

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
KYIV NATIONAL UNIVERSITY OF TECHNOLOGIES AND DESIGN

EDUCATIONAL PROGRAM
COMPUTER ENGINEERING

Level of higher education _____ Second _____

Degree of higher education _____ Master _____

Field of knowledge _____ 12 Information Technologies _____

Specialty _____ 123 Computer Engineering _____

Qualification _____ Master in Computer Engineering _____

Kyiv 2021

1. Profile of Educational Program Computer Engineering

1 – General Information	
Full name of higher educational institution and structural unit	Kyiv National University of Technologies and Design. Department of Computer Engineering and Sciences.
Degree of higher education and qualification in the original language	Level of higher education - second-cycle degree (Master). Degree of higher education – Master. Field of knowledge – 12 Information technologies. Specialty – 123 Computer engineering.
Type of diploma and scope of the program	Master’s diploma, single, 90 ECTS credits.
Accreditation	Certificate УД № 11007056 of 10.07.2018 valid till 01.07.2023.
Cycle/ level	National Qualifications Framework of Ukraine: Master level 7.
Prerequisites	Bachelor’s degree.
Language(s) of instruction	Ukrainian.
The validity of educational program	Till 01.07.2023 .
Internet address of permanent location of educational program description	http://knutd.edu.ua/ekts/
2 – The purpose of educational program	
Training of specialists with deep knowledge as well as basic and professional competencies in the field of information technology, aimed at acquiring thorough knowledge and skills by students to perform professional tasks and duties of research, design and innovation nature in the field of modern computer systems and to have the ability to set and solve the problems of scientific and practical activities in research and production organizations and pedagogical work in higher educational institutions of different levels of accreditation. Formation and development of general and professional competencies in the field of computer engineering, aimed at obtaining software learning outcomes necessary for research, design, production, use and maintenance of computer systems and networks.	
3 – Characteristics of the educational program	
Subject area	The program is focused on the formation of higher education applicants’ competencies to acquire in-depth knowledge and skills in the specialty. Compulsory educational components - 73%, of which: general training disciplines - 6%, vocational training - 50%, practical training - 12%, learning a foreign language - 6%, diploma design – 26%. Disciplines of free choice of students – 27% are selected from the University catalog in accordance with the approved procedure of the University.
Orientation of the educational program	Educational and professional training for master’s degree.
The main focus of the program	Emphasis is on the formation and development of professional competencies in the field of software development: definition and analysis of customer requirements, software system architecture design, detailed design, construction and integration of software, its testing, installation, support, maintenance and assistance in timely replacement of software from operation; study of theoretical and methodological provisions, organizational and practical tools for creating software.
Features of the educational program	The program is based on well-known scientific positions, taking into account the current state of development of computer engineering, focuses on current specializations, within which further professional and scientific career is possible: computer systems and networks.

4 – Suitability of graduates for employment and further training	
Suitability for employment	The graduate is suitable for employment in enterprises, organizations and institutions operating in the field of computer engineering and computer systems and networks. The following positions can be held: information technology specialist, software development and testing specialist, computer program development specialist, system administration technician, configured computer system technician, structured cabling system technician, computer (information and computing) center technician.
Further training	Graduates have the possibility to continue their education at the third (educational and scientific) level of higher education and acquire additional qualifications in the system of adult education.
5 – Teaching and assessment	
Teaching and assessment	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 a teacher and a student. Forms of organization of the educational process are a lecture, a practical class, a laboratory class, an independent work, consultation, development of professional projects
Assessment	Tests, presentations, laboratory work reports, practicum reports, project works, credits and examinations.
6 – Program competencies	
Integral competence (IC)	Ability to solve complex problems and problems in the field of computer engineering or in the learning process, which involves research and / or innovation and is characterized by uncertainty of conditions and requirements.
General competencies (GC)	GC 1 Ability to adapt and act in a new situation.
	GC 2 Ability to abstract thinking, analysis and synthesis.
	GC 3 Ability to conduct research at the appropriate level.
	GC 4 Ability to search, process and analyze information from various sources.
	GC 5 Ability to generate new ideas (creativity).
	GC 6 Ability to identify, set and solve problems.
	GC 7 Ability to make sound decisions.
	GC 8 Ability to communicate in a foreign language.
Professional competencies (PC)	PC 1 Ability to identify the technical characteristics, design features, application and operation of software, hardware, computer systems and networks for various purposes.
	PC 2 Ability to develop software, components of computer systems and networks, Internet applications, cyberphysical systems using modern methods and programming languages, as well as design automation tools and systems.
	PC 3 Ability to design computer systems and networks taking into account objectives, constraints, technical, economic and legal aspects.
	PC 4 Ability to build and research models of computer systems and networks.
	PC 5 Ability to build architecture and create system and application software for computer systems and networks.
	PC 6 Ability to use and implement new technologies, including smart, mobile, green and secure computing technologies, to participate in the modernization and reconstruction of computer systems and networks, various embedded and distributed applications, in particular to increase their efficiency.
	PC 7 Ability to research, develop and select technologies for creating large and ultra-large systems.

	PC 8	Ability to ensure the quality of information technology products and services throughout their life cycle.
	PC 9	Ability to present the results of own research and / or development in the form of presentations, scientific and technical reports, articles and reports at scientific and technical conferences.
	PC 10	Ability to identify, classify and describe the operation of software and hardware, computer systems, networks and their components.
	PC 11	Ability to choose effective methods for solving complex problems of computer engineering, critically evaluate the results and justify decisions.
7 – Program learning outcomes		
Knowledge and understanding:		
PLO 1	Know the concepts, terms, research principles, design, production, use and maintenance of computers and computer systems, computer networks, cyberphysical systems, the Internet of Things, IT infrastructures.	
Application of knowledge and understanding (skills):		
PLO 2	Apply general cognition approaches, methods of mathematics, natural and engineering sciences to solve complex problems of computer engineering.	
PLO 3	Find the necessary data, analyze and assess them.	
PLO 4	Build and research models of computer systems and networks, assess their adequacy and identify the limits of applicability.	
PLO 5	Apply specialized conceptual knowledge, including modern scientific advances in computer engineering necessary for professional activities, original thinking and research, critical re-evaluation of information technology problems and at the frontiers of knowledge.	
PLO 6	Develop and implement projects in the field of computer engineering and related interdisciplinary projects, taking into account engineering, social, economic, legal and other aspects.	
PLO 7	Analyze issues, identify and formulate specific problems that need to be solved, choose effective methods to solve them.	
PLO 8	Solve problems of analysis and synthesis of computer systems and networks.	
PLO 9	Apply knowledge of technical characteristics, design features, purpose and rules of operation of software and hardware of computer systems and networks to solve complex problems of computer engineering and related problems.	
PLO 10	Develop software for embedded and distributed applications, mobile and hybrid systems.	
PLO 11	Carry out development and research of methods of analysis, synthesis, optimization and forecasting of quality of the processes of information system and technology functioning.	
PLO 12	Analyze the results of experiments, choose the best solutions, prepare and compile reviews, reports and scientific publications, predict the development of information systems and technologies.	
Formation of judgements:		
PLO 13	Search for information in various sources to solve problems of computer engineering, analyze and evaluate this information.	
PLO 14	Make effective decisions on the development, implementation and operation of computer systems and networks, analyze alternatives, assess the risks and likely consequences of decisions.	
PLO 15	Fluently communicate orally and in writing in Ukrainian and in one of the foreign languages (English, German, Italian, French, Spanish) when discussing professional issues, research and innovation in the field of information technology.	
PLO 16	Clearly and unambiguously convey own knowledge, conclusions and reasoning on information technology and related intersectoral issues to specialists and non-specialists, in particular, to people who are studying.	

8 – Resource support for program implementation	
Staffing	All scientific and pedagogical workers who provide the educational program on qualification, correspond to a profile and the 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 support	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 provided with an educational and methodological complex of all the components of the educational program, the presence 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 in some components of the educational program, ensuring 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 seekers of higher education	Training of foreign applicants for higher education is carried out according to accredited educational programs.

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

2.1 The list of components of the educational-vocational program of the second (Master's) level of higher education

Code	Components of the study program (study courses, course projects (works), practical training, qualification work)	Number of credits	Form of control
1	2	3	4
Compulsory components			
General courses cycle			
CC 1	Business Foreign Language (English)	3	credit
CC 2	Methodology of Modern Scientific Studies with the Basics of Intellectual Property	3	exam
Total for the cycle		6	
Vocational courses cycle			
CC 3	Programmed Devices for Object Communication	6	exam
CC 4	Computer Systems of High Performance	6	exam
CC 5	Technology of Software Design	6	exam
CC 6	Research and Development of Computer Networks	6	exam
CC 7	Research Practicum	6	credit
CC 8	Pre Diploma Practicum	9	credit
CC 9	Master's Thesis (project)	21	attestation
Total for the cycle		60	
Total credits for compulsory components		66	
Elective components			
CSC	Courses for student's choice	24	залік
Total credits		90	