Ministry of Education and Science of Ukraine

V. N. Karazin Kharkiv National University

EDUCATIONAL AND PROFESSIONAL PROGRAM

(educational-professional / educational-scientific)

Computer Science

(program name)

second (master's) higher education level

(first (bachelor's), second (master's), third (educational and scientific)

Area of expertise 12 Information technology

(code, industry name)

Specialization 122 computer science

(code, specialty name)

Approved
By the Academic Council
Kharkiv National University
V. N. Karazin _____,
Protocol No. _____

Effective from 01.06. 2024.
by Order No. 0114-1/227 of 9.06.2022
Vice-Rector for Scientific and Pedagogical Work
_____ Oleksandr HOLOVKO

Kharkiv 2024

APPROVAL LETTER
educational and professional programs"Informatics"

Educational program reviewed and approved:

1. Scientific and Methodological Council of V. N. Karazin Kharkiv National University

protocol No. ____ of _____.

Chairman of the Scientific and Methodological Council,
vice-rector with scientific and pedagogical work

_____ Oleksandr HOLOVKO

2. To the Academic Council of the Faculty of Mathematics and Informatics:

Protocol No. ____ of _____.

Chairman of the Academic Council
Faculty of Mathematics and Computer Science

_____ Grigory ZHOLTKEVICH

3. Scientific and Methodological Department of Mathematics and Informatics:

Protocol No. ____ of _____.

Chairman of the Scientific and Methodological Commission
Faculty of Mathematics and Computer Science

_____ Olga ANOSHCHENKO

4. Department of Theoretical and Applied Informatics :

Protocol No. ____ of _____.

Acting Head of the Department,

_____ Ievgen MENIAILOV

PREAMBLE

Developed by a working group consisting of:

Last name, first name, patronymic	Name of the position (for part-timers-place of main work, position)	Scientific degree, academic title, according to which the department (specialty) was awarded
Head of the working group, guarantor of the educational program		
FROLOV Vyacheslav Viktorovich (guarantor of the educational program)	Professor of the Department of Theoretical and Applied Informatics	Doctor of Technical Sciences 05.13.12-design automation systems, Associate Professor at the Department of Mechanical Engineering Technology and Metal-cutting Machines
Members of the working group		
ZHOLTKEVICH Grigory Nikolaevich	Dean of the Faculty of Mathematics and Informatics, V. N. Karazin Kharkiv National University	Doctor of Technical Sciences 05.02.08-Mechanical Engineering Technology, Professor at the Department of Theoretical and Applied Informatics
RUKKAS Kirill Markovich	Professor of the Department of Theoretical and Applied Informatics	Doctor of Technical Sciences 05.13.06-Information Technologies, Associate Professor at the Department of Tactics
fate Peter Grigorovich	Associate Professor of the Department of Theoretical and Applied Informatics	Candidate of Technical Sciences, 05.01.01-Applied Geometry and Engineering Graphics, Associate Professor at the Department of Production Automation and Design

When developing the Program project, the following requirements are taken into account::

1. Standard of higher education in the specialty 122 computer science branches of knowledge 12 Information technologies for the second (master's) level of higher education, approved by Order No. 393 of the Ministry of Education and Science of Ukraine dated 28.04.2022;

1. Profile of the educational program

1-General information	
Full name of the institution of higher education and its structural division	V. N. Karazin Kharkiv National University Faculty of Mathematics and Computer Science
Official name of the program	Computer science
Higher education degree	second (master's) level
Qualifications to be awarded	Master of Computer Science, Computer Science
Type of diploma and scope of the educational program	Master's degree, single, 90 ECTS credits, duration of study 1 year 4 months
Availability of accreditation	Accreditation Commission. Ukraine. Certificate-SUN # 2189567 Validity period-01.07.2027.
Background	Availability of first-level (bachelor's) higher education
Language of instruction	Ukrainian
Duration of the educational program	5 years
Internet address of permanent placement of the educational program description	https://sites.google.com/karazin.ua/tacs-ua/education
2 - purpose of the educational program	
Program goal	Training of professionals capable of conducting scientific research in the development of software projects in the field of information technology.
3-Characteristics of the educational program	
Subject area (field of knowledge, specialty, specialization (if available)**)**	12 Information technology, 122 computer science and information technology
Orientation of the educational program	Educational and professional, professional. Provides mastery of a set of competencies required for specialists when performing research in the development of complex software projects in the field of information technology. Professional accents - specialist in information technology
Main focus of the educational program and specialization	Special education in the subject area that includes concepts and principles of higher and applied mathematics, programming, computer and mathematical modeling, intelligent data processing, system analysis and design, IT project management, enterprise architecture and IT infrastructure as such, ensuring the

	acquisition of relevant competencies by the graduate. Keywords: programmer, computer science, mathematical models
App Features	Widespread mathematical training is necessary for the implementation of innovative projects in the field of IT technologies.
4-suitability of graduates for employment and further education	
Suitability for employment	Professional activity as a specialist in the development of mathematical, information and software for information systems, in the field of information technology, as well as an administrator of databases and systems. Graduates can work in the following professions: National classifier of professions DC 003: 2010: 2131.1 research assistants (computing systems) 2131.2 computer system developers 2132.1 research assistants (Programming) 2132.2 computer software developers This list is not exhaustive.
Further training	The possibility of studying for a third cycle program in this field of knowledge (which is consistent with the master's degree obtained).
5-teaching and evaluation	
Teaching and learning	The main approaches to learning are competence-based, student-centered, and problem-oriented. The leading teaching methods are problem-based, partially exploratory, and exploratory. Teaching and learning is conducted in the form of lectures, including interactive and multimedia lectures, practical classes, laboratory work, self-study, and course research. Project-based, educational-game, graphic educational modeling, and interactive-communicative learning technologies are used
Rating process	Four-level and two-level, 100-point assessment system through such types of control with the accumulation of points received: *current* (oral and written survey) control, intermediate (protection of practical, independent works), *final report* (written exams, test papers, defense of practice

	reports), self-monitoring, *certification process* (preparation and public defense of the master's thesis).
6-program competencies	
Integral competence	Ability to solve research and / or innovation problems in the field of computer science.
General competencies	GC01-ability to think abstractly, analyze and synthesize. GC02-ability to apply knowledge in practical situations. GC03-ability to communicate in the state language both orally and in writing. GC04-ability to communicate in a foreign language. GC05-the ability to learn and master modern knowledge. GC06-ability to be critical and self-critical. GC07-ability to generate new ideas (creativity).
Professional competencies	PC01-awareness of the theoretical foundations of computer science. PC02-the ability to formalize the subject area of a particular project in the form of an appropriate information model. PC03-ability to use mathematical methods to analyze formalized domain models. PC04-the ability to collect and analyze data (including large ones) to ensure the quality of project decision-making. PC05-the ability to develop, describe, analyze and optimize architectural solutions of information and computer systems for various purposes. PC06-the ability to apply existing and develop new algorithms for solving problems in the field of computer science. PC07-the ability to develop software in accordance with the formulated requirements, taking into account available resources and limitations. PC08-the ability to develop and implement software development projects, including in unpredictable conditions, with unclear requirements and the need to apply new strategic approaches, use software tools to organize team work on the project. PC09-ability to develop and administer databases and knowledge. PC10-ability to evaluate and ensure the quality of IT projects, information and computer systems for various purposes, apply

	international standards for evaluating the quality of software for information and computer systems, models for assessing the maturity of information and computer system development processes. PC11-the ability to initiate, plan and implement the development processes of information and computer systems and software, including its development, analysis, testing, system integration, implementation and maintenance.
7-program learning outcomes	
Programmatic learning outcomes	PLO1 - have specialized conceptual knowledge that includes modern scientific achievements in the field of computer science and is the basis for original thinking and research, critical understanding of problems in the field of computer science and on the edge of knowledge branches PLO2 - have specialized computer science problem-solving skills that are necessary for conducting research and / or implementing innovative activities in order to develop new knowledge and procedures. PLO3-clearly and unambiguously communicate your own knowledge, conclusions and arguments in the field of computer science to specialists and non-professionals, in particular to people who are studying. PLO4-manage information technology workflows that are complex, unpredictable, and require new strategic approaches. PLO5-evaluate the performance of teams and teams in the field of information technology, ensure the effectiveness of their activities. PLO6-develop a conceptual model of an information or computer system. PLO7-develop and apply mathematical methods for analyzing information models. PLO8-develop mathematical models and data analysis methods (including large ones). PLO9-develop algorithmic and software solutions for data analysis (including large ones). PLO10-design architectural solutions for information and computer systems for various purposes PLO11-create new algorithms for solving problems in the field of computer science, evaluate their effectiveness and limitations on their application

	PLO12-design and maintain databases and knowledge. PLO13-evaluate and ensure the quality of information and computer systems for various purposes. PLO14-test the software. PLO15-identify the needs of potential customers for automating information processing. PLO16-perform research in the field of computer science. PLO17-identify and eliminate problem situations in the process of software operation, formulate tasks for its modification or reengineering. PLO18-collect, formalize, systematize and analyze the needs and requirements for an information or computer system that is being developed, operated or maintained PLO19-analyze the current state and global trends in the development of computer science and information technology
8-resource support for program implementation	
Specific characteristics of human resources support	Complies with the license conditions for educational activities. All teachers are full-time university teachers, have a scientific degree and / or academic title corresponding to the main profile of the discipline taught. All teachers undergo advanced training once every five years.
Specific characteristics of logistics support	Equipment and equipment, technical training facilities (whiteboards, multimedia projectors, laptops, printers, scanners, personal computers with software) for the formation of subject competencies in the course of training of the applicant. There are classrooms, laboratories, computer labs, dormitories, food outlets, wireless Internet access points, gyms, and the like
Specific characteristics of information and educational support	Official website of the University, unlimited access to the Internet, printed materials (collections of the V. N. Karazin Central National Library, repository, own libraries of educational laboratories) and Internet sources (incl. e-learning Center of the University) information; training and work plans (with explanatory notes to them), educational programs, working programs of disciplines

	and practices, educational and methodological complexes of disciplines, including lecture material, practical work tasks, questions of seminars, tasks of independent work, questions, tasks, tasks for the current and final stage of the project. control system. Meets the license conditions, 100%
9-academic mobility	
National credit mobility	In accordance with the law
International credit mobility	Erasmus + KA1 Academic Mobility Programs: Technical University of Lodz, Poland Nicolaus Copernicus University, Torun, Poland University of Murcia, Spain University of the Cote d'Azur, Nice, France.
Training of foreign applicants for higher education	Citizens of other countries are accepted for training on the basis of international agreements on the conditions defined by these agreements, as well as agreements concluded by an educational institution with foreign educational institutions, organizations, or individual agreements or contracts.

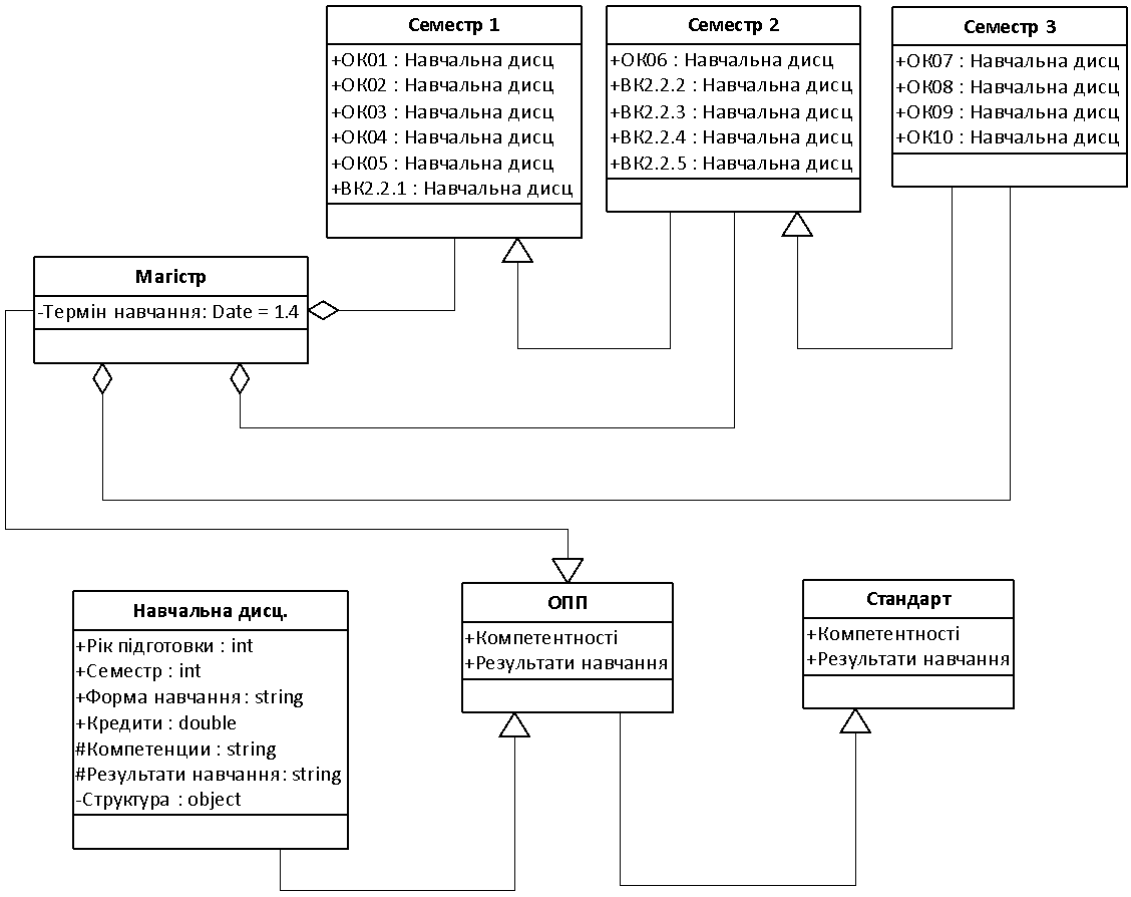
2. list of components of the educational and professional program and their logical sequence

2.1. list of OP components

N / A code	Components of the educational program (academic disciplines, course projects (works), internships, qualification work)	Quantity credits	Final control form
1	2	3	4
1. required OP components			
EC01	Global problems of our time	3	test
EC02	Statistical methods in computer science	5	exam
EC03	Distributed computing	5	exam
EC04	Database and data warehouse technologies	5	exam
EC05	Software Engineering	5	exam
EC06	Data protection	3	test
EC07	Research coursework	6	test
EC08	Research and production practice	20	exam
EC09	Pre-graduate practice	6	test
EC10	Preparation of the qualification work	4	exam
Total amount of required components	**62**		
2. selected OP components			
	2.2. Cycle of professional (professional) training		
	(5 disciplines are selected according to the catalog of professional selective		

	disciplines of the faculty with a total volume of 28 ECTS) https://sites.google.com/karazin.ua/tacs-ua/education/syllabus-master-prof?#h.m6b3ta5fprbe		
SC2. 2. 1	Discipline P-1	4	test
SC2. 2. 2	Discipline P-2	6	exam
SC2. 2. 3	Discipline P-3	6	exam
SC2. 2. 4	Discipline P-4	6	exam
SC2. 2. 5	Discipline P-5	6	exam
Total volume of sample components	**28**		
TOTAL SCOPE OF THE EDUCATIONAL PROGRAM	**90**		

2.2. Structural and logical scheme of the OP



2. Form of certification of applicants for higher education

Certification of graduates of the educational program "informatics" in the specialty 122 computer science is carried out openly and publicly, is carried out in the form of defense of a qualifying master's thesis and ends with the issuance of a standard document on awarding them a master's degree with the qualification: master of computer Science.

Requirements for a qualified Master's thesis:

During the preparation and defense of the qualification work, the graduate must demonstrate knowledge and ability to analyze the properties of the design object, justify the choice of technical and software, perform design work, develop application software, and use modern information technologies at all stages of development.

The master's thesis is subject to mandatory verification for academic plagiarism. Checking for academic plagiarism is carried out on the basis of regulations developed by universities. To check for academic plagiarism, the text of the final bachelor's thesis is submitted by the applicant in electronic form.

Public defense (demonstration) of a qualifying work provides for::

– presentation of the main points of the work in the form of a multimedia presentation and an explanatory note;

– preliminary announcement on the official website of the higher education institution;

– open form of the commission meeting;

– announcement on the same day after the end of the defense evaluation of the qualification work and registration of the minutes of the commission meeting;

– decision-making by the commission on awarding the qualification.

Certification is carried out openly and publicly before the examination committee, which is approved by the order of the Rector of V. N. Karazin Kharkiv National University. The applicant's report must be accompanied by a presentation using multimedia technology in order to be convincing and confirm the conclusions and suggestions.

3. Compliance matrix of program competencies components of the educational program

	ОК01	ОК02	ОК03	ОК04	ОК05	ОК06	ОК07	ОК08	ОК09	ОК10	ВК01.01.01	ВК02.01.02	ВК03.02.01	ВК04.02.02	ВК05.02.03	ВК06.02.04	ВК07.02.05
ІК01		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ЗК01	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ЗК02	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ЗК03	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ЗК04																	
ЗК05	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ЗК06	+																
ЗК07	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
СК01		+			+		+	+	+	+			+				
СК02		+		+			+	+	+	+	+				+	+	
СК03		+		+			+	+	+	+	+				+		
СК04				+			+	+	+	+				+	+	+	+
СК05			+		+	+	+	+	+	+		+	+			+	
СК06			+			+	+	+	+	+		+				+	
СК07			+		+	+	+	+	+	+		+	+			+	+
СК08					+		+	+	+	+		+	+				
СК09				+			+	+	+	+				+			+
СК10					+		+	+	+	+			+	+			+
СК11					+		+	+	+	+							

4. Matrix for ensuring programmatic learning Outcomes (PRN) relevant components of the educational program

	ОК01	ОК02	ОК03	ОК04	ОК05	ОК06	ОК07	ОК08	ОК09	ОК10	ВК01.01.01	ВК02.01.02	ВК03.02.01	ВК04.02.02	ВК05.02.03	ВК06.02.04	ВК07.02.05
ПРН01		+					+	+	+	+	+						
ПРН02		+					+	+	+	+	+					+	
ПРН03	+	+		+	+		+	+	+	+			+			+	
ПРН04					+		+	+	+	+			+			+	
ПРН05	+				+		+	+	+	+			+				
ПРН06		+			+		+	+	+	+			+	+			+
ПРН07		+	+	+			+	+	+	+	+			+			+
ПРН08		+		+			+	+	+	+	+			+	+		+
ПРН09			+		+		+	+	+	+	+	+	+			+	
ПРН10			+		+	+	+	+	+	+		+	+				
ПРН11			+				+	+	+	+		+				+	
ПРН12				+			+	+	+	+							+
ПРН13				+		+	+	+	+	+			+				
ПРН14			+			+	+	+	+	+		+	+			+	
ПРН15			+	+			+	+	+	+		+	+				
ПРН16			+			+	+	+	+	+			+		+	+	
ПРН17			+			+	+	+	+	+						+	
ПРН18			+	+			+	+	+	+							
ПРН19						+	+	+	+	+							