

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

Rector of SHEI USUCT  
\_\_\_\_\_ Pivovarov O.A.  
«\_\_\_» \_\_\_\_\_ 2016.

## **EDUCATION PROGRAMME PROFILE**

**Heat power engineering**

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**The second (master) level**

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**Master of Science**

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**Field of education knowledge** **14 Electrical engineering**

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**Specialisation** **144 Heat power engineering**

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Approved at the SHEI USUCT  
Academic Council meeting  
«\_\_\_».\_\_\_\_\_.2016.  
Protocol No. \_\_\_\_

Dnipro  
2016

## I. PROGRAMME PROFILE OF ELECTRICAL ENGINEERING MASTER'S DEGREE specialization "Heat power engineering"

<b>Programme profile (general information)</b>	
<b>Full name of qualification</b>	Master of Science in Electrical Engineering, Heat power engineering
<b>The name of education programme</b>	Master's Education Training Programme in Heat Power Engineering
<b>Diploma type and Program workload and duration</b>	Master of Science Diploma in Electrical Engineering, Heat power engineering; 1,5 years – 3 semesters (full-time study) – 90 ECTS-Credits
<b>Higher educational establishment</b>	State Higher Educational Institution «Ukrainian State University of Chemical Technology»
<b>Accreditation institution</b>	Accreditation commission of Ukraine (National agency of higher education quality assurance)
<b>Licence</b>	Was accredited in 2013, series HD-IV № 0423951, Expire date: 01.07.2018.
<b>Level</b>	National Ukrainian Qualification – 7 level, FQ-EHEA – Second level, EQF-LLL – Level 7
<b>Entrance conditions</b>	First (Bachelor) level
<b>Language of teaching</b>	Ukrainian language
<b>A</b>	
<b>Education programme purpose</b>	
<b>Programme Purpose</b>	To provide students with knowledge and skills in the field of electrical engineering, which will give them an opportunity to carry out original scientific researches or work in industrial production areas.
<b>B</b>	
<b>Programme characteristics</b>	
<b>Subject (field of knowledge, specialization)</b>	Field of education knowledge 14 – <i>Electrical engineering</i> : Specialization 144 - <i>Heat power engineering</i>
<b>The main focus of the programme and specialization</b>	General high education in the field of electrical engineering
<b>Programme status</b>	Education-professional
<b>Peculiar and distinctive features</b>	Education programme provides two opportunities professional training cycle: scientific or practical experience (module 1 or module 2).
<b>C</b>	
<b>Graduate rights</b>	
<b>Employment</b>	The programme graduates are employed in a wide range of high-technology industries such as power energy production, heat supply, engineering services, in scientific institutions, higher educational institutions, research laboratories, etc.
<b>Graduate academic rights</b>	The programme will provide the students with the necessary requirements for academic advancement in the electrical engineering

	field.
<b>D</b>	<b>Teaching and learning activities and assessment methods</b>
<b>Teaching and learning activities</b>	Lectures, practical and seminar classes, experimental laboratory study, term paper writing, self-training, preparation and writing of final qualifying (diploma) work.
<b>Assessment methods</b>	Periodic written and oral tests, exams, presentations, final oral bachelor's certification exam.
<b>E</b>	<b>Programme competences</b>
<b>Integral competence (IC)</b>	<i>Master (level 7):</i> Capacity to solve special complex and practice problems in the certain professional field or at learning process. It suggests the use of certain theory and methods for problem study, for research activity, innovation, and characterized by complexity and uncertainty of conditions.
<b>Generic competences (GC)</b>	<p>GC-1. Ability for abstract thinking, analysis and synthesis on the basis of logic, arguments and proven facts.</p> <p>GC-2. Ability to apply knowledge in practical situations.</p> <p>GC-3. Capacity to know and understand the subject area.</p> <p>GC-4. Ability to communicate both orally and through the written word in native language, ability to communicate in second language.</p> <p>GC-5. Ability to use information and communication technologies.</p> <p>GC-6. Ability to perform basic research in the certain areas.</p> <p>GC-7. Ability to adapt to new situations and to act in such conditions.</p> <p>GC-8. Ability to generate new ideas (creativity).</p> <p>GC-9. Ability to identify and solve problems.</p> <p>GC-10. Ability to make informed decisions.</p> <p>GC-11. Ability to work in a team.</p> <p>GC-12. Ability to communicate with non-specialists of your field (experts from other fields).</p> <p>GC-13. Ability to work in an international context</p> <p>GC-14. Ability to develop and manage the projects.</p> <p>GC-15. Security commitment.</p> <p>GC-16. The desire to save the environment.</p> <p>GC-17. Ability to act socially responsible and civic consciously.</p> <p>GC-18. Understanding the need of compliance with the safety and sanitation rules and requirements.</p>
<b>Subject specific competences (SC)</b>	<p>SC-1. Ability to define project task for modernization of technical equipment with advanced exploitation characteristics, increasing the level of ecological safety and resource efficiency.</p> <p>SC-2. Ability to calculate technical projects, to make technical-economic and functional analysis of the project efficiency with the use of application software. Ability to determine parameters of serial equipment and to develop new heat and power apparatus.</p> <p>SC-3. Ability to develop measures to improve production</p>

	<p>technologies.</p> <p>SC-4. Ability to ensure uninterrupted work, exploitation, repair and modernization of power and heat engineering equipment, automation and protection means, heating and electric networks, air and gas pipelines.</p> <p>SC-5. Ability to determine the production needs in fuel and energy resources, to substantiate resource saving measures, to normalize their consumption, to calculate energy resources needs.</p> <p>SC-6. Capacity to apply automated control methods and means for heat power engineering processes.</p> <p>SC-7. Ability to plan and define tasks, to choose experimental methods, to interpret and represent the results of study in the form of scientific and technical report, scientific publication or conference report based on the research results.</p> <p>SC-8. Ability to organize the team work, and be ready to take a decision.</p> <p>SC-9. Ability to find the optimal solutions under production conditions, taking into account the requirements for life safety.</p> <p>SC-10. Ability to organize supervision work at objects manufacturing, installation, adjustment and testing.</p> <p>SC-11. Education skills, necessary for continuous professional development.</p> <p>SC-12. Ability to pedagogical activity in the professional training field.</p> <p>SC-13. Communicativeness concerning the ability to interact with other people and to participate in teamwork.</p> <p>SC-14. Ability to work effectively in professional and interdisciplinary groups.</p>
<b>F</b>	<b>The programme learning outcomes</b>
<b>The cognitive learning outcomes (CLO)</b>	<p>CLO-1. To select and apply knowledge and skill of natural and socio-economic sciences at solving public and professional problems.</p> <p>CLO-2. To prepare the task for project development, to define technical indicators of the objects or technical schemes.</p> <p>CLO-3. To calculate technical projects, to make technical and economic analysis of the proposed solutions.</p> <p>CLO-4. To apply knowledge of the basic economic laws to analyse efficiency of some productions.</p> <p>CLO-5. To determine the influence of process technological parameters upon final product quality.</p> <p>CLO-6. To choose and apply complex technique to analyse energy consumption efficiency in the complex production processes.</p> <p>CLO-7. To correct instructions to improve the control of production quality.</p> <p>CLO-8. To evaluate ethical implications for scientific research</p>

	<p>and their implementation.</p> <p>CLO-9. To be able to use communication skills, be able to express oneself clearly, to communicate effectively in the social and professional area.</p> <p>CLO-10. To have skills for basic communication in any foreign language, to be able to read and convey the essence of general and professional literature.</p> <p>CLO-11. To be able to increase professional level through self-education.</p> <p>CLO-12. To be able to use information technologies in the professional area, including modern computer graphics tools.</p> <p>CLO-13. To study and test energetic, power and heat equipment in the process of equipment installation, checking and testing.</p> <p>CLO-14. To use regulatory legal documents at professional activity.</p>
<p><b>Learning outcomes using value-motivational criterion (VMLO)</b></p>	<p>VMLO-1. To analyze social and personally significant problems, to set goals and choose the way of achieving them.</p> <p>VMLO-2. To understand the role and importance of science and technology in the history of mankind, to respect cultural and religious values.</p> <p>VMLO-3. To demonstrate desire to work independently.</p> <p>VMLO-4. To take part in discussions about research and study results. To argument your own point of view based on logic laws and philosophical principles.</p> <p>VMLO-5. To demonstrate and apply professional knowledge and skills at scientific and project documentation creating.</p> <p>VMLO-6. To organize safety precautions at the workplace.</p> <p>VMLO-7. To collaborate with colleagues to achieve research and study goals.</p>
<p><b>Learning outcomes in the psychomotor sphere (PLO)</b></p>	<p>PLO-1. To understand the problem essence at professional activity, to find its solution using physical and mathematical instruments.</p> <p>PLO-2. To wield the basic methods of personnel protection against possible disasters and their consequences for people.</p> <p>PLO-3. To control quantitative processes characteristics which take place in the certain technical schemes based on existing methods.</p> <p>PLO-4. To make physical and numerical experiment, to develop the experimental stands for this.</p> <p>PLO-5. To design the basic equipment of electric power stations and other energetic and technical plants, to design units for new devices taking into account the necessary requirements.</p> <p>PLO-6. To develop technical documentation in accordance with standard construction requirements.</p> <p>PLO-7. To comply with fire and safety rules, labour protection, and industrial sanitation norms.</p>

**II. ACADEMIC DISCIPLINE DEFINITION / MODULES,  
providing 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**

No.	The subject	Credits	Hours	Semester	Tetramester	Final control
<b>1. OBLIGATORY PART</b>						
1.1. General training cycle (to form generic competences)						
1.1.1	Management in energy saving	4,0	120	1	1,2	exam
1.1.2	Intellectual Property	2,0	60	2	4	exam
1.1.3	Psychology and teaching method of professional disciplines in high school	2,0	60	2	3	exam
1.1.4	Foreign language (for professional purposes)	4,0	120	2	3,4	exam
1.1.5	Civil protection	1,5	45	1	1	exam
1.1.6	Protection of labour in the industry	2,0	60	1	1	exam
1.1.7	Methodology and organization of scientific research	3,0	90	1,2	2,3,4	exam
1.1.8	Physical education					
<b>Total for cycle 1.1</b>		<b>18,5</b>	<b>555</b>			
1.2. Professional training cycle (to form subject specific competences)						
1.2.1	Automated control systems of technological processes in the industry	4,0	120	1	1	exam
1.2.2	Energy saving in energy industry and technology	9,0	270	1,2	1,2,3	exam
1.2.3	Optimization of heat and mass-transfer processes and installations	5,0	150	1	1,2	exam
1.2.4	The study of heat and hydrodynamic processes	4,0	120	2	3	exam
1.2.5	Equipment and design of small energy objects	3,0	90	2	4	exam
1.2.6	Preparation of qualifying Master's work and state certification	19,5	585			SA
<b>Total for cycle 1.2</b>		<b>44,5</b>	<b>1335</b>			
<b>TOTAL for OBLIGATORY PART</b>		<b>63,0</b>	<b>1890</b>			
<b>2. SELECTIVE PART</b>						
2.1. General training cycle (to form generic competences)						

2.1.1	Methodology and organization of scientific research	3,0	90	1,2	2,3,4	exam
	<b>Total for cycle 2.1</b>	<b>3</b>	<b>90</b>			
<b>2.2. Professional training cycle (to form subject specific competences)</b>						
2.2.1	Equipment and design of small energy objects	1,0	30	2	4	exam
2.2.2	Thermal power stations (additional parts)	4,0	120	1	1,2	exam
2.2.3	Preparation of qualifying Master's work and state certification	8,5	255			SA
2.2.6	One of module	10,5	315			
	<b>Module 1</b>					
	Research practice	6	180			exam
	Assistant practice	4,5	135			exam
	<b>Module 2</b>					
	Research practice	6	180			exam
	Pre-diploma practice	4,5	135			exam
	<b>Total for cycle 2.2</b>	<b>24,0</b>	<b>720</b>			
	<b>TOTAL for SELECTIVE PART</b>	<b>27,0</b>	<b>810,0</b>			
	<b>TOTAL</b>	<b>90,0</b>	<b>2700</b>			

**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)	18,5 / 20,6	3 / 3,3	21,5 / 23,9
2.	Professional training cycle (to form subject specific competences)	44,5 / 49,4	24 / 26,7	68,5 / 76,1
Total for the whole period of study		63 / 56	27 / 44	90 / 100

### III – Form of attestation of higher education students

<b>Final Examinations</b>	<p>To attain the Master's degree there is a final exam, which consists of a public discussion of the students' thesis, which is their original work produced under the guidance of a supervisor.</p> <p>The student should demonstrate the competences and learning outcomes.</p> <p>The evaluation of Master educational goals achievement is determined by the follow: State Examination Commission, methodological guideline for Bachelor's final exam.</p>
<b>Requirements for the Final Bachelor's thesis (by the presence)</b>	<p>The requirements for final Bachelor's thesis are presented in the special methodological guideline.</p> <p>The students need to have supervisor's response and Reviewer review to the final Bachelor's thesis, which confirms the work quality and check on plagiarism</p>
<b>Requirements for State Qualification Exam (by the presence)</b>	
<b>Requirements for the public oral defense of a thesis (by the presence)</b>	<p>The requirements for oral public defense are presented in the documents of State Examination Commission and methodological guideline for Master's final exam.</p>

#### 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”.

<b>Components of internal quality assurance in higher education</b>	<b>Definition, references and relevant documents</b>
<b>Principles and procedures of quality assurance in education</b>	<ul style="list-style-type: none"> <li>- the Law of Ukraine “On Higher Education” from 01.07.2014, No. 1556-VII;</li> <li>- 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);</li> <li>- Provision on a diploma with USUCT honors degree (order of the rector from 25.02.2016 No. 55);</li> <li>- The provision on the order of the exam commission in USUCT (order of the rector from 01.04.2015, No. 68);</li> <li>- Provision about development, approval and review of academic discipline programmes (order of the rector from 01.12.15 No. 291)</li> </ul>
<b>Monitoring and periodic revision of education programmes</b>	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 )
<b>Annual evaluation of candidates for high education</b>	Provision about Rector’s control of education standards (order of the rector from 17.03.2014, No. №78)
<b>Annual evaluation of scientific and pedagogical personnel of higher Educational Institution</b>	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.

<b>Executive training of scientific and pedagogical personnel</b>	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 №48 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)
<b>Availability of the necessary resources for organization of education process</b>	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.
<b>Availability of information systems for effective management of education process</b>	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.
<b>Publicity of information about education programmes, degrees in higher education and qualifications</b>	Information about education programmes, degrees in higher education and qualifications is public and it is fully represented at official Higher Educational Institution Web-site: <a href="http://udhtu.com.ua">http://udhtu.com.ua</a>
<b>Academic Plagiarism Prevention and Detection</b>	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