

Ministry of Education and Science of Ukraine
State Higher Education Institution
"Ukrainian State University of Chemical Technology"

Rector of SHEI USUCT
_____ O.A. Pivovarov
" ____ " _____ 2018

EDUCATIONAL AND PROFESSIONAL PROGRAM

Computer science

(Name of the educational program)

First (bachelor) level

(name of the higher education level)

Bachelor

(name of the granted degree)

BRANCH OF KNOWLEDGE

12 Information technology

(code and name of the branch of knowledge)

SPECIALTY

122 Computer science

(code and name of the specialty)

Approved at the meeting of the
Academic Council of SHEI
USUCT
on " ____ " _____ 2018 protocol
no. ____

Dnipro
2018

Approval sheet

OF EDUCATIONAL AND PROFESSIONAL PROGRAM

Higher education level	Bachelor
Branch of knowledge	12 Information technology
Specialty	122 Computer science
Educational program	Computer science
«APPROVED»	«DEVELOPERS»
<p>First Vice-Rector, Chairman of the Academic Council of SHEI USUCT</p> <p>_____ <u>Goleus V.I.</u> (signature) (surname and initials)</p> <p>" ____ " _____ 2018</p>	<p>Project team leader</p> <p>_____ <u>Zelentsov D. G.</u> (signature) (surname and initials)</p> <p>" ____ " _____ 2018</p>
<p>Head of the SEC</p> <p>_____ <u>Smotraiev R.V.</u> (signature) (surname and initials)</p> <p>" ____ " _____ 2018</p>	<p>Member of the project team</p> <p>_____ <u>Olevskii V. I.</u> (signature) (surname and initials)</p> <p>" ____ " _____ 2018</p>
<p>Educational and Methodical Department</p> <p>_____ <u>Fomenko G.V.</u> (signature) (surname and initials)</p> <p>" ____ " _____ 2018</p>	<p>Member of the project team</p> <p>_____ <u>Korotka L.I.</u> (signature) (surname and initials)</p> <p>" ____ " _____ 2018</p>
<p>Dean of the Faculty of Computer Science and Engineering</p> <p>_____ <u>Levchuk I.L.</u> (signature) (surname and initials)</p> <p>" ____ " _____ 2018</p>	
<p>Head of Department</p> <p>_____ <u>Zelentsov D.G.</u> (signature) (surname and initials)</p> <p>" ____ " _____ 2018</p>	<p>Educational and professional program is carried into effect by the order of the rector no ____ from " ____ " _____ 2018.</p>

**I. THE PROFILE OF THE BACHELOR EDUCATIONAL AND PROFESSIONAL PROGRAM
on a specialty 122 Computer science**

The profile of the program (general information)	
Full name of qualification in original language	Ступінь вищої освіти – бакалавр, спеціальність - Комп'ютерні науки
Official name of the educational program	Educational and professional program "Computer science" for bachelor's degree in specialty 122 Computer science
The type of degree and size of educational program	Bachelor's degree in computer science, single (double, joint in the presence of relevant agreements and training programs); 240 ECTS credits
Full name of a higher education institution granting the qualification	State higher education institution "Ukrainian state University of Chemical Technology"
The accrediting organization	Accreditation Commission of Ukraine (SEI "Educational and methodical center for the quality of education"). NAQAHE.
Accreditation period	The validity period of the certificate after initial accreditation is 5 years, after re-accreditation it is 10 years.
Cycle / level	NFQ of Ukraine – level 6, FQ-EHEA – second cycle, EQF-LLL – level 6
Prerequisites	Complete general secondary education
Language(s) of instruction	Ukrainian language
A	
The purpose of the educational program	
The purpose of the educational program	To provide education in the field of information technology with wide access to employment, to prepare students with fundamental and professionally-oriented knowledge and skills in the field of information and communication technologies.
B	
Characteristics of the educational program	
Subject area (branch of knowledge, specialty)	Branch of knowledge 12 – <i>Information technology</i> : specialty 122 – <i>Computer science</i>
Main focus of the program and specialization	The main advantage of the bachelor's program is a focus on the formation of the widest possible scientific and technical worldview of the future professional. The program is balanced in socio-humanitarian and fundamental training and contains a sufficient selective component on specialization. This facts makes it possible to obtain basic knowledge of fundamental disciplines and natural science, disciplines of general professional and special training.

Program orientation	The program focuses on modern scientific results of the complex of sciences related to information technology in which further professional and scientific career of a specialist in information technology is possible.
Features and differences	Regular updates to take trends in progressive development of information technologies into account
C	Employability and possibilities for further training
Employability	Jobs in the field of information technology, communication and IT project management: IT-companies, financial companies, insurance companies, government agencies, consulting. Bachelors can work in the following specialties: Software technician, Information technology specialist, Specialist in development of computer programs, Specialist in computer graphics (design), Specialist in software development and testing.
Further training	Training at the second educational level on master's programs in the field of information technology.
D	Teaching style and training methods
Approaches to teaching and training	A combination of lectures, practical and seminar classes, laboratory classes in computer rooms, writing course projects or works, self-study, preparation of qualification work.
Evaluation methods	Written and oral examinations, tests, presentations, defense of bachelor qualification work.
E	Program competencies
Integral competence (INT)	Bachelor (level 6): the ability to solve complex specialized problems and practical problems in a particular field of professional activity or in learning process, which involves a use of certain theories and methods of the relevant science and is characterized by complexity and uncertainty of conditions
General competences (GC)	GC-1. Ability to abstract thinking, analysis and synthesis. GC-2. Ability to apply knowledge in practical situations. GC-3. Knowledge and understanding of the subject area and understanding of the professional activity. GC-4. Ability to communicate in the official state language both orally and in written form. GC-5. Ability to communicate in a foreign language. GC-6. Ability to learn and acquire modern knowledge. GC-7. Ability to search for, process and analyse information from a variety of sources. GC-8. Ability to generate new ideas (creativity). GC-9. Ability to work in a team. GC-10. Ability to be critical and self-critical. GC-11. Ability to develop and manage projects.

	<p>GC-12. Ability to make informed decisions.</p> <p>GC-13. Ability to evaluate and ensure the quality of performed work.</p> <p>GC-14. Certainty and perseverance with regard to the undertaken tasks and responsibilities.</p> <p>GC-15. Ability to act on ethical grounds.</p>
<p>Special (professional) competences (SC)</p>	<p>SC-1. Ability to mathematical and logical thinking, formulation and study of mathematical models, in particular discrete mathematical models, rationale for a choice of methods and approaches for solving theoretical and applied problems in the field of computer science, interpretation of the results.</p> <p>SC-2. Ability to identify patterns of random phenomena, the use of methods of statistical data processing and evaluation of stochastic processes in the real world.</p> <p>SC-3. Ability to draw logical conclusions, the use of formal languages and models of algorithmic calculations, design, development and analysis of algorithms, evaluation of their efficiency and complexity, solvability and insolubility of algorithmic problems for adequate modeling of subject areas and creation of software and information systems.</p> <p>SC-4. Ability to master modern technologies of mathematical modeling of objects, processes and phenomena, to develop computational models and algorithms for numerical solution of mathematical modeling problems taking into account errors of approximate numerical solution of professional problems.</p> <p>SC-5. Ability to carry out a formal description of tasks of the operations research in organizational, technical and socio-economic systems for various purposes, to determine their optimal solutions, to build models for optimal choice of management process taking into account changes in the parameters of the economic situation, to optimize management processes in systems of different purposes and hierarchy levels.</p> <p>SC-6. Ability for system thinking, use of the methodology of system analysis for a study of complex problems of different nature, methods of formalization and solving system problems that have conflicting objectives, uncertainties and risks.</p> <p>SC-7. Ability to apply theoretical and practical fundamentals of modeling methodology and technology, implement modeling algorithms to study the characteristics and behavior of complex objects and systems, conduct experiments on the simulation program with the processing and analysis of results.</p> <p>SC-8. Ability to design and develop software using different programming paradigms: structural, object-oriented, functional, logical, with appropriate models, methods and algorithms of calculations, data structures and control mechanisms.</p> <p>SC-9. Ability to implement multi-level computing model based on client-server architecture, including databases, data warehouses</p>

	<p>and knowledge bases, to meet computing needs of many users, transaction processing.</p> <p>SC-10. Ability to apply methodologies, technologies and tools to manage life cycle processes of information and software systems, products and services of information technologies in accordance with customer requirements.</p> <p>SC-11. Ability for intelligent multidimensional analysis of data and their prompt analytical processing with visualization of analysis results in a process of solving applied problems in the field of computer science.</p> <p>SC-12. Ability to provide an organization of computing processes in information systems for various purposes, taking into account an architecture, configuration, performance indicators of operating systems and system software.</p> <p>SC-13. Ability to develop network software that operates on a basis of different topologies of structured cabling systems, uses computer systems and data networks and analyzes a quality of computer networks.</p> <p>SC-14. Ability to apply methods and means of information security, to develop and operate special software for protection of information resources in critical information infrastructure.</p> <p>SC-15. Ability for analysis and functional modeling of business processes, construction and practical application of functional models of organizational, economic, production and technical systems, methods of risk assessment in IS design, synthesis of complex systems on the principles of using their computer models.</p>
F	Program learning outcomes
Learning outcomes in cognitive sphere	<p>OCS-1. To apply the basic provisions and methods of humanities and socio-economic sciences in solution of social and professional problems.</p> <p>OCS-2. To apply knowledge of basic economic laws to analyze the effectiveness of individual industries.</p> <p>OCS-3. To have communication skills, to be able to speak clearly orally and in written form, to communicate freely in public and in professional environment.</p> <p>OCS-4. To know the basic vocabulary of one of the foreign languages, to be able to read general and professional texts and convey their essence.</p> <p>OCS-5. To apply methods and means of knowledge for self-education, for intellectual development and to improve one's professional level.</p> <p>OCS-6. To use information technology, including modern methods of computer graphics, in one's subject area.</p> <p>OCS-7. To use normative legal documents in one's professional</p>

	activities.
Learning outcomes in the value and motivational sphere	<p>OVMS-1. To analyze social and personal significant problems, set goals and choose ways to achieve them.</p> <p>OVMS-2. To realize the role and place of science and technology in the history of mankind, to respect cultural and religious traditions.</p> <p>OVMS-3. To argue own point of view on the basis of the laws of logic, basic philosophical principles.</p> <p>OVMS-4. To demonstrate and apply basic knowledge in the field of natural sciences, to use basic laws in professional activities, to apply methods of mathematical analysis and modeling, theoretical and experimental research.</p> <p>OVMS-5. To demonstrate and use knowledge of concepts, theories and methods in intellectual and practical activities in the field of computer science, to comprehend a content and sequence of course of action, to summarize and systematize results of a work.</p>
Learning outcomes in the psychomotor sphere	<p>OPS-1. To understand the essence of a problem arising in a course of professional activity, to find its solution with the help of appropriate mathematical apparatus.</p> <p>OPS-2. To know the basic methods of protection of production personnel and population from consequences of possible accidents, catastrophes.</p> <p>OPS-3. To analyze scientific and technical information, to study domestic and foreign experience on a subject of research.</p> <p>OPS-4. To formulate decisions, summarize results and present a performed work in the form of a report.</p> <p>OPS-5. To describe a subject area, apply the principles of a systematic approach to the modeling and design of systems and objects of information.</p> <p>OPS-6. To determine components of the structural and parametric identification of models of real systems, to apply methods of modeling of complex objects and systems using the appropriate software.</p> <p>OPS-7. To assess a degree of completeness, adequacy, truthfulness and feasibility of models of real systems.</p> <p>OPS-8. To develop technical documentation in accordance with the requirements of ESCD.</p> <p>OPS-9. To create reliable and effective software.</p> <p>OPS-10. To carry out safety regulations, standards of industrial sanitation, fire safety and labor protection in practice.</p>

**II. THE DEFINITION OF EDUCATIONAL DISCIPLINES/MODULES
ensuring the achievement of the planned learning outcomes and forms of
certification of applicants for higher education in the educational program in
accordance with the standard of higher education**

**Table 1. Distribution of the content of the educational and professional program by
training cycles and a form of final control**

No.	Name of discipline	Credits	hours	Semester	Tetramester	Final control
1. MANDATORY PART						
1.1	<i>Cycle of general training (forms general competences)</i>					
1.1.1.	History of Ukraine	3.0	90	2	4	exam.
1.1.2.	Ukrainian (for professional purposes)	3.0	90	4	7	exam.
1.1.3.	History of Ukrainian culture	2.0	60	1	1	graded test
1.1.4.	Philosophy	5.0	150	5	3, 4	exam.
1.1.5.	Foreign language (for professional purposes)	8.0	240	1, 2	1, 2, 3, 4	pass/fail, exam.
1.1.6.	Advanced mathematics	15.0	450	1, 2	1, 2, 3, 4	exam.
1.1.7.	Discrete mathematics	6.0	180	1	1, 2	exam.
1.1.8.	Probability theory, probabilistic processes and mathematical statistics	5.0	150	3	5, 6	exam.
1.1.9.	Numerical methods	7.0	210	3	5, 6	pass/fail
1.1.10.	Decision theory	6.0	180	4	7, 8	exam.
1.1.11.	Theory of algorithms	5.0	150	3	5, 6	exam.
1.1.12.	Physics	8.0	240	2, 3	3, 4, 5, 6	exam.
1.1.13	Ecology	2.0	60	1	2	pass/fail
1.1.14	Physical culture (outside of the credits)			1, 2, 3, 4	1, 2, 3, 4, 5, 6, 7, 8	pass/fail
	<i>Total in cycle 1.1</i>	75	2250			
1.2	<i>Cycle of professional training (forms special (professional) competences)</i>					
1.2.1	Algorithmization and programming	10.0	300	1, 2	1, 2, 3, 4	graded test, exam.
1.2.2	Object-oriented programming	10.0	300	5, 6	9, 10, 11, 12	pass/fail, exam.
1.2.3	Operating system	5.0	150	6	11, 12	pass/fail
1.2.4	Organization of databases and knowledge bases	5.0	150	3	5, 6	exam.
1.2.5	Intetactual data analysis	6.0	180	4	7, 8	pass/fail
1.2.6	Web technologies and web design	10.0	300	4, 5	7, 8, 9, 10	pass/fail, exam.
1.2.7	Protection of information in computer systems	5.0	150	7	13, 14	exam.
1.2.8	Modeling of systems	10.0	300	5, 6	9, 10, 11,	pass/fail,

					12	exam.
1.2.9	Design of information systems	8.0	240	7, 8	13, 14, 15	pass/fail, exam.
1.2.10	Methods and systems of artificial intelligence	9.0	270	7, 8	13, 14, 15	pass/fail, exam.
1.2.11	Computer networks	5.0	150	5	9, 10	exam.
1.2.12	Fundamentals of labor protection	3.0	90	8	15	exam.
1.2.13	Vital activity security	2.0	60	1	1	pass/fail
1.2.14	Pre-diploma industrial practice	6.0	180	8	16	graded test
1.2.15	Preparation of qualification bachelor work and state certification	9.0	270			
	Total in cycle 1.2	103	3090			
	THE MANDATORY PART - TOTAL	178	5340			
2. SELECTIVE PART						
2.1	Cycle of general training (forms general competences)					
2.1.1	Jurisprudence	2.0	60	5	10	pass/fail
2.1.2	Chemistry	4.0	120	2	3, 4	pass/fail
2.1.3	Mathematical methods of operations research	5.0	150	2	3, 4	exam.
2.1.4	Information and coding theory	4.0	120	4	7, 8	exam.
2.1.5	Economics, organization and management of enterprises	4.0	120	7	13, 14	pass/fail
	Total in cycle 2.1	19	570			
2.2	Cycle of professional training (forms special (professional) competences)					
2.2.1	Logical and functional programming	6.0	180	6	11, 12	exam.
2.2.2	Computer-aided design technologies	4.0	120	6	11, 12	pass/fail
2.2.3	System analysis	4.0	120	5	9, 10	exam.
2.2.4	Parallel and distributed computing	6.0	180	7, 8	13, 14, 15	pass/fail, exam.
2.2.5	Electrical engineering and electronics	4.0	120	3	5, 6	graded test
2.2.6	Computer architecture	6.0	180	4	7, 8	pass/fail
	Module1					
2.2.7	Pattern recognition theory	4.0	120	6	11, 12	pass/fail
2.2.8	Neural networks	9.0	270	7, 8	13, 14, 15	pass/fail, exam.
	Module 2					
	Java technology	4.0	120	6	11, 12	pass/fail
	Computer monitoring of chemical industry	9.0	270	7, 8	13, 14, 15	pass/fail, exam.
	Total in cycle 2.2	43	1290			
	THE SELECTIVE PART - TOTAL	62	1860			
	TOTAL	240	7200			

Table 2. Generalized distribution of the content of the educational and professional program by groups of components (disciplines) and training cycles

No.	Training cycle	Academic load of the applicant for higher education (credits / %)		
		Mandatory components of the educational and professional program	Selective components of the educational and professional program	Total for the entire period of study
1.	Cycle of general training (forms general competences)	75.0 / 31.25	19.0 / 7.92	94.0 / 39.17
2.	Cycle of professional training (forms special (professional) competences)	103.0 / 42.92	43.0 / 17.91	146.0 / 60.83
Total for the entire period of study		178.0 / 74.17	62.0 / 25.83	240.0 / 100.00

Table 3. The list of disciplines of the educational and professional program for training of applicants for education of the second (master) level, educational time in credits of ECTS by training cycles, and the list of the created competences and learning outcomes

Training cycles	Codes of competences	Codes of learning outcome	List of disciplines	ECTS credits
1	2	3	4	5
1.1. Cycle of general training (forms general competences)	GC-1, GC-4, GC-6	OCS-1, OCS-3, OCS-5, OVMS-1, OVMS-2, OPS-3	1.1.1. History of Ukraine	3.0
	GC-1, GC-4, GC-6, GC-9, GC-15	OCS-1, OCS-3, OCS-5, OVMS-1, OVMS-2, OPS-3	1.1.2. Ukrainian (for professional purposes)	3.0
	GC-1, GC-6, GC-15	OCS-1, OCS-3, OCS-5, OVMS-1, OVMS-2, OPS-3	1.1.3. History of Ukrainian culture	2.0
	GC-1, GC-4, GC-6, GC-7, GC-10	OCS-1, OCS-3, OCS-5, OVMS-1, OVMS-2, OVMS- 3, OPS-3	1.1.4. Philosophy	5.0
	GC-1, GC-5, GC-6	OCS-1, OCS-3, OCS-4, OVMS-1, OVMS-2, OPS-3	1.1.5. Foreign language (for professional purposes)	8.0
	GC-1, GC-2, GC-6, SC-1	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-1, OPS-3	1.1.6. Advanced mathematics	15.0
	GC-1, GC-2, GC-6, SC-1	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-1, OPS-3	1.1.7. Discrete mathematics	6.0
	GC-1, GC-2, GC-6, SC-1, SC-2	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-1, OPS-3	1.1.8. Probability theory, probabilistic processes and mathematical statistics	5.0
	GC-1, GC-2, GC-6, SC-1, SC-4	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-1, OPS-3	1.1.9. Numerical methods	7.0

Training cycles	Codes of competences	Codes of learning outcome	List of disciplines	ECTS credits
1	2	3	4	5
	GC-1, GC-2, GC-6, GC-7, GC-11, GC-13, SC-6, SC-15	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-5, OPS-1, OPS-3, OPS-4, OPS-6	1.1.10. Decision theory	6.0
	GC-1, GC-2, GC-5, GC-6, SC-1	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-1, OPS-3	1.1.11. Theory of algorithms	5.0
	GC-1, GC-2, GC-6, SC-1	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-1, OPS-3	1.1.12. Physics	8.0
	GC-1, GC-2, GC-6	OCS-1, OCS-5, OCS-7, OVMS-1, OVMS-2, OPS-1, OPS-2, OPS-3	1.1.13. Ecology	2.0
			1.1.14. Physical culture (outside of the credits)	
	GC-1, GC-6, GC-10, GC-14	OCS-1, OCS-3 OCS-5, OVMS-1, OVMS-2, OPS-1, OPS-3	2.1.1. Jurisprudence	2.0
	GC-1, GC-2, GC-6	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-1, OPS-3	2.1.2. Chemistry	4.0
	GC-1, GC-2, GC-6, SC-1, SC-2	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-5, OPS-1, OPS-3, OPS-7	2.1.3. Mathematical methods of operations research	5.0
	GC-1, GC-2, GC-5, GC-6, GC-7, GC-12, SC-9, SC-13	OCS-1, OCS-2, OCS-5, OVMS-1, OVMS-5, OPS-4, OPS-5, OPS-6, OPS-7, OPS-8, OPS-9	2.1.4. Information and coding theory	4.0
	GC-1, GC-2, GC-6, GC-7, SC-5, SC-15	OCS-1, OCS-2, OCS-5, OVMS-1, OVMS-4, OPS-1,	2.1.5. Economics, organization and management of enterprises	4.0

Training cycles	Codes of competences	Codes of learning outcome	List of disciplines	ECTS credits
1	2	3	4	5
		OPS-3, OPS-6		
			TOTAL 1.1	94.0
1.2 Cycle of professional training (forms special (professional) competences)	GC-1, GC-2, GC-5, GC-6, SC-1, SC-3	OVS-1, OVS-5, OVMS-1, OVMS-4	1.2.1. Algorithmization and programming	10.0
	GC-1, GC-2, GC-5, GC-6, SC-3, SC-8, SC-12	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-1, OPS-3, OPS-8, OPS-9	1.2.2. Object-oriented programming	10.0
	GC-1, GC-2, GC-5, GC-6, SC-12	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-1, OPS-3, OPS-9	1.2.3. Operating system	5.0
	GC-1, GC-2, GC-3, GC-6, GC-11, SC-9	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-1, OPS-3, OPS-8, OPS-9	1.2.4. Organization of databases and knowledge bases	5.0
	GC-1, GC-2, GC-3, GC-6, GC-7, SC-4, SC-6, SC-7, SC-11	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OVMS-5, OPS-6, OPS-7, OPS-8, OPS-9	1.2.5. Intetactual data analysis	6.0
	GC-1, GC-2, GC-5, GC-6, GC-11, GC-13	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-6, OPS-7, OPS-8, OPS-9	1.2.6. Web technologies and web design	11.0
	GC-1, GC-2, GC-5, GC-6, SC-14	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-6, OPS-7, OPS-8, OPS-9	1.2.7. Protection of information in computer systems	5.0
	GC-1, GC-2, GC-6, GC-7, GC-11, GC-12, GC-13, SC-3, SC-7	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-6, OPS-7, OPS-8, OPS-9	1.2.8. Modeling of systems	10.0
	GC-1, GC-2, GC-3, GC-5, GC-6, GC-7, GC-11, GC-12, GC-13, SC-3, SC-10	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-5, OPS-6, OPS-7, OPS-8, OPS-9	1.2.9. Design of information systems	8.0

Training cycles	Codes of competences	Codes of learning outcome	List of disciplines	ECTS credits
1	2	3	4	5
	GC-1, GC-2, GC-6, GC-7, SC-6, SC-10	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-6, OPS-7, OPS-8, OPS-9	1.2.10. Methods and systems of artificial intelligence	9.0
	GC-1, GC-2, GC-5, GC-6, SC-9, SC-13	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-6, OPS-7, OPS-8, OPS-9	1.2.11. Computer networks	5.0
	GC-1, GC-2, GC-6, GC-7	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-1, OPS-2, OPS-10	1.2.12. Fundamentals of labor protection	3.0
	GC-1, GC-2, GC-6	OCS-1, OCS-5, OCS-6, OPS-1, OPS-2, OPS-10	1.2.13. Vital activity security	2.0
	GC-1, GC-2, GC-3, GC-5, GC-6, GC-7, GC-8, SC-8, SC-15	OCS-1, OCS-3, OCS-5, OCS-7, OVMS-1, OVMS-4, OVMS-5, OPS-4, OPS-5, OPS-6, OPS-7, OPS-8, OPS-9	1.2.14. Pre-diploma industrial practice	6.0
	GC-1, GC-2, GC-3, GC-5, GC-6, GC-7, GC-8, GC-10, GC-11, GC-12, GC-13, GC-14, GC-15, SC-6, SC-10, SC-15	OCS-1, OCS-3, OCS-5, OCS-7, OVMS-1, OVMS-4, OVMS-5, OPS-1, OPS-3, OPS-5, OPS-6, OPS-7, OPS-8, OPS-9	1.2.15. Preparation of qualification bachelor work and state certification	9.0
	GC-1, GC-2, GC-5, GC-6, GC-7, SC-3	OCS-1, OCS-2, OCS-5, OVMS-1, OVMS-5, OPS-1, OPS-4, OPS-5, OPS-7, OPS-8, OPS-9	2.2.1. Logical and functional programming	6.0
	GC-1, GC-2, GC-3, GC-5, GC-6, GC-7, SC-3, SC-7, SC-8, SC-10	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-5, OPS-6, OPS-7, OPS-8, OPS-9	2.2.2. Computer-aided design technologies	4.0
	GC-1, GC-2, GC-6, GC-7,	OCS-1, OCS-5, OCS-6,	2.2.3. System analysis	4.0

Training cycles	Codes of competences	Codes of learning outcome	List of disciplines	ECTS credits
1	2	3	4	5
	SC-4, SC-6	OVMS-1, OVMS-4, OPS-6, OPS-7, OPS-8, OPS-9		
	GC-1, GC-2, GC-6, GC-8, SC-12, SC-14	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-6, OPS-7, OPS-8, OPS-9	2.2.4. Parallel and distributed computing	6.0
	GC-1, GC-2, GC-6, SC-1, SC-2	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-1, OPS-3	2.2.5. Electrical engineering and electronics	4.0
	GC-1, GC-2, GC-6, SC-1, SC-2	OCS-1, OCS-5, OCS-6, OVMS-1, OVMS-4, OPS-1, OPS-3	2.2.6. Computer architecture	6.0
			Module 1	
	GC-1, GC-2, GC-6, SC-4, SC-8	OCS-1, OCS-2, OCS-5, OVMS-1, OVMS-4, OPS-6, OPS-7, OPS-9	2.2.7. Pattern recognition theory	4.0
	GC-1, GC-2, GC-5, GC-6, SC-8, SC-11	OCS-1, OCS-2, OCS-5, OVMS-1, OVMS-4, OPS-6, OPS-7, OPS-8, OPS-9	2.2.8. Neural networks	9.0
			Module 2	
	GC-1, GC-2, GC-5, GC-6, SC-9	OCS-1, OCS-2, OCS-5, OVMS-1, OVMS-4, OPS-6, OPS-7, OPS-8, OPS-9	Java technology	
	GC-1, GC-2, GC-6, SC-7	OCS-1, OCS-2, OCS-5, OVMS-1, OVMS-4, OPS-1, OPS-4	Computer monitoring of chemical industry	
			TOTAL 1.2	146.0
			TOTAL	240.0

Table 4. Matrix of compliance between software competences and training components

Code of discipline according to the curriculum	1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.1.6	1.1.7	1.1.8	1.1.9	1.1.10	1.1.11	1.1.12	1.1.13	1.1.14	2.1.1	2.1.2	2.1.3	2.1.4	2.1.5
INT										+									
GC-1	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+
GC-2						+	+	+	+	+	+	+	+			+	+	+	+
GC-3																			
GC-4	+	+		+															
GC-5					+						+							+	
GC-6	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+
GC-7				+						+								+	+
GC-8																			
GC-9		+																	
GC-10				+											+				
GC-11										+									
GC-12																		+	
GC-13										+									
GC-14															+				
GC-15		+	+																

Code of discipline according to the curriculum																			
	1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.1.6	1.1.7	1.1.8	1.1.9	1.1.10	1.1.11	1.1.12	1.1.13	1.1.14	2.1.1	2.1.2	2.1.3	2.1.4	2.1.5
SC-1						+	+	+	+	+	+	+					+		
SC-2								+									+		
SC-3																			
SC-4									+										
SC-5																			+
SC-6										+									
SC-7																			
SC-8																			
SC-9																		+	
SC-10																			
SC-11																			
SC-12																			
SC-13																		+	
SC-14																			
SC-15										+									+

Code of discipline according to the curriculum	1.2.1	1.2.2	1.2.3	1.2.4	1.2.5	1.2.6	1.2.7	1.2.8	1.2.9	1.2.10	1.2.11	1.2.12	1.2.13	1.2.14	1.2.15	2.2.1	2.2.2	2.2.3
INT					+			+	+					+	+			+
GC-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC-2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC-3				+	+				+					+	+		+	
GC-4																		
GC-5	+	+	+			+	+		+		+			+	+	+	+	
GC-6	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
GC-7					+			+	+	+		+		+	+	+	+	+
GC-8														+	+			
GC-9																		
GC-10															+			
GC-11				+		+		+	+						+			
GC-12								+	+						+			
GC-13						+		+	+						+			
GC-14															+			
GC-15															+			
SC-1	+																	
SC-2																		
SC-3	+	+						+	+							+	+	
SC-4					+													+

SC-5																		
SC-6					+					+					+			+
SC-7					+			+									+	
SC-8		+												+			+	
SC-9				+							+							
SC-10									+	+					+		+	
SC-11					+													
SC-12		+	+															
SC-13											+							
SC-14								+										
SC-15															+	+		

Code of discipline according to the curriculum	2.2.4	2.2.5	2.2.6	Module 1		Module 2	
				2.2.7	2.2.8	2.2.7	2.2.8
INT							
GC-1	+	+	+	+	+	+	+
GC-2	+	+	+	+	+	+	+
GC-3							
GC-4							
GC-5					+	+	
GC-6	+	+	+	+	+	+	+
GC-7							
GC-8							
GC-9							
GC-10							
GC-11							
GC-12							
GC-13							
GC-14							
GC-15							
SC-1		+	+				

Code of discipline according to the curriculum	2.2.4	2.2.5	2.2.6	Module 1		Module 2	
				2.2.7	2.2.8	2.2.7	2.2.8
SC-2		+	+				
SC-3							
SC-4				+			
SC-5							
SC-6							
SC-7							+
SC-8	+			+	+		
SC-9						+	
SC-10							
SC-11					+		
SC-12	+						
SC-13							
SC-14	+						
SC-15							
SC-16			+				

**Table 5. Matrix of provision of appropriate components for program learning outcomes
Of educational and professional program**

Code of discipline according to the curriculum	1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.1.6	1.1.7	1.1.8	1.1.9	1.1.10	1.1.11	1.1.12	1.1.13	1.1.14	2.1.1	2.1.2	2.1.3	2.1.4	2.1.5
<i>OCS-1.</i>	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+
<i>OCS-2.</i>																		+	+
<i>OCS-3.</i>	+	+	+	+	+										+	+			
<i>OCS-4.</i>					+														
<i>OCS-5.</i>	+	+	+	+		+	+	+	+	+	+	+	+		+	+	+	+	+
<i>OCS-6.</i>						+	+	+	+	+	+	+					+		
<i>OCS-7.</i>													+						
<i>OVMS-1.</i>	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+
<i>OVMS-2.</i>	+	+	+	+	+								+		+	+			
<i>OVMS-3.</i>				+															
<i>OVMS-4.</i>						+	+	+	+		+	+							+
<i>OVMS-5.</i>										+							+	+	+
<i>OPS-1.</i>						+	+	+	+	+	+	+	+		+	+	+		
<i>OPS-2.</i>													+						
<i>OPS-3.</i>	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+		+
<i>OPS-4.</i>										+								+	
<i>OPS-5.</i>																		+	
<i>OPS-6.</i>										+								+	+
<i>OPS-7.</i>																	+	+	

Code of discipline according to the curriculum	1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.1.6	1.1.7	1.1.8	1.1.9	1.1.10	1.1.11	1.1.12	1.1.13	1.1.14	2.1.1	2.1.2	2.1.3	2.1.4	2.1.5
<i>OPS-8.</i>																		+	
<i>OPS-9.</i>																		+	
<i>OPS-10.</i>																			

Code of discipline according to the curriculum	1.2.1	1.2.2	1.2.3	1.2.4	1.2.5	1.2.6	1.2.7	1.2.8	1.2.9	1.2.10	1.2.11	1.2.12	1.2.13	1.2.14	1.2.15	2.2.1	2.2.2	2.2.3
<i>OCS-1.</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>OCS-2.</i>										+	+					+		
<i>OCS-3.</i>														+	+			
<i>OCS-4.</i>																		
<i>OCS-5.</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>OCS-6.</i>		+	+	+	+	+	+	+	+	+	+	+	+				+	+
<i>OCS-7.</i>														+	+			
<i>OVMS-1.</i>	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+
<i>OVMS-2.</i>																		
<i>OVMS-3.</i>																		
<i>OVMS-4.</i>	+	+	+	+	+	+	+	+	+	+	+	+		+	+			+
<i>OVMS-5.</i>					+									+	+	+	+	
<i>OPS-1.</i>		+	+	+								+	+		+	+		
<i>OPS-2.</i>												+	+					
<i>OPS-3.</i>		+	+	+											+			
<i>OPS-4.</i>														+		+		
<i>OPS-5.</i>														+	+	+		

Code of discipline according to the curriculum	1.2.1	1.2.2	1.2.3	1.2.4	1.2.5	1.2.6	1.2.7	1.2.8	1.2.9	1.2.10	1.2.11	1.2.12	1.2.13	1.2.14	1.2.15	2.2.1	2.2.2	2.2.3
<i>OPS-6.</i>					+	+	+	+	+	+	+			+	+		+	+
<i>OPS-7.</i>					+	+	+	+	+	+	+			+	+	+	+	+
<i>OPS-8.</i>		+		+	+	+	+	+	+	+	+			+	+	+	+	+
<i>OPS-9.</i>		+	+	+	+	+	+	+	+	+	+			+	+	+	+	+
<i>OPS-10.</i>												+	+					

Code of discipline according to the curriculum	2.2.4	2.2.5	2.2.6	Module 1		Module 2	
				2.2.7	2.2.8	2.2.7	2.2.8
				<i>OCS-1.</i>	+	+	+
<i>OCS-2.</i>				+	+	+	+
<i>OCS-3.</i>							
<i>OCS-4.</i>							
<i>OCS-5.</i>	+	+	+	+	+	+	+
<i>OCS-6.</i>	+	+	+				
<i>OCS-7.</i>							
<i>OVMS-1.</i>	+	+	+	+	+	+	+
<i>OVMS-2.</i>							
<i>OVMS-3.</i>							
<i>OVMS-4.</i>	+	+	+	+	+	+	+
<i>OVMS-5.</i>							
<i>OPS-1.</i>		+	+				+
<i>OPS-2.</i>							
<i>OPS-3.</i>		+	+				
<i>OPS-4.</i>							+
<i>OPS-5.</i>							
<i>OPS-6.</i>	+			+	+	+	

Code of discipline according to the curriculum	2.2.4			2.2.5		2.2.6		Module 1		Module 2	
						2.2.7	2.2.8	2.2.7	2.2.8		
<i>OPS-7.</i>	+					+	+	+			
<i>OPS-8.</i>	+						+	+			
<i>OPS-9.</i>	+					+	+	+			
<i>OPS-10.</i>											

III FORMS OF EVALUATION OF APPLICANTS FOR HIGHER EDUCATION

<p>Forms of evaluation of applicants for higher education</p>	<p>An obligatory form of the state certification is implementation and defence of qualifying (diploma) works.</p> <p>The system of competences and learning outcomes specified in sections IV and V shall be submitted for state certification.</p> <p>The main method for objective control of the degree of achievement of the final goals of education and professional training of bachelors is a technology of implementation and defence of qualifying (diploma) works, defined in the following documents: Regulations on EC, Guidelines for the implementation of qualifying (diploma) works.</p>
<p>Requirements for final qualifying work (if available)</p>	<p>The requirements for the final qualifying work are set out in the Guidelines for the implementation of qualifying (diploma) works.</p> <p>A final qualifying work is accompanied by a review of the supervisor and review of the reviewer, who are responsible for checking the completeness of tasks, the quality of a work as a whole and its check for plagiarism.</p>
<p>Requirements for certification/unified state qualification exam(s) (if available)</p>	
<p>Public defence (presentation) requirements (if available)</p>	<p>Requirements for public defence are formulated in the Regulations on EC and guidelines for the implementation of qualifying (diploma) works.</p>

IV - Requirements for the internal quality assurance system in higher education

Determined in accordance with European standards and guidelines for quality assurance in higher education (ESG) and article 16 of the Law of Ukraine "On Higher Education"

Components of the system of internal quality assurance in higher education	Definitions, references and related documents
Principles and procedures for ensuring the quality of education	<ul style="list-style-type: none"> - The Law of Ukraine "On Higher Education" of 01.07.2014 No. 1556-VII; - Temporary regulations on the organization of the educational process SHEI USUCT (Order of the rector of SHEI USUCT from 30.11.2015 No. 290); - Regulations on honous degrees of SHEI USUCT (Order of the rector of SHEI USUCT from 25.02.2016 No. 55); - Regulations on the procedure of establishment and organization of the work of the Examination Committee in SHEI USUCT (Order of the rector from 01.04.2015, No. 68); - Regulations on the development, approval and revision of work programs for academic disciplines (Order of the rector of SHEI USUCT from 01.12.15 No. 291)
Monitoring and periodic revision of educational programs	Annual monitoring of industry and labor market requirements, revision of educational programs, work curricula, work programs of academic disciplines. On approval of composition of the project teams for the development of educational programs (Order of the rector of SHEI USUCT from 10.03.2016 No. 74)
Annual evaluation of applicants for higher education	Regulations on the organization of rector's quality control of learning process (Order of the rector from 17.03.2014 No. 78)
Annual evaluation of scientific-pedagogical and pedagogical workers of higher educational institution	Regulations on the Commission of rector's control of pedagogical skills of scientific-pedagogical workers of the University (Order of the rector of SHEI USUCT from 04.04.2016 No. 85), Order of application of rating system for evaluation of activity of scientific-pedagogical workers of SHEI USUCT (Order of the rector from 04.06.2010 No 209 with the changes to the

	<p>order from 09.06.2011 No. 147), Order of application of rating system for evaluation of activities of departments and faculties SHEI USUCT (Order of the rector from 04.06.2010 No. 209).</p> <p>Regular publication of the results of such evaluations on the official website of the higher educational institution, on information stands and in any other way</p>
Further training of scientific-pedagogical, pedagogical and scientific workers	<p>Further training of scientific-pedagogical workers is carried out according to the regulations, approved by the order of MESU from 24.01.2013, No. 48 and Regulation on further training and internship of pedagogical and scientific-pedagogical workers of SHEI USUCT (Order of the rector of SHEI USUCT from 28.05.2016, No. 105)</p>
Availability of necessary resources for the organization of the educational process	<p>Educational-methodical, material-technical and personnel support corresponds to license conditions (Resolution of CM from 30.12.2015 No. 1187) for educational activity. License series AE № 636496. Certificates in the fields of study and specialties.</p>
Availability of information systems for effective management of the educational process	<p>Temporary regulations on the organization of educational process in SHEI USUCT (Order of the rector of SHEI USUC from 30.11.2015 No. 290) is supported by Information-analytical control system for the educational process, that consists of subsystems: Applicant, Learning Process.</p>
Publicity of information about educational programs, degrees of higher education and qualifications	<p>Information about educational programs, degrees of higher education and qualifications is public and fully described on the official web-portal of the University http://udhtu.com.ua</p>
Prevention and detection of academic plagiarism	<p>Checking the completeness of the tasks, the quality of work in general and its check for plagiarism is carried out by the teacher – the supervisor of the course or diploma work (project) in the prescribed manner using the appropriate software.</p>