MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

KYIV NATIONAL UNIVERSITY
TECHNOLOGY AND DESIGN

EDUCATIONALLY-PROFESSIONAL PROGRAM

COMPUTER SCIENCE

Level of higher education	second (master's)
Degree of higher education	master
Field of knowledge	12 Information technologies
Specialty	122 Computer Science
Qualification	master of computer science

Kyiv 2021

PREFACE

DEVELOPED: Kyiv National University of Technology and Design

DEVELOPERS:

Guarantor of the educational program Demkivska Tetyana Ivanivna, Candidate of Technical Sciences, Associate Professor, Associate Professor of the Department of Computer Science and Technology, Kyiv National University of Technology and Design

Working group members:
Minaev Yuriy Mykolayovych, Doctor of Technical Sciences, Professor, Professor of the Department of Computer Science and Technology, Kyiv National University of Technology and Design;
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REVIEWS OF EXTERNAL STAKEHOLDERS:

1) V.M. Opanasenko, a leading researcher at the Institute of Cybernetics. V.M. Glushkova NAS of Ukraine, laureate of the State Prize of Ukraine in the field of science and technology, doctor of technical sciences, professor;
2) V.M. Alekseenko, Chief Engineer of Glomstar Ukraine Limited Liability Company.
3) V.D. Snitzar, Deputy Director of the Emergency Response Department;
4) G.V. Melnyk, Director of Dunn Consulting Limited Liability Company, Candidate of Technical Sciences, Associate Professor;
5) OI Vakarchuk, General Director of DOKPROM Limited Liability Company;

1. Profile of the educational and professional program Computer Science

1 - General information	
Full name of the institution of higher education and structural unit	Kyiv National University of Technology and Design. Department of Computer Science and Technology.
Higher education degree and qualification in the original language	The level of higher education is the second (master's). Degree of higher education - master. Field of knowledge - 12 Information technologies. Specialty - 122 Computer Science.
Type of diploma and scope of educational program	Master's degree, single, 90 ECTS credits
Availability of accreditation	Certificate of accreditation of the educational program UD № 11007782 from 08.01.2019
Cycle / level	National Qualifications Framework of Ukraine - Level 7.
Prerequisites	Bachelor degree.
Language (s) of instruction	Ukrainian
Term of the educational program	Until July 1, 2024.
Internet address of the permanent placement of the description of the educational program	https://en.knutd.edu.ua/ects/
2 - The purpose of the educational program	
Training of specialists with in-depth knowledge, as well as basic and professional competencies in the field of information technology, aimed at acquiring by students skills of research, design and innovation in the field of modern computer systems, the ability to correctly independently set and solve tasks of scientific and practical activities and research and production organizations. The main objectives of the program are to achieve the level of master's degree, which allows to perform research and development work in the field of application of information technology in light industry, and education of active members of civil society.	
3 - Characteristics of the educational program	
Subject area	The program is focused on the formation of applicants for competencies to acquire deep knowledge, skills and abilities in the specialty. Compulsory educational components - 73%, of which: disciplines of general training - 13.5%, vocational training - 27%, practical training - 23%, learning a foreign language - 4.5%, diploma design - 32%. Disciplines of free choice of students - 27% are selected from the university catalog in accordance with the approved procedure at the University.
Orientation of the educational program	Educational and professional training for a master's degree.
The main focus of the educational program	Emphasis is placed on the formation and development of professional competencies in the field of information technology; inThe study of theoretical and methodological provisions, organizational and practical tools in the field of computer graphics, systems analysis, modeling of information systems, database management, design of complex objects and systems, IT project management, computer information protection, computer architecture and computer networks.
Features of the program	The program focuses on training specialists in the use of information technology in light industry, in particular in the garment and footwear industries.
4 - Suitability of graduates for further study	
Suitability for employment	The graduate is suitable for employment in enterprises, organizations and institutions that engaged in the development and maintenance of software and those who generally use computer technology. Positions: computer systems analyst, computer systems architect, programmer, tester, technical team leader, software development manager.

Further training	Lifelong learning to improve professional, scientific and other activities. Possibility to continue studying at the third (educational-scientific) level of higher education (doctor of philosophy).	
5 - Teaching and assessment		
Teaching and learning	Student-centered and problem-oriented learning, research practice and self-study are used. The system of teaching methods is based on the principles of purposefulness, binary - active direct participation of teacher and student. The main approaches in teaching and learning are humanistic, student-centered, systematic, technological, discreet. Forms of organization of the educational process: lecture, practical lesson, practical training, independent work, consultation, development of professional projects.	
Evaluation	Exams, tests, tests, project work, presentations, reports.	
6 - Program competencies		
Integral competence (ІК)	Ability to solve problems of research and / or innovation in a particular field of professional activity.	
General competencies (ЗК)	ЗК 1	Ability to abstract thinking, analysis and synthesis.
	ЗК 2	Ability to apply knowledge in practical situations.
	ЗК 3	Ability to communicate in the state language both orally and in writing.
	ЗК 4	Ability to communicate in a foreign language.
	ЗК 5	Ability to learn and master modern knowledge
	ЗК 6	The ability to be critical and self-critical.
	ЗК 7	Ability to generate new ideas (creativity).
	ЗК 8	Ability to work in a team.
	ЗК 9	Ability to evaluate and ensure the quality of work performed.
Professional competencies (ФК)	ФК 1	Ability to understand the theoretical foundations of computer science to objectively assess the possibilities of using computer technology in certain processes of human activity and to identify promising information technologies.
	ФК 2	Ability to communicate with representatives of various fields of knowledge and areas of activity in order to clarify their needs in the automation of information processing.
	ФК 3	Ability to collect, formalize, systematize and analyze the needs and requirements of a computer system that is being developed, operated or maintained.
	ФК 4	The ability to formalize the subject area of a project as a complex system with the definition of key elements and relationships between them, the purpose and criteria for assessing its functioning in the form of an appropriate information model.
	ФК 5	Ability to use mathematical methods for the analysis of formalized models of the subject area of a particular project in the process of its implementation and maintenance.
	ФК 6	Ability to collect and analyze data (including large ones) to ensure quality decision making.
	ФК 7	Ability to develop, describe, analyze and optimize architectural solutions for computer systems for various purposes.
	ФК 8	Ability to apply existing and develop new algorithms for solving problems in the field of computer science: algorithms for solving computational and logical problems, algorithms for parallel and distributed computing, algorithms for analytical processing and intellectual analysis of large data to assess their efficiency and complexity.

	ФК 9	Ability to develop software: understand and apply the basics of logic to solve problems; be able to design, execute and debug programs using modern integrated software (visual) development environments; understand programming methodologies, including object-oriented, structured, procedural and functional programming; compare currently available programming languages, software development methodologies and development environments, as well as select and use those that correspond to a particular project; be able to evaluate code for reuse or inclusion in an existing library; be able to assess the configuration and impact on settings in terms of working with third-party software packages.
	ФК 10	Ability to use software tools to organize teamwork on the project.
	ФК 11	Ability to develop and administer databases and knowledge, have modern theories and models of data and knowledge, methods of their interactive and automated development, processing and visualization technologies.
	ФК 12	Ability to assess the quality of IT projects, computer and software systems for various purposes, to have methodologies, methods and technologies to ensure and improve the quality of IT projects, computer and software systems based on international standards for quality assessment of information systems software, maturity assessment models processes of information and software systems development.
	ФК 13	Ability to initiate and plan the development of computer systems and software, including it development, analysis, testing, system integration, implementation and maintenance.
	ФК 14	Ability to identify problem situations during the operation of the software and formulate tasks for its modification or reengineering.
7 - Program learning outcomes		
Knowledge and understanding:		
ПРН1	Identify the concepts, algorithms and data structures needed to describe the subject area of development or research; to provide decomposition of the set task for the purpose of application of known methods and technologies for its decision	
ПРН 2	Choose the right tools for development or research (eg, development environment, programming language, software, and software packages) to find the right and effective solution.	
Application of knowledge and understanding (skills):		
ПРН 3	Analyze intermediate results of development or research in order to determine their compliance with the requirements; develop tests and use verification tools to verify the quality of decisions made.	
ПРН 4	Analyze the subject area of development or research, using available documentation, consultations with stakeholders; develop documentation that records both functional and non-functional requirements for development or research.	
ПРН 5	Model the object of development or research in terms of functional components (subsystems) in such a way as to facilitate and optimize work on the project; use existing technologies and methods of dynamic and static analysis of programs to ensure the quality of the result.	
ПРН 6	Identify, evaluate and compare different technologies (methods, languages, algorithms, work schedules) in order to set priorities in accordance with the various performance and quality criteria defined by the task.	
ПРН 7	Have the principles, techniques and tools of development or research used in the subject area of development or research; create software prototypes to ensure that it meets the requirements for development; perform its testing and static analysis to ensure compliance with the task of development or research.	

ПРН 8	Develop and provide measures for monitoring, optimization, maintenance, fault detection, etc.
ПРН 9	Demonstrate the ability to participate in teamwork, use tools of collective development or research.
ПРН 10	Use documentation and reference materials, textbooks or software development manuals; be able to write technical reports and present the results of their work in both state and foreign languages.
Formation of judgments:	
ПРН 11	Be able to communicate with people who are not professionals in the field of computer science, in order to identify their needs for computerization of the processes in which they are involved.
ПРН 12	Provide tracking of the state of development, its reflection in the technical documentation with the use of document version control tools.
ПРН 13	Take into account the socio-economic aspects of the project in the context of the development or research task, in particular the consistency of technical progress and ethical standards.

8 - Resource support for program implementation	
Staffing	All scientific and pedagogical workers who provide the educational program on qualification, correspond to a profile and a direction of the educational components which are taught; have the necessary experience of pedagogical work and experience of practical work. In the process of organizing training, professionals with experience in research / management / innovation / creative work and / or work in the specialty are involved.
Logistics	Logistics allows to fully ensure the educational process throughout the training cycle of the educational program. The condition of the premises is certified by sanitary and technical passports that comply with current regulations.
Information and educational and methodical support	The program is fully equipped with an educational and methodological complex of all educational components, the availability of which is presented in the modular environment of the educational process of the University.
9 - Academic mobility	
National credit mobility	Provides for the possibility of academic mobility for some components of the educational program, providing the acquisition of general and / or professional competencies.
International credit mobility	The program develops prospects for participation and internships in research projects and academic mobility programs abroad.
Training of foreign applicants for higher education	Training of foreign applicants for higher education is carried out according to accredited educational programs.

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

2.1 List of educational components

Code n / a	Components of the educational program (academic disciplines, term papers, practices, qualification work)	Number of credits	Form of final control
1	2	3	4
Mandatory components of the educational program			
General training cycle			
OK 1	Business Foreign Language (English,, German,, French)	3	test
OK 2	Methodology of modern scientific research with elements of intellectual property	3	examination
OK 3	Modern methodologies for processing experimental data	6	examination
	Total from the cycle	12	
Cycle of professional training			
OK 4	Distributed computer systems and networks	6	test
OK 5	Mathematical modeling of macro and micro level objects	6	examination
OK 6	Operations Research	6	examination
OK 7	Research practice	6	test
OK 8	Pre-diploma practice	9	test
OK 9	Master's thesis (project)	21	certification
	Total from the cycle	54	
	The total amount of mandatory components	66	
Selective components of the educational program			
DVVS	Disciplines of free choice of the student	24	test
TOTAL VOLUME OF THE EDUCATIONAL PROGRAM		**90**	