

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

Rector of SHEI USUCT
_____ K. M. Sukhiy
" ____ " _____ 2019 p.

EDUCATIONAL AND PROFESSIONAL PROGRAM

Software engineering

(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 121 Software engineering

(code and name of the specialty)

Approved at the meeting of the
Academic Council of SHEI
USUCT
from " ____ " _____ 2019 protocol
no. ____

Dnipro
2019

**Approval sheet
OF EDUCATIONAL AND PROFESSIONAL PROGRAM**

Higher education level	First (bachelor) level
Branch of knowledge	12 Information technology
Specialty	121 Software Engineering
«APPROVED»	«DEVELOPERS» (project team)
First Vice-rector, Chairman of the Science-Methodical Council of SHEI USUCT _____ (signature) <u>Zaychuk O. V.</u> (surname and initials) " ____ " _____ 2019	Project team leader _____ (signature) <u>Olevskii V. I.</u> (surname and initials) " ____ " _____ 2019
Head of the SEC _____ (signature) <u>Smotraiev R. V.</u> (surname and initials) " ____ " _____ 2019	Project team members: _____ (signature) <u>Korotka L.I.</u> (surname and initials) " ____ " _____ 2019
Educational and Methodical Department _____ (signature) <u>Fomenko G.V.</u> (surname and initials) " ____ " _____ 2019	_____ (signature) <u>Denysiuk O. R.</u> (surname and initials) " ____ " _____ 2019
Dean of faculty _____ (signature) <u>Levchuk I.L.</u> (surname and initials) " ____ " _____ 2019	
Head of Department _____ (signature) <u>Zelentsov D.G.</u> (surname and initials) " ____ " _____ 2019	
	Educational and professional program is carried into effort by the order of the rector no _____ from " ____ " _____ 2019.

I. THE PROFILE OF THE BACHELOR EDUCATIONAL AND PROFESSIONAL PROGRAM
on specialty 121 "Software Engineering"

The profile of the program (general information)	
Full name of qualification in original language	Higher education degree - bachelor Specialty - <u>Software Engineering</u> (name)
Official name of the educational program	Educational and professional program "Software Engineering" for bachelor's degree on specialty 121 Software Engineering
The type of degree and size of educational program	Bachelor's degree in software engineering, single (double, joint in the presence of relevant contracts, training programs); 240 ECTS credits on the basis of full general secondary education; at least 120 ECTS credits on the basis of junior bachelor's degree (educational qualification level of junior specialist)
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"). National Agency for quality assurance of higher education.
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 7, FQ-EHEA – first cycle, EQF-LLL – level 6
Prerequisites	Full general secondary education, Junior bachelor's degree (educational qualification level of Junior specialist)
Language(s) of instruction	Ukrainian language
A	
	The purpose of the educational program
The purpose of the educational program	Training of specialists capable of setting and solving problems related to the development, maintenance and quality assurance of software.
B	
	Characteristics of the educational program
Subject area (branch of knowledge, specialty)	Branch of knowledge 12 – <i>Information technology</i> Specialty 121 - <i>Software Engineering</i>
Main focus of the program and specialization	General higher education of the first (bachelor's) level in the field of software engineering.
Program orientation	The educational and professional bachelor's program is designed for students who aspire to become specialists in the field of software

	development and testing. 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.
Features and differences	Regular updates to take trends in progressive development of information technologies into account
C	Employability and possibilities for further training
Employability	Bachelors can work in such specialties: Database administrator, data administrator, access administrator, system administrator, computer software engineer, software engineer, programmer (database), software and multimedia analyst, application programmer, computer application engineer, research engineer, information technology specialist, software development and testing specialist, computer software development specialist, computer graphics (design) specialist.
Further training	Training on the program of the second (master's) level of higher education.
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): ability to solve complex specialized problems and practical problems of software engineering, characterized by complexity and uncertainty of conditions, using the theories and methods of information technology.
General competences (GC)	C-1. Ability to abstract thinking, analysis and synthesis. C-2. Ability to apply knowledge in practical situations. C-3. Ability to communicate in the official state language both orally and in written form. C-4. Ability to communicate in the foreign language both orally and in written form. C-5. Ability to learn and acquire modern knowledge. C-6. Ability to search for, process and analyse information from a variety of sources. C-7. Ability to work in a team. C-8. Ability to act on ethical grounds. C-9. Desire to preserve the environment. C-10. Ability to act socially responsibly and consciously. C-11. The ability to realize one's rights and obligations as a member of society, to realize the values of civil (free democratic) society and the

	<p>need for its sustainable development, the rule of law, human and civil rights and freedoms in Ukraine.</p> <p>C-12. The ability to preserve and increase the moral, cultural, scientific values and achievements of society on the basis of understanding the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, technology and technology, to use different types and forms of physical activity for active recreation.</p>
Special (professional) competences (SC)	<p>C-13. Ability to identify, classify and formulate software requirements.</p> <p>C-14. Ability to participate in the design of software, including modeling (formal description) its structures, behaviors, processes and functions.</p> <p>C-15. Ability to develop architectures, modules and components of software systems.</p> <p>C-16. Ability to formulate and provide software quality capabilities in accordance with customer requirements, technical objectives and standards.</p> <p>C-17. Ability to adhere to specifications, standards, rules and guidelines in the professional industry when implementing life cycle processes.</p> <p>C-18. Ability to analyze, select and apply methods and tools to ensure information security (including cybersecurity).</p> <p>C-19. Knowledge of data information models, ability to create software for data storage, extraction and processing.</p> <p>C-20. Ability to apply fundamental and interdisciplinary knowledge to successfully solve software engineering tasks.</p> <p>C-21. Ability to assess and take into account economic, social, technological and environmental factors affecting the field of professional activity.</p> <p>C-22. Ability to accumulate, process and systematize professional knowledge on creating and maintaining software and recognizing the importance of lifelong learning.</p> <p>C-23. Ability to implement phases and iterations of software systems and information technology life cycle based on appropriate software development models and approaches.</p> <p>C-24. Ability to implement the system integration process, apply change management standards and procedures to support the integrity, overall functionality and reliability of the software.</p> <p>C-25. Ability to reasonably choose and develop tools for the development and maintenance of the software.</p> <p>C-26. Ability to algorithmic and logical thinking.</p>
F	Program learning results
	<p>PR01. To analyze, purposefully search and choose information and reference resources and knowledge necessary for the solution of</p>

professional tasks taking into account modern achievements of science and technology.

PR02. To know the code of professional ethics, understand the social significance and cultural aspects of software engineering and comply with them in professional activities.

PR03. To know the basic processes, phases and iterations of the software lifecycle.

PR04. To know and apply professional standards and other regulatory documents in the field of software engineering.

PR05. To know and apply relevant mathematical concepts, methods of domain, system and object-oriented analysis and mathematical modeling for software development.

PR06. Ability to select and use appropriate methodology of software creation for certain problem.

PR07. To know and apply in practice fundamental concepts, paradigms and basic principles of functioning of speech, instrumental and computational means of software engineering.

PR08. To be able to develop a human-machine interface.

PR09. To know and be able to use methods and tools to collect, formulate and analyze software requirements.

PR10. To conduct pre-project survey of the subject area, system analysis of the design object.

PR11. To select the source data for the design, guided by formal methods of requirements description and modeling.

PR12. To apply effective approaches to software design in practice.

PR13. To know and apply methods of algorithm development, software design and data structures and knowledge.

PR14. To implement domain analysis, design, testing, visualization, measurement and documentation for software tools.

PR15. To choose programming languages and development technologies to solve the problems of creating and maintaining software reasonably.

PR16. To have skills of team development, coordination, registration and release of all types of program documentation.

PR17. To be able to apply the methods of component-based software development.

PR18. To know and be able to apply information technologies of processing, storage and data transfer.

PR19. To know and be able to apply software verification and validation methods.

PR20. To know approaches to software quality assessment and assurance.

PR21. To know, analyze, choose, and competently apply means of ensuring information security (including cybersecurity) and data integrity according to the solved application problems and created software systems.

	<p>PR22. To know and be able to apply project management methods and tools.</p> <p>PR23. To be able to document and present the results of software development.</p> <p>PR24. To be able to calculate the economic efficiency of software systems.</p>
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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</i> (forms general competences)					
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	3	5,6	exam.
1.1.5	Foreign language (for professional purposes)	8.0	240	1,2	1,2,3,4	exam, pass/fail
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	Theory of algorithms	5.0	150	3	5,6	exam.
1.1.11	Physics	8.0	240	2,3	3,4,5,6	exam.
1.1.12	Ecology	2.0	60	1	2	pass/fail
1.1.13	Physical culture (outside of the credits)			1,2,3,4	1,2,3,4,5,6,7,8	pass/fail
	Total in cycle 1.1	69	2070			
1.2	<i>Cycle of professional training</i> (forms special (professional) competences)					
1.2.1	Algorithmization and programming	10.0	300	1,2	1,2,3,4	exam, graded test
1.2.2	Object-oriented programming	10.0	300	5,6	9,10,11,12	exam, pass/fail
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	Human-machine interaction	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	exam, pass/fail
1.2.7	Protection of information in computer systems	5.0	150	7	13,14	exam.

1.2.8	System software	8.0	240	5,6	9,10,11,12	exam, pass/fail
1.2.9	Software engineering	6.0	180	7,8	13,14,15	exam, pass/fail
1.2.10	Methods and systems of artificial intelligence	10.0	300	7,8	13,14,15	exam, pass/fail
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		16	graded test
1.2.15	Preparation of qualification bachelor work and state certification	9.0	270		16	
	Total in cycle 1.2	100	3000			
	THE MANDATORY PART - TOTAL	169	5070			
	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	Software quality and testing	4.0	120	5	9,10	exam.
2.2.4	Parallel and distributed computing	6.0	180	7,8	13,14,15	exam, pass/fail
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
2.2.7	Software modeling and analysis	6.0	180	4	7,8	exam.
	Module 1					
2.2.8	Software design	6.0	180	6	11,12	pass/fail
2.2.9	Neural networks	10.0	300	7,8	13,14,15	exam, pass/fail
	Module 2					
2.2.10	Java technology	6.0	180	6	11,12	Pass/fail
2.2.11	Computer monitoring of chemical manufacturing	10.0	300	7,8	13,14,15	exam, pass/fail
	Total in cycle 2.2	52	1560			
	THE SELECTIVE PART - TOTAL	71	2130			

		TOTAL	240.0	7200			
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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)	69 / 28.75	19 / 7.91	88 / 36.66
2.	Cycle of professional training (forms special (professional) competences)	100 / 41.66	52 / 21.67	152 / 63.33
Total for the entire period of study		169 / 70.41	71 / 29.58	240 / 100

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)	C08, C10, C11, C12	PR01, PR02, PR23	1.1.1. History of Ukraine	3.0
	C03, C07, C10, C12	PR01, PR02, PR04, PR16, PR18, PR23	1.1.2. Ukrainian (for professional purposes)	3.0
	C03, C06, C08, C12	PR01, PR02, PR23	1.1.3. History of Ukrainian culture	2.0
	C06, C08, C12	PR01, PR02, PR16, PR18	1.1.4. Philosophy	5.0
	C04, C05, C07	PR01, PR02, PR04, PR16, PR18, PR23	1.1.5. Foreign language (for professional purposes)	8.0
	C01, C02, C05	PR01, PR05, PR06, PR07, PR10	1.1.6. Advanced mathematics	15.0
	C01, C02, C05	PR01, PR05, PR06, PR07, PR10, PR21	1.1.7. Discrete mathematics	6.0
	C01, C02, C05	PR01, PR05, PR06, PR07, PR10, PR20	1.1.8. Probability theory, probabilistic processes and mathematical statistics	5.0
	C01, C02, C05	PR05, PR06, PR07, PR10, PR20, PR21	1.1.9. Numerical methods	7.0
	C01, C02, C05, C06, C07	PR03, PR05, PR06, PR07, PR10, PR11, PR12, PR13, PR18, PR21	1.1.10. Theory of algorithms	5.0
	C01, C02, C07	PR01, PR05, PR07, PR09, PR16	1.1.11. Physics	8.0
	C08, C09, C10, C11	PR01, PR02, PR05, PR07, PR09	1.1.12. Ecology	2.0

Training cycles	Codes of competences	Codes of learning outcome	List of disciplines	ECTS credits
1	2	3	4	5
	C07, C08, C12	PR02, PR16	1.1.13. Physical culture (outside of the credits)	
			TOTAL 1.1	69.0
1.2 Cycle of professional training (forms special (professional) competences)	C01, C02, C05, C06, C13, C18, C26	PR01, PR03, PR04, PR06, PR07, PR08, PR09, PR12, PR13, PR14, PR15, PR17, PR18, PR19, PR20, PR23	1.2.1. Algorithmization and programming	10.0
	C02, C05, C06, C13, C14, C15, C17	PR01, PR06, PR07, PR08, PR09, PR12, PR13, PR14, PR15, PR17, PR18, PR19, PR20, PR23	1.2.2. Object-oriented programming	10.0
	C02, C05, C06, C13, C14, C15, C17, C20, C26	PR03, PR07, PR12, PR13, PR14, PR15, PR17, PR18, PR19	1.2.3. Operating system	5.0
	C02, C05, C06, C14, C17, C18, C19, C26	PR03, PR05, PR06, PR07, PR12, PR13, PR14, PR15, PR17, PR18, PR21	1.2.4. Organization of databases and knowledge bases	5.0
	C02, C05, C06, C13, C26	PR03, PR07, PR08, PR10, PR19, PR22	1.2.5. Human-machine interaction	6.0
	C13, C14, C15, C18, C20, C21, C22, C23, C24, C25, C26	PR01, PR03, PR04, PR06, PR07, PR08, PR09, PR12, PR14, PR15, PR17, PR18, PR19, PR20, PR23	1.2.6. Web technologies and web design	10.0
	C13, C14, C16, C18, C25, C26	PR02, PR04, PR09, PR12, PR13, PR20, PR21	1.2.7. Protection of information in computer systems	5.0
	C13, C14, C15, C16, C18, C20, C21, C22, C23, C24, C25, C26	PR03, PR07, PR12, PR13, PR14, PR15, PR17, PR18, PR19	1.2.8. System software	8.0
	C13, C14, C15, C18, C20, C21,	PR01, PR03, PR04, PR06,	1.2.9. Software engineering	6.0

Training cycles	Codes of competences	Codes of learning outcome	List of disciplines	ECTS credits
1	2	3	4	5
	C22, C23, C24, C25, C26	PR07, PR08, PR09, PR12, PR13, PR14, PR15, PR17, PR18, PR19, PR20, PR22, PR23		
	C13, C14, C15, C16, C18, C20, C21, C22, C23, C24, C25, C26	PR02, PR03, PR05, PR06, PR07, PR10, PR12, PR13, PR18	1.2.10. Methods and systems of artificial intelligence	10.0
	C13, C14, C15, C17, C18, C20, C21, C22, C23, C24, C25, C26	PR02, PR04, PR09, PR12, PR13, PR20, PR21	1.2.11. Computer networks	5.0
	C02, C05, C06, C07, C08, C11	PR01, PR02, PR04	1.2.12. Fundamentals of labor protection	3.0
	C02, C05, C06, C07, C08, C09, C10, C11	PR01, PR02, PR04	1.2.13. Vital activity security	2.0
	C01, C02, C03, C05, C06, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26	PR01, PR03, PR04, PR06, PR07, PR08, PR09, PR12, PR13, PR14, PR15, PR17, PR18, PR19, PR20, PR23, PR24	1.2.14. Pre-diploma industrial practice	6.0
	C01, C03, C05, C06, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26	PR01, PR03, PR04, PR06, PR07, PR08, PR09, PR12, PR13, PR14, PR15, PR17, PR18, PR19, PR20, PR23, PR24	1.2.15. Preparation of qualification bachelor work and state certification	9.0
			TOTAL 1.2	100.0
2.1 Cycle of general training (forms general competences)	C02, C08, C10, C11	PR01, PR02, PR04, PR16, PR18, PR23	2.1.1. Jurisprudence	2.0
	C01, C06, C07	PR01, PR05, PR07, PR09, PR16	2.1.2. Chemistry	4.0
	C01, C02, C05	PR01, PR05, PR06, PR07,	2.1.3. Mathematical methods of	5.0

Training cycles	Codes of competences	Codes of learning outcome	List of disciplines	ECTS credits
1	2	3	4	5
		PR10, PR21	operations research	
	C13, C14, C15, C18, C20, C21, C22, C23, C24, C25, C26	PR04, PR09, PR12, PR13, PR20, PR21	2.1.4. Information and coding theory	4.0
	C02, C08, C10, C11, C21	PR01, PR02, PR04, PR22, PR24	2.1.5. Economics, organization and management of enterprises	4.0
			TOTAL 2.1	19
2.2 Cycle of professional training (forms special (professional) competences)	C13, C14, C15, C18, C19, C20, C21, C22, C23, C24, C25, C26	PR06, PR07, PR09, PR12, PR13, PR14, PR15, PR17, PR18, PR19, PR20, PR23	2.2.1. Logical and functional programming	6.0
	C13, C14, C15, C18, C20, C21, C22, C23, C24, C25, C26	PR03, PR04, PR06, PR07, PR08, PR09, PR12, PR13, PR14, PR15, PR17, PR18, PR19, PR20, PR22, PR23	2.2.2. Computer-aided design technologies	4.0
	C13, C14, C15, C18, C20, C21, C22, C23, C24, C25, C26	PR04, PR14, PR15, PR16, PR19, PR20	2.2.3. Software quality and testing	4.0
	C13, C14, C15, C18, C20, C21, C22, C23, C24, C25, C26	PR03, PR06, PR12, PR14, PR15, PR18	2.2.4. Parallel and distributed computing	6.0
	C01, C02, C05, C06, C07	PR01, PR05, PR07, PR09, PR16	2.2.5. Electrical engineering and electronics	4.0
	C01, C02, C06, C07, C15, C17, C26	PR05, PR07, PR18	2.2.6. Computer architecture	6.0
	C01, C03, C05, C06, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26	PR01, PR05, PR09, PR10, PR11, PR14, PR19, PR22	2.2.7. Software modeling and analysis	6.0
				Module 1
	C01, C03, C05, C06, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26	PR06, PR07, PR08, PR09, PR12, PR13, PR14, PR15, PR17, PR18, PR19, PR20, PR22, PR23	2.2.8. Software design	6.0

Training cycles	Codes of competences	Codes of learning outcome	List of disciplines	ECTS credits
1	2	3	4	5
	C13, C14, C15, C18, C20, C21, C22, C23, C24, C25, C26	PR02, PR03, PR05, PR06, PR07, PR10, PR12, PR13, PR18	2.2.9. Neural networks	10.0
			Module 2	
	C13, C14, C15, C18, C20, C21, C22, C23, C24, C25, C26	PR06, PR07, PR08, PR09, PR12, PR13, PR14, PR15, PR17, PR18, PR19, PR20, PR23	2.2.10. Java technology	6.0
	C05, C06, C13, C14, C15, C18, C20, C21, C22, C23, C24, C25, C26	PR05, PR07, PR09, PR10, PR16	2.2.11. Computer monitoring of chemical manufacturing	10.0
			TOTAL 2.2	52.0
			TOTAL	71

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	1.2.1	1.2.2	1.2.3	1.2.4	1.2.5	1.2.6	1.2.7	
C01						+	+	+	+	+	+			+							
C02						+	+	+	+	+	+			+	+	+	+	+			
C03		+	+																		
C04					+																
C05					+	+	+	+	+	+				+	+	+	+	+			
C06			+	+						+				+	+	+	+	+			
C07		+			+					+	+		+								
C08	+		+	+								+	+								
C09												+									
C10	+	+										+									
C11	+											+									
C12	+	+	+	+									+								
C13														+	+	+		+	+	+	
C14															+	+	+		+	+	
C15															+	+			+		
C16																					+

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	1.2.1	1.2.2	1.2.3	1.2.4	1.2.5	1.2.6	1.2.7
C17															+					
C18														+					+	+
C19																				
C20																+			+	
C21																			+	
C22																			+	
C23																			+	
C24																			+	
C25																			+	+
C26														+		+	+	+	+	+

Code of discipline according to the curriculum	1.2.8	1.2.9	1.2.10	1.2.11	1.2.12	1.2.13	1.2.14	1.2.15	2.1.1	2.1.2	2.1.3	2.1.4	2.1.5	2.2.1	2.2.2	2.2.3	2.2.4	2.2.5	2.2.6	2.2.7	Module 1		Module 2		
																						2.2.8	2.2.9	2.2.10	2.2.11
C01							+	+		+	+							+	+	+	+				
C02					+	+	+		+		+		+					+	+						
C03							+	+												+	+				
C04																									
C05					+	+	+	+			+							+		+	+				+
C06					+	+	+	+		+								+	+	+	+				+
C07					+	+				+								+	+						
C08					+	+			+				+												
C09						+																			
C10						+			+				+												
C11					+	+			+				+												
C12																									
C13	+	+	+				+	+				+		+	+	+	+			+	+	+	+	+	+
C14	+	+	+				+	+				+		+	+	+	+			+	+	+	+	+	+
C15	+	+	+				+	+				+		+	+	+	+		+	+	+	+	+	+	+
C16	+		+				+	+												+	+				

Code of discipline according to the curriculum	1.2.8	1.2.9	1.2.10	1.2.11	1.2.12	1.2.13	1.2.14	1.2.15	2.1.1	2.1.2	2.1.3	2.1.4	2.1.5	2.2.1	2.2.2	2.2.3	2.2.4	2.2.5	2.2.6	2.2.7	Module 1		Module 2		
																						2.2.8	2.2.9	2.2.10	2.2.11
C17				+			+	+										+		+	+				
C18	+	+	+	+			+	+				+		+	+	+	+			+	+	+	+	+	+
C19							+	+						+							+	+			
C20	+	+	+	+			+	+				+		+	+	+	+				+	+	+	+	+
C21	+	+	+	+			+	+				+	+	+	+	+	+				+	+	+	+	+
C22	+	+	+	+			+	+				+		+	+	+	+				+	+	+	+	+
C23	+	+	+	+			+	+				+		+	+	+	+				+	+	+	+	+
C24	+	+	+	+			+	+				+		+	+	+	+				+	+	+	+	+
C25	+	+	+	+			+	+				+		+	+	+	+				+	+	+	+	+
C26	+	+	+	+			+	+				+		+	+	+	+	+			+	+	+	+	+

Table 5. Matrix of provision of appropriate components for program learning results 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	1.2.1	1.2.2	1.2.3	1.2.4	1.2.5	1.2.6	1.2.7	
PR01.	+	+	+	+	+	+	+	+			+	+		+	+				+		
PR02.	+	+	+	+	+							+	+								+
PR03.										+				+		+	+	+	+		
PR04.		+			+									+					+	+	
PR05.						+	+	+	+	+	+	+					+				
PR06.						+	+	+	+	+				+	+		+		+		
PR07.						+	+	+	+	+	+	+		+	+	+	+	+	+		
PR08.														+	+			+	+		
PR09.											+	+		+	+				+	+	
PR10.						+	+	+	+	+								+			
PR11.										+											
PR12.										+				+	+	+	+		+	+	
PR13.										+				+	+	+	+			+	
PR14.														+	+	+	+		+		
PR15.														+	+	+	+		+		

PR16.		+		+	+						+		+							
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	1.2.1	1.2.2	1.2.3	1.2.4	1.2.5	1.2.6	1.2.7
PR17.														+	+	+	+		+	
PR18.		+		+	+					+				+	+	+	+		+	
PR19.														+	+	+		+	+	
PR20.								+	+					+	+				+	+
PR21.							+		+	+							+			+
PR22.																		+		
PR23.	+	+	+		+									+	+				+	
PR24.																				

Code of discipline according to the curriculum	1.2.8	1.2.9	1.2.10	1.2.11	1.2.12	1.2.13	1.2.14	1.2.15	2.1.1	2.1.2	2.1.3	2.1.4	2.1.5	2.2.1	2.2.2	2.2.3	2.2.4	2.2.5	2.2.6	2.2.7	Module 1		Module 2		
																						2.2.8	2.2.9	2.2.10	2.2.11
PR01.		+			+	+	+	+	+	+	+		+					+		+					
PR02.			+	+	+	+			+				+										+		
PR03.	+	+	+				+	+							+		+						+		
PR04.		+		+	+	+	+	+	+			+	+		+	+									
PR05.			+							+	+							+	+	+			+		+
PR06.		+	+				+	+			+			+	+		+					+	+	+	
PR07.	+	+	+				+	+		+	+			+	+			+	+			+	+	+	+
PR08.		+					+	+							+							+		+	
PR09.		+		+			+	+		+		+		+	+			+		+		+		+	+
PR10.			+								+										+		+		+
PR11.																				+					
PR12.	+	+	+	+			+	+				+		+	+		+					+	+	+	
PR13.	+	+	+	+			+	+				+		+	+							+	+	+	
PR14.	+	+					+	+						+	+	+	+			+		+		+	
PR15.	+	+					+	+						+	+	+	+					+		+	
PR16.									+	+						+		+							+

Code of discipline according to the curriculum	1.2.8	1.2.9	1.2.10	1.2.11	1.2.12	1.2.13	1.2.14	1.2.15	2.1.1	2.1.2	2.1.3	2.1.4	2.1.5	2.2.1	2.2.2	2.2.3	2.2.4	2.2.5	2.2.6	2.2.7	Module 1		Module 2		
																						2.2.8	2.2.9	2.2.10	2.2.11
PR17.	+	+					+	+						+	+							+		+	
PR18.	+	+	+				+	+						+	+		+		+			+	+	+	
PR19.	+	+					+	+						+	+	+					+	+		+	
PR20.		+		+			+	+				+		+	+	+						+		+	
PR21.				+							+	+													
PR22.		+											+		+						+	+			
PR23.		+					+	+	+					+	+							+		+	
PR24.							+	+					+												

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 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 qualification work requires solution of a specialized problem or a practical problem of software engineering, characterized by complexity and uncertainty of conditions, using the theories and methods of information technology.</p> <p>A qualification work cannot include academical plagiarism, falsification and lies.</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); - Temporary regulations on the system of internal quality assurance of educational activities of the University and the quality of higher education (Order of the rector of SHEI USUCT from 27.02.17 No. 52)
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	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

workers of higher educational institution	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 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). 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.
Further training of scientific-pedagogical, pedagogical and scientific workers	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)
Availability of necessary resources for the organization of the educational process	Educational-methodical, material-technical and personnel support corresponds to license conditions (Resolution of CM from 30.12.2015 No. 1187) for educational activity.
Availability of information systems for effective management of the educational process	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.
Publicity of information about educational programs, degrees of higher education and qualifications	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.edu.ua
Prevention and detection of academic plagiarism	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.