

"APPROVE"

Member of the Board - Vice-Rector
for Academic Affairs of NAO "Abylkas
Saginov Karaganda Technical University"

A.M. Temerbayeva

« 24 » 06 2022 ж.



"AGREED"

LLP «MEGALIGHT ENGINEERING»
CEO

D.I. Kayumov

« 22 » 06 2022 ж.



"AGREED"

Head of production department
"Energougol" MD JSC "
Arcelor Mittal Temirtau"

K.A. Sultanov

« 25 » 06 2022 ж.



Educational program 7M07107 "Power engineering" (2 year of study, enrollment 2022)

№	ECTS Credits	The list of disciplines of the university component and elective disciplines	
1	2	3	4
1	4 (BD)	<p align="center">PsiP 1 The module of psycho-pedagogical HPS 5101 «History and philosophy of science» 1-2-0-1 Prerequisites: - Post requisites: PP 5105 0-0-0-2</p> <p>The purpose of studying the discipline is: the formation of a culture of scientific thinking, develops analytical abilities and skills of research activities, provides theoretical and practical knowledge necessary for a future scientist. The content of the main sections: the phenomenon of science as a subject of special philosophical analysis; knowledge of the history and theory of science; patterns of development of science; structure of scientific knowledge. Learning outcomes: own the research methodology of the branch of science and be able to apply in research activities.</p>	
2	4 (BD)	<p align="center">FL 5102 «Foreign language» 0-3-0-1 Prerequisites: - Post requisites: MTTD 5202 1-2-0-2</p> <p>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 graduate student in the countries of the language being studied; subject of research of a graduate student; international cooperation in the scientific field: 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</p>	

		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.
3	4 (BD)	<p align="center">PHE 5103 «Pedagogy of higher education» 1-2-0-1</p> <p align="center">Prerequisites: - Post requisites: PP 5205 0-10-0-2</p> <p>The purpose of studying the discipline is: mastering by the undergraduate the basics of professional and pedagogical culture of a higher education teacher.</p> <p>The content of the main sections: The modern paradigm of higher education. Methodology of pedagogical science. Professional competence of a university teacher. Theory of education in higher education (didactics). The content of higher education. Organization of the learning process based on the credit system of education in higher education. Traditional and active methods and forms of organization of training in the training of future specialists. New educational technologies in high school. The activities of an adviser, tutor and office registrar at the university. The organization of independent work of students in the conditions of credit technology. Theory of scientific activity of higher education. Student research. Higher school as a social institution for the education and formation of the personality of a specialist.</p> <p>Learning outcomes: designs the pedagogical process at the university; determines the ways of organizing and conducting the educational process at the university; predicts the results of pedagogical activity.</p>
4	3 (BD)	<p align="center">PM 5104 «Psychology of management» 1-1-0-1</p> <p align="center">Prerequisites: - Post requisites: PP 5205 0-10-0-2 HPS 5101 2-1-0-2 MTFIAE 5201 2-1-0-2</p> <p>The purpose of studying the discipline is: the formation of systemic representations and understanding of the psychological essence of managerial activity; mastery of the basic socio-psychological management methods; personal growth motivation development.</p> <p>The content of the main sections: Methodological foundations of management psychology. Socio-psychological problems of management and ways to solve them. Person-oriented approach and socio-psychological management methods. Personality in the system of social management. Personality as an object of management. Professionally significant qualities and professional skills of a specialist manager. Personality as an object and subject of management. Working Group Relationships. Leadership. Fundamentals of the psychology of managerial communication. Psychological analysis of management activities. Psychology of training, management decision making.</p> <p>Learning outcomes: aware of the psychological nature of management activities; analyzes the psychological characteristics of management effectiveness; owns the basic socio-psychological management methods; owns the skills of studying and evaluating the individual psychological properties of control subjects; organizes group work based on the principles of team building; prevents professional risks in management activities; resolves conflict situations in the production team; motivates the subjects of management on the development of personal growth</p>
5	5 (BD)	<p align="center">PP 5205 «Pedagogical practice» 0-10-0-2</p> <p align="center">Prerequisites: HPS 5101 1-2-0-1 PHE 5103 1-2-0-1 Post requisites:</p> <p>The purpose of studying the discipline is: preparation for teaching activities in the relevant specialty</p> <p>The content of the main sections: conditions of pedagogical activity at the university; volume and nature of pedagogical assignments; requirements that the teacher makes a real pedagogical activity at the university</p> <p>Learning outcomes: skills in preparing and conducting lecture, practical and laboratory classes at a university.</p>
		MAEPI 2 Module Modern aspects of electric power industry
6	5	<p>STPPEPS 5106 «Scientific and technical problems of power</p> <p>STPRE 5106 «Scientific and technical problems of renewable energy» 2-1-</p>

	(BD)	<p>engineering of power systems» 2-1-0-1 Prerequisites: - Post requisites: PI 5203 0-24-0-3 PSEC 5207 2-0-2-2</p> <p>The purpose of studying the discipline is: the formation of knowledge of the problems of the electric power industry of energy systems and methods for solving them, based on the achievements of science. The content of the main sections: structure of the electric power industry of Kazakhstan, alternative energy, legislation of Kazakhstan in the field of energy conservation, technologies and automation for energy conservation in various industries. Learning outcomes: owns knowledge of modern methods of implementing effective technologies and reducing energy consumption in the electric power industry.</p>	<p>0-1 Prerequisites: Post requisites: PI 5203 0-24-0-3 ET 5207 2-0-2-2</p> <p>The purpose of studying the discipline is: acquisition of skills in the field of understanding the technology of designing renewable energy facilities, their competent operation and management. 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.</p>
7	5 (BD)	<p>ESTPIA 5107 « Energy-saving technologies in power industry and automation» 2-0-1-1 Prerequisites: - Post requisites: PSEC 5207 2-0-2-2 PI 5203 0-24-0-3</p> <p>The purpose of studying the discipline is: information on modern materials and technologies to reduce energy costs in production. The content of the main sections: General issues of energy conservation. Energy management. Energy Audit. Energy service contracts. Energy-saving technologies in various industries. Electricity quality indicators. Examples of the introduction of energy-saving technologies using 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 latest technologies and be able to use it to increase production efficiency while reducing energy costs.</p>	<p>ARES 5107 « Alternative and renewable energy sources» 2-0-1-1 Prerequisites:- Post requisites: PSEC 5207 2-0-2-2 PI 5203 0-24-0-3</p> <p>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: Energy of sun. Solar installations. Heliomobiles. Wind power. Types of winds used. Storage of wind energy. Thermal energy of the Earth. The energy of the oceans. The energy of the tides. The energy of ocean currents. The energy of the rivers. Ecological problems of using non-traditional and renewable energy sources. Learning outcomes: knowledge in the field of alternative and renewable energy sources.</p>
8	5 (BD)	<p>IMS 5108 «Identification and modeling of systems» 2-1-0-1 Prerequisites: - Post requisites: ME 5203 2-0-2-2</p> <p>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 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.</p>	<p>TE 5108 «Theory of experiment» 2-1-0-1 Prerequisites: Ele 2207 1-1-1-4* Post requisites: PEUVE 6207 2-0-1-3</p> <p>The purpose of studying the discipline is: mastering the theoretical foundations and practical skills for processing data from a scientific experiment. 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.</p>

		TMRP 3 Module Teaching methods and Research practice
9	5 (ED)	<p style="text-align: center;">K(R)L(Prof) 5201) 5201 «Kazakh (Russian) language (professional)» 0-3-0-2</p> <p style="text-align: center;">Prerequisites: IYa(Prof) 5102 0-3-0-1</p> <p style="text-align: center;">Post requisites:-</p> <p>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.</p> <p>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.</p> <p>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.</p>
10	5 (ED)	<p style="text-align: center;">MTMMCACS 5202 «Methods of teaching technical disciplines» 1-2-0-2</p> <p style="text-align: center;">Prerequisites: PHE 5103 1-2-0-1</p> <p style="text-align: center;">Post requisites:-</p> <p>The purpose of studying the discipline is: the formation of professional, pedagogical and methodological competencies of undergraduates to prepare them for future pedagogical activities.</p> <p>The content of the main sections: The content of vocational education. Functions of the process of teaching technical subjects. Curricula and training programs. The main forms of organization of training in technical and special subjects. Lecture as the main form and method of teaching at a university. Didactics of practical and laboratory training. Control at the university. Lesson analysis as a condition for improving the quality of training. Teacher Image.</p> <p>Learning outcomes: conducts classes based on the methodological basis of higher education pedagogy and psychology; develops educational and methodological support of the educational process; uses IT technology to optimize the learning process and effectively assimilate learning information.</p>
11	12 (ED)	<p style="text-align: center;">RP 5203 «Research practice» 0-0-0-3</p> <p style="text-align: center;">Prerequisites: TP 5108 2-1-0-1</p> <p style="text-align: center;">Post requisites: -</p> <p>The purpose of studying the discipline is: independently formulate the production task for the current moment and in the near future for the automation of production processes; to draw up the results of the work performed; collect data to analyze the use and functioning of automatic control systems; to upgrade individual elements of automatic control systems in accordance with the work task; document the changes made and prepare reporting documentation; build relationships with the team; own methods of analysis and introspection that contribute to the development of the personality of the leader of the group; make informed conclusions on production activities; substantiate the adopted action plan, adequately select the means and methods for solving the tasks.</p> <p>The content of the main sections: energy supply systems of an industrial enterprise, principles of arrangement of heat power and heat technology equipment, means of mechanization, protection and automation of industrial facilities, issues of metrology and standardization;</p> <p>Learning outcomes: in building a model of professional tasks and meaningful interpretation of the results; in the design, adaptation and implementation of standard processes for the automation of technological processes and mechatronics and robotics objects; in the maintenance of operational and</p>

		organizational and administrative production documentation.	
		DCSTES 4 Module Development of control systems and technologies in energy saving	
12	6 (ED)	<p style="text-align: center;">MED 5204 « Modeling of electric drives» 2-0-2-2 Prerequisites: - Post requisites: PIC 6204 2-0-1-3</p> <p>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.</p>	<p style="text-align: center;">ITE 5204 «Информационные технологии в электроэнергетике» 2-0-2-2 Prerequisites: - Post requisites: ESEA 5205 2-0-2-2</p> <p>The purpose of studying the discipline is: preparation for scientific research, the design of information systems using object-oriented programming 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: Power supply of an intellectual building. Uninterruptible power supply system. Electric facilities. Organization of operation of the power supply system. Learning outcomes: successfully solve professional problems associated with the design, maintenance and operation of electric power facilities..</p>
13	5 (ED)	<p style="text-align: center;">EDCS 5205 «Electric drive control systems» 2-0-1-3 Prerequisites: ME 5203 2-0-2-2 Post requisites: -</p> <p>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.</p>	<p style="text-align: center;">EE 5205 «Energy saving and energy audit» 2-0-1-3 Prerequisites: ITE 5204 2-1-0-1 Post requisites:-</p> <p>The purpose of studying the discipline is: study of the main methods of efficient use of electricity. The content of the main sections: The policy and legislation of the Republic of Kazakhstan in the field of energy conservation. Characteristics of fuel and energy resources, traditional technologies for the production of electricity. World experience in energy conservation and energy efficiency. Methodology for the design of energy-saving technologies. Learning outcomes: knowledge of the basic laws in the field of energy conservation.</p>
14	5 (ED)	<p style="text-align: center;">PIC 5206 «Programming of industrial controllers» 1-2-0-3 Prerequisites: Post requisites: -</p> <p>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.</p>	<p style="text-align: center;">//MMES 5206 «Methods of modeling electrical systems» 1-2-0-3 Prerequisites: Post requisites: -</p> <p>The purpose of studying the discipline is: to acquire knowledge in the field of design and research of electric power systems based on modeling of their components and dynamics of processes occurring in them. The content of the main sections: analysis of electric power systems; theory of calculation of design parameters of electric power systems; systematization of factors influencing the choice of model; mathematical modeling of electric power systems; CAD/CAE modeling of hydrodynamic and energy processes; identification of optimal design parameters of electric power systems; methodology of research and analysis of the results of modeling of electric power systems; methods of designing modern installations of traditional energy carriers, renewable and non-traditional energy sources.</p>

			Learning outcomes: the student has knowledge and skills in the field of development, design and analysis of electric power systems by modeling methods using software; can carry out experimental research work within the framework of professional activity; owns methods of designing thermal power systems.
ADFPS 5 Module Automation and design of facilities in the power sector			
15	6 (ED)	<p>PSEC 5207 «Power supply of electrical complexes» 2-0-2-2 Prerequisites: STPPEPS 5106 2-1-0-1 ESTPIA 5107 2-0-1-1 Post requisites: AECMMP 5208 2-0-1-3</p> <p>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 supply system. Learning outcomes: own algorithms and a set of measures in accordance with the requirements of the operation of PSEC systems.</p>	<p>ET 5206 «Electrical technology» 2-0-2-2 Prerequisites: - Post requisites: AECMMP 5208 2-0-1-3</p> <p>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.</p>
16	5 (ED)	<p>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: -</p> <p>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.</p>	<p>DOREP 5208 «Design and operation of renewable energy plants» 2-0-1-3 Prerequisites: - Post requisites: AECMMP 5208 2-0-1-3</p> <p>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.</p>

Head of the Department of APP

Yugay V.V.

Acting head of the Department of ES

Neshina Y.G.

Approver Representative

**Open Company «MEGALIGHT ENGINEERING»
GENERAL MANAGER**

Kayumov D.I.