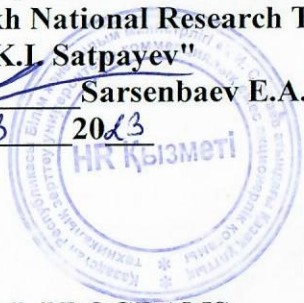


AGREED

Head of the Department of Energy,
NJSC "Kazakh National Research Technical University
named after K.I. Satpayev"

Sarsenbaev E.A.

«24» 03 2023



«Логистика және көлік академиясы» АҚ
«Автоматтандыру және
телекоммуникациялар» институты
АО «Академия логистики и транспорта»
Институт «Автоматизация
и телекоммуникации»

I APPROVE
Director of the Institute
«Automation and telecommunications»
Toygozhinova A.Zh.
«24» 03 2023

CATALOG OF ELECTIVE DISCIPLINES

EDUCATIONAL PROGRAMS

7M07150 - Electrical power engineering

Education level: master's degree

Duration of study: 2 years

Year of admission: 2023 y.

Module	Cycle	Component	Name of the discipline	Overall labor intensity		Semester	Learning outcome	Brief description of the discipline	Prerequisites	Postrequisites
				in academic hours	in academic loans					
1	2	3	4	5	6	7	8	9	10	11
Module 3 – Research Competencies	BD	EC	Modern methods of modeling a scientific experiment	270	9	1	LO 1	Studies the structure of models as a process consisting of a number of stages and levels, representing the modern scientific knowledge of reality, revealing the specifics, versatility, multidimensional modeling. When studying the discipline, undergraduates develop professional knowledge on modern methods of scientific experiment in the electric power industry, the basics of modeling, processing and analysis of scientific experiment data, as well as the scientific outlook of specialists in the electric power industry. Within the framework of the discipline, guest lectures are provided by top managers and specialists of scientific and design institutes. Methods of active learning - group work, scientific discussion.	Undergraduate disciplines	Digital substation control systems

			Modern methods of modeling a scientific experiment				LO 1	Studies the use of computer technologies for modeling scientific experiments in the electric power industry and the creation of software. When studying the discipline, professional knowledge of the use of computer technologies, the basics of software for solving scientific and technical problems of our time is formed. Within the framework of the discipline, guest lectures are provided by top managers and specialists of scientific and design institutes. Methods of active learning - group work, scientific discussion.	Undergraduate disciplines	Digital devices and microprocessors
Module 2 – Economic and managerial competencies	BD	EC	Strategic management	180	6	2	LO 10	Formation of undergraduates" basic theoretical knowledge and basic practical skills in the field of strategic management of enterprises and organizations, strategic analysis of the external and internal environment of the company, the company"s competitive strategy and corporate management strategy. Active learning methods are used - brainstorming, group work	Undergraduate disciplines	RWMS, FC, Research practice
			Business research				LO 10	Mastering theory by undergraduates, as well as developing practical skills in business research and analytics, life cycle analysis of the development of promising technologies. The scientific and technical aspects of the project are being studied. Active teaching methods used in the discipline - individual task	Undergraduate disciplines	RWMS, FC, Research practice
Module 5 – Professional Competencies	PD	EC	Ways to improve reliability	180	6	1	LO 4	Studies the main methods of calculating the reliability of power supply systems, analyzing the reliability of individual power supply systems. the main ways to improve the operational reliability of energy systems, providing consumers with electric energy with standardized quality, reliability and efficiency. Active teaching methods: teamwork, discussions. Within the framework of the discipline, guest lectures are provided by top managers of JSC NC KTZ.	Bachelor's majors	Problems of energy saving in power supply systems

Module 5 – Professional Competencies			Ways to improve the quality of electricity				LO 4	Studies methods and technical means of rational use of electricity and reduction of energy losses in the power supply system of an industrial enterprise, providing consumers with electric energy with standardized quality, reliability and efficiency. Formation of stable knowledge of undergraduates on problematic issues of power supply systems of various industries. The discipline uses interactive teaching methods, case methods, group work. Within the framework of the discipline, guest lectures are provided by top managers of JSC NC KTZ.	Bachelor's majors	Problems of energy saving in power supply systems
	PD	EC	Mutual electromagnetic influence in electrical equipment	180	6	2	LO 2	The issues of a complex of concepts, concepts and requirements for electromagnetic compatibility of electrical and power equipment in transport and industrial enterprises are considered. Active teaching methods used in the discipline are an individual task. Within the framework of the discipline, guest lectures are provided by stakeholders of scientific and design institutes, top managers of JSC NC KTZ.	Bachelor's majors	Digital substation control systems
			Mutual electromagnetic influence in the electric power industry				LO 2	The issues of electromagnetic compatibility of electrical equipment in power supply systems in transport, industrial and other facilities are considered. The discipline uses active teaching methods: teamwork, discussions, brainstorming, express survey. Within the framework of the discipline, guest lectures are provided by top managers of JSC NC KTZ.	Bachelor's majors	Digital devices and microprocesso rs
	PD	EC	Electrotechnical complexes and electric drive of technological processes	180	6	2	LO 2, 3	Studies the general physical laws of the electric drive, the features of the interaction of the elements of the electromechanical system, the nature of dynamic processes and the features of static modes. Acquires knowledge on the properties and characteristics of automated electric drive systems, methods of calculating parameters, static and dynamic characteristics and selection of elements. Active teaching methods: group work,	Bachelor's majors	Digital substation control systems

Module 5 – Professional Competencies				180	6	3		discussions. Within the framework of the discipline, guest lectures are provided by top managers of energy companies.		
			Electrical installations in technological processes				LO 2, 3	When studying the discipline, the issues of the use of electrical installations in technological processes with an automated electric drive and the determination of parameters under various modes of its operation are considered. The task of the discipline is to study the interaction of elements in the technological processes of systems. Teaching methods: teamwork, discussions, individual tasks. Within the framework of the discipline, guest lectures are provided by top managers of energy companies.	Bachelor's majors	Digital devices and microprocessors
	PD	EC	Digital substation control systems	180	6	3	LO 6	Studies methods of effective use of modern computer and information technologies, digital equipment and software for solving scientific and technical problems of control and management of substation modes, acquires professional skills of working with computer programs MatLab, Multisim, etc. Within the framework of the discipline, guest lectures are provided by stakeholders of scientific and design institutes. Methods of active learning - group work, interactive teaching methods.	Bachelor's majors	Theoretical foundations of unconventional and renewable energy, Writing a master's thesis
			Digital devices and microprocessors				LO 6	Studies the rules of construction and optimization of logical operations, logic circuits, their implementation in modern digital control systems of electric power facilities. Acquires professional skills in organizing the work of peripheral devices of microprocessor technology, circuit design and software management. Within the framework of the discipline, guest lectures are provided by stakeholders of scientific and design institutes. Methods of active learning - group work, interactive teaching methods.	Bachelor's majors	Alternative energy sources and energy-saving technologies, Writing a master's thesis

Module 5 – Professional Competencies	PD	EC	Theoretical foundations of unconventional and renewable energy	270	9	3	LO 7	The methods of calculating the modes of the main power and auxiliary equipment of renewable energy installations, the main properties, designs and operating principle are considered, and practical skills sufficient for successful production activities are acquired, allowing them to independently master new necessary knowledge and achievements in the field of forecasting the potentials of renewable energy sources. Within the framework of the discipline, guest lectures are provided by stakeholders of scientific and design institutes. Methods of active learning - group work, interactive teaching methods, individual tasks.	Bachelor's majors	Internship, Writing a master's thesis
			Alternative energy sources and energy-saving technologies				LO 5, 7	Studies the application and analysis of the features of the use of alternative energy sources, energy conservation issues in the power supply of industrial enterprises and electrified railways, the use of secondary energy resources to improve environmental conditions. Guest lectures by specialists of scientific and design institutes are provided within the framework of the discipline. Methods of active learning - group work, individual tasks.	Bachelor's majors	Internship, Writing a master's thesis
TOTAL				1440	48					

Head of the Department «Energy»

Egzekova A.T.