MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN
S.SEIFULLIN KAZAKH AGRO TECHNICAL UNIVERSITY

APPROVED
First Vice-Rector
_____ A. Abdyrov
«12» 06 2014

Catalogue of elective disciplines

SPECIALTY: 5B080600-"AGRARIAN TECHNIQUE AND TECHNOLOGY" EDUCATIONAL PROGRAMS "TECHNICAL SUPPORT OF AGRICULTURAL PRODUCTION PROCESSES", "TECHNICAL SERVICE IN AGRICULTURE"

Training time 2014-2018

Astana, 2014

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This catalog contains a list of elective disciplines and the appropriate amount of loans offered by the University for the study of educational programs "Technical Support of Agricultural Production Processes", "Technical Service in Agriculture" for specialty: 5B080600-"Agrarian Technique and Technology" and is intend for credit system students.

Approved at the meeting of the Academic Council of S.Seifullin Kazakh Agro Technical University
Protocol № 11 « 10 » 06 2014

Content of the Catalogue of elective disciplines

Explanation

Dear students! According credit system a mandatory element of educational-methodical complex of specialty is the catalog of elective disciplines (CED). CED is a list of elective disciplines. It developed by the University for each specialty in order to possibility of substantive, flexible and comprehensive definition of learning trajectories. CED covers the entire spectrum of disciplines, including all profiles, specialization and professional activities, which allows University to develop and successfully adapt of already established scientific and pedagogical school into the changing conditions, maximum use information-library resources, educational-laboratory facilities of the University. CED contains a list of subjects that will fully learn the professional competence.

Catalogue of elective disciplines is used by student for making an individual curriculum, developed personally by the student under the guidance of faculty advisor, based on student individual abilities, prospects, market and production needs. In the Catalogue, as well as a Specialty Model Curriculum, discipline combined into three cycles: general disciplines (GD), basic disciplines (BD), profile disciplines (PD).

For form educational program, the student should learn all disciplines of general components in accordance with the Model Curriculum, as well as choose from the catalog one of the proposed Educational Program, and in accordance with the Program choose elective disciplines. Disciplines combined into modules in the Catalogue.

"Technical Support of Agricultural Production Processes" educational program of the 5B080600 - "Agrarian Technique and Technology" specialty is aimed to prepare bachelors for the following professional activities:

- Production and technology;
- Organization and management;
- Calculation and design;

a) The production and technological activities:

- The production and processing of crops, livestock, selection of machines and their complexes, organization of highly effective agricultural machinery usage, technological equipment at production, processing and storage;
- Operation and maintenance of modern technology, the implementation of quality input control of the raw materials, production control of processed products and parameters of technological processes;
- Installation, setting up of machinery and equipment, that contacts directly with living biological objects, maintaining their operation modes and preset parameters of electrified technological processes;

- Exploitation and utilization of agricultural waste and processing enterprises.

b) Organizational and management activities:

- The organization of production, storage, transportation and processing of agricultural products on the basis of resource-machine technologies;
- Providing high performance of machines and technological equipment;
- The organization of the group of performers, decisions making in the sphere of the health and safety and environmental protection requirements;
- The assessment of the costs of engineering and technical production support, storage and processing of agricultural products.

c) Calculation and design activity:

- Calculation and design of operating details and components of machines, drawing technological maps of the production, storage and processing of agricultural products, as well as maintenance of machinery and equipment;
- Scientifically and Research.

”Technical Service in Agriculture” educational program of the 5B080600 - " Agrarian Technique and Technology" specialty is aimed to prepare bachelors for the following professional activities:

- Organizational and technological;
- Production and management;
- Calculation and design;

a) Organizational and technological activities:

- The organization of engineering service of rural producers’ production and technical service;
- The organization of maintenance and repair of machines and equipment with the latest methods and means of diagnosis;
- Compromises to suit different requirements (cost, quality, deadlines and security) for various kinds of planning and determination of optimal solutions;
- Consideration of the different types of costs to ensure timely technical service of agro technological machinery and equipment.

b) Production and management activities:

- The development and implementation of measures for the comprehensive mechanization of production, storage and processing of agricultural products;
- Providing high performance of machines and technological equipment;

- Justification of the machines and tractors in farms and agricultural enterprises;
- Quality control of manufacturing processes, materials and finished products;
- The organization and management of agro technical service.

c) Calculation and design activity:

- Calculation and design of operating details and components of machines, drawing technological maps of the production, storage and processing of agricultural products, as well as maintenance of machinery and equipment;
- Participation in the development of computation-construction documents during the construction of agro technical service enterprises;
- Participation in the research and design developments in research and design institutions.

You should know that the cycle of educational disciplines involve the preparation of intellectual, personal and social development specialist. Student must dial 1 credit of the given cycle. The cycle of basic disciplines aimed at developing future specialist fundamental knowledge in the relevant specialty, so in this cycle student must score 46 credits. The majors' cycle determines the list of special knowledge, skills and competences in relation to a particular area of professional activity. A student must earn 27 credits from this cycle. It is important to remember that the level of student as a future specialist depends on how well thought-out and coherent will be the student educational trajectory.

Module title	Code of discip-line	Name of discipline	Loans RK / ECTS	Seme-ster	Prerequi-sites	Post requ-isites	Course Description (main part)	Formed competence	Depart-ment, provides discipline
1	2	3	4	5	6	7	8	9	10
General education disciplines									
Social-Political Discipline	Rel 2112	Religious	1/2	3	History of Kazakh-stan; So-ciology	Political Science; Philosophy	Origin of religion and its early forms. The main stages of the historical development of re-ligion and its main directions. Development of philosophical and religious in Western Eu-rope, US, Muslim East. De-velopment of the Kazakh edu-cation. Basic principles and laws of development of the religious aspects of society. The problem of religious ex-tremism and terrorism in the XXI century. Fundamental values - human life, freedom of conscience and religious tolerance. The evolution of religion in the modern world.	A. Knowledge and understanding in the field of religion, aimed to creating a social and ethical competencies; B. Acquisition practical skills, tests, edu-cational and scientific literature, indepen-dent compilation of scientific presentations, essay, report; C. The ability to compare and draw con-clusions, to build their own reasoning, to express and justify its position to religion, to find interesting problems and be able to disclose their position as with any religious doctrine, and from a position of its own reflection. D. In the field of communication - create a sense of tolerance, of their own worldview, respect for spiritual values and traditions of the Kazakhstan peoples; E. In the field of education - the ability to analyze the key problems in the cultural space of the society in terms of religion.	Philoso-phy

1	2	3	4	5	6	7	8	9	10
Basic disciplines for educational programs "Technical Support of Agricultural Production Processes", "Technical Service in Agriculture"									
Physics-Mathematics	Him 1208	Chemistry	1/ 2	1	Mathematics (school course); Physics (school course)	Construction Materials Technology; Fundamentals of Hydraulics and Heating; Tractors and Motor Vehicles; Fuel-Lubricants and Industrial Fluids	The object and purpose of chemistry. Chemistry significance in the study of nature and the development of technology. Basic laws and concepts of chemistry. Atom structure. Chemical bonding and molecular structure. Regularities of chemical processes. Energy and chemical processes. Chemical thermodynamics. Chemical kinetics. Chemical equilibrium. Solution. Solutions of strong and weak electrolytes. Redox reactions. Galvanic element. Corrosion and Metals protection.	A. Ability to use scientific research in the practice: - concept of chemical processes in nature, ways and methods of their description, basic principles, laws of chemistry, physico-chemical research methods and rational processing of data; - concepts and methods of modern mathematics; - solutions of different types calculation tasks. B. Acquisition practical skills: - learning the ways and methods of solution of specific problems in the field of chemistry, introduction with modern scientific equipment, forming skills of the chemical experiment; - application of the foundations of the mathematical apparatus for solving theoretical and applied problems, the ability to solve practical problems into logic language C. The ability to compare, formulate tasking, make solution method, prove and justify reasoning loyalty; ability to allocate specific chemical content in applications for future specialty, ability to compare, draw conclusions, and make arguments. D. In the field of communication - the formation of personality, development of intelligence and abilities to logical and algorithmic thinking; holistic view of modern scientific picture of the world and the environment.	Physics and Chemistry
	IM 1212	Engineering Mathematics	1/ 2	2	Elementary Mathematics, Mathematical Analysis Algebra and Geometry	Theoretical and Applied Mathematics; Fundamentals of Probability Theory and Mathematical Statistics; Modeling Framework of Agroengineering Systems.	Numbers and algebra. Determination of lengths, areas and volumes. Geometry and trigonometry. Graphs. Vectors. Complex numbers. Matrix and determinants. Boolean algebra and logic diagrams. Differential and integral calculus. Differential equations. Statistics and probability theory. Laplace transforms. Fourier series.		Higher Mathematics

1	2	3	4	5	6	7	8	9	10
								E. In the field of education - the ability to model chemical processes by using computer technology; ability to apply the methods of higher mathematics in the various sectors of natural science and technology, obtaining systematic fundamental education.	
General Technical	TKM 1213	Construction Materials Technology	2/ 3	2	Mathematics; Chemistry	Theoretical and Applied Mechanics; Tractors and Motor Vehicles; Agro-Technical Machines; Mechanization of Livestock; Course and Diploma Projects	Metals crystal structure. Theory of alloys. Thermal and chemical-thermal metal processing. Physical basis of the cutting process. Cutting tools. Cut force and speed in turning. Appointment of cutting conditions. Classification of machine tools. Lathes Group and work on them. Machines drill groups and work on them. Milling groups and work on them. Grinding-finishing groups and work on them. Whittle hollow and broaching machines and work on them. Gear cutting machines and work on them. Operation of machine tools.	A. The ability to use knowledge in the sphere of structure composition and properties of various materials (metal and nonmetal) understand the technology and methods of obtaining material handling, using modern tools, machinery and equipment for the design decisions, operational, research and experimental design tasks; use the solution of various positional and metric problems on a complex drawing and perspective; use in the practice of knowledge about the structure of wheeled and tracked vehicles; knowledge and understanding of the principle of the basic grain machinery device operation (combines, harvesters, balers); knowledge of the device usage, workflow, process adjustments and the basic characteristics of agricultural machinery. B. To successfully use and apply to production the theoretical knowledge and practical training for the creation and production of modern technological machines, tools and equipment using advanced computer technology; acquisition of practical skills of reading and making drawings on the profile of the specialty; practical skills of effective use of wheel and tracked vehicles based on knowledge of their mechanism and operation, the ability to analyze and predict the operation of machinery in general, its mechanisms, components and systems; ability to select and apply harvester machines on the practice; use in practice the basics of	Technological Machinery and Equipment
	NGIG 1214	Descriptive Geometry and Engineering Graphics	3/ 5	2	Mathematics; Drawing (school course)	Theoretical and Applied Mechanics; Engineering Drawing; Tractors and Motor Vehicles; Agro-Technical Machines; Design	Basic geometric elements of the space. Positional and metric problems. Converting drawings methods. The overlapping and sweep surfaces. Axonometric projection. Unified system for design documentation. Types of products and design documents. Geometric constructions. Design drawings. Compounds. Explosion drawings and drawing general form. Reading and detailing of		Technical Mechanics

						Principles and Machine Parts; Mechanization of Livestock; Course and Diploma Projects	drawing general form.	aggregation, management and organization of agricultural machines. C. The ability to compare and argue the correctness and validity of the developed technologies and new materials for the production of advanced equipment and technology; compare drafting design documentation for the design and construction of facilities for the repair and maintenance of machine-enterprises etc.; compare and draw conclusions, to build their own reasoning, to express its position on the main issues of wheel device and tracked vehicles, to evaluate the performance and efficiency of the grain trucks and agricultural machinery in general. D. In the field of communication person should be prepared to the social, economic and occupational changes in the surrounding society; cope with the problems that admit several solutions, which is characteristic of professional work of technical workers; the feelings formation of tolerance, respect for and observance of the legislation on statutory activities in maintenance, repair and operations wheel and tracked vehicles; ability to prepare combine and agricultural machinery for work, as well as to organize and evaluate the quality of their work. E. In the field of education - the constant improvement of the level of knowledge acquisition for complex professional, intercultural and communicative skills; ability to analyze key challenges of working with different drawings and measuring instru-	
	OUKGM 1209	Fundamentals of Devices Wheeled-Tracked Machines	2/ 3	1	Physics (school course); Mathematics (school course)	Tractors and Motor Vehicles; Agro-Technical Machines; Using Machines; Agricultural and Meliorative Machines	General arrangement of wheeled-tracked machines. Purpose, classification, principles of mechanisms and systems of wheeled-tracked machines and motors. Design features of the motors mechanisms and systems. Basic adjustment settings. Design features of transmissions, turns controls. Brake systems. Electrical equipment. Hydraulic systems. Tools and accessories. Control of wheeled-tracked machines.		Technical Service
	ZUM 1210	Harvesting Machines	1/ 2	1	Physics (school course); Mathematics (school course)	Tractors and Motor Vehicles; Agro-Technical Machines; Using Machines; Agricultural and Meliorative Machines	General information about the crops. The methods and technology of harvesting crops. Types of machines and agronomic requirements. General arrangement and operation of grain cars. Organization and quality control of basic grain cars.		Agricultural and Grain Processing Machines

	RAM 1211	Adjustment and Linkage of Agricultural Machines	2/ 3	1	Physics (school course); Mathematics (school course)	Tractors and Motor Vehicles; Agro-Technical Machines; Using Machines; Industrial Exploitation of Machine - tractor Fleet	Technology, process, technological operation, technological means. Technological tools and technologies for soil, fertilizing, seeding and planting, crop tending, harvesting and post-harvest crop production reclamation works. Technological complexes. Technology tools for crop: device control and aggregation. Technology tools: purpose, principles of classification, general arrangement and labeling.	ments and devices, i.e. technique for making drawings; simulate and analyze the state of wheeled and tracked vehicles; identify and solve problems associated with the design of wheeled and tracked vehicles; predict ways of improving structures of wheeled and tracked vehicles and extensions of their functionality. To be able to use the educational and methodical literature, visual and technical facilities in the process of learning.	Agricultural and Grain Processing Machines
Mechanics	Sopr 2215	Strength of Materials 2	1/2	3	Mathematics; Engineering Mathematics; Physics; Chemistry	Design Basics and Machine Parts; Tractors and Motor Vehicles; Agricultural and Meliorative Machines; Agro-Technical Machines; Mechanization of Livestock; Technical Services at Agricultural Complex; Reliability and Repair of	Key assumptions. The method of sections. Tension and compression. Shear and torsion. Direct lateral bending. The method of initial parameters. The main hypotheses. Theory of strength. Planar and spatial stress state. Oblique bending. Eccentric tension and compression. Bending with torsion.	A. Knowledge and understanding of the basic assumptions, the classification of simple and complex forms of resistance, the theoretical foundations of drawing design diagrams, equations describing the behavior of mechanical systems. Obtaining skills in solving problems and exercises. The use in the practice of research concepts and methods of probability theory, the study of general and specific methods of mathematical description of natural phenomena. Knowledge and understanding of the application of computer graphics. Knowledge and understanding of the fundamental laws of equilibrium and motion of the liquid, allowing applying the knowledge gained in the various fields of science and technology, law and obtain the energy conversion efficiency of the use of methods of analysis of heat, the ability to experimentally determine the thermal characteristics of the heat power equipment. Understanding the essence of interchangeability, the basic concepts and definitions in the field of interoperability,	

1	2	3	4	5	6	7	8	9	10
						Machines		principles of the system of tolerances, machining accuracy and its components.B. Use of practical knowledge and the ability to understand the methods of constructing a model of a real object. Application of basic concepts, equations and theory to solve practical problems. The acquisition of practical skills meet technical strength calculations, applying the basics of mathematical statistics to solve economic and applications, the ability to translate practical issues the language of logic. The acquisition of practical skills and reading performance of drawings in the specialty. The ability to evaluate the processes of fluid motion at different modes, to produce hydro modeling and calculation of all hydraulic machines. The acquisition of practical skills in the area of acquisition, conversion, transfer and use of heat based economy Heat energy resources and materials intensification and optimization of technological processes. Ability in practice to use reference books on tolerances and landing assign landing. Identify the basic elements of smooth cylindrical joints keyed connection, splines, assign landing bearings, to be able to perform the calculation of the size of chains and other compounds. Ability to define the basic metrological characteristics of measuring instruments. Understand that the choice of means of measurement depends on the accuracy of the details and means of measurement error. C. The ability to compare different schemes of a real object and choose the best option with the rationale, articulate statement of the problems, to build their own solution	Technical mechanics
	OTVMS 2216	Fundamentals Theory of Probability and Mathematical Statistics	2/ 3	3	Mathematics; Engineering Mathematics	Theoretical and Applied Mechanics; Interchangeability, Standardization and Technical Measurements; Agricultural and Meliorative	Probability theory studies the laws of mass of homogeneous random events. Knowledge of the laws that govern mass random events to anticipate how these events occur. Using the methods of probability theory and mathematical statistics in the various branches of Science and Technology, in reliability theory, queuing theory, in theoretical physics, the theory of errors of observation, metrology and many		Mathematics

						Machines; Agro-Technical Machines; Mechanization of Livestock; Technical Services at Agricultural Complex	other theoretical and applied science. The use of probability theory to justify the mathematical and applied statistics, planning and organization of production, in the analysis of processes and others.	method to prove their loyalty and justify reasoning, constitute the design documentation for the design and construction of facilities. The choices of the most appropriate technological equipment, intensify and optimize Vat processes, identify and utilize waste energy. Make judgments on the use of complex systems of general technical requirements of standards for the implementation of the accuracy of calculations and the use of metrological assurance in production. D. In the field of communication - the formation of logical thinking with technically competent outlining the formation of personality, development of intelligence and logical abilities and algorithmic thinking, the ability to cope with problems that can have multiple solutions. Forming a sense of tolerance, respect for traditions and laws in the application of hydraulic and heat engineering. To be able to defend their professional level solutions, debate the decisions taken. Consider raising manufacture quality and repair of agricultural engineering positions with standards-motion and control setcal those requirements. E. In the field of education - the ability to analyze technical issues in the field of agricultural engineering and environmental phenomena; apply statistical methods in various branches of natural science and technology; receive systematic fundamental education; ability to analyze key challenges of working with different drawings and measuring instruments and devices, i.e. technique for making drawings; the ability to produce hydro mechanical modeling and payment of any hydraulic machines; the ability to assess the processes of fluid mo-	
	MChAVCh 2217	Engineering Drawing and Automation of Execution Drawings	3/ 5	3	Mathematics; Descriptive Geometry and Engineering Graphics; Informatics	Theoretical and Applied Mechanics; Tractors and Motor Vehicles; Agro-Technical Machines; Mechanization of Livestock; Course and Diploma Projects	Basic concepts of the course: views, sections, cross sections, ascenders. Detachable and permanent connection. Detalirovanie and sketching. Assembly drawing and general appearance. Specification. Scheme. Graphic Editors Corel DRAW and Auto CAD.		Technical Mechanics
	OGT 2218	Fundamentals of Hydraulic and Thermal Engineering	3/ 5	3	Mathematics; Physics; Chemistry; Descriptive Geometry and Engineering Graphics; Informatics	Theoretical and Applied Mechanics; Tractors and Motor Vehicles; Design Principles and Machine Parts; Agricultur-	Hydrostatics (determination of fluid pressure). Hydrodynamics (laws of fluid motion and their application in hydraulic engineering, energy, irrigation). Agricultural water supply (water consumption of agriculture and its calculations). Hydraulic equipment (pumps, water-pump, etc.), classification and their application in agricultural production. The thermodynamic pa-		Technical Service

						al and Meliorative Machines; Agro-Technical Machines; Reliability and Repair of Machines; Mechanization of Livestock; Course and Diploma Projects.	rameters of the gas state and processes. The first and second laws of thermodynamics. Water vapor and moist air. Cycles of thermal engines and systems. Bases for design of heat exchangers. Thermal energy installation. Heating, ventilation and hot water production and municipal buildings. The use of heat in protected ground buildings. Warmth fundamentals of drying and storage of agricultural products. The use of cold in agriculture. Heat supply system. Heat networks. Heating of industrial, residential and public buildings. Renewable machines. Electromechanical properties motors AC and DC. Coordinate regulation of the drive. Mechanics and dynamics of the drive. Selection of motor power. Control equipment and automatic control of electric drives. Selection of electric drive systems. The drive in agriculture.	tion at various modes, the ability to apply the methods of analysis of efficiency of use of heat in the process equipment, experimentally determine the thermal characteristics of the process equipment, to measure the basic thermal parameters associated with the profile of engineering activities; the ability to assign numerical values of tolerances for each of the components of precision machining	
	VSTI 2221	Interchangeability, Standardization and Technical Measurement	3/ 5	4	Mathematics; Descriptive Geometry and Engineering Graphics	Agro Technological Machines; Tractors and Motor Vehicles; Using Machine; Agricultural and	The aim of the course is to develop in future mechanical engineers knowledge and practical skills in the use of and compliance with complex systems of general technical standards, performance and accuracy of calculations of metrological assurance in production, exploitation and repair of agricultural machi-		Standardization, Metrology and Certifica-tion

						Meliorative Machines; Mechanization of Livestock; Technical Services in the Agricultural Sector; Course and Diploma Projects	nery. The course examines: the main problems in the theory of interchangeability and technical measurements; Uniform standards of tolerance and landings; Terms of technological documentation; methods of calculation and choice of standard landings connection types of machine parts; calculation of the size of chains; device and purpose of measuring their settings, rules of operation and method of selection.		
Electrical Engineering	TOE 2222	Theoretical Fundamentals of Electrical Engineering	2/ 3	4	Mathematics; Physics; Chemistry; Descriptive Geometry and Engineering Graphics	Agro Technological Machines; Tractors and Motor Vehicles; Using Machines; Agricultural and Meliorative Machines; Mechanization of Livestock; Technical Service at the Agricultural Sector; Course and Diploma Projects	Linear link, their components and circuits. Ohm's and Kirchhoff's Laws. Analysis of direct current electric circuits. Chains of sinusoidal current and their elements. The parameters characterizing the sine value. Power and resonance modes in the chain of the sinusoidal current. Methods for calculating circuit sinusoidal current. Three-phase electrical circuit. Line and phase voltages and currents. Activation and reactive powers. Calculation of the three-phase circuit. Carry-chain periodic sinusoidal current. Representation of Fourier series ne-periodic nesinusoi Far functions. Tion-defined values. Power in these circuits. Magnetic circuit. The quantities characterizing the	A. Knowledge and understanding of electro technical terms, the operating principle, characteristics and parameters of semiconductor devices, transistor amplifiers, pulse, logic and digital devices. B. Practical application of knowledge of theoretical foundations of electrical engineering, electronics and microprocessor-those nicknames, the ability of understanding technical instruments, charts, tables, graphs and test electronic devices. C. Ability to make judgments on the selection processes involved in electrical series, assessing the choice of electric-circuits, electronic devices and appliances. Have the appropriate skills judgments on physical nature of the phenomena accompanying the process of converting electric power AC and DC. Be able to evaluate ideas form conclusions. D. In the field of communication - the ability to acquire knowledge of electromagnetic processes, use diversion various electronic devices, circuits, and read them to know	Electric Power Supply

							magnetic field. Basic laws of magnetic circuits. Methods for calculating the magnetic unbranched chains.	specifications. E. In the field of education - the ability to use the information for rational of use of equipment, to make circuit in electronic devices and appliances, do the analysis and oriented in electronics and microprocessor technology.	
	EMT 3224	Electronics and Microprocessor Technology	2/ 3	5	Mathematics; Physics; Informatics; Theoretical Foundations of Electrical Engineering	Tractors and Motor Vehicles; Using Machines; Reliability and Repair of Machines; Mechanization of Livestock	Electronic database of electronics. Semiconductor diodes, thyristors, photovoltaic and optoelectronic devices. Structural basis of microelectronics, integrated circuit. Electronic equipment - amplifiers, generators, triggers, comparators, encoders, recorders, decoders, counters, analog-digital and digital-analog input. The transformation. Microprocessor-funds. Typical structure of a microcomputer. Microcontrollers.		Radio Engineering, Electronics and Telecommunications
Crop and Livestock	OA 2219	Fundamentals of Agronomy	2/ 3	3	Physics; Mathematics; Ecology and Sustainable Development	Tractors and Motor Vehicles; Agricultural and Meliorative Machines; Agro-Technical Machines; Using Machine	Land Resources of RK. The fertility of the soil, its value, types and ways to improve. Weeds and their control measures. Introduction and development of crop rotation. Methods and techniques of tillage. Pairs value types and methods of their processing. Minimizing tillage. Criteria for assessing the quality of soil treatment. Morphological, biological features and characteristics of the technology of cultivation of field, vegetable and fruit and berry crops cultivated in the Republic of Kazakhstan.	A. Knowledge and Understanding: - General principles of agriculture, crop production, theory and practice of field crops in all their diversity, taking into account soil and climatic conditions and economic zone on agronomic requirements of the process of mechanization of production; - Morphology, biology and technologies' cultivation of field crops, livestock breeding technologies; - Working methods, ways to increase crop production and animal husbandry will introduce the most efficient ways to produce that output of agricultural enterprises of all forms of ownership. B. Acquisition of practical skills application of agricultural techniques promoting conservation and in elevated soil fertility and effectiveness-efficiency of fertilizer use, for-shields soil from erosion and allow higher yields for Agricultural crops. Ability	Crop Production
	OZh 2220	Fundamentals of Livestock	2/ 3	3	Physics; Mathematics; Ecol-	Tractors and Motor Vehicles;	Goals and objectives of the course study fundamentals of livestock. Breeding, feeding,		Technology of Production and

					ogy and Sustainable Development	Agro-Technical Machines; Mechanization of Livestock.	and maintenance of animals of different species. Technology of production of certain subsectors of livestock: cattle, horses, camel, sheep, pig, poultry, rabbit husbandry. Biological characteristics and productivity of different animal species, characteristic of the breed, bred in Kazakhstan and abroad, their use for the production of a particular type of product in the country, modern technology herd reproduction and rearing.	to practice crop rotation and make technological card cultivation of field crops based on their morphological and bio-logical features. Use practical knowledge on technologies pet, how to work with them, ways to improve production the most effective way to complexes, farms and other forms of business entities. C. The ability of setting goals and making decisions in practice the basics of agronomy, animal husbandry, making adjustments in the production process, formulation of conclusions. D. In the field of communication - manual employees (group) with acceptance of responsibility for the results of site-specific process or at the unit level; coordination of work entrusted to the site with that of other regions. E. Ability to conduct an independent search, analysis and evaluation of professional-term information, the ability of creative work-to-operation in professional activities. Ability to justify the necessary requirements for the production and processing of crop and livestock production; analyze the main processing methods for the production of agricultural products; perform quality control of main types of products; assess the cost-effectiveness of the work.	Processing Livestock Products

1	2	3	4	5	6	7	8	9	10
Fundamentals of Modeling Systems and Patents	OMAS 3225	Fundamentals of Modeling Agroengineering Systems	3/ 5	5	Mathematics; Physics; Informatics; Theoretical and Applied Mechanics	Using Machine; Agro-Technical Machines; Technical Service at the Agricultural Sector	The object and purpose of discipline. General principles of mathematical modeling agroengineering systems. Modeling agroengineering and processes. Optimization of agroengineering objects. Modeling of complex dynamic systems. Modern approaches to the visual simulation of complex dynamic systems. Simulation systems having continuous, discrete and hybrid properties	A. Knowledge and understanding of the fundamentals of modeling agroengineering systems, as well as the concepts of creative thinking. The ability to orient himself in the modern flow of scientific information to produce inventive staging of tasks to perform and bring them to completion logical - obtaining patents for inventions and utility models. Skills, knowledge and experience of independent, creative work on the search, analysis, development and implementation in the agricultural machinery, modern agricultural production, materiality and weight of research and development carried out at a high scientific level and provide a significant increase in the efficiency of agricultural production. B. Acquisition of skills with computer technology, tables, schemes, the ability to solve mathematical problems and perform work on the creation of new technical solutions on the level with the use of inventions- methods to activate thinking, conduct a patent search and prepare applications for the alleged invention correspondence with the patent Office to obtain a patent for invention or utility model. Use technical development course and degree designing. C. Ability to solve, to compare, formulate, draw conclusions, to build their own arguments and express its position on the main issues of modeling agroengineering systems, professional creativity and patents. D. In the field of communication - create a sense of tolerance, sociable, respect for and observance of the legislation regulating the activities in the field of technical creativity, patents, process modeling and creating new efficient machines for agriculture. Scientific	Technological Machines and Equipment
	OPPT 3227	Fundamentals of Patenting and Professional Creativity	1/ 2	6	Physics; Mathematics; Descriptive Geometry and Engineering Graphics; Theoretical and Applied Mechanics; Construction Materials Technology; Combine Harvesters	Diploma Work	Fundamentals of professional creativity. History of scientific and technical creativity. Methods of activating creative thinking. Fundamentals of patenting. The role of invention at the present stage of development of the state. Organization inventive work in the Republic of Kazakhstan. The concept of the invention. Features of the invention. Objects of the invention: a method, apparatus, a substance of their symptoms. Making application for the invention. Patent Law of the Republic of Kazakhstan. General provisions and basic sections. Rights of inventors, their protection and benefits. The pro-		Technical Service

							cedure of remuneration of inventors. Types of disputes. Patent and license work in the Republic of Kazakhstan. Licensed trade. Types of licenses.	comprehend and understand the nature of scientific knowledge, to promote student mastery of skills in the scientific literature, the ability to competently express thoughts, to argue a point of view, lead the discussion. E. In the field of education - the ability to analyze and simulate the key issues, the state of the technical solution, quality and patenting the design and simulation of technological processes in agriculture. Improving the efficiency of student learning at the expense of independent work skills in the acquisition of new knowledge in the design and creation of new types of equipment for agricultural mechanization.	
Economic	OBUN 3228	Fundamentals of Accounting and Taxation	1/ 2	6	Mathematics; Informatics; Fundamentals of Economic Theory	Economics and Management; Diploma Project	Accounting, its essence, function and role in a market economy. Concepts and principles of accounting. Elements of financial statements and accounting facilities. Balance sheet. Accounts and double entry. Accounting organization. Accounting for current assets. Accounting for long-lived assets. Accounting for current assets. Accounting for long-lived assets. Accounting for long-term and current liabilities. Accounting for settlements with the budget by type of tax. The preparation of financial statements.	A. Knowledge of the basics of accounting, taxation, economic laws and forms of agricultural production, economic relations in the industry, taking into account its specific characteristics and understanding of the interaction of agriculture with other spheres of material production, as well as the principles and methods of accounting and taxation. B. Using practical knowledge of financial reporting principles, techniques and methods of accounting in business entities. C. Have the ability to make judgments, evaluating ideas and forming conclusions on the documentation and inventory, balance sheet and changes in it under the influence of business operations, accounting for fixed assets and inventories. The ability to make the right decisions in specific situations. D. Be able to communicate clearly in expressing their knowledge and skill in all matters of accounting and taxation. Ability to form communicative relationship. Formation of communicative skills of group inte-	Account and Audit

								raction in the learning process, the formation of professional knowledge necessary to guide people in the workplace. E. To be able to bring to the learning of students their knowledge and experience; examples adopt teaching methods and technical literature; regulations and legislative acts of the Republic of Kazakhstan; apply technical training, the ability to analyze actual problems of accounting and taxation with the use of theoretical and practical knowledge.	
Tractors and Motor Vehicles	TSMTZh 2223	Fuel-Lubricants and Industrial Fluids	2/ 3	4	Physics; Chemistry; Ecology and Sustainable Development	Tractors and Motor Vehicles; Agro-Technical Machines; Using Machines; Technical Services at the Agricultural Sector; Labor Protection	The purpose of the course is the acquisition of theoretical knowledge of students about the properties of fuels, lubricants and special liquids, their influence on the techno-economic indicators in agricultural machinery, as well as practical skills in the selection of appropriate varieties and grades of fuel, lubricants and special liquids operated equipment.	A. Knowledge of the requirements for the fuel and lubricants and special liquids. B. Use of practical knowledge and ability to understand the selection of appropriate varieties and brands of fuel and lubricants and special liquids operated equipment. C. The ability to compare varieties and brands of fuel and lubricants, to draw conclusions on the application of the operation of a particular technology, to build their own arguments. D. In the field of communication - create a sense of respect for the opinions of others, ability to listen and be heard. Constantly improve their horizons in knowledge learn discipline "Fuel and lubricants and technical fluids." E. In the field of education - the ability to analyze current information on new developments in the field of improvement of quality fuels and lubricants. Ability to analyze the results of scientific research in the above areas to analyze key issues of agricultural production, to navigate the vast flow of information in the media and on the Internet.	Technical Service

Project	OKDM 3226	Fundamentals of Design and machine parts	2/ 3	5	Physics; Mathematics; Construction Materials Technology; Engineering Drawing and Automation Execution of Drawings; Theoretical and Applied Mechanics; Interchangeability, Standardization and Technical Measurement	Agro Technological Machines; Modeling Framework of Agroengineering Systems; Mechanization of Livestock; Course and Diploma Projects	Fundamentals of assessing the performance or reliability of machines. Economic fundamentals of designing machines and equipment. Gears. Bevel gears. Worm gears. The chain of transmission. Belt transmission. Friction transmission and variable speed. Axles and shafts. Bearings. Couplings. Compounds. Slot and gears (splined) connection. Welded and riveted joints. Threaded connections Springs. Housing parts. Automated design of machine parts. Registration of design documentation. Fundamentals of tribotechnology.	A. Knowledge of the classification criteria of efficiency of machine parts, the basic theory and calculation bases of calculation and design of parts and assemblies. B. Acquisition of practical skills of designing the greatest number of machine parts (gears) connections, couplings, bearing units, et al., Which is used to drive machinery. C. The ability to independently design machine components desired destination on a given output data among them choose the best option with the rationale. Choose most suitable material for machine parts and use them rationally. D. In the field of communication - the formation of logical thinking with technically competent outlining responsibilities in the implementation of the student selection and calculation of means. Ability to communicate in learning and practical work. Formation of a sense of responsibility to the tasks assigned to the use of different instruments, respect for the opinions of others, ability to listen and be heard. E. In the field of education - the ability to analyze engineering problems in the art. Ability to use educational and methodical literature, visual and technical facilities. Ability to analyze the results of scientific research in the field of construction and machine parts, to analyze key issues of agricultural production.	Technical Mechanics

1	2	3	4	5	6	7	8		10
Basic disciplines for the educational program "Technical Support of Agricultural Production Processes"									
Economic	EM 4229	Economics and Manage-ment	3/ 5	7	Mathemat-ics; Fun-damentals of Eco-nomic Theory	Analysis of Economic Activity; Diploma Project	Agriculture. Market and agri-business. Land resources. Fixed and working capital. Investment policy and capital investment. Human resources and labor productivity. Pro-duction costs and production costs. Pricing and price sys-tem. Economic efficiency of agricultural production in the agricultural sector. Economics of crop and livestock produc-tion. Essence, principles and functions of management. Bonding process in manage-ment. Group dynamics and leadership. Ensuring the effec-tiveness of the organizations. Components and process con-trol Agromarketing. Market segmentation. Implementation strategy products. International marketing and society.	A. Knowledge of economic laws and forms of agricultural production, economic rela-tions in the industry, taking into account its specific characteristics and understanding of the interaction between agriculture and oth-er spheres of material production, relation-ship management, and marketing is an integral flexible system that can be respon-sive to the state of the market conditions, the competitive environment. B. Using practical knowledge of financial reporting principles, techniques and me-thods of accounting in business entities, knowledge of agricultural production man-agement and ability to use methods and functions of management. C. Have the ability to make judgments, eva-luating ideas and forming conclusions on the documentation and inventory. The abili-ty to make the right decisions in specific situations. D. Be able to communicate in a clear form the communicative relationship. Formation of communicative skills of group interaction in the learning process, the formation of professional knowledge necessary to guide people in the workplace. E. To be able to bring to the learning of students their knowledge and experience; examples adopt teaching methods and tech-nical literature; regulations and legislative acts of the Republic of Kazakhstan; apply technical training, the ability to analyze actual problems of production and business management of transport using theoretical and practical knowledge.	Manage-ment

1	2	3	4	5	6	7	8	9	10
Mechanization of Farming, Processing of Products and Labor Protection	OT 4230	Labor Protection	2/ 3	7	Mathematics; Physics; Chemistry	Educational and Industrial Practice; Course and Diploma Projects	Introduction to the course. Safety management system. Methods of study of occupational accidents and diseases. Dangerous and harmful production factors and remedies. The microclimate in the premises. Industrial lighting. Industrial vibration and noise control measures and their harmful effects. Protection against electric shock, electromagnetic fields, radiation. Sanitary requirements for production facilities. Occupational safety in the operation of facilities and vessels working under pressure, and gas equipment. Occupational safety in the operation of material handling equipment and other production equipment. Fire safety. Anti-fire measures and remedies.	A. Knowledge of the basic concepts of occupational safety, regulatory and legal instruments for the protection of labor. B. Acquisition of practical skills in mastering the methods of identifying and analyzing, environment and safety, prediction and prevention of accidents and occupational diseases. C. The ability to compare and draw conclusions, and express and justify its position to the creation of healthy and safe working conditions for employees of agricultural production. D. In the field of communication - the ability to position the system approach argue basic requirements for occupational health, safety and fire protection requirements for the unit of production facilities, processes, jobs. E. In the field of education - the formation of logical thinking with technically competent outlining the formation of personality, development of intelligence and logical abilities and algorithmic thinking, the ability to cope with problems that can have multiple solutions, the ability to develop requirements for the design and unconditional implementation of the legal, socio-economic, technical, hygienic and organizational measures for labor protection and fire safety.	Mechanization of Technological Processes

1	2	3	4	5	6	7	8		10
Basic disciplines for educational program "Technical Service in Agriculture"									
Economic	EMTS 4229	Economics and Management of Technical Service	3/ 5	7	Mathematics; Fundamentals of Economic Theory	Analysis of Economic Activity; Diploma Project	Agriculture. Market and agribusiness. Land resources. Fixed and working capital. Investment policy and capital investment. Human resources and labor productivity. Production costs and production costs. Pricing and price system. Economic efficiency of agricultural production in the agricultural sector. Economic efficiency of technical service. Economics of crop and livestock production. Essence, principles and functions of business management technical services. Bonding process in management. Group dynamics and leadership. Ensuring the effectiveness of the organizations. Components and process control agromarket in respects. Market segmentation. Implementation strategy products. International marketing and society. System basics Organization of technical services. Fundamentals of organization of production processes of technical service in agriculture.	A. Knowledge of economic laws and forms of agricultural production, economic relations in the industry, taking into account its specific characteristics and understanding of the interaction of agriculture with other spheres of material production, relationship management, and marketing is an integral flexible system that can be responsive to the state of the market conditions, the competitive environment. B. Using practical knowledge of financial reporting principles, techniques and methods of accounting in business entities, knowledge of agricultural production management, technical service, and the ability to use the methods and functions of management. C. Have the ability to make judgments, evaluating ideas and forming conclusions on the documentation and inventory. The ability to make the right decisions in specific situations. D. Be able to communicate in a clear form the communicative relationship. Formation of communicative skills of group interaction in the learning process, the formation of professional knowledge necessary to guide people in the workplace. E. To be able to bring to the learning of students their knowledge and experience; examples adopt teaching methods and technical literature; regulations and legislative acts of the Republic of Kazakhstan; apply technical training, the ability to analyze actual problems of production and business management of technical service with theoretical and practical knowledge.	Management

1	2	3	4	5	6	7	8	9	10
Mechanization of Livestock, Service Maintenance and Safety	OT 4230	Labor Protection	2/ 3	7	Mathematics; Physics; Chemistry	Educational and Industrial Practice; Course and Diploma Projects	Introduction to the course. Safety management system. Methods of study of occupational accidents and diseases. Dangerous and harmful production factors and remedies. The microclimate in the premises. Industrial lighting. Industrial vibration and noise control measures and their harmful effects. Protection against electric shock, electromagnetic fields, radiation. Sanitary requirements for production facilities. Occupational safety in the operation of facilities and vessels working under pressure, and gas equipment. Occupational safety in the operation of material handling equipment and other production equipment. Fire safety. Anti-fire measures and remedies.	A. Knowledge of the basic concepts of occupational safety, regulatory and legal instruments for the protection of labor. B. Acquisition of practical skills in mastering the methods of identifying and analyzing, environment and safety, prediction and prevention of accidents and occupational diseases. C. The ability to compare and draw conclusions, and express and justify its position to the creation of healthy and safe working conditions for employees of agricultural production. D. In the field of communication - the ability to position the system approach argue basic requirements for occupational health, safety and fire protection requirements for the unit of production facilities, processes, jobs. E. In the field of education - the formation of logical thinking with technically competent outlining the formation of personality, development of intelligence and logical abilities and algorithmic thinking, the ability to cope with problems that can have multiple solutions, the ability to develop requirements for the design and unconditional implementation of the legal, socio-economic, technical, hygienic and organizational measures for labor protection and fire safety.	Mechanization of Technological Processes

1	2	3	4	5	6	7	8	9	10
Profile disciplines for the educational program " Technical Support of Agricultural Production Processes"									
Agro Technological Machines and Electric Drive	EME 3304	Electric Machines and Electric Drive	2/ 3	5	Mathematics; Physics; Chemistry	Agro Technological Machines; Electronics and Microprocessor Technology; Tractors and Motor Vehicles; Livestock Mechanization	Transformers. Instrument transformers. Autotransformers. Asynchronous machines. Synchronous machines. Direct current machines. Universal machines AC and DC, micromachines. The mechanical characteristics of working machines. Electromechanical properties motors AC and DC. Coordinate regulation of the drive. Mechanics and Dynamics of electric drive. Selection of motor power. Control equipment and automatic control of electric drives. Selection of electric drive systems. The drive in agriculture.	A. Knowledge of the concept of the destination device, the working process and the adjustments of electrical machines and drives. B. To be able to use the acquired knowledge into practice by setting up the machine for a given mode of operation, to identify shortcomings of machines at work in economic conditions; ability to find ways to address the shortcomings and technically competent to implement them in practice. C. The ability to assess the quality of work and efficiency of electrical machines and drives; compare and draw conclusions, to build their own reasoning, to express its position on the main issues of the technological process, to draw conclusions on the application of specific techniques to build their own arguments. Have skills judgments on physical nature of the phenomena accompanying the process of converting electric power AC and DC. D. In the field of communication - create a sense of tolerance, patriotism and respect for the specialty profile. Ability to design and develop processes of electrical machines and drives. E. In the field of education - the ability to analyze key issues to validate the basic parameters and modes of operation of electrical machines; ability to choose the type and capacity of electric drives for different operating modes and perform the calculation of electromechanical transients drives.	Operation of Electrical Equipment

1	2	3	4	5	6	7	8	9	10
Exploitation of Machine-Tractor Fleet	TS APK 3306	Technical Support in the Agricultural Complex	3/ 5	6	Mathematics; Informatics; Construction Materials Technology; Theoretical and Applied Mechanics; Interchangeability, Standardization and Technical Measurement	Using Machine; Diploma Project	Place of technical services in agriculture system. System maintenance. Content and technology of maintenance of tractors and machinery. Types and frequency of maintenance. The basic malfunctions of machines and their external features. Technical diagnostics of machines. Technology diagnosis. Classification, designation and general characteristics of maintenance facilities. Mobile and stationary tools for maintenance and diagnostics (selection and justification). Organization of corporate technical service and its basic elements. Pre-sale, after-sales, warranty and post-warranty service. Planning and organization of technical service. Reliability, properties and concepts. Providing comprehensive and reliable indicators. Measures to improve reliability. System repair machines. The basic malfunctions of machines, causes, manifestations and solutions. Concept and technology resource recovery machines. Classes of machine parts and repair parts feature of different classes. Specifications for repair. Documentation and quality control of the repair	A. For specific natural and climate conditions cal areas of future work, to have the knowledge and skills of choice for the needs of branches of agrarian and industrial complex technologies cropping given the direction of technology development and technology. Knowledge and understanding of the importance of service in Agrotechnological agriculture system and the form of engineering, provide manufacturers of goods, regulations on the technical use of the machines. Knowledge and understanding of on-the-reliability and repair of machines. B. Ability to practice for the needs of the economy rely composition tractor fleet, to plan the organization of effective use and efficient management of the work, to practice the knowledge and understanding of reliability and repair of machinery, equipment and technologies for the organization and implementation of agrotechnical service in agroindustrial complexes, the organization of mechanized operations in the cultivation of crops. C. Analysis of the shortcomings in the use of machines and tractors and tractor operated machinery, reducing their efficiency, increased fuel consumption and lubricating materials, cost and ability to propose measures to address these shortcomings. Ability to identify factors influencing the effective use of technology and logistical base in agribusiness enterprises and agrotechnical service, to draw conclusions and make proposals to improve the efficiency. Teach students to think creatively in the process of practical, laboratory and independent works, using modern tools and methods. Have the skills formation, application and	Technical Service

							machinery. Material and technical base repair facility.	evaluation of agricultural machinery park. D. In the field of communication - using modern information technology to monitor the improvement of technology to keep in touch with the companies and dealers, and delivers new equipment, materials and spare parts. Prepare students for work and skill introduction of scientific and technological achievements in the repair and service industries. Ability to communicate and monitor the development of technologies cal equipment for the organization's technical service Agrotechnique in abroad with the help of information technology advances and new technologies. Have the skills to set up and use modern devices point farming. E. Ability to learn new technologies and techniques to master and implement them in the learning process and into production. Ability to follow the development of technology and equipment, agro technical service in the near and far abroad, to master them and be able to use them in practice. The ability to analyze key issues repair production, make a critical analysis of the use of the machine-tractor fleet and address the shortcomings in his work.	
	NRM 4309	Reliability and Repair of Machines	3/ 5	7	Mathematics; Informatics; Technology of Construction Materials; Theoretical and Applied Mechanics; Interchangeability, Standardization and Technical Measurement	Using Machines; Mechanization of Livestock; Diploma Project	Quality and reliability of the machines. Property and the main indicators of reliability of machines. Physical basis of reliability. External and internal factors that reduce the reliability of the machines. General features of the wear of machine parts. The main directions of improving the reliability of equipment. Requirements for the maintainability of machines. Theoretical Foundations of repair machines. Recovery Methods landings compounds. The production process of repair of machines. Technological processes of restoration parts by plastic deformation, welding, welding, electroplating, and other methods. Recovery of standard parts and assembly units Repair, principles of design processes; basis for the organization of repair of machines and principles of design and repair service companies. Technical and economic performance of the repair and maintenance companies.		Technological Machines and Equipment

	PEMTP 4310	Production Exploitation of Machine-Tractor Flee	4/ 7	7	Fundamentals of Hydraulics and Heating; Agro-Technical Machines; Fundamentals of Devices of Wheeled-Tracked Vehicles; Combine Machine	Using Machines; Diploma Project.	Technical equipment and the use of state of the art. Basics aggregation machines. Recruitment and training of his unit to work. Features mashinoispolzovaniya under the northern regions of Kazakhstan. Of operational technology of mechanized field work carried out anti-erosion units. Features of use of tractors and cars in winter conditions. Work on the snowpack. Maintenance and storage of anti-erosion techniques.		Technical Service

1	2	3	4	5	6	7	8	9	10
Mechanization of Livestock, Processing Products and Labor Protection	MZh 3307	Livestock Mechanization	3/ 5	6	Mathematics; Physics; Descriptive Geometry and Engineering Graphics; Construction Materials Technology; Fundamentals of Hydraulics and Heating; Theoretical and Applied Mechanics; Electric Machines and Electric Drive	Diploma Project	The subject, objectives and content of the discipline. The mechanization of production processes on the farm. Theoretical basis of the processes of manufacture and storage of fodder. Theoretical Foundations of feed distribution process. Theoretical Foundations of removal processes, storage and disposal of manure. Theoretical Foundations of milking process, primary treatment and processing of milk. Theoretical Foundations of shearing processes and primary processing of wool. Theoretical bases of maintenance of machinery and equipment of livestock farms. Fundamentals of the design process on the farms.	A. Knowledge of the device, operating machinery, plant and equipment used for mechanization of animal husbandry, the foundations of the theory of production processes and a basic understanding of the design process in animal husbandry with a justification of mechanization. Knowledge of equipment processes for the processing of agricultural products and understanding of the fundamentals of the theory of machines and apparatus of processing enterprises and development of elements of the calculation of the main parameters. B. Use of practical knowledge and ability to understand the design and acquisition of flow-process lines of livestock production and processing of agricultural products, manuals, installation and commissioning of process equipment livestock and poultry farms, as well as equipment for processing animal and plant products. C. The ability to compare and draw conclusions, to build their own arguments for choice of technology and production equipment, developed in the fundamental way of development of mechanization of production livestock and processing of agricultural products. D. In the field of communication - the ability to correctly position a systemic approach to address issues of mechanization of production processes on the farms of different ownership forms, correctly assign tasks of design and construction of process equipment processing of agricultural products. E. In the field of education - the formation of logical thinking with technically competent outlining the formation of personality, development of intelligence and logical	Mechanization of Technological Processes
	TOPSP 4311	Technologies and Equipment for Processing Agricultural Products	3/ 5	7	Fundamentals of Hydraulics and Heating; Agro-Technical Machines; Electric Machines and Electric Drive	Diploma Project	The subject, objectives and content of the discipline. General information about the technological equipment of processing agricultural products industries. Equipment for the preparation of agricultural raw materials, the basic technological operations. Technological equipment for the processing of raw materials and semi-finished products division. Technological		Mechanization of Technological Processes

							equipment for the mechanical processing of agricultural raw materials and semi-finished products and molded compound. Technological equipment for the heat and mass transfer processes. Technological equipment for electrophysical processing raw materials and intermediates. Machinery and equipment for processing grain. Machinery and equipment for processing fruits and vegetables. Machinery, apparatus and equipment for processing sunflower seeds and soybeans. Machinery, apparatus and equipment for milk processing. Machinery, apparatus and equipment for the production of fermented milk products. Machinery, apparatus and equipments for manufacturing ofbutter. Machinery and equipment for cheese production. Meat processing equipment. Machines and apparatus for the production of sausages. Machines and devices for handling and processing related products of slaughter animals.	abilities and algorithmic thinking, the ability to cope with problems that can have multiple solutions, the ability to develop requirements for the design and unconditional implementation of the legal, socio-economic, technical and organizational measures.	

1	2	3	4	5	6	7	8	9	10
Project	ASP 3308	Automation of Agricultural Production	3/ 5	6	Mathematics; Physics	Using Machines; Mechanization of Livestock; Technical Service in the Agricultural Sector; Technologies and Equipment for Processing Agricultural Products;	Technological bases of automation of agricultural production. Automation of standard processes. Automation of technological processes in field. Automation of technological processes in greenhouses. Automation and animal feed production. Automation of power, water and irrigation. Automate storage and processing of agricultural products. Automation of repair and diagnostics of agricultural machinery. Microcontroller control system.	A. Ability to use in the practice of the principles and methods of building hardware in automatic control systems; Knowledge and understanding of the principle of the device operation and reclamation of modern agricultural machinery. Knowledge and understanding of the basic technological physic-mechanical properties of materials of agricultural production. Knowledge and understanding of the processes occurring inside the cylinder of internal combustion engines and their work systems (power supply, lubrication, cooling, start), and the general dynamics and traction of wheeled and tracked vehicles, their handling and stability, throughput and efficiency. B. Development of design documentation, preparation of functional and structural patterns of agricultural automation control objects. Ability to select, adjust, and to practice the technical means of mechanization of agriculture and land reclamation works. The acquisition of practical skills in the use of various instruments under certain qualitative execution of the process. Use knowledge and understanding abilities to perform the thermal and dynamic calculation of the internal combustion engine, for the calculation and construction of the traction characteristics of the tractor and the dynamic characteristics of the car. C. Ability, compare, draw conclusions, to build their own arguments in the automation of production processes, to express its position on the main issues and theories of the device and agricultural reclamation machines and process. The ability to compare the results of calculations of the perfor-	Operation of Electrical Equipment
	SMM 2303	Agricultural and Meliorative Machines	3/ 5	4	Mathematics; Physics; Fundamentals of Devices of Wheeled-Tracked Machines; Combine Machine	Agro-Technical Machines; Industrial Exploitation of Machine-Tractor Fleet; Using Machine; Diploma Project	Technological fundamentals of crop mechanization. The device, workflows and regulation of agricultural, meliorative machines and machines for post harvest handling of the crop. Interaction of the working bodies of cars to the material, the justification of their parameters. Basic calculations of the parameters of agricultural and meliorative machines.		Agricultural and Meliorative Machines

	OTRDVS 3305	Fundamentals of Theory and Calculation of the Internal Combustion Engine	3/ 5	5	Mathematics; Physics; Construction Materials Technology	Tractors and Motor Vehicles; Technical Service in the Agricultural Sector; Reliability and Repair of Machines; Diploma Project	Thermodynamic cycle internal combustion engine. Actual cycle internal combustion engine. Indicator and efficient performance of the working cycle. Increased power and fuel efficiency of automotive engines. Kinematics and dynamics Crank mechanism. Equilibration engines. Engine characteristics. Traction balance tractors and motor vehicles. General dynamics of wheeled and tracked vehicles. Traction dynamics and fuel economy of tractor and motor vehicle. Braking tractors and motor vehicles. Manageability wheeled and tracked vehicles. Stability, permeability and smooth running of the tractor and motor vehicle.	mance of the internal combustion engine, tractor and car; formulate conclusions about the validation of the engine systems. Build your own reasoning, to express and justify their position in relation to the benefits or drawbacks of work of a particular node, the unit system. Build your own reasoning, to express and justify their position on the advantages or disadvantages of new power plants transport technology. D. In the field of communication - create a sense of respect for the opinions of others, ability to listen and be heard. Ability to design and develop processes and agricultural reclamation machines, as well as methods of calculation of internal combustion engine. E. In the field of education - the ability to analyze current information on new advances in engine, tractor, car. Ability to analyze the results of scientific research in the field of process automation, analyze key issues of agricultural production, to navigate the vast flow of information in the media and on the Internet.	Technical Service

1	2	3	4	5	6	7	8		10
Profile disciplines for the educational program "Technical Service in Agriculture"									
Agro Technological Machines and Electric Drive	EME 3304	Electric Machines and Electric Drive	2/ 3	5	Mathematics; Physics; Chemistry	Agro-Technical Machines; Electronics and Microprocessor Technology; Tractors and Motor Vehicles; Mechanization of Livestock	Transformers. Instrument transformers. Autotransformers. Asynchronous machines. Synchronous machines. Direct current machines. Universal machines AC and DC, micromachines. The mechanical characteristics of working machines. Electromechanical properties motors AC and DC. Coordinate regulation water electric drive. Mechanics and dynamics of electric drive. Selection of motor power. Control equipment and automatic control of electric drives. Selection of electric drive systems. The drive in agriculture.	A. Knowledge of the concept of the destination device, the working process and the adjustments of electrical machines and drives. B. To be able to use the acquired knowledge into practice by setting up the machine for a given mode of operation, to identify shortcomings of machines at work in economic conditions; ability to find ways to address the shortcomings and technically competent to implement them in practice. C. The ability to assess the quality of work and efficiency of electrical machines and drives; compare and draw conclusions, to build their own reasoning, to express its position on the main issues of the technological process, to draw conclusions on the application of specific techniques to build their own arguments. Have skills judgments on physical nature of the phenomena accompanying the process of converting electric power AC and DC. D. In the field of communication - create a sense of tolerance, patriotism and respect for the specialty profile. Ability to design and develop processes of electrical machines and drives. E. In the field of education - the ability to analyze key issues to validate the basic parameters and modes of operation of electrical machines; ability to choose the type and capacity of electric drives for different operating modes and perform the calculation of electromechanical transients drives.	Operation of Electrical Equipment

1	2	3	4	5	6	7	8	9	10
Exploitation of Machine-Tractor Fleet	TS APK 3306	Technical Support in the Agricultural Sector	3/ 5	6	Mathematics; Informatics; Construction Materials Technology; Theoretical and Applied Mechanics; Interchangeability, Standardization and Technical Measurement	Using Machines; Diploma Project	Place of technical services in agriculture system. System maintenance. Content and technology of maintenance of tractors and machinery. Types and frequency of maintenance. The basic malfunctions of machines and their external features. Technical diagnostics of machines. Technology diagno-stirovaniya. Classification, designation and general characteristics of maintenance facilities. Mobile and stationary tools for maintenance and diagnostics (selection and justification). Organization of corporate technical service and its basic elements. Pre-sale, after-sales, warranty and post-warranty service. Planning and organization of technical service. Reliability, properties and concepts. Providing comprehensive and reliable indicators. Measures to improve reliability. System repair machines. The basic malfunctions of machines, causes, manifestations and solutions. The concept and technology of the renewal of the life of machines. Classes of machine parts and repair parts features of different classes. Specifications for repair. Documentation and	A. For specific natural and climate conditions cal areas of future work, to have the knowledge and skills of choice for the needs of branches of agrarian and industrial complex technologies cropping given the direction of technology development and technology. Knowledge and understanding of the importance of service in Agro technological agriculture system and the form of engineering support from producers, regulations on the technical use of the machines. Knowledge and understanding of the reliability and maintenance of machines. Knowledge about services Electrics trucking and agricultural machinery. The use in the practice of scientific research methods to maintain in operational condition of electrical components, minimizing maintenance costs and repairs. Knowledge of methods of diagnosis of electrical circuits. Knowledge and understanding of the organization and principles of design enterprises agro technical service. B. Ability to practice for the needs of the economy rely composition tractor fleet, to plan the organization of effective use and efficient management of the work, to practice the knowledge and understanding of reliability and repair of machinery, equipment and technologies for the organization and implementation of agro-technical services in the agricultural sector, organization of mechanized operations in the cultivation of crops. The acquisition of practical skills in organizing and carrying out diagnostics of electrical elements, taking into account the effective use of human and material resources. The practical application of the basic principles of the organization of tech-	Technical Service

							quality control of the repair machinery. Material base of repair facility.	nical service enterprises agro formations. C. Analysis of the shortcomings in the use of machines and tractors and tractor operated machinery, reducing their efficiency, increased fuel consumption and lubricating materials, cost and ability to propose measures to address these shortcomings. Ability to determine the causes of decline efficiency of using technology and material-technical base of agriculture and agro technical service companies, to draw conclusions and make proposals to improve the efficiency. Teach students to think creatively in the process of practical, laboratory and independent works, using modern tools and methods. The ability to compare and draw conclusions, to build their own reasoning, to express its position on the main issues of technical service of automotive electrical equipment and agricultural machinery. Reasoned position on the organization and design of agro technical service enterprises. D. In the field of communication - using modern information technology to monitor the improvement of technology to keep in touch with the companies and dealers, and delivers new equipment, materials and spare parts. Prepare students for work and design at enterprises of agro technical service and introduction of scientific and technological achievements in the repair and service industries. Ability to communicate and monitor the development of technological equipment for organization of agro technical service in the near and far abroad with the help of information technology advances and new technologies. The ability to compare and draw conclusions, to build their own reasoning, to express its position on the main issues of technical service of automo-	
	NRM 4309	Reliability and Repair of Machines	3/ 5	7	Mathematics; Informatics; Technology of Construction Materials; Theoretical and Applied Mechanics; Interchangeability, Standardization and Technical Measurement	Using Machines; Mechanization of Livestock; Diploma Project	Quality and reliability of the machines. Property and the main indicators of reliability of machines. Physical basis of reliability. External and internal factors that reduce the reliability of the machines. General features of the wear of machine parts. The main directions of improving the reliability of equipment. Requirements for the maintainability of machines. Theoretical Foundations of repair machines. Recovery Methods landings compounds. The production process of repair of machines. Technological processes of restoration parts by plastic deformation, welding, welding, electroplating, and other methods. Recovery of standard parts and assembly units Remon, principles of design processes; basis for the organization of repair of machines and principles of design and repair service companies. Techno-economic performance of the repair and maintenance companies.		Technological Machines and Equipment
	TSEAST 4310	Technical Service of Automotive Electrical	2/ 3	7	Fundamentals of Hydraulics and Heat-	Using Machines; Diploma Project	Theoretical foundations, basic concepts and definitions of technical service of automotive electrical equipment and		Technical Service

		and Agricultural Machinery			ing; Agro-Technical Machines; Basics Devices of Wheeled - Tracked Vehicles; Combine Machine; Theoretical Fundamentals of Electrical Engineering; Electronics and Microprocessor Technology		agricultural machinery. Conductors and electric current semiconductors. Dielectrics. Construction of electrical circuits. Sources of electric current. Rechargeable batteries are their types, maintenance and repair. Gensets AC and DC. Design Features of generator sets. The current controller. Contact transistor and integrated relay controls. Gauges light and sound alarm. Battery, contact transistor and electronic ignition systems. Electric starters. Diagnosis of electrical appliances. The basic malfunctions of electrical appliances and how to resolve them. Maintenance of electrical components.	tive electrical equipment and agricultural machinery. E. Ability to learn new technologies and techniques to master and implement them in the learning process and into production. Ability to follow the development of technology and equipment, organization and design of agro technical service in the near and far abroad, to master them and be able to use them in practice. The ability to analyze key issues repair production, make a critical analysis of the use of the machine and tractor and address the shortcomings in his work. The ability to model and analyze the state of electrical automotive and agricultural machinery. Identify and solve problems associated with borrowing operable electrical automotive components and agricultural machinery. Predict ways to improve electrical service in solving various production tasks.	
	OOPPAS 4311	Organization and Principles of Design Enterprises Agrotechnical Service	2/ 3	7	Mathematics; Design Principles and Machines Parts; construction materials technology	Using Machines; Diploma Project	Calculation of the production program of the complexity of the technical influences. Technology calculation of industrial zones and other elements of the enterprises. General conditions of the development of design solutions and building road tractor fleet. Planning decisions of industrial premises and buildings of the car fleet of tractors. Technical and economic efficiency of projects for the construction and reconstruction of motor tractor fleet.		Technological Machines and Equipment

1	2	3	4	5	6	7	8		10
Mechanization of Livestock, Maintenance and Labor Protection	MZh 3307	Mechanization of Livestock	3/ 5	6	Mathematics; Physics; Descriptive Geometry and Engineering Graphics; Construction Materials Technology; Fundamentals of Hydraulics and Heating; Theoretical and Applied Mechanics; Electric Machines and Electric Drive	Diploma Project	The subject, objectives and content of the discipline. The mechanization of production processes on the farm. Theoretical basis of the processes of manufacture and storage of fodder. Theoretical Foundations of feed distribution process. Theoretical Foundations of removal processes, storage and disposal of manure. Theoretical Foundations of milking process, primary treatment and processing of milk. Theoretical Foundations of shearing processes and primary processing of wool. Theoretical bases of maintenance of machinery and equipment of livestock farms. Fundamentals of the design process on the farms.	A. Knowledge of the device, operating machinery, plant and equipment used for mechanization of animal husbandry, the foundations of the theory of production processes and a basic understanding of the design process in animal husbandry with a justification of mechanization. Knowledge of the tasks and functions of service livestock machinery and equipment, development of methods of calculation and planning of customer service. B. Use of practical knowledge and ability to understand the design and acquisition of flow-process lines of livestock production, management, installation and commissioning of process equipment livestock and poultry farms. The acquisition of practical skills in mastering the methods of identifying and analyzing, environment and safety, prediction and prevention of accidents and occupational diseases. C. The ability to compare and draw conclusions, to build their own arguments for choice of technology and production equipment, the fundamental way of development of mechanization of livestock production and maintenance of machinery and	Mechanization of Technological Processes

	SOMO Zh 4312	Service maintenance of machinery and Livestock equipment	3/ 5	7	Agro-Technical Machines; Mechanization of Livestock; Reliability and Repair of Machines; Technical Service in the Agricultural Sector	Diploma project	The subject, objectives and content of the discipline. The system of maintenance of machinery and equipment of cattle farms and complexes. Organization of customer service. Planning Services service. Plant service water. Service-servicing of machines and equipment for the preparation and distribution of feed. Service maintenance of milking machines and units. Servicing of refrigeration and cooling tanks. Plant service systems, manure removal. Plant Service shearing points. Plant service climate livestock buildings. Servicing Electrical and Automation farms and complexes. Safety in the servicing of machinery and equipment of farms and complexes.	equipment of livestock, as well as to express and justify its position to the creation of healthy and safe working conditions for employees agricultural production. D. In the field of communication - the ability to correctly position a systemic approach to address issues of mechanization of production processes on the farms of different ownership forms, correctly assign tasks of design and construction of process equipment, servicing it, to argue the basic requirements of occupational health, safety and fire protection requirements for unit production facilities, processes, jobs. E. In the field of education - the formation of logical thinking with technically competent outlining the formation of personality, development of intelligence and logical abilities and algorithmic thinking, the ability to cope with problems that can have multiple solutions, the ability to develop requirements for the design and unconditional implementation of the legal, socio-economic, technical, hygienic and organizational measures for labor protection and fire safety.	Mechanization of Technological Processes
Project	ASP 3308	Automation of Agricultural Production	3/ 5	6	Mathematics; Physics	Using Machine; Mechanization of Livestock; Technical Service in the Agricultural Sector; Technologies and Equipment for	Technological bases of automation of agricultural production. Automation of standard processes. Automation of technological processes in field. Automation of technological processes in greenhouses. Automation and animal feed production. Automation of power, water and irrigation. Automate storage and processing of agricultural products. Automation of repair and diagnostics of agri-	A. Ability to use in the practice of the principles and methods of building hardware in automatic control systems; Knowledge and understanding of the principle of the device operation and reclamation of modern agricultural machinery. Knowledge and understanding of the basic technological physic-mechanical properties of materials of agricultural production. Knowledge and understanding of the processes occurring inside the cylinder of internal combustion engines and their work systems (power supply, lubrication, cooling, start), and the general dynamics and traction of wheeled	Operation of Electrical Equipment

						Processing Products; Diploma Project	cultural machinery. Microcontroller control system.	and tracked vehicles, their handling and stability, throughput and efficiency. B. Development of design documentation, preparation of functional and structural patterns of agricultural automation control objects. Ability to select, adjust, and to practice the technical means of mechanization of agriculture and land reclamation works. The acquisition of practical skills in the use of various instruments under certain qualitative execution of the process. Use knowledge and understanding abilities to perform the thermal and dynamic calculation of the internal combustion engine, for the calculation and construction of the traction characteristics of the tractor and the dynamic characteristics of the car. C. Ability, compare, draw conclusions, to build their own arguments in the automation of production processes, to express its position on the main issues and theories of the device and agricultural reclamation machines and process. The ability to compare the results of calculations of the performance of the internal combustion engine, tractor and car; formulate conclusions about the validation of the engine systems. Build your own reasoning, to express and justify their position in relation to the benefits or drawbacks of work of a particular node, the unit system. Build your own reasoning, to express and justify their position on the advantages or disadvantages of new power plants transport technology. D. In the field of communication - create a sense of respect for the opinions of others, ability to listen and be heard. Ability to design and develop processes and agricultural reclamation machines, as well as methods of calculation of internal combustion en-	
	SMM 2303	Agricultural and Meliorating Machineries	3/ 5	4	Mathematics; Physics; Fundamentals of Devices of Wheeled-Tracked Machines; Combine Machine	Agro-Technical Machines; Production Operation of Machines and Tractors; Using Machine; Diploma Design	Technological bases of crop mechanization. The device, workflows and regulation of agricultural, reclamation machines and machines for post-harvest processing of the crop. Interaction of the working bodies of cars to the material, the justification of their parameters. Basic calculations of the parameters of agricultural and reclamation machines.		Agricultural and Meliorating Machineries
	OTRDVS 3305	Basic Theory and Calculation of the Internal Combustion Engine	3/ 5	5	Mathematics; Physics; Technology of Structural Materials	Tractors and Motor Vehicle; Technical Service in the Agricultural Sector; Reliability and Repair of Machines; Diploma Design	Thermodynamic cycle engine. Actual cycles of ICE. Indicator and efficient performance of the working cycle. Increased power and fuel efficiency of automotive engines. Kinematics and dynamics of the crank mechanism. Equilibration engines. Engine characteristics. Traction balance tractors and cars. General dynamics of wheeled and tracked vehicles. Traction dynamics and fuel economy of tractor and car. Braking tractors and cars. Manageability wheeled and tracked vehicles. Stability, permeability and smooth running of the tractor and car.		Technical Service

								gine. E. In the field of education - the ability to analyze current information on new advances in engine, tractor, car. Ability to analyze the results of re-scientific research in the field of automation of processes, analyze the key issues of agricultural production, to navigate the vast flow of information in the media and on the Internet.	

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