

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

KYIV NATIONAL UNIVERSITY OF TECHNOLOGIES AND DESIGN

APPROVED BY THE ACADEMIC COUNCIL

Chairman of the Academic Council KNUTD

_____ **Ivan GRyshCHENKO**

(minutes «_____» _____ 2021 №__)

EDUCATIONAL-PROFESSIONAL PROGRAM
COMPUTER SYSTEMS AND NETWORKS

Level of higher education _____ **First** _____

Degree of higher education _____ **Bachelor** _____

Knowledge area _____ **12 Information technology** _____

Specialty _____ **123 Computer engineering** _____

Qualification _____ **Bachelor in Computer engineering** _____

Kyiv 2021

1. Profile of the educational-professional program "Computer Systems and Networks"

1 – General information	
Full names of the higher education institution and structural unit	Kyiv National University of Technologies and Design, Department of Computer engineering and electromechanics.
Degree of higher education and qualification	Level of higher education - first. Degree of higher education - bachelor. Knowledge area - 12 Information technology. Specialty - 123 Computer engineering.
Diploma and the scope	Bachelor`s Diploma, unitary, 240 credits ECTS.
Accreditation	–
Cycle/level	the sixth level according to National Qualifications Framework
Prerequisites	Complete general secondary education, professional higher education or junior bachelor's degree (junior specialist). In accordance with the Standard of Higher Education in the specialty based on the degree of junior bachelor (OQR of the junior specialist), the University recognizes and recalculates ECTS credits received within the previous educational program of junior bachelor (junior specialist).
Language	Ukrainian
The validity of the study program	–
Weblink to the study program description	http://en.knutd.edu.ua/ekts/
2 – The purpose of the study program	
<p>Training of specialists with deep knowledge, as well as basic and professional competencies in the field of computer engineering, aimed at acquiring the student's knowledge, skills and abilities necessary for employment, and ensuring his ability to work professionally.</p> <p>The main goals of the program are: training of specialists who are able to independently use and implement computer engineering technologies; formation and development of general and professional competencies in the field of computer engineering, aimed at acquiring the knowledge, skills and abilities necessary for the design, creation and maintenance of computer systems and networks.</p>	
3 – Characteristics of the study 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 - 75%, of which: general training - 34%, vocational training - 40%, practical training - 13%, foreign language learning - 13%. Disciplines of free choice of the student - 25% are chosen from the general university catalog according to the approved University procedure.
Program orientation	Educational-professional for bachelor's degree preparation.
The main focus of the program	Emphasis is placed on the formation and development of professional competencies in the field of computer engineering; study of theoretical and methodological provisions, organizational and practical tools for designing, creating and maintaining computer systems and networks.
Study program features	The educational-professional program develops theoretical and practical training in the field of design, creation and maintenance of computer systems and networks, as well as the introduction of innovative information technologies in the domestic sphere.
4 – Graduate's suitability for employment and further study	

The employment suitability	The graduate is suitable for employment in enterprises, organizations and institutions operating in the field of computer engineering and computer systems and networks. Professional titles of works that can be performed by the applicant: information technology specialist, software development and testing specialist, computer program development specialist, system administration technician, configured computer system technician, structured cabling system technician, technician computer (information and computing) center.	
Further study	Opportunity to study according to the educational-scientific and / or educational-professional program of the second (master's) level of higher education.	
5 – Teaching and grading		
Teaching and learning	Student-centered and problem-oriented learning, learning through educational, industrial, undergraduate practice and self-study are used. The system of teaching methods is based on the principles of purposefulness, binary - active direct participation of research and teaching staff and applicants for higher education. Forms of organization of the educational process: lecture, seminar, practical, laboratory classes, practical training, independent work, consultation, development of professional projects (works).	
Grading	Testing of knowledge, presentations, reports on laboratory works, reports on practice, control works, course (project) works, tests, examinations, public defense of qualifying work.	
6 – Program competencies		
Integral competence (IC)	Ability to solve complex specialized problems and practical problems during a professional activity in the field of computer science or training, which involves the application of theories and methods of computer engineering and is characterized by complexity and uncertainty of conditions.	
General competencies (GC)	GC 1	Ability to abstract thinking, analysis and synthesis.
	GC 2	Ability to learn and master modern knowledge.
	GC 3	Ability to apply knowledge in practical situations.
	GC 4	Ability to communicate in the state language qualitatively and in writing.
	GC 5	Ability to communicate in a foreign language.
	GC 6	Interpersonal skills.
	GC 7	Ability to identify, pose and solve problems.
	GC 8	Ability to work in a team.
	GC 9	Ability to exercise their rights and responsibilities as a member of society, to realize the values of civil (free democratic) society and the need for its sustainable development, the rule of law, human and civil rights and freedoms in Ukraine.
	GC 10	Ability to preserve and increase moral, cultural, scientific values and achievements of society based on understanding the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, techniques and technologies. active recreation and a healthy lifestyle.
Professional competencies (PC)	PC 1	Ability to apply legal and regulatory framework, as well as national and international requirements, practices and standards for the purpose of professional activity in the field of computer engineering.
	PC 2	Ability to use modern methods and programming languages to develop algorithmic and software.
	PC 3	Ability to create system and application software for computer systems and networks.

	PC 4	Ability to protect information processed in computer and cyberphysical systems and networks in order to implement the established information security policy.
	PC 5	Ability to use design automation tools and systems to develop components of computer systems and networks, Internet applications, cyberphysical systems, etc.
	PC 6	Ability to design, implement and maintain computer systems and networks of various types and purposes.
	PC 7	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 8	Willingness to participate in the implementation of computer systems and networks, their commissioning at facilities for various purposes.
	PC 9	Ability to systematically administer, use, adapt and operate existing information technologies and systems.
	PC 10	Ability to organize workplaces, their technical equipment, placement of computer equipment, use of organizational, technical, algorithmic and other methods and means of information protection.
	PC 11	Ability to draw up the obtained work results in the form of presentations, scientific and technical reports.
	PC 12	Ability to identify, classify and describe the work of software and hardware, computer and cyberphysical systems, networks and their components through the use of analytical methods and modeling methods.
	PC 13	Ability to solve problems in the field of computer and information technologies, to determine the limitations of these technologies.
	PC 14	Ability to design systems and their components taking into account all aspects of their life cycle and objectives, including design, configuration, operation, maintenance and disposal.
	PC 15	Ability to justify the choice of methods for solving specialized problems, critically evaluate the results, justify and defend decisions.
	PC 16	Ability to use and implement innovative information technologies and systems.

7 – Program learning outcomes

Knowledge and understanding:

PLO 1	Know and understand the scientific principles that underlie the operation of computer tools, systems and networks.
PLO 2	Have skills in experimentation, data collection and modeling in computer systems.
PLO 3	Know the latest technologies in computer engineering.
PLO 4	Know and understand the impact of technical solutions in the social, economic, social and environmental context.
PLO 5	Have knowledge of the basics of economics and project management.
PLO 6	Have knowledge in the field of innovative information technologies and systems.
Skills:	
PLO 7	Be able to apply knowledge to identify, formulate and solve technical problems of the specialty, using methods that are most suitable for achieving goals.
PLO 8	Be able to solve problems of analysis and synthesis of tools specific to the specialty.
PLO 9	Be able to think systematically and apply creative abilities to form new ideas.

PLO 10	Be able to apply knowledge of technical characteristics, design features, purpose and rules of operation of software and hardware of computer systems and networks to solve technical problems of the specialty.
PLO 11	Be able to develop software for embedded and distributed applications, mobile and hybrid systems, calculate, operate, typical for the specialty equipment.
PLO 12	Be able to search for information in various sources to solve problems of computer engineering.
PLO 13	Be able to work effectively both individually and as a team.
PLO 14	Be able to identify, classify and describe the operation of computer systems and their components.
PLO 15	Be able to combine theory and practice, as well as make decisions and develop a strategy for solving problems of the specialty, taking into account universal values, social, state and industrial interests.
PLO 16	Be able to perform experimental research on professional topics.
PLO 17	Be able to apply knowledge in the field of innovative information technologies and systems to solve practical problems.
Forming reasoning:	
PLO 18	Be able to evaluate the results obtained and defend the decisions made with arguments.
PLO 19	Communicate orally and in writing on professional issues in Ukrainian and one of the foreign languages (English, German, French, Spanish).
PLO 20	Use information technology and for effective communication at the professional and social levels
PLO 21	Ability to adapt to new situations, justify, make and implement decisions within its competence.
PLO 22	Realize the need for lifelong learning in order to deepen the acquired and acquire new professional knowledge, improve creative thinking.
PLO 23	Perform quality work and achieve the goal in compliance with the requirements of professional ethics.
8 – Resources for program implementation	
Staffing	All teaching staff who provide this scientific study program correspond to the taught courses profile by qualification and have got the necessary experience of pedagogical activity and practical work. High professionals with experience in research / management / innovation / creative work in the consumer industry field are involved in the training.
Logistics	Logistics allows to fully ensure the educational process throughout the study program cycle. The condition of the classes and laboratories is certified with sanitary and technical passports that comply with existing regulations.
Information and methodical support	The program is fully provided with an educational and methodical complex of all courses, which availability is presented in the modular environment of the educational process of the University.
9 – Academic mobility	
National credit mobility	The program provides the possibility for academic mobility in some components provided the acquisition of general and / or professional competencies.
International credit mobility	The program develops prospects for internships and participation in research projects and academic mobility programs abroad.
Studying for foreign students	Studying of foreign students is according to accredited programs.

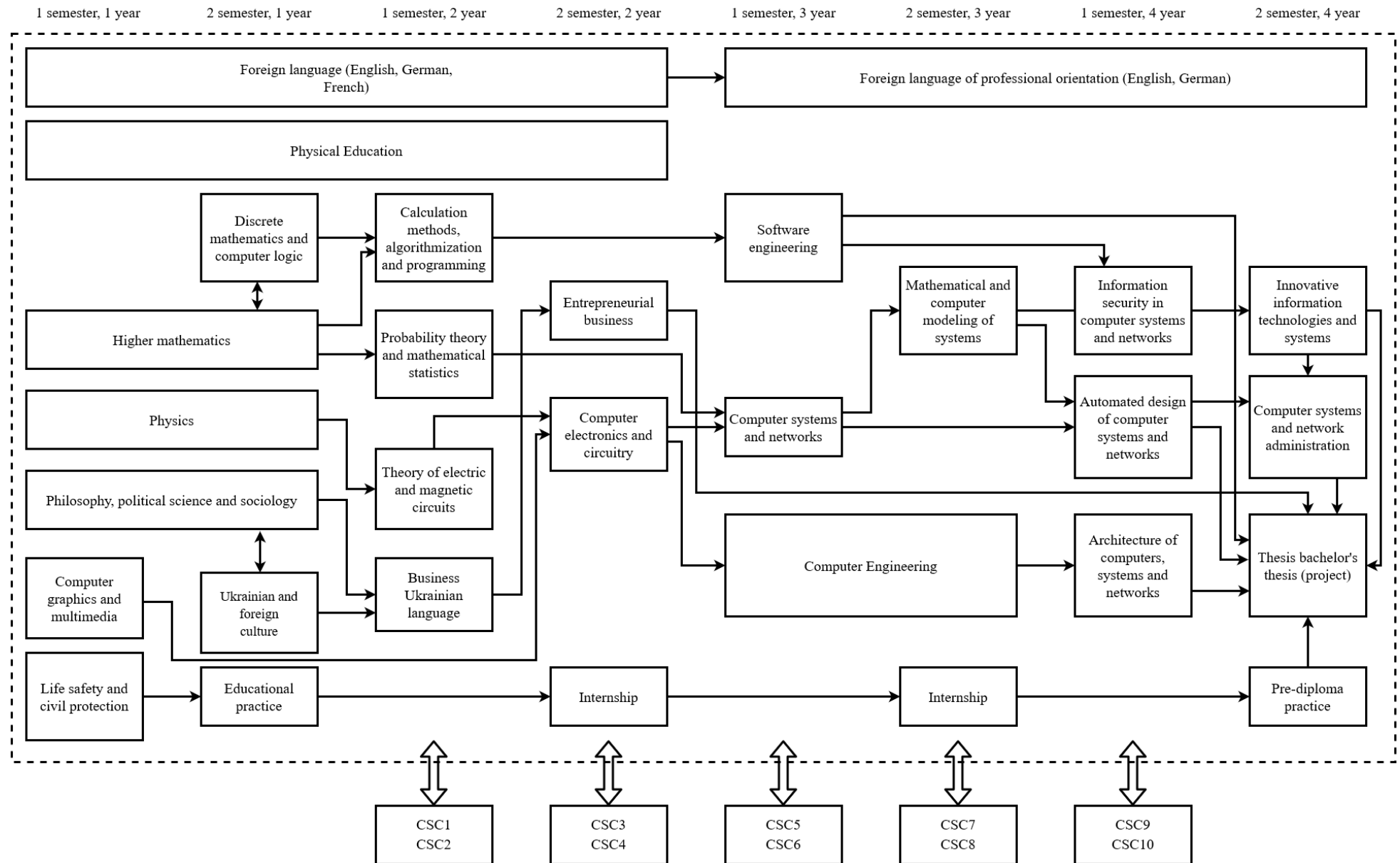
2. The list of components of the educational program and their logical sequence

2.1. List of components of the educational-professional program

Cod	Components of the study program (study courses, courses projects (works), practices, qualification work)	Number of credits	Form of control
1	2	3	4
Compulsory components			
General courses cycle			
CC 1	Business Ukrainian language	3	credit
CC 2	Foreign Language(english , german , france)	12	exam
CC 3	Ukrainian and foreign culture	3	credit
CC 4	Philosophy, political science and sociology	6	exam
CC 5	Physical Education	3/9*	credit
CC 6	Higher mathematics	12	exam
CC 7	Probability theory and mathematical statistics	3	exam
CC 8	Physics	12	exam
CC 9	Discrete mathematics and computer logic	3	credit
CC 10	Computer graphics and multimedia	6	exam
CC 11	Theory of electric and magnetic circuits	3	exam
CC 12	Life safety and civil protection	3	exam
CC 13	Entrepreneurial business	3	credit
Total for the cycle		72	
Professional courses cycle			
CC 14	Foreign language of professional orientation (English , German)	12	exam
CC 15	Computer Engineering	6	credit,exam
CC 16	Computer electronics and circuitry	6	exam
CC 17	Architecture of computers, systems and networks	3	exam
CC 18	Calculation methods, algorithmization and programming	6	exam
CC 19	Software engineering	6	exam
CC 20	Information security in computer systems and networks	6	exam
CC 21	Automated design of computer systems and networks	6	exam
CC 22	Computer systems and networks	6	credit
CC 23	Innovative information technologies and systems	3	exam
CC 24	Computer systems and network administration	6	exam
CC 25	Mathematical and computer modeling of systems	6	exam
CC 26	Educational practice	6	credit
CC 27	Internship	12	credit
CC 28	Pre-diploma practice	6	credit
CC 29	Thesis bachelor's thesis (project)	12	attestation
Total for the cycle		108	
Total credits for Compulsory components		180	
Elective components			
CSC	Courses for student`s choice	60	credit
Total credits for Elective components		60	
TOTAL CREDITS		240	

* Non-credit academic discipline in 2, 3, 4 semesters.

2.2. Structural and logical scheme of the educational-professional program "Computer Systems and Networks" in the specialty 123 Computer Engineering



3. Attestation

Form of attestation	Attestation of a graduate of an educational program is carried out in the form of public defense of a bachelor's thesis (project).
Document of higher education	Bachelor's degree with a qualification: Bachelor of Computer Engineering.

4. Matrix of correspondence of program competences to components of the educational-professional program "Computer systems and networks"

	GC1	GC2	GC3	GC4	GC5	GC6	GC7	GC8	GC9	GC10	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9	PC10	PC11	PC12	PC13	PC14	PC15	PC16
CC1				+			+														+					
CC2		+		+	+		+																			
CC3		+		+	+	+			+	+																
CC4	+			+		+		+	+	+																
CC5						+		+		+																
CC6	+																						+			+
CC7	+						+																+			+
CC8																							+			+
CC9	+																						+			+
CC10			+												+							+				
CC11			+				+									+	+			+		+				+
CC12			+							+	+														+	
CC13			+			+		+			+															
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CC26			+					+												+	+					
CC27			+					+										+		+	+					
CC28			+				+				+			+	+		+		+	+						
CC29			+				+				+			+	+	+	+		+	+				+	+	+

5. Matrix for providing software learning outcomes with relevant components of the educational-professional program "Computer Systems and Networks"

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PLO 13	PLO 14	PLO 15	PLO 16	PLO 17	PLO 18	PLO 19	PLO 20	PLO 21	PLO 22	PLO 23	
CC1					+							+						+	+	+				
CC2												+							+	+	+			
CC3															+			+					+	+
CC4				+									+		+								+	
CC5													+										+	+
CC6	+	+						+								+								
CC7	+	+														+								
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CC11	+	+					+																	
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CC27													+		+							+		
CC28		+			+	+						+			+	+	+			+				+
CC29		+			+	+						+			+	+	+	+	+	+	+			+