MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SEPARATE STRUCTURAL UNIT
"PROFESSIONAL COLLEGE OF SHIPBUILDERS
OF ADMIRAL MAKAROV NATIONAL UNIVERSITY OF SHIPBUILDING "

EDUCATIONAL AND PROFESSIONAL PROGRAM

"COMPUTER SCIENCE"

professional higher education

Field of knowledge 12 - Information technology

SPECIALTY 122 - Computer Science

QUALIFICATION Professional junior bachelor of computer science

APPROVED BY THE SCIENTIFIC COUNCIL
Chairman of the Academic Council

_____ /O. M. Dubovyi/
(protocol No. 5 of 31 May 2024)

The educational programme is put into effect from "01" 09 2024.
Acting Director _____ /I.O. Ratushniak/.
Rector _____ /E.I. Trushlyakov/.
(Order No.146 of 14 June 2024)

Mykolaiv, 2024

LETTER OF APPROVAL

of the educational and professional programme

The draft of the Educational and professional programme "Computer Science" was considered at a meeting of the Cycle Commission on Information Disciplines

Minutes No. 6 of 31 May 2024

Chairman of the cycle commission _____ /A.Y. Hayda/.

The project of the Educational and professional programme "Computer Science" was considered at a meeting of the Council of the Professional College

Minutes No. 6 of 31 May 2024

Chairman _____ /I.O. Ratushniak/.

The project of the Educational and professional programme "Computer Science" has been agreed with the educational department

Head of the Department _____ /A.V. Labartkava/

The project of the Educational and professional programme "Computer Science" was considered by the Educational and Methodological Council of NUOS

Minutes No. 4 of 31 May 2024.

Chairman of the NUOS EMC _____ /S.O. Slobodian/.

The educational and professional programme "Computer Science" is registered in the Unified State Database on Education, programme ID 42624

Head of the Educational Scientific Centre

of the Digital Communication _____ /V.I. Komyshnyk/.

BACKGROUND

The educational and professional program "Computer Science" for the training of specialists of the educational and professional degree "Professional Junior Bachelor" in specialty 122 - "Computer Science" is developed on the basis of the Standard of Professional Higher Education of Ukraine for the educational and professional degree "Professional Junior Bachelor", field of knowledge 12 Information Technology, specialty, 122 Computer Science, approved and put into effect by the order of the Ministry of Education and Science of Ukraine dated 30.11.2021 № 1283.

URL: https://cutt.ly/H8cflpY

Developed by a working group consisting of:

1. HAYDA Anatolii Yulianovych - Head of the working group, Candidate of Technical Sciences, Specialist of the highest category, Head of the Cycle Commission on Information Disciplines;
2. Bobrovskyi Oleksii Sergiiovych - member of the working group, lecturer at the Department of Information Technologies;
3. MARSHAK Olena I. - member of the working group, specialist of the highest category, Head of the Department of Information Technologies;
4. Ihor Leonidovych MYKHELIEV - member of the working group, Candidate of Technical Sciences, specialist of the highest category, Head of the Department of Information Management Systems and Technologies of Admiral Makarov National University of Shipbuilding.

Reviews and feedback from external stakeholders:

1. Farionova T. A., Educational and Research Institute of Computer Science and Project Management of Admiral Makarov National University of Shipbuilding, Director.
2. Artemenko S. V., ART SOFT Limited Liability Company, Director.

The educational programme was introduced from 01.09.2024.

The term for reviewing the educational program is once every 1 year.

1. 1. Description of the educational and professional program in specialty 122 "Computer Science", field of knowledge 12 - "Information Technology"

1 - General information	
Full name of the institution of higher education	Separate structural subdivision "Professional College of Shipbuilders of Admiral Makarov National University of Shipbuilding"
Educational and professional degree	Professional junior bachelor
Educational qualifications	Professional junior bachelor's degree in computer science
Professional qualifications	None
Qualification in the diploma	Educational and professional degree - professional junior bachelor. Specialty - 122 Computer Science. Educational program - Computer Science.
Qualification level according to the National Qualifications Framework	The educational and professional degree of professional junior bachelor corresponds to level 5 of the National Qualifications Framework
Official name of the educational and professional program	**Computer sciences** **Computer sciences**
ECTS credits required to obtain a professional junior bachelor's degree	180 ECTS credits, duration of study 2 years 10 months
Availability of accreditation	Conditional accreditation in accordance with the order of the State Education Quality Service of Ukraine dated 01.03.2024 No. 01-10/81. The certificate of accreditation of the educational programme is valid until 01.03.2025
Duration of the educational and professional program	01.07.2027 The accreditation of the EPP is envisaged in the academic year 2024-2025
Requirements for persons who can start studying under the program	- complete general secondary education (specialized secondary education, regardless of the acquired profile); - educational and qualification level of a skilled worker; - educational and qualification level of a junior specialist or an educational and professional degree of a professional junior bachelor; - any degree of higher education.

Language(s) of instruction	Ukrainian
Internet address of the permanent location of the educational and professional program	http://kk.nuos.edu.ua/
2 - Objective of the educational program	
Preparation of highly qualified, competitive professional junior bachelors in computer science who are able to solve typical specialized problems in the field of information technology, which requires the application of provisions and methods of computer science and may be characterized by some uncertainty of conditions; to be responsible for the results of their activities; to exercise control over other persons in certain situations.	
3 - Characteristics of the educational and professional program	
Subject area	*Object(s) of study and/or activity:* *- mathematical, information, simulation models of real phenomena, objects, systems and processes;* *- methods and technologies for obtaining, storing, processing, transmitting and using information;* - theory, analysis, development, performance evaluation, implementation of algorithms. Learning objectives: formation of a set of knowledge, skills and abilities for use in professional activities in the field of computer science, aimed at a professional approach to solving production issues in the field of information technology. Theoretical content of the subject area: modern information technologies, methods and ways of obtaining, presenting, processing, analyzing, transmitting and storing data. Methods, techniques and technologies: models and methods for solving complex applied problems that arise during the development of information technology (IT); modern technologies and programming platforms; computer graphics and data visualization technologies. Tools and equipment: database management systems, operating systems, computer networks, cloud services. Program features: The industry context is taken into account through the formation and implementation of a model for training professional junior bachelors with an emphasis on technical direction and taking into account the needs of industrial enterprises and IT companies in Mykolaiv region.
4 - Suitability of graduates for employment and further education	
Suitability for employment	Jobs in information technology, communication, and project management: IT companies, financial companies, insurance companies, government agencies, consulting companies, shipbuilding and engineering companies, etc. According to the National Classification of Occupations DK 003:2010, specialists who have completed the Computer Science

	program can hold the following primary positions: 3114 Configurable computer system technician 3114 Technician of a computing (information and computing) center 3121 Programmer technician 3121 System administration technician 3121 Specialist in information technology 3121 Specialist in computer graphics (design) 3121 Specialist in software development and testing 3121 Specialist in the development of computer programs
Academic rights of graduates	They have the right to continue their studies at the initial level (short cycle) or the first (bachelor's) level of higher education. Acquisition of additional qualifications in the adult education system, including postgraduate education.
5 - Teaching and assessment	
Teaching and learning	A student-centered approach to learning and teaching, which involves creating an educational environment focused on meeting the needs and interests of students, including providing opportunities for the formation of an individual educational trajectory. Lectures, laboratory classes, seminars, practical classes, term papers, independent work, consultations, preparation of qualification (diploma) papers, training, industrial and pre-diploma practices. Teaching methods: explanatory and illustrative, problem-based, research, reproductive, self-study, etc.
Evaluation	The system for assessing students' knowledge in each discipline includes current, module and semester control of knowledge, evaluation of practice results and final certification. Exams, credits, module control papers , test assignments, term papers, laboratory work, reports on educational, industrial and undergraduate practices, public defense of qualification (diploma) work. Assessment methods (forms of control): combined, written control, self-control, test control, oral control. Assessment of academic achievements is carried out on a 100-point scale, ECTS scale.
6 - Program competencies	
Integral competence	The ability to solve typical specialized tasks in the field of information technology or in the learning process, which requires the application of provisions and methods of computer science and may be characterized by some uncertainty of conditions; to be responsible for the results of their activities; to control other persons in certain situations.

General competencies	**GC1. Ability to realize their rights and responsibilities as a member of society, to realize the values of civil (free democratic) society and the need for its sustainable development, the rule of law, human and civil rights and freedoms in Ukraine.** **GC2. Ability to preserve and enhance moral, cultural, scientific values and achievements of society based on an understanding of 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 various types and forms of physical activity for active recreation and healthy lifestyle.** **GC3. Ability to abstract thinking, analysis and synthesis.** **GC4. Ability to apply knowledge in practical situations.** **GC5. Knowledge and understanding of the subject area and understanding of professional activities.** **GC6. Ability to communicate in the state language both orally, and in writing.** **GC7. Ability to communicate in a foreign language.** **GC8. Ability to learn and master modern knowledge.**
Special competencies	**SC1. Ability to use basic concepts, ideas and methods of basic sciences in solving complex specialized problems in computer science in the field of information technology.** **SC2. Ability to use theoretical and fundamental knowledge in the field of computer science and information technology to solve various problems.** **SC3. Ability to develop, analyze and apply effective algorithms to solve specific professional problems depending on the subject environment.** **SC4. Ability to design and develop software.** **SC5. Ability to apply the principles and methods of building and using network technologies.** **SC6. Ability to apply methods and means of protecting software and data from unauthorized access in the maintenance and operation of software systems and complexes.** **SC7. Ability to design, develop and maintain web applications with dynamic content using web technologies, computer graphics and animation technologies.** **SC8. Ability to apply modern methods, technologies and tools for designing and creating software systems and their maintenance.** **SC9. Ability to apply knowledge of modern methods and technologies for creating and maintaining distributed systems.** **SC10. Ability to administer system and application software during the implementation of information systems life cycle processes.** **SC11. Ability to apply software testing methods and techniques during the software development life cycle.** **SC12. Ability to develop databases.** **SC13. Ability to make informed decisions to ensure business planning and economic efficiency of activities in the field of information technology**

	SC14*. Ability to apply software development methods and technologies in solving complex problems of shipbuilding and mechanical engineering. ***Competencies defined by the institution of professional higher education, taking into account the specifics of the EPP**
7 - Program learning outcomes	
	PO01. Analyze phenomena and events of the socio-political, cultural, spiritual environment to form a person's worldview and establish connections between them. **ELO02. Communicate fluently orally and in writing in the state and foreign languages, including on professional issues.** **PLO03. To use professionally specialized knowledge and practical skills of methods of fundamental and applied mathematics in solving standard problems and problems of applied nature in the field of computer science.** **GC04. To apply modern methods of mathematical and computer modeling and to build effective algorithms for numerical research and solution of applied problems.** **PLO05. Understand the basic methods and technologies of object-oriented and component programming.** **PLO06. Understand the general principles and models of building computer networks.** **ELO07. Apply basic mechanisms and methods of security of networks and software systems.** **ELO08. Develop applications using modern web technologies.** **PLO09. Apply modern tools of computer graphics and animation in solving practical problems of professional activity.** **PLO10. To know the methodologies, methods, models, processes and technologies of the software development and testing life cycle.** **PLO11. Apply modern programming languages and technologies for software development of distributed systems.** **PLO12. Know the basic principles of system and application software.** **PLO13. To monitor the operation of software systems and complexes.** **ELO14. Organize configuration and software debugging of information systems in the process of their maintenance and operation.** **ELO15. Develop supporting documentation at various stages of the software development life cycle.** **ELO16. Develop databases and perform their administration.** **PLO17*. To master modern methods of software development and operation, taking into account the needs of shipbuilding and machine-building enterprises in the region.** ***Learning outcomes determined by the institution of professional higher education**
8 - Resource support for the program implementation	
Personnel support	The implementation of the EPP is provided by the teaching staff of the IUC FCC.

	The number and quality of academic staff providing training in the EPP "Computer Science" comply with the current Licensing requirements. The advanced training of academic staff in terms of terms and forms meets the current requirements. The professional-oriented nature of the educational program involves the involvement of practitioners, industry experts, and employer representatives, which enhances the synergistic relationship between theoretical and practical training.
Material and technical support	The provision of classrooms, computer workstations, and multimedia equipment meets the established requirements. Local networks with access to the Internet are used. The use of the Internet is unlimited. Free Wi-Fi access to the Internet is provided in all academic buildings and dormitories of the university. There are specialized training laboratories and classrooms; computer classes that meet the requirements of the curriculum, equipped with the necessary devices and software. There is a strong social and amenity infrastructure. The provision of higher education students with dormitories is 100%.
Information and educational support	The official website http://kk.nuos.edu.ua/ contains publicly available information and documents provided for by the Laws of Ukraine "On Education" and "On Professional Higher Education". For the implementation of the EPP, there are: a description of the educational program; curriculum; work programs for each academic discipline of the curriculum; teaching and methodological complexes of curriculum disciplines; practical training programs, work programs of practices; methodological materials for certification of applicants, etc. NUOS has a scientific library (NL) with an extensive structure, the activities of which are determined by the "Strategy for the Development of the NUOS NL for 2018-2022". The book collection of the Library is more than 930000 copies, including scientific publications over 97000 copies, educational publications over 532000 copies. The collection of the Electronic Library is 17000 documents. All applicants have access to Scopus, Web of Science, Science Direct and Springer full-text databases, international identification systems ResearcherID/Publons, ORCID, etc. For students with special educational needs, access to the library with free access to all information opportunities.
9 - Academic mobility	
National credit mobility	The procedure for organizing academic mobility programs for participants in the educational process is regulated by the Regulations on the procedure for exercising the right to academic mobility by participants in the educational process of the IHE of the NUOS.

	The Regulations on the procedure for expulsion, interruption of study, renewal and transfer of applicants for professional higher education in the IUC NUOS establishes the appropriate procedure for persons studying in licensed programs. The procedure for re-enrollment of academic disciplines, determination of academic differences and recognition of learning outcomes acquired in non-formal (informal) education in the process of forming an individual curriculum for students of all forms of education is determined by the Regulations on the procedure for re-enrollment of learning outcomes (transfer of credits) of the IHE of the UPC NUOS.
International credit mobility	NUOS has established and operates the Research Center for International Cooperation, developed Regulations on the Recognition of Foreign Educational Documents and Regulations on Student Training and Internships (Research Internships) for Postgraduate Students, Doctoral Students, Researchers and Academic Staff of NUOS in Leading Universities and Research Institutions Abroad. NUOS has a long history of cooperation with universities, research institutes, and industrial enterprises in many countries. An important factor in the development of NUOS is participation in the international technology transfer "Jiangsu Center of International Technology Transfer". The strategic direction of NUOS's international activities is the participation of teachers, staff, graduate students and students in competitions for scholarships or grants from international organizations and foundations, such as the German Academic Exchange Service, the Alexander von Humboldt Foundation, the Fulbright Program, IREX (USA), the Education for Democracy Foundation, Erasmus+, Horizon 2020, etc.
Training of foreign applicants for higher education (if any)	–

2. List of educational components and logical sequence of their implementation

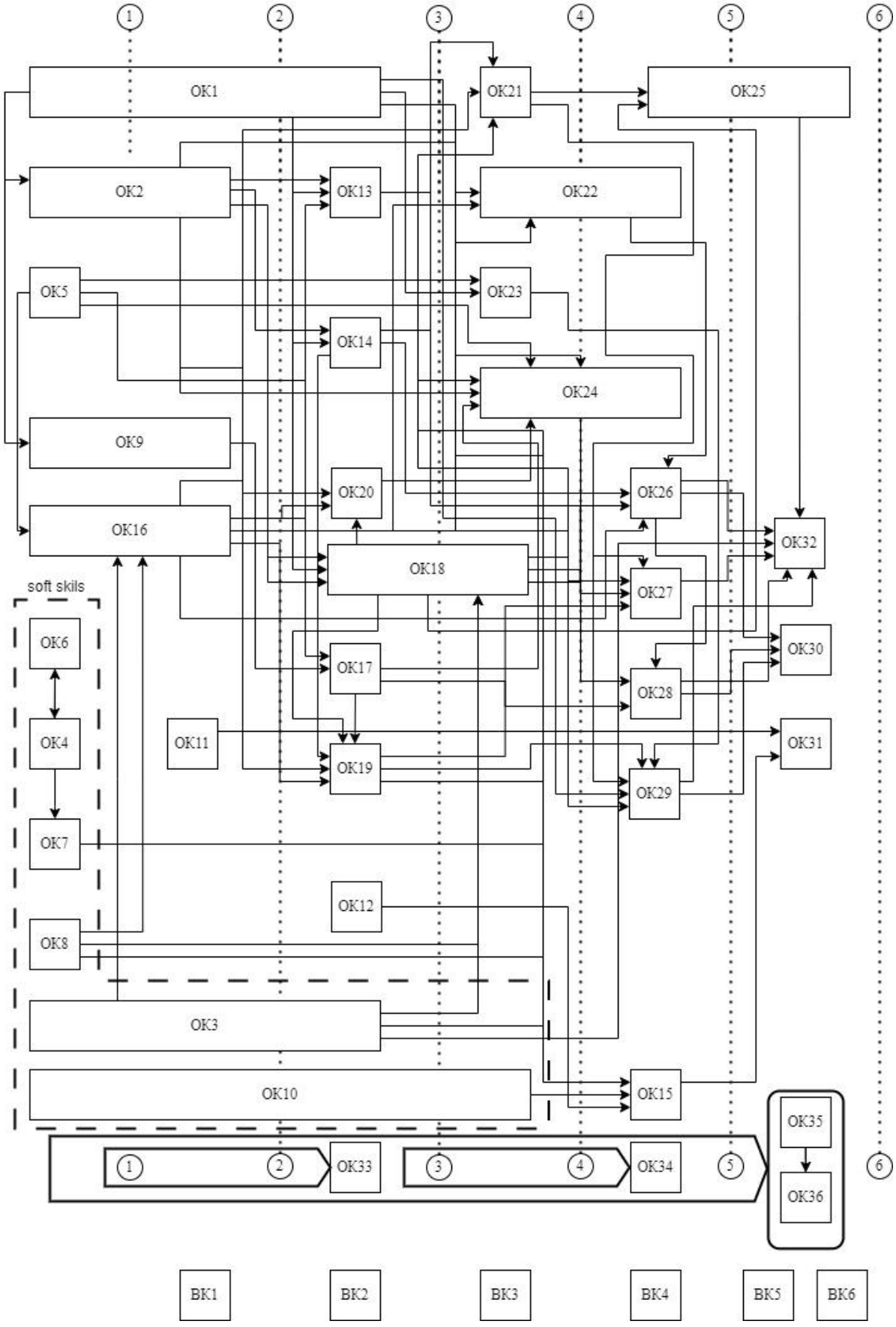
1.1. List of educational components of the EPP

Account code	Educational components of the EPP (academic disciplines, course projects (works), internships, qualification work, etc.)	Number of ECTS credits	Form of final control
Mandatory educational components			
Compulsory educational components that form general competencies			
EC1	Higher mathematics	10	test, exam
EC2	Discrete mathematics	6	examination
EC3	Foreign language (for professional purposes)	6	test, examination
EC4	History of Ukraine	3	exam
EC5	Fundamentals of information technology	3	test
EC6	Fundamentals of philosophical knowledge (philosophy, cultural studies, religious studies)	4	exam
EC7	Human rights and their protection in modern realities	3	test
EC8	Ukrainian language (for professional purposes)	3	exam
EC9	Physics	4	exam
EC10	Physical education (non-credit educational component)	0	test
EC11	Economic theory and economy of Ukraine	3	test
EC12	Ecology and environmental ethics	3	test
EC13	Mathematical methods of operations research	3	test
EC14	Theory of algorithms	3	exam
EC15	Labor protection, life safety and civil defense	3	test
Mandatory educational components that form special competencies			
EC16	Algorithmization and programming	11	test, exam, term paper
EC17	Computer circuitry and computer architecture	4	examination
EC18	Object-oriented programming	10	exam term paper
EC19	Operating systems	3	offset
EC20	Information security technologies	3	offset
EC21	Computer graphics	4	offset
EC22	Organization of databases and knowledge	9	exam term paper

Account code	Educational components of the EPP (academic disciplines, course projects (works), internships, qualification work, etc.)	Number of ECTS credits	Form of final control
EC23	Numerical methods	3	exam
EC24	Computer networks	6	exam
EC25	Web-technologies and Web-design	6	exam
EC26	Software of distributed information systems	3	exam
EC27	Development of mobile applications	3	test
EC28	Development of client-server architecture applications	3	test
EC29	Technologies for modeling and development of software systems	4	test
EC30	Administration of software systems and complexes	3	exam
EC31	Economics and basics of IT business	3	test
EC32	Testing of software systems and complexes	3	exam
	Practical training		
EC33	Educational practice	6	test
EC34	Industrial practice	6	test
EC35	Undergraduate practice	6	test
	Certification of applicants for professional higher education		
EC36	Qualification work	6	defense
Total amount of compulsory educational components		Total amount of compulsory educational components	
Elective educational components*.			
ECK 1	Elective course 1. The Ukrainian word in the context of the present/Culture of business speech	3	offset
EC 2	Elective course 2. Testing WEB-applications using Selenium WebDriver / Automation of testing web applications using Python	3	offset
EC 3	Elective course 3. . Data Warehouses/Database Management Systems	3	credit
EC 4	Elective course 4. . Project management in environmental activities / Management of social and environmental projects	3	credit
EC 5	Elective course 5. Using the desktop-engine framework to create applications in the IntelliJ IDEA environment / Development of two-dimensional graphical applications	3	credit
EC 6	Elective course 6. . Implementation of information systems software/ Integration of software systems	3	credit
Total volume of elective educational components		18	
TOTAL VOLUME OF EOCP		**180**	

*Elective educational components are chosen by applicants for professional higher education in accordance with the Regulations on elective disciplines at the Separate Structural Subdivision "Professional College of Ships of the Admiral Makarov National University of Shipbuilding".

2.2. The structural and logical diagram of the EPP



2. Form of certification of applicants for professional higher education

Attestation of applicants for professional higher education of the educational and professional program "Computer Science", specialty 122 - "Computer Science" is carried out in the form of a public defense of qualification work.

Qualification attestation is aimed at verifying the achievement of learning outcomes defined by the standard and the EPP.

The qualification work involves solving a specialized or applied problem using the theories and methods of the specialty used in professional activities in the field of computer science and information technology.

Applicants who have completed the curriculum are allowed to defend their qualification work.

The qualification work must not contain academic plagiarism, fabrication, or falsification.

Attestation is carried out openly and publicly at a meeting of the Examination Commission, the composition of which is approved in accordance with the established procedure.

On the basis of the decision of the Examination Commission, a person who has demonstrated compliance with the requirements of the EPP is awarded an educational and professional degree of professional junior bachelor with the qualification of "professional junior bachelor in computer science" and the award of a diploma of professional junior bachelor of the established sample.

The qualification work must be published on the official website or in the repository of the institution of professional higher education.

Disclosure of qualification papers containing restricted information is carried out in accordance with the requirements of the law.

3. Requirements to the system of internal quality assurance of professional higher education

The legislative basis for the formation of the internal quality assurance system at the College is the Law of Ukraine "On Professional Higher Education" (Section IV, Article 17).

The Quality Management System has been established within the framework of Admiral Makarov National University of Shipbuilding and its functional units, including separate structural subdivisions (QMS NUOS), which, among other things, regulates the procedures for the development, approval, monitoring and periodic review of all educational programs. Bureau Veritas Certification Ukraine carries out a supervisory audit of the functioning of the QMS of the NUOS on an annual basis.

The internal quality assurance system provides for the following procedures and activities:

1) determination and publication of policies, principles and procedures for quality assurance of professional higher education, which are integrated into the overall management system of the institution of professional higher education, consistent with its strategy and involve the involvement of internal and external stakeholders;

2) determination and consistent observance of procedures for the development of educational and professional programs that ensure that their content meets the standards of professional higher education (professional standards - if any), declared goals, taking into account the positions of stakeholders, a clear definition of the qualifications awarded and/or conferred, which should be consistent with the National Qualifications Framework;

3) monitoring and periodic review of educational and professional programs with the participation of students to ensure that they achieve their goals and meet the needs of students and society, including surveys of students;

4) ensuring compliance with the requirements of legal certainty, publication and consistent compliance with the regulatory documents of the institution of professional higher education regulating all stages of training of applicants for professional higher education (admission to study, organization of the educational process, recognition of learning outcomes, transfer, expulsion, certification, etc;)

5) ensuring the relevance, reliability, transparency and objectivity of the assessment carried out within the educational process;

6) determination and consistent compliance with the requirements for the competence of pedagogical (scientific and pedagogical) staff, application of fair and transparent rules for hiring and continuous professional development of staff;

7) providing the necessary funding for educational and teaching activities, as well as adequate and accessible educational resources and support for students of professional higher education in each educational and professional program;

8) ensuring the collection, analysis and use of relevant information for the effective management of educational and professional programs and other activities of the institution;

9) providing public, understandable, accurate, objective, timely and easily accessible information about the activities of the institution and all educational and professional programs, conditions and procedures for awarding degrees and qualifications;

10) ensuring the observance of academic integrity by employees of the institution of professional higher education and students of professional higher education, including the creation and maintenance of an effective system for the prevention and detection of academic plagiarism and other violations of academic integrity, bringing violators to academic responsibility;

11) periodic passing the procedure of external quality assurance of professional higher education;

12) involvement of students and employers as full partners in the procedures and measures to ensure the quality of education;

13) ensuring compliance with student-centered learning in the educational process;

14) implementation of other procedures and measures defined by the legislation, constituent documents of professional higher education institutions or in accordance with them.

3. Matrix of correspondence of program competencies to the components of the educational program

	EC1	EC2	EC3	EC4	EC5	EC6	EC7	EC8	EC9	EC10	EC11	EC12	EC13	EC14	EC15	EC16	EC17	EC18	EC19	EC20	EC21	EC22	EC23	EC24	EC25	EC26	EC27	EC28	EC29	EC30	EC31	EC32	EC33	EC34	EC35	EC36
GC1				+			+								+																+					+
GC2				+	+	+		+		+	+	+			+																		+		+	+
GC3	+	+							+				+	+		+					+		+												+	+
GC4	+	+			+								+			+		+	+	+	+	+	+	+									+	+	+	+
GC5					+									+		+	+	+	+			+		+								+	+	+	+	+
GC6								+																									+	+	+	+
GC7			+																															+	+	+
GC8			+		+															+		+											+	+	+	+
SC1	+	+			+				+					+		+	+						+										+		+	+
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SC12																						+			+	+	+	+							+	+
SC13											+																		+		+				+	+
SC14*																										+			+		+				+	+

4. Matrix of ensuring program learning outcomes with relevant components of the educational program

	EC1	EC2	EC3	EC4	EC5	EC6	EC7	EC8	EC9	EC10	EC11	EC12	EC13	EC14	EC15	EC16	EC17	EC18	EC19	EC20	EC21	EC22	EC23	EC24	EC25	EC26	EC27	EC28	EC29	EC30	EC31	EC32	EC33	EC34	EC35	EC36
RL1			+	+		+	+	+		+	+	+			+																+		+			+
RL2			+		+			+																									+		+	+
RL3	+	+							+				+	+		+		+					+										+	+	+	+
RL4	+	+			+								+	+		+		+		+			+						+				+	+	+	+
RL5																		+																+	+	+
RL6																	+		+					+				+							+	+
RL7																			+	+				+						+				+	+	+
RL8																					+				+	+	+	+							+	+
RL9																					+				+									+	+	+
RL10																+		+								+	+		+			+			+	+
RL11																						+			+	+	+		+						+	+
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RL14																	+		+	+				+						+					+	+
RL15			+		+			+								+		+				+							+		+	+	+	+	+	+
RL16																						+			+	+	+	+	+	+					+	+
RL17*																										+			+		+				+	+