

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
INTERNATIONAL HUMANITIES UNIVERSITY

APPROVED

Scientific council

International humanitarian university

(protocol No. 15 from "09" 2022 year)

Rector

professor K.V. Hromovenko



EDUCATIONAL AND PROFESSIONAL PROGRAM
"Computer Engineering"

LEVEL OF HIGHER EDUCATION	<u>first (bachelor) level</u> (name of higher education level)
DEGREE OF HIGHER EDUCATION	<u>bachelor</u> (name of higher education degree)
BRANCH OF KNOWLEDGE	<u>12 Information technologies</u> (code and name of field of knowledge)
SPECIALTY	<u>123 Computer engineering</u> (code and specialty name)
MEETS THE REQUIREMENTS OF THE EDUCATIONAL ACTIVITY STANDARD	<u>order of the Ministry of Education and Culture No. 1262 dated 19.11.18</u>

The educational and professional program at the first (bachelor's) level of higher education in the specialty 123 "Computer Engineering" contains the amount of ECTS credits necessary for obtaining the corresponding degree of higher education; list of graduate competencies; the normative content of the training of higher education seekers, formulated in terms of learning outcomes; attestation forms of higher education applicants; requirements for the existence of a system of internal quality assurance of higher education.

Developed by the project group consisting of:

Hura Volodymyr Ihorovych - candidate of technical sciences, head of the department of computer engineering and innovative technologies of the International Humanitarian University - guarantor of the educational program.

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protocol No. 1 of " 19 " 09 2022

The standard of higher education specifies the following requirements for the educational and professional program:

V. Form of attestation of applicants of higher education

Forms of attestation of applicants of higher education	Attestation is carried out in the form of public defense of qualification work.
Requirements for qualifying work	<p>The qualification work must demonstrate the graduate's ability to solve complex tasks and problems of development, ensure the quality of implementation and support of software tools, find rational methods and means of solving them, solve the most difficult of them, ensure the sustainable development of IT companies in terms of the quality of processes and development results software based on research and/or innovation under uncertain conditions and requirements.</p> <p>The qualifying work should not contain academic plagiarism, fabrication, or falsification.</p> <p>The qualification work must be published on the official website of the institution of higher education or its division, or in the repository of the institution of higher education.</p>

Guarantor of educational and professional programs

Ph.D. , Head of the Department of Computer Engineering
and innovative technologies of IHU



V.I. Hura

- 1) the amount of ECTS credits required to obtain the corresponding degree of higher education;
- 2) list of graduate competencies;
- 3) the normative content of the training of higher education seekers, formulated in terms of learning outcomes;
- 4) attestation forms of higher education applicants;
- 5) requirements for the existence of a system of internal quality assurance of higher education;

On the basis of the educational and professional program (EPP), the university develops a curriculum that defines:

- the list and volume of educational disciplines in ECTS credits;
- the sequence of studying disciplines;
- forms of conducting educational classes and their scope;
- schedule of the educational process;
- forms of current and final control.

To specify the planning of the educational process, a working educational plan is drawn up for each academic year and approved by the rector of the university.

The standard and the EPP are based on a competency-based approach and share the philosophy of determining the requirements for a specialist, which is the basis of the Bologna process and the international project of the European Commission "Harmonization of educational structures in Europe" (Tuning Educational Structures in Europe , TU-NING).

BASIC TERMS AND THEIR DEFINITIONS

Attestation is the establishment of compliance of the level and volume of knowledge, skills, and other competencies acquired by higher education students with the requirements **of the educational program** .

The field of knowledge is the main subject area of education and science, which includes a group of related specialties for which professional training is carried out.

Descriptors of the National Qualifications Framework

- **autonomy and responsibility** – the ability to independently perform tasks, solve tasks and problems, and be responsible for the results of one's activities;

- **knowledge** – scientific information understood and assimilated by the subject, which is the basis of his conscious, purposeful activity. Knowledge is divided into empirical (factual) and theoretical (conceptual, methodological);

- **communication** – interrelationship of subjects for the purpose of information transfer, coordination of actions, joint activities;

- **skill** – the ability to apply knowledge to perform tasks and solve tasks and problems. Skills are divided into cognitive (intellectual-creative) and practical (based on mastery using methods, materials, instructions and tools).

The European Credit Transfer and Accumulation System (ECTS) is a system of credit transfer and accumulation used in the European Higher Education Area for the purpose of providing, recognizing, confirming qualifications and educational components and promoting the academic mobility of higher education students. The system is based on the determination of the educational load of the student of higher education, which is necessary to achieve the specified learning outcomes, and is counted in ECTS credits.

Qualification is an official result of assessment and recognition, which is obtained when an authorized institution (competent body) has established that a person has achieved competencies (learning outcomes) according to specified standards.

Educational qualification – a qualification awarded by higher educational institutions on the basis of meeting the requirements of the Standards higher education.

A qualification level is a structural unit of the National Qualifications Framework defined by a certain set of competencies that are typical for the qualifications of this level .

Competence is a dynamic combination of knowledge, skills and practical skills, ways of thinking, professional, worldview and civic qualities, moral and ethical values, which determines a person's ability to successfully carry out professional and further educational activities and is the result of training at a certain level of higher education.

- **Integral competence** is a generalized description of the qualification level, which expresses the main competence characteristics of the level in relation to training and/or professional activity.

- **General competences** are universal competences that do not depend on the subject area, but are important for the successful further professional and social activities of the acquirer in various fields and for his personal development.

- **Special (professional, subject) competences** – competences that depend on the subject area and are important for successful professional activity in a certain specialty.

A credit of the European Credit Transfer and Accumulation System (hereinafter referred to as ECTS credit) is a unit of measurement of the educational load of a student of higher education, necessary to achieve the specified (expected) learning results. The volume of one ECTS credit is 30 hours. The workload of one academic year in the full-time form of education is, as a rule, 60 ECTS credits.

The National Qualifications Framework is a systematic and competency-based description of qualification levels.

Learning outcomes (programmatic) – a set of knowledge, abilities, skills, and other competencies acquired by a person in the process of learning a certain educational and professional program, which can be identified, quantified and measured.

Specialization is a component of a specialty that is determined by a higher educational institution and provides a profile specialized educational and professional training program for students of higher education.

A specialty is a component of the field of knowledge for which professional training is carried out.

The quality of higher education is the level of a person's acquired knowledge, abilities, skills, and other competencies, which reflects his competence in accordance with the standards of higher education.

Subject area	Field of knowledge: 11 Information technologies Specialty: 12 Computer engineering
The main focus of the program	Educational and professional, based on well-known scientific results of computer engineering, which, with a further professional career and further training in the field of information technologies, enable a graduate to work in the technology of development and construction of computer systems and networks and their testing. Training of specialists capable of independently using and implementing computer engineering technologies. In particular the principles of operation and maintenance of communication-technical components of computer systems, construction and operation of computer systems and networks, methods and technologies of creating systems and applications programs within the framework of functional, program and object-oriented approach for desktop, mobile, portable, embedded and cloud systems.
Any other fields of qualification	The opportunity to continue education at the second educational level of higher education. Acquisition of additional professional skills in the form of postgraduate education.

II. Profile of the educational and professional program

general information	
Full name of the higher educational institution and structural division	International Humanities University Institute of Law, Economics and International Relations Department of computer engineering and innovative technologies
Level of higher education	First (bachelor) level
Degree of higher education	Bachelor
Branch of knowledge	12 Information technologies
Specialty	123 Computer engineering
Educational qualification	Bachelor of Computer Engineering
The scope of the educational program, the term of study	Bachelor's degree, single, volume - 240 ECTS credits 3 years and 10 months in full-time study 5 years of correspondence education
Prerequisites	Certificate of complete general secondary education, certificates of secondary school, diploma of junior specialist Entrance exams in the profession The rest of the requirements are determined by the rules of admission to the bachelor's educational program
Internet address of the permanent placement of the description of the educational program	mgu.edu.ua
The purpose of the educational and professional program	
The purpose (goals) of the educational and professional program: formation of personal competencies of a specialist capable of solving complex specialized tasks and practical problems in computer engineering, which involves students' acquisition of knowledge, skills and abilities in the design, creation, support and maintenance of computer systems, networks and their components; creation of system and application programs within the framework of a functional, procedural and object-oriented approach for desktop, mobile, portable, embedded and cloud systems; design of circuit devices	
Characteristics of the educational and professional program	
Subject area	Field of knowledge: 12 Information technologies Specialty: 123 Computer engineering
The main focus of the program	Educational and professional, based on well-known scientific results of computer engineering, within which a further professional career and further training in the field of information technologies is possible. Emphasis is placed on the technology of development and maintenance of computer systems and networks and their software. Training of specialists capable of independently using and implementing computer engineering technologies, in particular the principles of operation and architecture of microprocessor technology, components of computer systems, construction and operation of computer systems and networks, methods and technologies of creating system and application programs within the framework of functional, procedural and object-oriented approach for desktop, mobile, portable, embedded and cloud systems.
Academic rights of graduates	The opportunity to continue education at the second (master's) level of higher education. Acquisition of additional qualifications in the postgraduate education system.
The amount of ECTS credits required for obtaining first (bachelor) degree of higher education	

<p>The scope of the educational program at EKTS</p>	<p>- on the basis of complete general secondary education is 240 ECTS credits, - on the basis of the "junior bachelor" degree (educational and qualification level "junior specialist"), the higher education institution has the right to recognize and re-enroll no more than 120 ECTS credits obtained within the previous educational program of the junior bachelor (junior specialist) training program. At least 50% of the volume of the educational and professional program is aimed at ensuring general and special (professional) competences in the specialty, defined by the Standard of Higher Education.</p>
<p>List of graduate competencies</p>	
<p>Integral competence</p>	<p>The ability to solve complex specialized tasks and practical problems during professional activity in the computer field or training, which involves the application of theories and methods of computer engineering and is characterized by complexity and uncertainty of conditions.</p>
<p>General competences (CG)</p>	<p>Z1. Ability to abstract thinking , analysis and synthesis. Z2. Ability learn and master modern knowledge Z3. Ability apply knowledge in practical situations . Z4. Ability communicate state language both orally and in writing . Z5. Ability communicate foreign language Z6. Skills interpersonal interaction . Z7. Skill identify, set and solve problems Z8. Ability work in team Z9. Ability realize to realize their rights and responsibilities as a member of society values civil (free democratic) society and necessity him sustainable development , rule of law, rights and freedoms of man and citizen in Ukraine . Z10. Ability save and multiply moral , cultural , scientific values and achievements society based _ understanding history and regularities development objective region , her places in the general system knowledge about nature and society and in development society , techniques and technologies , to use different types and forms motor activities for active recreation and leading a healthy lifestyle .</p>
<p>Special (professional, subject) competence</p>	<p>P 1. Ability to apply the legislative and regulatory framework, as well as state and international requirements, practices and standards in order to carry out professional activities in the field of computer engineering. P2. Ability use modern methods and languages programming for development algorithmic and software provision P3. Ability create systemic and applied software software computer systems and networks. P4. Ability provide protection information that _ processed in computer and cyber-physical systems and networks for the purpose of implementation installed politicians informative security . P5. Ability use means and systems automation design to development components computer systems and networks, Internet applications in , cyber-physical systems , etc. P6. Ability to design , implement and maintain computer systems and networks of different types and purposes . P7. Ability use and implement new ones technologies , including technologies smart , mobile , green and safe calculations , participate in modernization and reconstruction computer systems</p>

	<p>and networks , various embedded and distributed applications , in particular for the purpose of promotion their efficiency .</p> <p>P8. Readiness participate in implementation work computer systems and networks, introduction them for operation at facilities different _ appointment _</p> <p>P9. Ability to systemically administer , use , adapt and exploit available informative technologies and systems .</p> <p>P10. Ability carry out organization workers places , theirs technical _ equipment , accommodation computer equipment , use organizational , technical , algorithmic and others methods and means protection information .</p> <p>P11. Ability to issue received workers results in the form presentations , scientific and technical reports .</p> <p>P12. Ability identify , classify and describe software and technical work means , computer and cyber-physical systems, networks and theirs component in the path use of analytical methods and modeling methods. P13. The ability to solve problems in the field of computer and information technologies, to determine the limitations of these technologies.</p> <p>P14. Ability to design systems and their components considering all aspects of their life cycle and mission, including creation, configuration, operation, maintenance and disposal.</p> <p>P15. The ability to argue the choice of methods for solving specialized problems, critically evaluate the obtained results, justify and defend the decisions made. P16. The ability to use the apparatus of artificial neural networks and machine learning to solve applied problems in the subject area of computer engineering.</p> <p>P17. Ability to design, deploy and support cloud and IoT solutions.</p> <p>P18. The ability to develop and improve circuit and electronic components and means of computer systems and networks for various purposes.</p> <p>P19. Ability to use and implement information processing technologies in data storage and transmission systems.</p> <p>P20. Ability to develop and use algorithmic, software and hardware data storage: relational and non-relational , centralized and distributed.</p>
7 – Program learning outcomes	
Knowledge	<p>N1. Know and understand the scientific principles underlying the functioning of computer tools, systems and networks.</p> <p>N2. Have the skills of conducting experiments, collecting data and modeling in computer systems.</p> <p>N3. Know the latest technologies in the field of computer engineering. N4. Know and understand the impact of technical solutions in the public, economic, social and environmental context.</p> <p>N5. Have knowledge of the basics of economics and project management. N6. To know the basic principles of operation of hardware and software components of computer systems and data transmission networks: electronic, schematic , algorithmic, software.</p>
Skill	<p>N7. To be able to apply knowledge to identify, formulate and solve technical problems of the specialty, using methods that are most suitable for achieving the set goals.</p> <p>N8. To be able to solve problems of analysis and synthesis of means characteristic of the specialty.</p>

	<p>N9. Be able to think systematically and apply creative abilities to the formation of new ideas.</p> <p>N10. Be able to apply knowledge of technical characteristics, design features, purpose and rules of operation of software and technical means of computer systems and networks to solve technical problems of the specialty. N11. Be able to develop software for embedded and distributed applications, mobile and hybrid systems, calculate, operate equipment typical for the specialty.</p> <p>N12. Be able to search for information in various sources to solve computer engineering problems.</p> <p>N13. Be able to work effectively both individually and as part of a team.</p> <p>N14. Be able to identify, classify and describe the operation of computer systems and their components.</p> <p>N15. To be able to combine theory and practice, as well as to make decisions and develop an activity strategy to solve the tasks of the specialty, taking into account universal human values, public, state and industrial interests. N16. Be able to perform experimental research on professional topics.</p> <p>N17. Be able to evaluate the obtained results and justify the decisions made.</p> <p>N18. Be able to apply modern analytical methods, modeling methods , machine learning tools and artificial intelligence systems.</p> <p>N19. To be able to analyze existing, design and create new circuit components of computer systems for various purposes.</p> <p>N20. Be able to design, develop and implement specialized computer systems: embedded, mobile, high-performance.</p> <p>N21. Be able to design and use modern data transmission, storage and organization systems at the hardware and software level.</p> <p>N22. Be able to create software components of computer systems for various purposes, taking into account procedural, object-oriented and functional programming paradigms. N23. Be able to carry out diagnostics, testing and maintenance of hardware and software in order to ensure their reliability, warranty and security.</p>
<p>Communication</p>	<p>N24. Communicate orally and in writing on professional issues in Ukrainian and one of the foreign languages (English, German, Italian, French, Spanish).</p> <p>N25. Use information technology and for effective communication on professional and social levels.</p> <p>N26. The ability to adapt to new situations, justify, make and implement decisions within the competence.</p> <p>N27. To be aware of the need for lifelong learning in order to deepen acquired and acquire new professional knowledge, improve creative thinking.</p> <p>N28. To perform work qualitatively and achieve the set goal in compliance with the requirements of professional ethics.</p>
<p>8 – Resource support for program implementation</p>	
<p>Staff support</p>	<p>All scientific and pedagogical workers providing the educational and professional program correspond to the profile and direction of the taught disciplines, have the necessary teaching experience and practical work experience. In the process of organizing the educational process, professionals with experience in research,</p>

	management, innovation, creativity and professional work are involved
Material and technical support	Educational premises allow to fully ensure the educational process during the entire cycle of training under the educational program, as they have a sufficient number of computerized and specialized workplaces and are equipped with the necessary modern technical means
Informational and educational and methodological support	Information support of the educational process includes library funds, including electronic resources, remote access points. Educational and methodological support of the educational program includes educational content, plans for practical classes, tasks for independent work of students, questions, problems, tasks or cases for current and final control, tasks for complex control work, work program of all types of practice.
9 - Academic mobility	
National credit mobility	Students studying under this educational program have the legally recognized right to cross-enroll in other specialties, including with credits in related disciplines.
International credit mobility	Students studying under this educational program have the right to international academic mobility within the terms and conditions stipulated by the legislation of Ukraine, both within the framework of concluded agreements and international programs, and in a personal manner. Under the condition of simultaneous study at the higher education institutions of Ukraine and another country, an individual study plan-schedule is drawn up with the passage of the appropriate attestation.
Education of foreign students of higher education	Foreign citizens have the right to enter training to ensure an effective training process, training in the state language is implemented, which ends with a state certification at the end of the entire training period.

III. Requirements for the existence of a system of internal quality assurance of higher education

The institution of higher education operates a system of ensuring the quality of educational activities and the quality of higher education by the institution of higher education (system of internal quality assurance), which provides for the implementation of the following procedures and measures:

1. Determination of the principles and procedures for ensuring the quality of higher education;
2. Monitoring and periodic review of educational programs;
3. Annual evaluation of higher education applicants, scientific and pedagogical and pedagogical workers of the institution of higher education, regular publication of the results of such evaluations on the official website of the institution of higher education, on information stands and in any other way;
4. Provision of advanced training of pedagogical, scientific and scientific-pedagogical workers;
5. Ensuring the availability of the necessary resources for the organization of the educational process, including the independent work of students, for each educational program;
6. Ensuring the availability of information systems for effective management of the educational process;

7. Ensuring publicity of information about educational programs, degrees of higher education and qualifications;

8. Ensuring compliance with academic integrity by employees of institutions of higher education and students of higher education, including the creation and ensuring the functioning of an effective system for the prevention and detection of academic plagiarism;

9. Other procedures and measures.

The system of ensuring the quality of educational activities and the quality of higher education (internal quality assurance system) by the institution of higher education is evaluated by the National Agency for Quality Assurance of Higher Education or independent institutions accredited by it for the purpose of its compliance with the requirements for the assurance system quality of higher education, approved by the National Agency for Quality Assurance of Higher Education, and international standards and recommendations for quality assurance of higher education.

Code	Description	10	1.1	1.2
AK-21.1	Foreign language (academic, with direction of the	9	1.1	Good
AK-21.2	Foreign language (academic)	9	1.1	Good
AK-21.3	Foreign language (academic)	9	1.1	Good
AK-21.4	Foreign language (academic)	9	1.1	Good
AK-21.5	Foreign language (academic)	9	1.1	Good
AK-21.6	Foreign language (academic)	9	1.1	Good
AK-21.7	Foreign language (academic)	9	1.1	Good
AK-21.8	Foreign language (academic)	9	1.1	Good
AK-21.9	Foreign language (academic)	9	1.1	Good
AK-21.10	Foreign language (academic)	9	1.1	Good
AK-21.11	Foreign language (academic)	9	1.1	Good
AK-21.12	Foreign language (academic)	9	1.1	Good
AK-21.13	Foreign language (academic)	9	1.1	Good
AK-21.14	Foreign language (academic)	9	1.1	Good
AK-21.15	Foreign language (academic)	9	1.1	Good
AK-21.16	Foreign language (academic)	9	1.1	Good
AK-21.17	Foreign language (academic)	9	1.1	Good
AK-21.18	Foreign language (academic)	9	1.1	Good
AK-21.19	Foreign language (academic)	9	1.1	Good
AK-21.20	Foreign language (academic)	9	1.1	Good
AK-21.21	Foreign language (academic)	9	1.1	Good
AK-21.22	Foreign language (academic)	9	1.1	Good
AK-21.23	Foreign language (academic)	9	1.1	Good
AK-21.24	Foreign language (academic)	9	1.1	Good
AK-21.25	Foreign language (academic)	9	1.1	Good
AK-21.26	Foreign language (academic)	9	1.1	Good
AK-21.27	Foreign language (academic)	9	1.1	Good
AK-21.28	Foreign language (academic)	9	1.1	Good
AK-21.29	Foreign language (academic)	9	1.1	Good
AK-21.30	Foreign language (academic)	9	1.1	Good
AK-21.31	Foreign language (academic)	9	1.1	Good
AK-21.32	Foreign language (academic)	9	1.1	Good
AK-21.33	Foreign language (academic)	9	1.1	Good
AK-21.34	Foreign language (academic)	9	1.1	Good
AK-21.35	Foreign language (academic)	9	1.1	Good
AK-21.36	Foreign language (academic)	9	1.1	Good
AK-21.37	Foreign language (academic)	9	1.1	Good
AK-21.38	Foreign language (academic)	9	1.1	Good
AK-21.39	Foreign language (academic)	9	1.1	Good
AK-21.40	Foreign language (academic)	9	1.1	Good
AK-21.41	Foreign language (academic)	9	1.1	Good
AK-21.42	Foreign language (academic)	9	1.1	Good
AK-21.43	Foreign language (academic)	9	1.1	Good
AK-21.44	Foreign language (academic)	9	1.1	Good
AK-21.45	Foreign language (academic)	9	1.1	Good
AK-21.46	Foreign language (academic)	9	1.1	Good
AK-21.47	Foreign language (academic)	9	1.1	Good
AK-21.48	Foreign language (academic)	9	1.1	Good
AK-21.49	Foreign language (academic)	9	1.1	Good
AK-21.50	Foreign language (academic)	9	1.1	Good

**IV . List of components of the educational and professional program
and their logical sequence**

4.1 . List of components of the educational and professional program

Code n/a	Components of the educational program (study subjects, course projects (works), practices, qualification work)	Number of credits	Semester	Form summary control
1	2	3	4	5
Mandatory OP components				
I. Educational disciplines of fundamental, humanitarian and socio-economic training		137		
OKZP 1	Ukrainian language as foreign	16	1...8	Exam
OKZP 2	Foreign language (according to the direction of the professor)	9	1...5	Exam
OKZP 3	Higher mathematics	9	1...3	Exam
OKZP 4	Physics	7	1...2	Exam
OKZP 5	Theory electric and magnetic circuits	6	2	Exam
OKZP 6	Theory probabilities and mathematical statistics	4	4	Exam
OKZP 7	Algorithms and methods calculations	3	3	Exam
OKZP 8	Linear and analytical algebra geometry	3	1	Exam
OKZP 9	Discrete Math	5	2	Exam
OKZP 10	Computer room electronics	4	3	Exam
OKZP 11	Computer room logic	6	5...6	Test
OKZP 12	Architecture computers	5	6	Exam
OKZP 13	Organization of databases	4	6	Test
OKZP 14	Computer room circuitry	7	3...4	Exam
OKZP 15	Theory information and coding	4	2	Test
OKZP 16	Systemic software	3	7	Test
OKZP 17	Engineering software	5	3	Exam
OKZP 18	Microprocessors and microcontrollers	7	5	Exam
OKZP 19	Electrical installation practice	7.5	3	Test
OKZP 20	Project - technological practice	7.5	5	Test
OKZP 21	Pre-diploma practice	7.5	7	Test
OKZP 22	Graduation qualifying work	7.5	8	Test
II. Educational disciplines of professional training		38		
OKPP 1	Technologies designing computer systems	7	7	Exam
OKPP 2	Computer systems	6	5	Exam
OKPP 3	Operational systems	5	6	Exam
OKPP 4	Systemic programming	8	8	Exam
OKPP 5	Computer network	8	4	Exam
OKPP 6	Introduction to the specialty	4	1	Test
The total volume of mandatory components :		175		
Selective OP components				
The total amount of sample components:		65		
GENERAL SCOPE OF THE EDUCATIONAL PROGRAM		240		

Загальні компетенції (5-15)				
Z1	N1, N3	N8, N17, N18, N19, N20, N22	N24, N25	N26
Z2	N1, N4, N5	N9, N10, N12, N13, N15, N18, N20, N22	N24, N25	N26, N27
Z3	N4	N10-N16, N20, N22	N24, N25	N26, N28
Z4	-	-	N24	N27
Z5	-	N18, N22	N24, N25	N26, N27, N28
Z6	N4	N12	N25	N27
Z7	N2, N5	N8, N9, N17, N18, N19	N24, N25	N26, N27, N28
Z8	N5	N8, N10, N13, N17	N24, N25	N27, N28
Z9	-	N13, N17	N24, N25	N26, N27, N28
Z10	N1, N2, N3	N7, N9, N12, N14, N16, N17	N24, N25	N26, N27
Спеціальні (фахові) компетенції (10-20)				
P1	N2, N4, N5	N8, N10, N11	-	N27
P2	N1, N2, N4, N5	N7, N9, N14, N17, N20, N22	N24, N25	N27
P3	N1, N2	N7, N9, N10, N14, N22	N25	N27
P4	N1, N2, N5	N7, N9, N14, N17	N25	N27

P5	N1, N2, N5	N7, N9, N14, N17, N19, N20	N25	N27
P6	N2, N4	N9, N10, N12, N13, N17	N24, N25	N26, N27, N28
P7	N4	N10, N12, N13, N17, N23	N24, N25	N26, N27, N28
P8	N2, N4	N10, N12, N13, N17, N23	N24	N26, N27, N28
P9	N2	N10, N12, N13, N17, N20, N21, N23	N24	N26, N27, N28
P10	N2, N4	N10 - N13	-	N26, N27, N28
P11	N5	N9, N12, N13, N17	N24, N25	N28
P12	N1, N2	N7, N9, N14, N17, N18	-	N27
P13	N1, N2, N4, N5	N7, N9, N14, N17, N23	N24, N25	N27
P14	N1, N2, N5	N7, N9, N14, N17, N19, N20	N25	N27
P15	N1-N3, N4	N7, N9, N12, N15, N17	N24, N25	N26, N27
P16	N1-N3, N6	N7, N9, N16, N18, N22	N24, N25	N26, N27, N28
P17	N3, N6	N8, N10, N14, N20, N23	N24, N25	N26, N27, N28
P18	N2, N3, N6	N7, N12, N14, N19, N23	N24, N25	N26, N27, N28
P19	N1-N3, N6	N7, N8, N10, N20, N22	N24, N25	N26, N27, N28
P20	N1-N3, N6	N7, N8, N10, N20, N22	N24, N25	N26, N27, N28

Програм результат	компете нтність	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	Z9	Z10	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20							
		N1	+	+									+	+	+	-	-								+	+	+	+										
N2								+			+	-	+	+	-	+	+		+	+	+		+	+	+	+												
N3		+		+							+																											
N4			+				+											+	+	+	+	+			+													
N5			+					+	+			+	+	+	+	+							+		+	+												
N6									+		+	+	+	+	+	+								+	+	+	+	+		+	+	+	+					
N7																																						
N8		+						+	+		+	-	+	+	+	+								+	+	+	+											
N9			+					+			+	+	+	+	+	+							+	+	+	+	+											
N10			+	+					+		+	+	+	+	+	+	+		+	+	+				+													
N11				+					+		+	+	+	+	+	+			+																			
N12			+	+			+		+		+	+	+	+	+	+										+	+											
N13			+	+					+	+	+	+	+	+	+	+																						
N14				+							+	+	+	+	+	+								+	+	+	+											
N15				+	+																																	
N16				+							+																											
N17		+						+	+	+	+	+	+	+	+	+			+	+	+	+	+	+	+	+	+											
N18		+	+			+		+																											+			
N19		+						+																			+								+			
N20		+	+	+																																+		+
N21																																				+	+	+

