Profile of the educational program "Computer Science"

specialty 122 Computer Science

1 - General information	
Full name of higher education institution	O.M.Beketov National University of Urban Economy in Kharkiv
Higher education degree and qualification name in original language	Master Master of Computer Science
Official name of educational program	Computer Science
Diploma type and educational program amount	Master's degree, single. 90 ECTS credits, training period 1 year 4 months
Presence of accreditation	Accredited by NAQA, Ukraine. Accreditation certificate of the educational program - 61, valid until 23.12.2024
Cycle/Level	Second (Master's) Level Ukrainian NQF - Level 7 FQ-EHEA - second cycle EQF LLL - Level 7
Prerequisites	Availability of an educational degree of bachelor, specialist, master's degree in another specialty
Teaching language(s)	Ukrainian
The term of the educational program	5 years
URL for permanent placement of the educational program description	https://knit.kname.edu.ua/
2 - The purpose of the educational program	
Training of professionals capable of applying mathematical foundations, algorithmic principles in modeling, designing, developing and maintaining information systems and technologies;	
3 - Characteristics of the educational program	
Subject Area	Objects of study: mathematical, informational, simulation, cognitive models of real phenomena, objects, systems and processes; methodological, technological, practical aspects of operational and intellectual data analysis, processing of super-large data, high-performance and parallel calculations; methods of ontological, mathematical, cognitive modeling; machine learning methods and algorithms, automatic text analysis and processing, development of intelligent and recommendation systems, analysis of social networks; theory, analysis, development, evaluation of efficiency, implementation

	of high-performance algorithms; systems of artificial intelligence and decision-making;
	The objectives of training: formation and development of general and professional competencies in computer technologies that contribute to the social stability and mobility of the graduate in the labor market, obtaining higher education for the development, implementation and research of information systems and technologies, training of professionals capable of conducting theoretical and experimental research in the field of computer science and modern information technologies; apply methods of operational and intelligent data analysis, machine learning, processing of ultra-large data, modeling and forecasting, apply modern methods and technologies of programming in new fields of science, technology and economics. *Theoretical content of the subject area*: methods of scientific research, methodology of modeling complex systems of different nature, decision-making methods, discrete processes of information processing, methods and algorithms of machine learning and processing of natural language, distributed computing, scalable algorithms for big data processing, computer vision, associative-local search in semantic networks, intelligent systems, problems of artificial intelligence. Methods, methodologies and technologies: CASE technologies of modeling and design of business processes, IC and IT; technologies and methods of design, development and quality assurance of IT and IC components; knowledge engineering technologies; data visualization methods and technologies; active teaching methods: business (situational) games, interactive technologies, distance learning, differentiated learning. *Tools and equipment*: hardware and software tools for building and analyzing models of objects, systems and processes; computer equipment, instrumentation, modern programming languages, software environments for prompt and intelligent data analysis, processing of ultra-large data; high-level programming languages for high-performance computing; formal languages for ontology construction; distributed computing systems; computer networks; mobile and cloud technologies, database and knowledge management systems, operating systems, etc..
Orientation of the educational program	Educational and professional
The focus of the educational program and specialization	Training of professionals capable of solving complex specialized problems and practical problems in the field of computer science and information technologies, which involves the use of theories and methods of computer science and is characterized by complexity and uncertainty of conditions. *Keywords*: information, system, technology, computer, program, programming, model, modeling, object-oriented programming, database, knowledge base
Features of the program	Training of professionals in the field of computer science, having in-depth knowledge of the organization of design and implementation of information systems at urban facilities for the implementation of a

	strategy for building a "smart city", based on computing intelligence, machine learning, electronic management technologies.
4 - The suitability of graduates to employment and further education	
Employment suitability	Professional activity as a specialist in the development of mathematical, information and software information systems, in the field of information technology, as well as administrator of databases and systems. Graduates can work in professions according to the current edition of the National Classifier of Ukraine: Класифікатор професій (ДК 003:2010):
	2131.2 Database Administrator 2131.2 Data Administrator 2131.2 Access Administrator 2131.2 System Administrator 2131.2 Computer software engineer 2132.1 Junior Researcher (programming) 2132.2 Programmer engineer 2132.2 Programmer (database) 2132.2 Application programmer 2139.2 Computer Engineer
Further education	Master can continue education at the third (educational and scientific) level of higher education, as well as improve qualifications and receive additional postgraduate education
5 - Teaching and evaluation	
Teaching and learning	Student-centered learning, self-study, (personal-oriented, humanistic, socially-practically-oriented, problematic-oriented). Teaching and learning includes: lectures and practical classes, independent training, project work, individual consultations with teachers, practice and performance of master's qualification work.
Evaluation	Oral and written surveys, test tasks, graphic works, term works and projects, practice reports, oral and written examinations, differentiated tests, protection of qualification work (master's degree). The evaluation system is carried out on the ETS scale by conducting oral and written examinations, tests, practices, organization of presentations, project work, etc.
6 - Program competencies	
Integral competence	Ability to solve research and innovation problems in the field of computer science.
General **competences (GC)** defined by the standard of higher education for the specialty	GC1. Ability for abstract thinking, analysis and synthesis. GC2. Ability to apply knowledge in practical situations. GC3. Ability to communicate in the state language both orally and in writing. GC4. Ability to communicate in a foreign language. GC5. Ability to learn and acquire modern knowledge. GC6. Ability to be critical and self-critical. GC7. Ability to generate new ideas (creativity).

	GC8. Ability to work in a team. GC9. Ability to evaluate and ensure the quality of work performed.
Professional competencies of the specialty (PC), defined by the standard of higher education for the specialty	PC1. Awareness of the theoretical principles of computer science. PC2. The ability to clearly and unambiguously communicate their own knowledge, conclusions and arguments to specialists and non-specialists, in particular to persons studying, to clarify the needs of potential customers regarding the automation of information processing. PC3. The ability to collect, formalize, systematize and analyze the needs and requirements for the information or computer system being developed, operated or accompanied. PC4. The ability to formalize the subject area of a particular project in the form of an appropriate information model. PC5. Ability to use mathematical methods to analyze formalized models of the subject area. PC6. Ability to collect and analyze data (including large ones) to ensure the quality of decision-making. PC7. Ability to develop, describe, analyze and optimize architectural solutions of information and computer systems for various purposes. PC8. The ability to apply existing and develop new algorithms for solving problems in the field of computer science, to evaluate their effectiveness. PC9. Ability to develop software in accordance with the formulated requirements, taking into account available resources and restrictions. PC10. The ability to develop and implement software projects, including in unpredictable conditions, under vague requirements and the need to apply new strategic approaches, use software tools to organize teamwork on the project. PC11. Ability to develop and administer databases and knowledge. PC12. 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 information and computer systems, models for assessing the maturity of the processes of development of information and computer systems. PC13. The ability to initiate, plan and implement processes for the development of information and computer systems and software, including its development, analysis, testing, system integration, implementation and support. PC14. Ability to detect and fix problematic situations during software operation, formulate tasks for its modification or reengineering. PC15. Ability to original thinking and research, critical comprehension of problems in the field of computer science and on the verge of fields of knowledge.
7 - Program learning outcomes	
Program learning outcomes defined by the standard of higher education for the specialty	LO1. Carry out a description of the subject area of development or research; to ensure the decomposition of the task. LO2. Choose the right development or research tools (development environment, programming language, software and software packages, etc.) that allow you to find the right and effective solution.

	LO3. Analyze interim results of development or research in order to find out their compliance with the requirements; develop tests and use verification tools to ensure the quality of decisions taken.
	LO4. Analyze the subject area of development or research using the available documentation, consultations with stakeholders; develop documentation that fixes both functional and non-functional requirements for development or research.
	LO5. Model an object of development or research in terms of functional components (subsystems) in such a way as to facilitate and optimize the work on the project; use existing technologies and methods of dynamic and static analysis of programs to ensure the quality of the result.
	LO6. Analyze, evaluate and compare different technologies (methods, languages, algorithms, work schedules) in order to set priorities in accordance with the different performance and quality criteria defined by the task.
	LO7. Create software prototypes to make sure it meets development requirements; perform its testing and static analysis to ensure compliance with the development or research task.
	LO8. Develop, implement and provide monitoring, optimization, maintenance, failure detection, etc..
	LO9. Manage complex workflows taking into account the economic, legal and ethical aspects, evaluate the results of the team.
	LO10. Communicate fluently in state and English orally and in writing to discuss professional activities in the field of information technology, projects, research and innovation results, and other computer science issues.
	LO11. Find the necessary information in the scientific literature, databases, other sources, analyze and evaluate it.
	LO12. Ensure tracking of the development status, displaying it in technical documentation using document version control tools.
	LO13. Have specialized conceptual knowledge that includes modern scientific achievements in the field of information technology and is the basis for original thinking and research.
8 - Resources for the program implementation	
Personnel	High quality level implementation of the program is provided by a qualified scientific and pedagogical staff, which includes PhDs and ScDs, professors, associate professors, including those with B-2 level English certificates. All the teachers of the graduating department have powerful practical experience in the field of information technology.

Material and Technical Ensure	The educational process is fully provided by the classroom fund, administrative and auxiliary premises. Specialized computer laboratories of the department have both modern equipment and software (Microsoft 365, Visual Studio Community 2019, SQL Server Management Studio 18, Google Chrome, Opera, Internet Explorer, GIMP Paint.NET, SketchUp, Linux OS, Geany, NetBeans, GIMP, Apache, PHP), and broadband Internet access. For lectures, auditoriums with multimedia equipment are used. Specialized laboratories are used for practical classes, including "Laboratory of information systems modeling", "Laboratory of Corporate Network Technologies", "Laboratory of Information Technologies", "Laboratory of Artificial Intelligence and Big Data Processing".
Information and educational and methodological Ensure	Educational program Computer Science is provided with educational materials that are available for students in the reading rooms of the scientific library of the university http://library.kname.edu.ua/index.php/uk/, equipped with computers with internet and local network of the University, in the digital repository http://eprints.kname.edu.ua, in MS Teams, on the portal of the Center for Distance Learning http://dl.kname.edu.ua Students have free access to modern professional literature and periodicals; Scopus and Web of Science databases; Springer resources; ScienceDirect databases from Elsevier publishing house; on the ScienceDirect platform - up to 39 thousand e-books and a collection of 2088 electronic monographs 2019-2020 editions.
9 - Academic mobility	
National credit mobility	In accordance with the Regulations on academic mobility of students, postgraduates, doctoral students, scientific-pedagogical and scientific workers of O.M. Beketov NUUE.
International Credit Mobility	O.M. Beketov NUUE has 5 existing agreements under **Erasmus + International Credit Mobility** with the following foreign universities: 1) Middle East Technical University, Ankara, Turkey. 2) Aristotle University of Thessaloniki, Thessaloniki, Greece 3) University of Nova Gorica, Nova Gorica, Slovenia 4) The Estonian University of Life Sciences, Tartu, Estonia 5) Lodz University of Technology, Lodz, Poland
Education of foreign applicants for higher education	In accordance with the Rules of admission to O.M. Beketov NUUE.