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

6B07104-Technological machines and equipment

Nur-Sultan, 2021

MINISTRY OF AGRICULTURE OF THE REPUBLIC OF KAZAKHSTAN
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Brief description of elective disciplines of the educational program

Pathomorphology

1	Name of course	Chemistry
2	Code of course	Him 1211
3	Cycle of course	BD
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Department of Physics and Chemistry
7	Year	1
8	Prerequisites	SchoolChemistrycourse
9	Postrequisites	Materialsinengineeringdesign
10	Course summary	Expansion and deepening of knowledge in the course of chemistry, the study of the theoretical foundations of chemistry, the basic concepts of chemistry, the basics of qualitative analysis, the formation of the concept of the role of chemistry
11	Learning outcomes	The acquired knowledge in chemistry helps future specialists of the agricultural industry to solve the problems of increasing the yield of agricultural crops, which are associated with the study of the composition of soils, the determination of macro-and microelements in them

1	Name of course	Mechanization of cattle-breeding farm
2	Code of course	MZh 2214
3	Cycle of course	BD
4	Amount of credits	5
5	Level of preparation	Undergraduate studies
6	Department	Agrotechnics and technology
7	Year	3
8	Prerequisites	Physics; mathematics; chemistry; descriptive geometry and engineering graphics; computer graphics; mechanics of materials; computer-aided design of mechanisms; fundamentals of design; measuring systems; electrical machines and drives
9	Postrequisites	Agricultural machinery, Mechanical assembly shop design, Failure analysis and machine repair, Installation, testing and operation of technological machines
10	Course summary	Repair and maintenance of the agro-industrial complex. Types of enterprises and their characteristics. Organization of workplaces. Fundamentals of the organization of the repair and maintenance base, ways to improve it. General provisions and procedure for designing a PTS. Specialization, concentration and cooperation of enterprises. Selection of the site for the construction of the enterprise. Planning of production capacity utilization. Optimal distribution of production resources. Calculation of the main indicators of technological solutions Basic provisions and initial materials for the design. Fundamentals of calculation of technical service enterprises. Design of auxiliary production units. Features of reconstruction and technical re-equipment of the PTS
11	Learning outcomes	Be able to correctly solve the issues of mechanization of production processes on farms of various forms of ownership from the position of a systematic approach, design and complete production lines, manage installation and commissioning works, and evaluate the quality and efficiency of livestock mechanization tools.

1	Name of course	Industrial controllers
2	Code of course	PK 2220
3	Cycle of course	BD
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Operation of electrical equipment
7	Year	3
8	Prerequisites	Mathematics, Physics, Electrical Engineering, Electrical Machines and Drives
9	Postrequisites	Pneumatic and hydraulic drives, CNC system (Fundamentals of mechatronics), Manipulators and robots
10	Course summary	General information about controllers. Architecture and types of PLCs. Structure and structure of ARIES controllers. Programming and interface of ARIES controllers. Additional ARIES modules. Installation of ARIES modules. Structure and structure of SIEMENS controllers. Programming and interface of SIEMENS controllers. Additional SIEMENS modules. Installation of SIEMENS modules. Structure and structure of Schneider Electric controllers. Programming and interface of Schneider Electric controllers. Additional modules of Schneider Electric. Installation of Schneider Electric modules. Design of automation systems.
11	Learning outcomes	the ability to plan the commissioning, maintenance and testing of individual modules and subsystems, to participate in the organization and conduct of installation, commissioning and maintenance at existing facilities and experimental models, as well as in the processing of the results of experimental studies

1	Name of course	Pneumatic and hydraulic drives

2	Code of course	PGP 2221
3	Cycle of course	BD
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Agricultural machinery and technology
7	Year	3
8	Prerequisites	Mathematics, Physics, Chemistry, Fundamentals of Wheeled and Tracked Vehicles
9	Postrequisites	Agricultural machines, Manipulators and robots, CNC system (Basics of mechatronics)
10	Course summary	Hydrostatics. Hydrodynamics. Volumetric hydraulic drives. Working fluids. Volumetric hydraulic machines. Hydraulic equipment. Determination of parameters and selection of hydraulic drive and hydraulic equipment. Pneumatic actuators. Calculation of pneumatic actuators
11	Learning outcomes	Know the basics of hydraulics, hydraulic drives, hydraulic machines, hydraulic equipment and working fluids. Be able to calculate and select hydraulic and pneumatic actuators

1	Name of course	Thermal Engineering and Thermodynamics Basics
2	Code of course	TOT 2222
3	Cycle of course	BD
4	Amount of credits	3

5	Level of preparation	Undergraduate studies
6	Department	Heat power engineering
7	Year	3
8	Prerequisites	Physics, Fundamentals of Processing Technology, Electrical Engineering and Fundamentals of Electronics, Automated Electric Drive
9	Postrequisites	Livestock products processing machines and apparatuses, Machines and devices for processing plant products, Calculation and design of food production machines, Technological processes and devices for food production
10	Course summary	Equipment for heat and cold treatment. The role of heat transfer and mass transfer in technical processes. Thermal equipment in public catering. Classification of heat treatment methods in the OP. General principles of the device of thermal devices OP. Designs of some types of heating devices in public catering. Devices for hydrothermal and thermal processing of grain, cereals and feed components. Dryers in the food industry. Equipment for freezing food products. Design features of self-unloading separators. Fundamentals of the theory of the centrifugal separation process. Basic requirements for heat exchangers. Features of plate and tube heat exchangers
11	Learning outcomes	Know the basics of the kinetics and dynamics of the main technological processes; be able to perform calculations of processes, devices, machines; acquire skills in solving typical project tasks of the course.

1	Name of course	Technology of agricultural engineering
2	Code of course	TSM 2223
3	Cycle of course	BD
4	Amount of credits	5
5	Level of preparation	Undergraduate studies
6	Department	Technological machines and equipment
7	Year	3
8	Prerequisites	Measuring systems; Electrical machines and drives; Thermal Engineering and Fundamentals of Thermodynamics; Pneumatic and hydraulic drives; Materials in engineering design; Cutting theory, Cutting tools and tooling; Computer-aided design of mechanisms

9	Postrequisites	Agricultural machinery; Design of mechanical assembly shops; Modeling of metalworking; Failure analysis and repair of machines; Installation, testing and operation of technological machines; Metalworking machines and welding equipment
10	Course summary	it consists of the main sections, which include: basic concepts and definitions, the choice of workpieces, the basing of parts during processing, the accuracy and quality of the treated surfaces, the design of technological processes for processing parts, methods of mechanical processing of standard parts of agricultural machines
11	Learning outcomes	apply knowledge in solving practical design problems, analyze the manufacturability of structures of parts and machines, design machine tools, choose cutting and measuring tools, rationally choose the technology of manufacturing parts while ensuring the quality of processing; carry out technical standardization of technological operations and processes in general; make calculations in the analysis of technological processes of machine assembly,design technological processes for processing parts and assembling machines in mass production; choose the necessary technological equipment and technological equipment when designing;

1	Name of course	Manipulators and robots
2	Code of course	MR 3217
3	Cycle of course	BD
4	Amount of credits	5
5	Level of preparation	Undergraduate studies
6	Department	Technological machines and equipment
7	Year	4
8	Prerequisites	Electrical engineering and the basics of electronics. Electric machines and drives. Industrial microcontrollers. Pneumaticandhydraulicactuators.
9	Postrequisites	Diplomadesign
10	Course summary	Classification of lifting machines, manipulators and robots. Construction of lifting machines. Cargo handling devices. Elements of cargo and traction devices. Stops and brakes. Mechanisms for lifting the load and changing the boom departure. Mechanisms of movement. Turning mechanisms. The device of manipulators and industrial robots. Industrialrobotdrives. Robotcontrolsystems.
11	Learning outcomes	Know the structure of lifting machines.Have an understanding of the design and control systems of industrial robots

1	Name of course	Patent Law
2	Code of course	PZ 3218
3	Cycle of course	BD
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Agricultural machinery and technology
7	Year	4
8	Prerequisites	Descriptive geometry and engineering graphics, Measurement systems, Automation of drawing execution, Materials in engineering design, Design basics
9	Postrequisites	Diplomadesign
10	Course summary	Fundamentals of Intellectual Property law. Types of intellectual property rights objects. The history of the development of Kazakhstan's legislation on the protection of intellectual property. The system of sources of legal regulation of relations related to the protection of intellectual property. International conventions on intellectual property issues.procedure for registration and filing of an application for an invention and utility model, procedure for consideration of applications in the patent office; types of decisions of the patent office on applications; rights and benefits of inventors; the concept and types of licenses, the economy of inventions. Preparation and submission of the application. Preparation of claims and utility models, utility models and industrial designs. Grant of a patent or certificate. The validity of patents and copyright certificates issued before the introduction of modern patent legislation. The rights of the authors of inventions, utility models and industrial designs. Patent rights and their protection. Content of patent rights. Duties of the patent owner

11	Learning outcomes	Be able to analyze the technical situation and find new technical solutions; possess methods of activating creative thinking; make applications for proposed inventions and utility models and conduct correspondence with the patent office; conduct a patent search when performing course and diploma design, as well as in research work.prepare a report on scientific, technical and patent research with conclusions and recommendations on the patent purity and patent capacity of intellectual property objects

1	Name of course	Mechanical and design assembly room
2	Code of course	PMSC 3216
3	Cycle of course	BD
4	Amount of credits	5
5	Level of preparation	Undergraduate studies
6	Department	Technological machines and equipment
7	Year	4
8	Prerequisites	Descriptive geometry and engineering graphics, Measurement systems, Computer-aided design of mechanisms, Fundamentals of design, Installation, testing and operation of technological machines
9	Postrequisites	Diploma design
10	Course summary	Repair and maintenance of the agro-industrial complex. Types of enterprises and their characteristics. Organization of workplaces. Fundamentals of the organization of the repair and maintenance base, ways to improve it. General provisions and procedure for designing a PTS. Specialization, concentration and cooperation of enterprises. Selection of the site for the construction of the enterprise. Planning of production capacity utilization. Optimal distribution of production resources. Calculation of the main indicators of technological solutions. Basic provisions and initial materials for the design. Fundamentals of calculation of technical service enterprises. Design of auxiliary production units. Features of reconstruction and technical re-equipment of the PTS
11	Learning outcomes	choose the best option for the development and placement of a network of technical service facilities in the region; justify the composition of the repair and maintenance company or division and calculate its main parameters; calculate the number of employees, the number of jobs and select the necessary technological equipment

1	Name of course	Production management
2	Code of course	PM 3311
3	Cycle of course	PD
4	Amount of credits	4
5	Level of preparation	Undergraduate studies
6	Department	Management
7	Year	4
8	Prerequisites	Economic theory, higher mathematics microeconomics.
9	Postrequisites	Diplomadesign
10	Course summary	Agro-industrial complex. The market in the agro-industrial complex. Economic foundations of market mechanisms of management. Fixed assets of agricultural production. Labor resources. Production costs and production costs. Pricing and pricing system. Agricultural production and its economic efficiency. Management development: essence and principles. The essence and main types of the organization. Management functions: planning and organization. Management functions: motivation and control. Connecting processes in management. Marketing management: elements and processes. Marketsegmentation. Productpolicyinmarketing
11	Learning outcomes	The purpose of the course: to prepare students for work in a market economy. This course provides students with the basics of knowledge of economic laws and forms of their application in agricultural production, the relationship of agriculture with other areas of the economy; training students in effective management of agricultural enterprises by studying the experience, the science of management and marketing, mastering the skills inherent in the manager.