Educational program profile
Computer Science. Project management

General information	
Official name of the educational program	Computer Science. Project management
Specialty	122 Computer Science
Field of knowledge	12 Information Technology
Degree of higher education and qualification name in the original language	Master of Science (MSc) in Computer Science Bachelor, Bachelor of Computer Science
Type of diploma and volume of study program	Master's degree, single, 90 ECTS credits, duration of training 1 year 4 months
Accreditation	Accreditation certificate of the Ministry of Education and Science of Ukraine № 21006912; The certificate is valid until July 1, 2024.
Cycle / level	Second (master's) level NQF of Ukraine – 8 level FQ-EHEA – second cycle EQF-LLL – 7 level
Requirements for the applicants level of education	Bachelor's, specialist's degree
Teaching language	Ukrainian
Duration of the educational program	5 years
Purpose of educational program	
	Training professionals capable to conduct the theoretical and experimental research in computer science and modern information technology; to apply methods of operative and intellectual data analysis, machine learning, processing of big data, modeling and forecasting, to apply modern methods and technologies of programming in new branches of science, technology and economy.
Characteristics of educational program	
Subject area	**Object (s) of study and / or activity:** – mathematical, informational, simulation, cognitive models of real phenomena, objects, systems and processes, – methodological, technological, practical aspects of operational and intellectual data analysis, processing of big data, high-performance and parallel calculations; – semantic technologies and methods of associative-local search; – ontological, mathematical, cognitive modeling methods; – methods and algorithms of machine learning, automatic analysis and word processing, development of intelligent and recommendation systems, analysis of social networks; – theory, analysis, development, performance evaluation, implementation of high-performance algorithms; – artificial intelligence and decision-making systems; – technologies of system design and development of complex

	information systems, knowledge bases. **Theoretical content of the subject area:** research methods, methodologies for modeling complex systems of different nature, decision-making methods, discrete information processing processes, methods and algorithms for machine learning and natural language processing, distributed computing, scalable algorithms for processing big data, computer vision, associative-local search in semantic networks, intellectual systems, problems of artificial intelligence. **Methods, techniques and technologies:** CASE-technologies of business processes modeling and designing, IS and IT; technologies and methods of design, development and quality assurance of IT and IS components; knowledge engineering technologies; methods and technologies of data visualization; active teaching methods: business (situational) games, interactive technologies, distance courses, differentiated learning. **Tools and equipment:** hardware and software tools for constructing and analyzing models of objects, systems and processes; software environments for rapid and intelligent data analysis, oversized data processing; 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.
Educational program orientation	Educational and professional
Main focus of the educational program and specialization	Special education in the field of information technology, specialty computer science. Keywords: mathematical, information, simulation models of objects, systems and processes, methods and technologies of data acquisition, storage, processing, transmission and use, data mining and decision making, theory, analysis, development, efficiency estimation, implementation of algorithms, parallel calculations and Big Data, project management.
Program features	The educational program provides the acquisition of theoretical knowledge and practical skills in information systems and technologies.
Suitability of graduates for employment and further learning	
Suitability for employment	Professional work as a software development project manager, specialist in the development of mathematical, information and software information systems, in the field of information technology and project management.
Further learning	Doctor of Philosophy (Ph.D.) obtaining. Obtaining additional qualifications in the system of postgraduate education.
Teaching and Assessment	
Teaching and learning	Implementation of student-centered approach, establishment of open dialogue and feedback between students and teachers, formation of course catalog, ensuring consistency between learning outcomes, formation of individual student learning trajectory, integration of modern information technologies into the educational process.
Assessment	Credit transfer system, providing students with grades for all types of classroom and extracurricular educational activities aimed at mastering the workload of the educational program. Written exams, practice report, essays, presentations of individual assignments. Intermediate modular control, final control in the form of

	exams and tests in the relevant disciplines, computational and graphic work, course papers and projects. Public defense of the Master's qualification work.
	Program learning outcomes
Integral competence	The Master is able to solve complex specialized problems and practical problems in the field of computer science or in the process of teaching with elements of scientific novelty, which involves the application of theories and methods of computer science, information technology, innovation and is characterized by complexity and uncertainty of conditions.
General competencies	GC1. Ability to think abstractly, analyze and synthesize. GC2. Ability to apply knowledge in practical situations. GC3. Knowledge and understanding of the subject area and understanding of professional activity. GC4. Ability to communicate in the state language both verbally and in writing. GC5. Ability to communicate in a foreign language. GC6. Ability to learn and master modern knowledge. GC7. Ability to search, process and analyze information from various sources. GC8. Ability to generate new ideas (creativity). GC9. The ability to work as a team. GC10. The ability to be critical and self-critical. GC11. Ability to develop and manage projects. GC12. Ability to make informed decisions. GC13. Ability to evaluate and ensure the quality of work performed. GC14. Definition and perseverance about tasks and responsibilities. GC15. Ability to act on ethical considerations.
Professional competences	PC1. Ability to identify and analyze problems, develop options for decision-making, assess risks of managerial decision-making, master the theoretical and applied aspects of decision-making systems. PC2. Ability to identify models of complex systems and processes, develop and apply methods and tools for modeling and forecasting systems and processes in uncertainty. PC3. Ability to research and analyze large data sets with complex heterogeneous and / or uncertain structure to make informed business decisions. PC4. Ability to apply Big Data Organization methods and tools to design scalable storage consolidation infrastructures, research, manage, protect and maintain information, to solve modeling tasks and to predict strategic directions for the IT industry. PC5. Ability to solve complex scientific and engineering problems involving the parallelization of computing, high time consuming machine time, computing resources and methods of organizing problem solving on supercomputers. PC6. Ability to use high-performance computing for mathematical modeling and forecasting problems in basic and applied research in various disciplines. PC7. Ability to solve complex data processing problems using data mining methods and tools, application of computational intelligence to solve practical problems in various fields of professional activity. PC8. Ability to develop and apply inductive methods for model synthesis, object recognition on images, multiagent and fuzzy systems, neural networks in the process of their implementation on modern high-

	performance systems.
	PC9. Ability to anticipate long-term business requirements, influence the improvement of organizational process efficiency, effectively manage financial, human, technical and other project resources to ensure the success of projects.
	PC10. Ability to use basic methodologies, methods, languages and tools to create and integrate knowledge-based systems, to model the processes of development and transformation of information and communication technologies in practical professional work.
	PC11. Understanding of economic preferences of innovative development of IT enterprises (newest approaches of organization, application of software, hardware, network, mathematical, technological, ergonomic and other means) in order to solve topical problems of increasing the competitiveness of the industry; the ability to solve the complex problems and challenges of designing a corporate information environment that involves innovation.
	PC12. Ability to conduct research, ergonomics of functional efficiency and reliability of information systems.
	PC13. Ability to design dynamic web applications as an information system using object-oriented programming technologies, including state-of-the-art client and server interaction software using distributed database management, web page maintenance and optimization.
	PC14. Ability to use a systems approach to build information systems using advanced mapping services and GIS applications, to organize and conduct research related to the development of projects and information systems based on the analysis and processing of arrays of mapping information.
	PC15. Ability and readiness for designing information system of a specific application by analyzing and synthesizing the composition and structure of the system or their individual components, developing functional and non-functional requirements for the projected system.
	PC16. Ability to design and provide implementation of the server infrastructure of the corporate data center.
Special (Professional) competencies, defined by a university	SPC1. Ability to apply project management methods and tools to make sound decisions in managing municipal and state projects and programs, in particular documentary support for project work and management activities.
	SPC2. Ability to apply methods and means of classification and construction of mathematical models of information processes.
	SPC3. Ability to use innovative web-oriented formation technologies, information technologies of data analysis, technologies of work of scripting programming languages.
	SPC4. Ability to apply software engineering methods, technologies and tools; database management systems; solve applied spatial data management problems.
Program learning outcomes	
Program learning outcomes, defined by the standard	PO1. Identify problem situations, perform their research on the basis of a systematic approach, make a sound choice of methods and models for the formation of effective management decisions, apply models and methods of decision-making in forecasting the development of the enterprise and in the subject area of computer science.
	PO2. Use decision-making models and methods, in particular based on fuzzy set theory, fuzzy calculations, etc., and in the face of uncertainty and risk in industry management.

	PO3. Acquire new data processing tools for weblog processing, text mining and machine learning to predict business processes and situational management, sentiment analysis reviews, development of e-commerce, media, social networking, banking, advertising, etc. .
	PO4. Analyze big data and model high-level abstractions in large datasets of different nature, design big data repositories to extract data and knowledge, visualize big data, build and evaluate predictive models generated from big data.
	PO5. Solve complex problems that require systems with high computing power to ensure scalability of parallel algorithms and programs.
	PO6. Utilize distributed high-performance computing technologies to effectively select and utilize consolidated resources and services.
	PO7. Be able to use high-power computing systems to perform the multiprocessor programming paradigm, develop efficient parallel algorithms for complex production tasks, deploy cloud platforms and virtualize them.
	PO8. To master methods and technologies of organization and application of data in tasks of computational intelligence, in particular with involvement of modern quantum technologies, to build decision-making models on the basis of the theory of pattern recognition, neural networks and fuzzy logic.
	PO9. Use intelligent agents, multiagent systems, machine learning and self-study, genetic, cooperative and distributed evolutionary algorithms for computer-based tasks that require a human level of thinking.
	PO10. Be able to analyze risks in the light of corporate values and interests, develop a risk management plan to identify the necessary preventive measures, take actions to mitigate the effects of risks and unforeseen actions. Demonstrate business planning, market valuation and risk management IT performance.
	PO11. Develop concepts of company business strategy, trends and consequences of internal or external IT events for typical organizations, determine the potential and capabilities of relevant business models.
	PO12. To possess methods and technologies of work with knowledge: extraction, structuring, presentation, creation of knowledge bases.
	PO13. Utilize computer science and information technology skills and critical thinking, analysis and synthesis skills for professional purposes.
	PO14. Implement sound decisions regarding the design, implementation and implementation of management information support systems.
Program Learning Outcomes, defined by a university	DPO1. Implement sound decisions in the management of municipal and state projects and programs.
	DPO2. To use in practical and scientific activity methods and means of classification and construction of mathematical models of information processes.
	DPO3. To use innovative web-oriented formation technologies, information technologies of data analysis, technologies of work of scripting programming languages.
	DPO4. Apply software engineering methods, technologies and tools; database management systems; solve applied spatial data management problems.
Resource support for the implementation of the program	
Staffing	The educational program is provided by scientific and pedagogical staff: professors, doctors of sciences, associate professors, candidates of sciences. All teachers of the specialized graduating department underwent a scientific and pedagogical internship for one month in higher

	educational institutions and scientific research institutions of Ukraine.
Material and technical support	The educational process of the educational program takes place in audiences equipped with audiovisual and multimedia equipment and the necessary technical facilities. The specialized computer laboratories of the department and the university as a whole have the modern equipment and software necessary for the implementation of the curriculum, the ability to access the Internet.
Information and educational-methodological support	The content and quality of information and learning and teaching support material meets the requirements and is sufficient to ensure high-quality training of specialists in modern conditions. Information about educational programs, educational and scientific activities, structure of the university, admission rules, event announcements, news, etc. is distributed on the official website of the University (https://www.kname.edu.ua/). O.M. Beketov NUUE in Kharkiv has a library, which includes scientific, student subscription and subscription of fiction and reading rooms for 540 seats. The university has an electronic repository (http://eprints.kname.edu.ua/), which provides access of higher education applicants to methodological and educational materials (educational and methodical complexes of disciplines, materials for independent and individual work of students, programs of practices, etc.), as well as the electronic version of the scientific and technical collection "Municipal economy of cities" and materials of scientific conferences. Students and teachers are provided with access to the Moodle distance learning system (http://cdo.kname.edu.ua). All library computers are connected to the Internet. In the reading room, it is organized access to Internet resources using Wi-Fi technologies. Access to Web of Science and Scopus scientometric databases is available.
Academic mobility	
National Credit Mobility	The opportunity to participate in national credit mobility programs at other universities in the country where master's in this specialty are trained.
International credit mobility	O. M. Beketov Kharkiv National University of Urban Economy has 5 existing agreements International Credit Mobility Erasmus + with the following mobility from foreign universities: 1) Middle East Technological University, Ankara, Turkish Republic 2) Aristotle University, Thessaloniki, Greece 3) University of Nova Gorica, Nova Gorica, Slovenia 4) Estonian University of Natural Sciences, Tartu, Estonia 5) Lodz Technical University (Lodz, Poland)
Education of foreign applicants	–