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«24» 06 2022 ж.

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«23» 06 2022 ж.

Educational program 7M07107 "Power engineering" (1.5 year of study, enrollment 2022)

№	ECTS Credits	The list of disciplines of the university component and elective disciplines	
1	2	3	4
		PM 1 Psychological and managerial module	
1	3 (BD)	**MenPsiU 5101 «Management, management psychology» 1-1-0-1** **Prerequisites: -** **Post requisites:** **PP 5205 0-0-0-2** **The purpose of studying the discipline is:** familiarization of students with the fundamental provisions of effective management of organizations, enterprises, firms: various conceptual approaches to management, factors influencing the adoption of effective effective decisions. formation of systemic ideas and understanding of the psychological essence of managerial activity; mastering the basic socio-psychological methods of management; development of motivation for personal growth. **The content of the main sections:** management as a type of activity, the concept and types of organization, Communication and decision-making, strategic management of the organization, innovation management, crisis management, management functions: planning, organization, motivation and control, team management.theories of leadership, power and influence, personnel management.payment and stimulation of labor. Methodological foundations of management psychology. Socio-psychological problems of management and ways to solve them.Personality-oriented approach and socio-psychological management methods. Personality in the social management system. Personality as an object of management. Professionally significant qualities and professional skills of a specialist manager. Personality as an object and subject of management. Relationships in the working group. Guide. Leadership. Fundamentals of psychology of managerial communication. Psychological analysis of managerial activity. Psychology of preparation, management decision-making. **Learning outcomes:** understands the psychological essence of management activity; analyzes the psychological features of management effectiveness; owns the basic socio-psychological management methods; has the skills to study and evaluate the individual psychological properties of management subjects; organizes group work based on the principles of team formation; prevents professional risks in management activities; resolves conflict situations in the production team; motivates management subjects to develop personal growth.	
2	3 (BD)	**FL 5102 «Foreign language (professional)» 0-2-0-1** **Prerequisites: -** **Post requisites:** **PP 5205 0-0-0-2** **The purpose of studying the discipline is**: mastering a foreign language as a means of intercultural, interpersonal and professional communication in various fields of production and scientific-pedagogical activity. **The content of the main sections**: the content of the course is training in various types of speech activity in the alleged areas of professional and scientific communication. The thematic content of the course is implemented in two directions: oral and written communication in a foreign language. Thematic content of oral communication: the role of science in the development of society; achievements of science in the field of scientific interests of a	

		international scientific seminar (conference, congress, symposium, discussion); international visits (participation in exhibitions, foreign internships); participation in a joint project, project presentation. Forms of written communication: scientific translation; scientific abstracting and annotation; resume, abstract, report, article; business correspondence. According to the international standard of foreign language proficiency CEFR, the level of knowledge of undergraduates must correspond to level C1 + LAP + LSP. **Learning outcomes:** be able to annotate, abstract and present in a foreign language the main content of scientific texts (articles) in the specialty; have skills in using the basic terminology of the specialty in oral and written statements for the organization of foreign-language professional communication; have the skills to analyze the necessary information from foreign sources created in various sign systems in typical situations of professional and business communication; be able to translate scientific, technical, socio-political and other special literature, materials of correspondence with foreign organizations, as well as materials of conferences, meetings, seminars; have the skills of processing the audited text, allowing to form speech experience in situations of foreign professional and scientific-pedagogical communication; have the skills to freely carry out oral communication in the specialty in a monological and dialogical form, taking into account the complex exchange of information; be able to independently carry out professional development in the framework of foreign language communication based on modern technologies.	
		MAEPI 2 Module Modern aspects of electric power industry	
3	5 (BD)	**MTMMCACS 5103 «Modern theories, methods and means of creating automation and control systems» 1-0-2-1** **Prerequisites: -** **Post requisites:** **PIC 5207 1-2-0-2** **PP 5202 0-20-0-2** **The purpose of studying the discipline is:** the formation of knowledge on the use of telecommunication technologies and powerful computing systems in the creation of automated control systems. **The content of the main sections:** telecommunication technologies; powerful computing systems that exclude restrictions on numerical methods; big data processing; the influence of stochastic processes and phenomena on the means of creating automation and control systems. **Learning outcomes:** apply modern technologies and tools for research and design of control systems.	**MPEPI 5103 «Modern problems of electric power industry» 1-0-2-1** **Prerequisites:** **Post requisites:** **PIC 5207 1-2-0-22** **PP 5202 0-20-0-2** **The purpose of studying the discipline is**: acquisition of skills in the field of understanding the operational properties of electric power facilities and their use in the management, operation, design of installations based on renewable energy sources. **The content of the main sections:** Three-dimensional modeling of structures and equipment in the design of renewable energy objects. Creating a frame model of an industrial building. Equipment for renewable energy plants. **Learning outcomes:** knowledge of the design and operation of installations.
4	4 (BD)	**ESTPIA 5104 «Energy-saving technologies in power industry and automation» 1-0-2-1** **Prerequisites: -** **Post requisites:** **AECMMP 5206 1-0-2-2** **The purpose of studying the discipline is:** information about modern materials and technologies to reduce energy costs in production. **The content of the main sections:** General questions of energy saving. Energy management. Ene rgy audit. Energy service contracts. Energy-saving technologies in various industries. Power quality indicators. Examples of the implementation of energy saving technologies on the example of Expo 2017. The main results of the Expo 2017 fair in the field of energy. **Learning outcomes:** knowledge of a wide range of the latest technologies and be able to use it to increase production efficiency while	**ESEA 5104 «Energy saving and energy audit» 1-0-2-1** **Prerequisites: -** **Post requisites:** **AEKGMP 5206 1-0-2-2** **The purpose of studying the discipline is:** information about modern materials and technologies to reduce energy costs in production. **The content of the main sections:** Policy and legislation of the Republic of Kazakhstan in the field of energy saving. Characteristics of fuel and energy resources, traditional technologies for the production of electricity. World experience in energy saving and energy efficiency. Methodology for designing energy-saving technologies. **Learning outcomes:** knowledge of the basic laws in the field of energy saving.

		reducing energy costs.	
		IP 3 Module Industrial practice	
5	5 (ED)	**K(R)L(Prof) 5201 «Kazakh (Russian) language (professional)» 0-3-0-2** **Prerequisites:** **IYa(Prof) 5102 0-2-0-1** **Post requisites:-** **The purpose of studying the discipline is**: the formation of the ability to communicate in a foreign language in specific professional and business areas and situations, taking into account the peculiarities of professional thinking. Possession of cognitive linguistic and cultural complexes for solving professional tasks. Knowledge of the history, literature, traditions of the Kazakh people. **The content of the main sections**: the subject content of the discipline is presented in the form of cognitive-linguistic-cultural complexes consisting of typical situations of professional communication. General technical speech practice. Professionally-oriented speech topics of the specialty. The basic categorical and conceptual apparatus of a general technical nature in its foreign language expression. Special material and its use in specified professional situations. A system of exercises for teaching listening. Dialogical and monologue texts of a professionally oriented nature and their communicative goals. A system of exercises for teaching speaking. Communicative and professional language games. Classification of types of reading. Teaching different types of reading. Professionally-oriented texts for teaching reading. Development of writing techniques. Methods of teaching business writing as one of the forms of professional communication. **Learning outcomes**: to be able to build their verbal and nonverbal behavior in the public, professional spheres of communication; to have the skills to apply a variety of language and speech tools adequately to social factors and professional situations; to be able to correctly intonate the speech of a professional communicative act, relying on lexical and terminological sufficiency and grammatical correctness; to be able to analyze the structural and semantic organization of the text; to use individual methods of professional communication in oral and written forms in Kazakh, Russian and foreign languages to solve the tasks of professional activity.	
6	10 (ED)	**PP 5202 «Industrial practice» 0-10-0-2** **Prerequisites:** **Men 5102 1-0-0-1** **MTMMCACS 5103 1-0-2-1** **SUE 5202 1-0-2-1** **Post requisites: -** **The purpose of the practice is:** consolidation of theoretical knowledge and the acquisition of practical skills for experimental research and maintenance of automatic control systems. **The content of the main sections:** organization of operation and commissioning of automatic control objects; software configuration of control systems for production and mechatronic facilities; implementation of regulations for updating, technical support and restoration of control systems; work with technical documentation; compilation of a review in the field of automation; planning and conducting an experiment. **Learning outcomes:** have the skills of collecting and processing factual material during experimental studies of automatic control systems; conducting production discussions; without violating the laws of logic and the rules of argumentation.	
		MES 4 Module Modeling of electrical systems	
7	5 (ED)	**IMS 5203 «Identification and modeling of systems» 2-1-0-1** **Prerequisites: -** **Post requisites:** **MED 5205 1-0-2-2** **The purpose of studying the discipline is:** the formation of theoretical knowledge and practical skills of identification and modeling of technical objects and systems. **The content of the main sections:** identification methods, classification of mathematical models, features of technological processes as objects of	**TE 5203 «Теория эксперимента» 2-1-0-1** **Prerequisites:** **Ele 2207 1-1-1-4*** **Post requisites:** **PEUVE 5208 1-0-2-2** **The purpose of studying the discipline is**: mastering the theoretical foundations and practical skills for processing data from a scientific experiment.

		modeling and identification, analytical methods for constructing mathematical models of technological systems, methods for experimental studies of technical systems. **Learning outcomes:** possesses methods of identification and modeling of system engineering systems for research and design of their control systems.	**The content of the main sections:** Three-dimensional modeling of structures and equipment in the design of renewable energy objects. Creating a frame model of an industrial building. Equipment for renewable energy installations. Terrain modeling. **Learning outcomes:** theoretical knowledge and practical skills in processing data from a technical experiment.
8	5 (ED)	**EDCS 5204 «Electric drive control systems» 1-0-2-1** **Prerequisites:** **ME 5203 2-0-2-2** **Post requisites: -** **The purpose of studying the discipline is**: formation of knowledge and skills of construction and technical implementation of electric drive control systems (SUEP). **The content of the main sections**: logical control of the EP, control systems for the speed and torque of the EP, SUEP in tracking modes and in positioning modes, software implementation of the SUEP, projects of the Department of APP on SUEP. **Learning outcomes**: to master the design methods and operation skills of the SUEP.	**NTRES 5204 «Non-traditional and renewable energy sources» 1-0-2-1** **Prerequisites:-** **Post requisites:** **AEKGMP 5208 1-0-2-2** **The purpose of studying the discipline is**: the formation of knowledge in the field of development prospects and the existing world and domestic experience in the development of energy sources. **The content of the main sections**: Solar Energy. Solar installations. Heliomobiles. Wind energy. Types of winds used. Storage of wind energy. Thermal energy of the Earth. The energy of the world ocean. The energy of the tides. The energy of ocean currents. The energy of rivers. Environmental problems of using unconventional and renewable energy sources. **Learning outcomes**: knowledge in the field of non-traditional and renewable energy sources.
9	5 (ED)	**MED 5205 «Modeling of electric drives» 1-0-2-2** **Prerequisites:** **IMS 5203 1-1-1-1** **Post requisites: -** **The purpose of studying the discipline is:** the formation of knowledge of methods and algorithms for modeling a controlled electric drive. **The content of the main sections:** disturbing and controlling influences, output coordinates, equivalent circuits and mathematical models of the constant part of the adjustable electric drive, a simulation model of the electric drive, the formulation of the problem of theoretical studies of the controlled electric drive, optimal control of the electric drive. **Learning outcomes:** use simulation methods for research and design of electric drive control systems.	**ET 5205 «Electrotechnology» 1-0-2-2** **Prerequisites:** **Ele 2207 1-1-1-4*** **Post requisites: -** **The purpose of studying the discipline is**: preparation for scientific research to solve problems associated with the development of innovative methods that increase the efficiency of operation and design of electric power systems. **The content of the main sections:** Electric heating, basics of kinetics of heating, resistance electric heating, direct heating, indirect heating, electrophysical, electrochemical and electrobiological processing of materials, processing methods, electric current treatment. **Learning outcomes:** knowledge of methods and methods of electric heating and methods of processing materials.
		ADFPS 5 Module Automation and design of facilities in the power sector	
10	5 (ED)	**PSEC 5206 «Power supply of electrical complexes»** **1-0-2-1** **Prerequisites: -** **Post requisites:** **AEKGMP 5208 1-0-2-2** **The purpose of studying the discipline is:** the formation of knowledge and skills on power supply of electrical complexes (PSEC). **The content of the main sections:** characteristics of electricity consumers, permissible loads, safety, grounding and grounding, protection against atmospheric overvoltages and electrocorrosion, measurements, monitoring of power supply, transformer substations, selection of the number and capacity of transformers, design of a power	**ITE 5206 «Information technologies in power industry» 1-0-2-1** **Prerequisites: -** **Post requisites:** **DORES 5208 1-0-2-2** **The purpose of studying the discipline is**: preparation for scientific research, design of information systems using object-oriented programming to solve problems related to the development of innovative methods that increase the efficiency of operation and design of electric power systems. **The content of the main sections**: Power supply of an intelligent building. Uninterrupted power supply system. Electric machine rooms. Organization of power supply system operations. **Learning outcomes**: successfully solve professional tasks related to the

		supply system. **Learning outcomes:** own algorithms and a set of measures in accordance with the requirements of the operation of PSEC systems.	design, maintenance and operation of electric power facilities.
11	5 (ED)	**PIC 5207 «Programming of industrial controllers»** **1-2-0-2** **Prerequisites:** **Post requisites: -** **The purpose of studying the discipline is:** the formation of knowledge and programming skills of modern industrial logic controllers (ILC). **The content of the main sections:** ILC programming environments creation of dispatch control systems based on SCADA systems. **Learning outcomes:** own methods of design and maintenance of process control systems using ILC.	**EST 5207 «Engineering and smart technologies» 1-2-0-2** **Prerequisites:** **ETEEA 5104 1-0-2-1** **SUE 5204 1-0-2-1** **Post requisites:-** **The purpose of studying the discipline is**: the formation of undergraduates' knowledge about information systems in the energy sector, obtaining the knowledge and skills necessary to solve engineering problems in the field of designing power supply systems, the composition of project documentation, its content and the possibility of using computer technology to improve the quality and reduce the design time. **The content of the main sections**:. Structure, organization of design of electrical systems and complexes. The content of the project work. The main characteristics of the design of electrical systems and complexes. The project and its characteristics. Types of projects. Project planning. Smart technologies. Information technologies in the professional sphere. Industrial ICT. **Learning outcomes**: to master the methods of solving the problems of designing systems of secondary (low-voltage) circuits of the design object; formation of skills in developing systems of secondary (low-voltage) circuits of the design object, selection of electrical equipment of secondary circuits; formation of skills in using reference and normative-technical literature on the development of systems of secondary (low-voltage) circuits of the design object, working with standard projects of the organization of systems secondary (low-voltage) circuits.
12	5 (ED)	**AEKGMP 5208 «Automation of electrical complexes of mining and metallurgical production» 2-0-1-3** **Prerequisites:** **OEK 5207 2-0-2-2** **ETEA 5107 2-0-1-1** **ME 5204 2-0-2-2** **Post requisites: -** **The purpose of studying the discipline is:** the formation of knowledge and skills in the automation of electrical complexes of mining and metallurgical production (ECMMP). **The content of the main sections:** technical characteristics of ECMMP technological devices, instrumentation sensors of general industrial and explosion-proof design, visualization systems for operating modes of technological objects in ECMMP, automatic process control systems ECMMP. **Learning outcomes:** to have design methods and to know the required sequence of actions for servicing ECMMP automated control systems.	**DOREP 5208 «Design and operation of renewable energy plants»** **2-0-1-3** **Prerequisites: -** **Post requisites:** **AECMMP 5208 2-0-1-3** **The purpose of studying the discipline is**: acquisition of skills in the field of understanding the operational properties of electric power facilities and their use in the management, operation, design of installations based on renewable energy sources. **The content of the main sections:** Three-dimensional modeling of structures and equipment in the design of renewable energy facilities. Creating a frame model for an industrial building. Renewable Energy Equipment. **Learning outcomes:** knowledge of the design and operation of installations.

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