled and tracked vehicles.
9	Postrequisites	Diploma design
10	Course summary	1. Basic concepts and definitions of reliability theory as a science. 2. Methods of testing machines for reliability. 3. Improving the reliability of machines. 4. The technology of the main works during the repair of machines. 5. Assembly work and the requirements for them. 6. Technological processes of restoration of machine parts and equipment. 7 -. Features of the technology of restoring parts by welding and surfacing. 8-9. Technology of restoration of parts by electrolytic coatings and plastic deformation. 9. Features of technological processes of engine repair. 11-12. Features of technological processes of repair of power transmission, chassis, control mechanisms, cabs and bodies. 13-14. Features of repair of specialized technological equipment. 15. Principles of organization of repair enterprises.
11	Learning outcomes	Know the production processes of repair and modernization of agricultural machinery, transport and technological machines and equipment in agriculture, modern technological processes of restoration of machine parts, technological processes of modernization and repair of assembly units, machines and equipment, the influence of processing modes on the quality indicators of repair of products, methods of increasing the durability of parts, assembly units, machines and equipment

1	Name of course	Modern technologies and equipment for the diagnostics of agriculture machinery
2	Code of course	STSDST 3311
3	Cycle of course	AS
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Agrarian Technique and Technology
7	Year	3
8	Prerequisites	1. Mathematics. 2. Fundamentals of economics and law. 3. Operation of the machine and tractor fleet. 4. Reliability and repair of machines

9	Postrequisites	1 Diploma design 2 Mechanization of technological processes in the system of precision agriculture
10	Course summary	1-2.Theoretical foundations, basic concepts and definitions of technical service. 3-6. Maintenance of electrical equipment of motor vehicles and agricultural machinery. 7-9.The operability of the state of the elements of electrical equipment, minimizing the cost of maintenance and repair of automotive and agricultural machinery. 10-15. Organization and performance of agrotechnical services in agro-industrial complexes, organization of mechanized works
11	Learning outcomes	fundamentals of the organization of machine maintenance; - planning and methods of modern diagnostics and troubleshooting of machines; - methods and organization of machine storage.

1	Name of course	Mechanization of cattle-breeding farm
2	Code of course	MZh 3312
3	Cycle of course	AS
4	Amount of credits	5
5	Level of preparation	Undergraduate studies
6	Department	Agrarian Technique and Technology
7	Year	3
8	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.
9	Postrequisites	Pre-graduate practice, diploma design.

10	Course summary	Production and technological characteristics of livestock enterprises. Mechanization; water supply of farms and pastures, procurement and distribution of feed and means of mechanization of feed storages, milking of farm animals, primary processing, milk processing, technological processes in sheep farming, technological processes in poultry farming, removal, transportation and preparation of manure for use. Machines and equipment for the preparation of feed and feed mixtures and a system for forming microclimate parameters in livestock premises. Operation of machinery and equipment of livestock farms and organization of their technical service. Technol
11	Learning outcomes	Master the basics of technologies for the production of livestock and beekeeping products; - principles of providing livestock with high-quality feed and technologies for harvesting and storing feed; - rules for the preparation of rations for farm animals

1	Name of course	Design and organization of technical service
2	Code of course	POTS 4315
3	Cycle of course	AS
4	Amount of credits	5
5	Level of preparation	Undergraduate studies
6	Department	Agrarian Technique and Technology
7	Year	4
8	Prerequisites	1. Mathematics. 2. Fundamentals of Economics and law. 3. operation of the machine and tractor fleet 4. Machine Repair and reliability
9	Postrequisites	1 Diploma design 2 theoretical principles of mechanization of agricultural production
10	Course summary	1. Кіріспе. Кәсіпорын жобалау туралы жалпы ақпарат 2-5. Техникалық әсердің еңбек қарқындылығы үшін өндірістік бағдарламаны есептеу. 6.-7. Өндірістік аймақтарды және басқа да элементтерді жобалау шешімдері мен кәсіпорындарын дамыту үшін технологиялық есептеу. 8-11. АТК-ды жалпы дамыту. Өндірістік нысандар мен АТК ғимараттарына арналған жоспарлау шешімдері. 12-15. Автомобильдер мен ауылшаруашылық техникалары, АТК электр жабдықтары құрылыстарының және қайта құру жобаларының техникалық-экономикалық тиімділігі.
11	Learning outcomes	Justify the composition of the repair and maintenance company or division and calculate its main parameters, be able to perform a technical and economic assessment of project proposals

1	Name of course	Technical service in agriculture
2	Code of course	TSSH 4316
3	Cycle of course	AS
4	Amount of credits	5
5	Level of preparation	Undergraduate studies
6	Department	Agrarian Technique and Technology
7	Year	4
8	Prerequisites	1. Mathematics. 2. Fundamentals of economics and law. 3. Operation of the machine and tractor fleet. 4. Reliability and repair of machines.
9	Postrequisites	1 Diploma design 2 Theoretical foundations of agricultural production mechanization
10	Course summary	1. Introduction. General information about enterprise design 2-5. Calculation of the production program of the labor intensity of technical impacts. 6.-7. Technological calculation of production zones and other elements of the conditions for the development of design solutions and enterprises. 8-11. General buildings of the ATP. Planning solutions for industrial premises and buildings of the ATP. 12-15. Technical and economic efficiency of projects for the construction and reconstruction of ATP electrical equipment for automotive and agricultural machinery.
11	Learning outcomes	Justify the composition of the repair and maintenance company or division and calculate its main parameters, be able to perform a technical and economic assessment of project proposals

