Ministry of Education and Science of Ukraine
State Higher Educational Institution
«Ukrainian State University of Chemical Technology»

Rector of SHEI USUCT
_____ Sukhyi K.M.
«___» _____2019

EDUCATION PROGRAMME PROFILE

Electroenergetics, electrical engineering and electromechanics

The first (bachelor) level

Bachelor of Science

Field of education knowledge 14 Electrical engineering

Specialisation 141 Electroenergetics, electrical engineering and electromechanics

Approved at the SHEI USUCT
Academic Council meeting
«___».____.2019.
Protocol No. ____

Dnipro
2019

I. PROGRAMME PROFILE OF ELECTRICAL ENGINEERING BACHELOR'S DEGREE specialization 141 Electroenergetics, electrical engineering and electromechanics

Programme profile (general information)	
Full name of qualification	Bachelors of Science in Electrical Engineering, Electrical engineering
The name of education programme	Bachelor's Education Training Programme in **electroenergetics, electrical engineering and electromechanics**
Diploma type and Program workload and duration	Bachelors of Science Diploma in **electroenergetics, electrical engineering and electromechanics**; 4 years – 8 semesters (full-time study) – 240 ECTS-Credits
Higher educational establishment	State Higher Educational Institution «Ukrainian State University of Chemical Technology»
Accreditation institution	Accreditation commission of Ukraine (National agency of higher education quality assurance)
Level	National Ukrainian Qualification – 7 level, FQ-EHEA – First level, EQF-LLL – Level 6
Entrance conditions	Complete secondary education
Language of teaching	Ukrainian language
A	**Education programme purpose**
Programme Purpose	Students can gain knowledge, skills and experience in the field of electrical engineering. They will be able to solve professional problems in the field of electroenergetics, electrical engineering and electromechanics in practice or during training which involves the application of theories and methods of physics and engineering and characterized by complexity and uncertainty of the conditions
B	**Programme characteristics**
Subject (field of knowledge, specialization)	Field of education knowledge 14 – *Electrical engineering:* Specialization 141 - Electroenergetics, electrical engineering and electromechanics
The main focus of the programme and specialization	General high education in the field of electrical engineering
Programme status	Education-professional
Peculiar and distinctive features	The programme gives additional practical experience due to the practical training period.
C	**Graduate rights**
Employment	The programme graduates are employed in a wide range of high-

	technology industries such as electric power generation sector, companies with electrotechnical profile, etc.
Graduate academic rights	The programme will provide the students with the necessary requirements for academic advancement in the electrical engineering field.
D	**Teaching and learning activities and assessment methods**
Teaching and learning activities	Lectures, practical and seminar classes, experimental laboratory study, term paper writing, self-training, preparation and writing of final qualifying (diploma) work.
Assessment methods	Periodic written and oral tests, exams, presentations, final oral bachelor's certification exam.
E	**Programme competences**
Integral competence (IC)	Bachelor (level 6): Capacity to solve special complex and practice problems in the certain professional field. It suggests the use of certain theory and methods in the field of electroenergetics, electrical engineering and electromechanics and characterized by complexity and uncertainty of conditions.
Generic competences (GC)	К01. Ability for abstract thinking, analysis and synthesis. К02. Ability to apply knowledge in practical situations. К03. Ability to communicate both orally and through the written word in native language. К04. Ability to communicate in a foreign language. К05. Ability to find, select and analyse information from different sources. К06. Ability to identify and to solve problems. К07. Ability to work in a team. К08. Ability to work autonomously. К09. Ability to act with social responsibility and civic awareness, to realize the values of free democratic society and the need for its sustainable development, the rule of law, rights and freedoms of man and of the citizen in Ukraine. К10. Ability to preserve and enhance the moral, cultural, scientific values and achievements of society, on the basis of general knowledge about the history and subject area development, its influence on society and its development, to use different types and forms of physical activity for healthy lifestyle.
Subject specific competences (SC)	К11. Ability to solve practical problems with the use of computer aided design and calculations (CAD) systems. К12. Ability to solve practical problems with the use of mathematics, physics and electrical engineering methods. К13. Ability to solve complex specialized problems and practical problems related to the operation of electrical systems and networks,

	the electrical power stations and its parts and high voltage engineering. К14. Ability to solve complex specialized problems and practical problems related to problems of metrology, electrical measurements, operation of automatic control devices, relay protection and automation. К15. Ability to solve complex specialized problems and practical problems related to the operation of electric machines, apparatus and automated electric drive. К16. Ability to solve complex specialized problems and practical problems related to the problems of electricity generation, transmission and distribution. К17. Ability to develop projects of electric power, electrotechnical and electromechanical equipment in compliance applying the requirements of legislation, standards and terms of reference. К18. Ability to perform professional duties in compliance with the requirements of safety, occupational, industrial and environmental regulations. К19. Awareness of the need to increase the efficiency of power, electrotechnical and electromechanical equipment. К20. Awareness of the need to constantly expand our knowledge of new technologies in electricity, electrical engineering and electromechanics. К21. Ability to quickly take effective measures in emergency situations in power and electromechanical systems.
F	**The programme learning outcomes**
The programme learning outcomes	ПР01. To know and understand the principles of operation of electrical systems and networks, power equipment of power stations and its parts, protective devices and be able to use them to solve practical problems at professional activity. ПР02. To know and understand the theoretical basics of metrology and electrical measurements, the operation principles of automatic control devices and relay protection, to have the skills to make appropriate measurements and use these devices to solve professional problems. ПР03. To know the principles of operation of electric machines, devices and automated electric drives and be able to use them to solve practical problems in professional activity. ПР04. To know the principles of operation of wind energy, bioenergy, hydropower and solar power plants. ПР05. To know the basics of electromagnetic field theory, methods of electric circuits calculating, and be able to use them to solve practical problems in professional activity. ПР06. To apply application software, microcontrollers and microprocessor technology to solve practical problems in your

	professional career. ПР07. To analyse the processes which take place in the electric power, electrotechnical and electromechanical equipment. ПР08. To select and apply suitable methods for the analysis and synthesis of electromechanical and power systems with specified parameters. ПР09. To be able to evaluate the energy efficiency and reliability of power, electrical and electromechanical systems. ПР10. To find the necessary information in the scientific and technical literature, databases and other sources of information, to evaluate its relevance and reliability. ПР11. To be able to communicate free about professional problems in native and foreign languages orally and in writing, discuss the results of professional activity with specialists and non-specialists, argue your position on discussion issues. ПР12. To understand the basic principles and tasks of the technical and environmental safety of electrical and electromechanical objects, and take them into account when making decisions ПР13. To understand the importance of traditional and renewable energy for the successful economic development of the country ПР14. To understand the principles of European democracy and respect for citizens' rights, take them into account when making decisions. ПР15. To understand and demonstrate good professional, social and emotional behavior, adhere to a healthy lifestyle. ПР16. To know the requirements of normative acts concerning engineering activity, protection of intellectual property, labor protection, safety and industrial sanitation, to take them into account when making decisions. ПР17. To solve complex specialized tasks in the design and maintenance of electromechanical systems, electrical equipment of power stations, systems and networks. ПР18. To be able to learn independently, to acquire new knowledge and to improve the skills of working with modern equipment, measuring equipment and application software ПР19. To apply suitable empirical and theoretical methods to reduce electricity losses in its production, transportation, distribution and use.

1.2.4	Basics of labor protection	*3,0*	90	8	15	exam

II. ACADEMIC DISCIPLINE DEFINITION / MODULES, will provide the planned learning outcomes and form of attestation for higher education students according to higher education standard

Table 1. The content of education programme profile by training cycles and forms of final control

№	The subject	Credits	Hours	Semester	Tetramester	Final control
	1. OBLIGATORY PART					
	1.1. General training cycle (to form generic competences)					
1.1.1	History of Ukaraine	*3,0*	90	2	4	exam
1.1.2	Ukrainian language	*3,0*	90	5	9,10	exam
1.1.3	History of Ukrainian culture	*2,0*	60	2	3	exam
1.1.4	Philosophy	*5,0*	150	3	10	exam
1.1.5	Foreign language (for professional purposes)	*8,0*	240	1,2	1-4	exam
1.1.6	Higher mathematics	*15,0*	450	1-3	1-6	exam
1.1.7	Fundamentals of Information Technology and Programming	*9,0*	270	1,2	1-3	exam
1.1.8	Physics	*12,0*	360	2,3	3-6	exam
1.1.9	Chemistry	*4,0*	120	2	3,4	exam
1.1.10	Ecology	*2,0*	60	8	15	exam
1.1.11	Physical education					
	Total for cycle 1.1	***63,0***	***1890***			
	1.2. Professional training cycle (to form subject specific competences)					
1.2.1	Engineering and computer graphics	*7,0*	210	1	1,2	exam
1.2.2	Theoretical mechanics	*3,0*	90	4	7	exam
1.2.3	Theoretical foundations of electrical engineering	*12,0*	360	3	6-8	exam
1.2.4	Basics of labour protection	*3,0*	90	8	15	exam
1.2.5	Life Safety	*2,0*	60	4	8	exam
1.2.6	Electrotechnical and structural materials	*4,0*	120	4	6	exam
1.2.7	Mathematical methods and models in computer calculations of power equipment	*6,0*	180	6	11,12	exam
1.2.8	Basics of relay protection and automation of power systems	*4,0*	12	7	13,14	exam
1.2.9	Technical thermodynamics	*6,0*	180	3,4	6,7	exam
1.2.10	Heat and mass exchange	*6,0*	180	4	8	exam
1.2.11	Light appliances	*6,0*	180	5,6	10,11	exam

1.2.12	Electric Appliances	*5,0*	150	5	10	exam
1.2.13	Electric machines	*5,0*	150	4	8	exam
1.2.14	The basics of electric drive	*5,0*	150	6	12	exam
1.2.15	Electrical systems and networks	*6,0*	180	6	12	exam
1.2.16	Metrology and electrical measurements	*4,0*	120	7,8	14,15	exam
1.2.17	Electricity consumers	*3,0*	90	7	14	exam
1.2.18	Automatic control theory	*4,0*	120	7,8	14,15	exam
1.2.19	Energy Economics	*4,0*	120	7	13	exam
1.2.20	Practical work	*6,0*	180	8	16	exam
1.2.21	Preparation of qualifying bachelor's work and state certification	*9,0*	270			State attestation
	Total for cycle 1.2	***110,0***	***3300***			
	TOTAL for OBLIGATORY PART	***173,0***	***5190***			
2. SELECTIVE PART						
2.1. General training cycle (to form generic competences)						
2.1.1	Economic theory	*2,0*	60	5	10	exam
2.1.2	science of law	*2,0*	60	5	10	exam
	Total for cycle 2.1	***4***	***120***			
2.2. Professional training cycle (to form subject specific competences)						
2.2.1	Calculation methods and informatics in heat and power engineering	*5,0*	150	3	6	exam
2.2.2	Special parts of higher mathematics	3,0	90	5	10	exam
2.2.3	Fail-safety and diagnostics of electrical equipment	*3,0*	90	4	8	exam
2.2.4	Power supply of industrial enterprises	*4,0*	120	4	7	exam
2.2.5	Energetics and its influence at Ukraine development	*5,0*	150	1	2	exam
2.2.6	Power plants	*5,0*	150	5	10	exam
2.2.7	Secondary and non-traditional energy resources and energy technology combinations	*6,0*	180	7,8	14,15	exam
2.2.8	Electrical part of stations and its parts	*4,0*	120	7	13	exam
2.2.9	Renewable energy sources	*7,0*	210	6	12	exam
2.2.10	Energy production and distribution systems	*7,0*	210	7,8	14,15	exam
2.2.11	Lighting devices and systems	*3,0*	90	8	15	exam
2.2.12	The theory of high voltages	*3,0*	90	7	13	exam
2.2.13	Machine parts	*4,0*	120	6	12	exam
2.2.14	Electronics and micro-circuitry	*4,0*	120	5	9	exam
	Total for cycle 2.2	***63,0***	***1890***			
	TOTAL for SELECTIVE PART	***67,0***	***2010,0***			
	TOTAL	***240,0***	***7200***			

Table 2. **Generalized distribution of education programme profile content according to subjects part and training cycles**

№	Training cycle	The amount of training load for high education student (credits / %)		
		Obligatory components of education programme profile	Selective components of education programme profile	Total for the whole period of study
1.	General training cycle (to form generic competences)	63 / 26,2	4 / 1,7	67 / 27,9
2.	Professional training cycle (to form subject specific competences)	110 / 45,8	63 / 26,3	173 / 72,1
Total for the whole period of study		173 / 72	67 / 28	240 / 100

III – Form of attestation of higher education students

Final Examinations	Certification is carried out in the form of public defense of the qualification project (qualification work). The student should demonstrate the competences and learning outcomes (see part II). The evaluation of Bachelor educational goals achievement is determined by the follow: State Examination Commission, methodological guideline for Bachelor's final exam.
Requirements for the Final Bachelor's thesis (by the presence)	Qualification project (qualification work) should involve the solve of a complex specialized task or practical problem of electric power, electrical engineering and/or electromechanics, characterized by complexity and uncertainty of conditions, using theories and methods of electrical engineering Qualification project (qualification work) should not contain academic plagiarism, fabrication and falsification. The qualification project (qualification work) should be posted on the website of the higher education institution or its structural unit, or in the repository of the higher education institution.
Requirements for State Qualification Exam (by the presence)	
Requirements for the public oral defense of a thesis (by the presence)	The requirements for oral public defense are presented in the documents of State Examination Commission and methodological guideline for Bachelor's final exam.

IV – Requirements for internal quality assurance in higher education

The requirements are determined by Standards and Guidelines for Quality Assurance in the European Higher Education (ESG) and by Article 16 of the Law of Ukraine "On Higher Education".

Components of internal quality assurance in higher education	**Definition, references and relevant documents**
Principles and procedures of quality assurance in education	- the Law of Ukraine "On Higher Education" from 01.07.2014, No. 1556-VII; - Temporary provision about organization of education process in State Higher Educational Institution «Ukrainian State University of Chemical Technology» (order of the rector from 30.11.2015 No. 290); - Provision on a diploma with USUCT honors degree (order of the rector from 25.02.2016 No. 55); - The provision on the order of the exam commission in USUCT (order of the rector from 01.04.2015, No. 68); - Provision about development, approval and review of academic discipline programmes (order of the rector from 01.12.15 No. 291)
Monitoring and periodic revision of education programmes	Annual monitoring of requirements of industry and labour market, revision of education programmes, education planes, work programmes of academic disciplines (order of the rector No.74 from 10.03.2016)
Annual evaluation of candidates for high education	Provision about Rector's control of education standards (order of the rector from 17.03.2014, No. №78)
Annual evaluation of scientific and pedagogical personnel of higher Educational Institution	Provision about Rector's control commission of institution personnel pedagogical skill (order of the rector from 04.04.2016. No.85). Application of rating system for evaluation of scientific and pedagogical personnel activity in USUCT (order of the rector from 04.06.2010, No. 209 with the changes to the order from 09.06.2011, No. 147), Application of rating system for evaluation of chair and faculty activity in USUCT (order of the rector from 04.06.2010, No. 209). Publication of evaluation results at official Higher Educational Institution Web-site, at information stands, etc.

Executive training of scientific and pedagogical personnel	Executive training of scientific and pedagogical personnel is carried out according to provision approved by the order of Ministry of Education and Science of Ukraine Nº48 from 24.01.2013 and provisions of executive training of scientific and pedagogical personnel of State Higher Educational Institution «Ukrainian State University of Chemical Technology» (order of the rector from 28.05.2016 No. 105)
Availability of the necessary resources for organization of education process	Educational and methodical, material and technical, and personnel support meets the educational license terms (Decree of Cabinet of Ministers No.1187 from 30.12.2015.). License series AE №636496. Certificates in the field of education knowledge and specialization.
Availability of information systems for effective management of education process	Temporarily provision about management of educational process in the State Higher Educational Institution «Ukrainian State University of Chemical Technology» (order of the rector No.290 from 30.11.2015) is supported by information-analytical system for education process control, which is consists of subsystems: Applicant, Education process.
Publicity of information about education programmes, degrees in higher education and qualifications	Information about education programmes, degrees in higher education and qualifications is public and it is fully represented at official Higher Educational Institution Web-site: http://udhtu.com.ua
Academic Plagiarism Prevention and Detection	Evaluation of students' knowledge and checking for plagiarism in thesis and students' research works is carried out by university lecturer in the established order using the relevant software