MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

KYIV NATIONAL UNIVERSITY OF TECHNOLOGIES AND DESIGN

EDUCATIONAL PROFESSIONAL PROGRAM

SYSTEMS ANALYSIS AND MANAGEMENT

Degree of higher education <u>first (bachelor)</u>

Branch of knowledge <u>12 Information Technology</u>

Specialties <u>124 Systems Analysis</u>

Qualification <u>Bachelor of Systems Analysis</u>

Kyiv 2021

1. Profile of the educational and professional program "System analysis and management"

1 – General information	
Full name of the institution of higher education and structural unit	Kyiv National University of Technologies and Design Department of computer engineering and electromechanics
Higher education degree and qualification in the original language	Higher education level - first (bachelor's) Degree of higher education - bachelor Field of knowledge - 12 Information technologies Specialty - 124 System Analysis
Type of diploma and scope of educational program	Bachelor's degree, single, 240/180 ECTS credits
Availability of accreditation	_
Cycle / level	The National Qualifications Framework of Ukraine is the sixth level
Prerequisites	Complete general secondary education, professional higher education or a bachelor's degree
Language (s) of instruction	Ukrainian
Term of the educational program	_
Internet address of the permanent placement of the description of the educational program	http://knutd.edu.ua/ekts/
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 systems analysis, aimed at acquiring the student's knowledge, skills and abilities necessary for employment, and ensuring his ability to work. The main objectives of the program are: training of specialists capable of developing and applying methods and tools of systems analysis to solve management problems in complex systems; formation and development of general and professional competencies in the field of systems analysis, aimed at acquiring the knowledge, skills and abilities necessary to solve management problems based on systems methodology.	
3 – Characteristics of the educational program	
Subject area	The program is focused on the formation of applicants' competencies for the acquisition of deep knowledge, skills and abilities in the specialty. Compulsory educational components - 75%, of which: disciplines of general training - 30%, vocational training - 44%, practical training - 13%, learning a foreign language - 13%. Disciplines of free choice of students - 25% are selected from the university catalog in accordance with the approved procedure at the University.
Orientation of the educational program	Educational and professional.
The main focus of the program	Emphasis is placed on the formation and development of professional competencies in the field of systems analysis; study of theoretical and methodological provisions, organizational and practical management tools in complex systems.

Features of the educational program	The educational-professional program develops theoretical and practical training in the field of systems analysis to ensure management in complex systems.

4 – Suitability of graduates for employment and further study

Suitability for employment	Graduates are able to perform professional work as specialists in information technology and systems analysis, as well as software technicians, namely: a specialist in software development and testing, a specialist in computer program development, a system administration technician, a technician with a configured computer. computer system, technician of the structured cabling system, technician of the computer (information-computing) center.
Further training	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 assessment

Teaching and learning	Student-centered and problem-oriented learning, learning through industrial (and research for masters) 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 students of higher education. Forms of organization of the educational process: lecture, seminar, practical, laboratory classes, practical training, independent work, consultation, development of professional projects (works).
Evaluation	Testing of knowledge, presentations, reports on laboratory works, reports on practice, control works, course (project) works, oral and written examinations, public defense of qualifying work.

6 – Program competencies

Integral competence (IC)	Ability to solve complex specialized problems and practical problems of systems analysis in professional activities or in the learning process, involving the application of theoretical principles and methods of systems analysis and information technology and characterized by complexity and uncertainty of conditions.	
General competencies (GK)	K 01	Ability to abstract thinking, analysis and synthesis.
	K 02	Ability to apply knowledge in practical situations.
	K 03	Ability to plan and manage time.
	K 04	Knowledge and understanding of the subject area and understanding of professional activity.
	K 05	Ability to communicate in the state language orally and in writing.
	K 06	Ability to communicate in a foreign language.
	K 07	Ability to search, process and analyze information from various sources.
	K 08	The ability to be critical and self-critical.
	K 09	Ability to adapt and act in a new situation.
	K 10	Ability to work autonomously.
	K 11	Ability to generate new ideas (creativity).
	K 12	Ability to work in a team.
	K 13	Ability to work in an international context.

	K 14	Ability to evaluate and ensure the quality of work performed.
	K 15	The 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.
	K 16	Ability to preserve and multiply 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 leading a healthy lifestyle.
Professional competencies (FC)	K 17	Ability to use systems analysis as a modern interdisciplinary methodology based on applied mathematical methods and modern information technologies and focused on solving problems of analysis and synthesis of technical, economic, social, environmental and other complex systems.
	K 18	Ability to formalize problems described in natural language, including through mathematical methods, to apply general approaches to mathematical modeling of specific processes.
	K 19	Ability to build mathematically correct models of static and dynamic processes and systems with concentrated and distributed parameters taking into account the uncertainty of external and internal factors.
	K 20	Ability to determine the main factors influencing the development of physical, economic, social processes, to distinguish stochastic and indeterminate indicators, to formulate them in the form of random or fuzzy quantities, vectors, processes and to investigate the relationships between them.
	K 21	Ability to formulate optimization problems in the design of control systems and decision making, namely: mathematical models, optimality criteria, constraints, management objectives; choose rational methods and algorithms for solving optimization and optimal control problems.
	K 22	Ability to computer implementation of mathematical models of real systems and processes; design, apply and maintain software tools for modeling, decision making, optimization, information processing, data mining.
	K 23	Ability to use modern information technologies for computer implementation of mathematical models and prediction of behavior of specific systems, namely: object-oriented approach in the design of complex systems of different nature, applied mathematical packages, application of databases and knowledge.
	K 24	Ability to organize work on the analysis and design of complex systems, the creation of appropriate information technology and software.

	К 25	Ability to present mathematical arguments and conclusions from them with clarity and accuracy and in forms that are suitable for the audience both orally and in writing.
	К 26	Ability to develop experimental and observational studies and analyze the data obtained in them.
	К 27	Ability to systematically analyze their professional and social activities, evaluate the experience gained.
	К 28	Ability to use and implement innovative information technologies and management systems.

7 – Program learning outcomes

Knowledge and understanding:

ПР 01	Know and incorporate integral analysis of the practice of differentiation and integral series and Fourier integration, linear algebra and vector analysis, functional analysis and discrete mathematics to the extent necessary to perform typical tasks of systems analysis.
ПР 02	Be able to use standard schemes to solve combinatorial and logical problems that form natural language, use classical algorithms to check authorities and classify objects, many, recovery, graphical, group, ring, lattice, Boolean functions, etc.
ПР 03	Be able to determine the probabilistic indicators of stochastic indicators and factors that affect the characteristics of the studied processes, investigate the properties and find the characteristics of many significant random vectors and use them to solve complex problems, formalize stochastic indicators and factors in appropriate quantities, vectors, processes.
ПР 04	Know and be able to basic methods of qualitative analysis and integration of ordinary differential levels and systems, differential levels in parts of derivatives, including the level of mathematical physics.
ПР 05	Know the basic principles of the theory of metric spaces, Lebesgue theory of measure and integral, the theory of bounded linear operators in Banach and Hilbert spaces, technologies and methods of functional analysis for solving problems of control of complex processes in conditions of uncertainty.
ПР 06	Have knowledge in the field of innovative information technologies and management systems.

Application of knowledge and understanding (skills): solving problems of system analysis in conditions of uncertainty of goals, external

ПР 07	Know and be able to apply the basic methods of setting and conditions and conflicts.
ПР 08	Know the basics of optimization theory, optimal control, decision theory, be able to apply them in practice to solve applied control problems and design complex systems.
ПР 09	Have modern methods of developing programs and software packages and making optimal decisions about the composition of software, algorithms, procedures and operations.
ПР 10	Be able to create efficient algorithms for computational problems of systems analysis and decision support systems.
ПР 11	Know the architecture of modern computer systems and computer networks.

ПР 12	Know and be able to apply in practice database management systems and information systems.
ПР 13	Apply methods and tools for working with data and knowledge, methods of mathematical, logical-semantic, object and simulation modeling, technology of system and statistical analysis.
ПР 14	Be able to apply knowledge in the field of innovative information technologies and systems to solve practical management problems.
Formation of judgments:	
ПР 15	Design, implement, test, implement, maintain, operate data and knowledge software in computer systems and networks.
ПР 16	Understand and apply in practice the methods of statistical modeling and forecasting, evaluate the original data.
ПР 17	Understand Ukrainian and foreign languages at a level sufficient for processing professional information and literary sources, professional oral and written communication, writing texts on professional topics.
ПР 18	Understand and realize their rights and responsibilities as a member of society, to realize the values of a free democratic society, the rule of law, human and civil rights and freedoms in Ukraine.
ПР 19	Preserve and increase the achievements and values of society based on understanding the place of the subject area in the general system of knowledge, use different types and forms of physical activity to lead a healthy lifestyle.
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.
Material and technical software	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 components of the educational program, 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 in 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. List of components of the educational program and their logical sequence

2.1 List of components of the educational and professional program

Code	Components of the educational program (academic disciplines, term papers (projects), practices, qualification work)	Number of credits	Form of final control
1	2	3	4
Mandatory OP components			
General training cycle			
OK 1	Ukrainian and Foreign Culture	3	credit
OK 2	Foreign language	12	exam
OK 3	Ukrainian and foreign culture	3	credit
OK 4	Philosophy, political science and sociology	6	exam
OK 5	Physical Training *	3	credit
OK 6	Higher mathematics	12	exam
OK 7	Probability theory and mathematical statistics	3	exam
OK 8	Physics	12	exam
OK 9	Discrete mathematics and computer logic	3	exam
OK 10	Computer graphics and multimedia	6	exam
OK 11	Methods of optimization and research of operations	3	exam
OK 12	Life safety and civil defense	3	exam
OK 13	Entrepreneurial business	3	exam
Total from the cycle		78	
Цикл професійної підготовки			
OK 14	Foreign language on profession direction	12	exam
OK 15	System analysis and management	6	exam
OK 16	Data structures and analysis	6	credit
OK 17	Architecture of computers, systems and networks	3	exam
OK 18	Calculation methods, algorithmization and programming	6	credit
OK 19	Software engineering	6	exam
OK 20	Information security in computer systems and networks	6	exam
OK 21	Automated design of computer systems and networks	6	exam
OK 22	Systems and methods of decision making	6	credit
OK 23	Innovative information technologies and systems	6	exam
OK 24	Computer systems and network administration	6	exam
OK 25	Mathematical and computer modeling of systems	3	exam
	Practical training	24	credit
	Thesis bachelor's thesis (project)	12	certification
Total from the cycle		105	
The total amount of required components		**180**	
Selective components of the educational program			
DVVS	Disciplines of free choice of the student	60	credit
The total amount of sample components		**60**	
TOTAL VOLUME OF THE EDUCATIONAL PROGRAM		**240**	

* Non-credit academic discipline