3. Educational program. Information Technology and Business Analytics (Data Science) (Master`s Degree). The Quarantor of the educational program is Roskladka A.A, Prof., Doctor of Economic Science, Heard of the Department of Digital Economics and Systematic Analysis

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3. 1. Profile of the educational program of specialty 124 " Systematic Analysis " (specialization «Information Technology and Business Analytics (Data Science)")

1 – General information	
Full name of the institution of higher education and structural department	Kyiv National University of Trade and Economic, Faculty of Information Technology, Department of Digital Economics and Systematic Analysis
The degree of higher education and the name of the qualification in the language of the original	Degree in Higher Education - "Master" («магістр») specialty - «Systems Analysis» («Системний аналіз») Specialization - « Information Technology and Business Analytics (Data Science) » («Інформаційні технології та бізнес-аналітика (Data Science)»
The official name of the educational program	«Information Technology and Business Analytics (Data Science)")
Type of the diploma and the volume of the educational program	Master's degree, unitary, 90 ECTS credits, term of study - 1 year 4 months
Presence of accreditation	Primary accreditation planned in 2022
Cycle / Level	NFQ of Ukraine - level 7, FQ-EHEA - the second cycle, EQF-LLL - 7 level
Prerequisites	Educational Degree in Higher Education – "Bachelor"
Language (s) of teaching	Ukrainian
The term of the educational program	2 years
Internet address of the permanent description of	https://knute.edu.ua

the educational program	
2 – The purpose of the educational program	
.Preparation of Masters of Systems Analysis capable for successfully performing of comprehensive business analysis in the complex systems based on system methodology of Data Science, mathematical methods and software tools using modern information technology.	
3 - Characteristics of the educational program	
Subject area (field of knowledge, specialty, specialization) (if available))	Field of Knowledge 12 « Information Technology », Specialty 124 " Systems Analysis ", Specialization " Information Technology and Business Analytics (Data Science)" "
Orientation of the educational program	Educational and professional, research, professional, practical. Emphasis on studying the theoretical and practical principles of mathematical and computer modeling of data of various nature, intellectual analysis and synthesis of data and knowledge.
Educational focus of educational program and specialization	Special education in the field of intelligent business analysis in complex systems of various nature based on the system methodology of Data Science using information technologies. Key words: data systems of various nature (information, economic, financial, social, political, technical, organizational, environmental, etc.), intellectual data analysis, business analytics, information technologies, mathematical modeling, computer simulation., Big Data, Data Science. .
Features of the program	In-depth study and knowledge of promising directions of mathematical and computer simulation of processes and systems, information technologies of intelligent data analysis.
4 – Eligibility of graduates to employment and further training	
Eligibility for employment	Graduates of the educational program "Information Technology and Business Analytics (Data Science) can work in scientific, educational, analytical, IT and other institutions

	and subdivisions, which require the use of system analysis methods and data analysts, according to occupations defined by the National Classifier Ukraine "Classifier of professions (DK 003: 2010)": 1238 Project Managers and Programs 2121.2 Mathematician analyzing operations; 2131.1 Scientific consultant (computing systems); 2131.2 Analyst of computer systems; 2131.2 Data Administrator; 2131.2 Analyst of a computer data bank; 2149.2 Analyst of systems (except for computer); 2433.1 Scientific consultant (informational analyst); 2433.2 Analyst of consolidated information. 2447 Professional in the field of project management and programs.
Further training	Ability to study in postgraduate studies in specialties: 121 - Software Engineering; 122 - Computer Science; 123 - Computer Engineering; 124 - System Analysis; 125 ¬ Cyber Security; 126 - Information Systems and technology ..
5 – Teaching and assessment	
Teaching and learning	Problem-oriented training, self-learning, training through practical training.
Assessment	Current control, written examinations, protection of coursework, defense of graduation qualifying work. The assessment is carried out in accordance with the "Regulations on the assessment of the results of studying students and postgraduate students of KNTEU", "Regulations on the organization of educational process of students"
6 – Program competencies	
Integral competence	Ability to solve research and innovation problems in the field of

	systems analysis, involving the application of theory and methods of Data Science, business analysis, data engineering and knowledge.
General competencies	GC1. Ability to abstract thinking, analysis and synthesis. GC2. Ability to communicate in a foreign language. GC3. Ability to search, process and analyze information of different sources GC4. Ability to communicate with representatives of other professional groups of different levels (with experts from other fields of knowledge / types of economic activity). GC5. Ability to develop and manage projects.
Professional competence of the specialty (PC)	PC1. Ability to integrate knowledge and carry out systems research, apply methods of mathematical and information modeling of complex systems and processes of different nature. PC2. Ability to design the information systems architecture. PC3. Ability to develop decision support systems and recommendation systems. PC4. Ability to assess risks, to develop risk management algorithms in complex systems of different nature. PC5. Ability to model, predict and design complex systems and processes based on methods and tools of systems analysis. PC6. Ability to apply the theory and methods of Data Science for performing data mining to identify new properties and generate new knowledge about complex systems. PC7. Ability to manage work flows in the field of information technology which are complex, unpredictable and require new strategic approaches. PC8. Ability to develop and implement scientific and applied projects in the field of information technology and related interdisciplinary projects.

	PC9. Ability to protect intellectual property rights, commercialization of research and innovation results. PC10. Ability for self-education and professional development. *PC11. Ability to effectively use the theory and methods of Data Science.* *PC12. Ability to carry out procedures for research, analysis, systematization and processing of Big data.* *PC13. Ability to develop and implement models of data mining problems by means of computer modeling.*
7 – Program learning outcomes	
	PLO1. Specialized conceptual knowledge, which includes modern scientific achievements in the field of systems analysis and information technology and is the basis for original thinking and research. PLO 2. Build and research models of complex systems and processes using methods of systems analysis, mathematical, computer and information modeling. PLO 3. Apply methods of disclosing uncertainties in problems of system analysis, reveal situational uncertainties and uncertainties in the tasks of interaction, counteraction and conflict of strategies, find a compromise in disclosing conceptual uncertainty. PLO 4. Develop and apply methods, algorithms and tools for predicting the development of complex systems and processes of different nature. PLO 5. Use risk assessment measures and apply them in the analysis of multi factorial risks in complex systems. PLO 6. Apply methods of machine learning and data mining, mathematical apparatus of fuzzy logic, game theory and distributed artificial intelligence to solve complex problems of systems analysis. PLO 7. To develop intelligent systems in the conditions of poorly structured data of different nature.

	PLO 8. Identify and evaluate the parameters for mathematical models of control objects. PLO 9. Develop and apply models, methods and algorithms for decision-making in conditions of conflict, unclear information, uncertainty and risks. PLO 10. It is clear and unambiguous to convey one's own knowledge, conclusions and arguments to specialists and non-specialists, in particular to students PLO 11. Freely present and discuss orally and in writing the results of research and innovation, other issues of professional activity in the state and English languages. PLO *12.Develop data and knowledge management models in complex systems.* PLO *13.Perform intelligent analysis and processing of Big data by means of computer modeling.*
8 – Resource support for program implementation	
Personnel support	Specialists who train masters in the educational program "Information Technology and Business Analytics (Data Science)" must have professional knowledge and professional skills in data analysis, mathematical modeling and modern information technology. The participation of foreign specialists and practitioners in the teaching of disciplines is possible.
Material and technical support	The basis of the material and technical support is made up of specialized computer laboratories with modern hardware and software resources that provide high-quality training for masters in the educational program "Information Technology and Business Analytics (Data Science)".
Information and educational and methodological support	General scientific and special sources of information from system analysis and data analysis, educational-methodical and monographic literature, information resources of the distance learning system and the Internet.

9 – Academic Mobility	
National Credit Mobility	National credit mobility is carried out in accordance with the concluded agreements on academic mobility.
International Credit Mobility	International credit mobility is implemented through the conclusion of agreements on international academic mobility (Erasmus +), on double diploma, on long-term international projects that provide for the training of students, the issuance of a double diploma, and the like.
Teaching foreign applicants for higher education	Conditions and features of the educational program in the context of teaching foreign citizens: knowledge of the Ukrainian language at a level not lower than B1.

3.2. **The list of components of the educational program and their logical consistency**

List of components of EP

Code number	Educational program components (educational disciplines, course projects (works), practice, qualifying examination, final qualification work)	Number of credits
Compulsory components of EP		
CC1	Theory and practice of scientific research	6
CC2	English of Data Analytics	6
CC3	System analysis of complex economic systems under conditions of uncertainty	6
CC 4	Design of recommendation systems	6
CC 5	Knowledge management	7,5
CC 6	Intelligent systems	7,5
CC 7	Big Data Analytics	6
Total volume of compulsory components		**45**
Selective components of EP		
SC 1	Enterprise Java programming	6
SC 2	Internet resources Security	6
SC 3	Information systems security	6
SC 4	Biometric authentication technologies in information systems	6
SC 5	Information policy of the state	6
SC 6	Cryptographic methods of information protection	6
SC 7	Video information processing methods	6
SC	Applied systems analysis	6

Code number	Educational program components (educational disciplines, course projects (works), practice, qualifying examination, final qualification work)	Number of credits
8		
SC 9	Stochastic models in economics	6
SC 10	Mobile application development technology	6
SC 11	Financial ecosystems	6
SC 12	Functional and logical programming	6
Total amount of selective components::		**24**
	Practical training	
Production (pre-diploma) practice		9
	Attestation	
Preparation of final qualification work and attestation		12
GENERAL SCOPE OF THE EDUCATIONAL PROGRAM		**240**

For all components of the educational program, the form of final control is an exam.

Structural logical scheme of Educational Program

3.3 Form of certification of applicants for higher education

Certification is carried out in the form of public defense of the qualification work.

Qualification work should involve solving a complex specialized problem or scientific and practical problem of business intelligence research and / or innovation in the field of systems analysis using the theoretical provisions and methods of Data Science using information technology.

Qualification work should not contain academic plagiarism, fabrication, falsification.

Qualification work must be published on the official website of the higher education institution or its subdivision, or in the repository of the higher education institution.

Publication of qualification works containing information with limited access should be carried out in accordance with the requirements of the legislation.

3.4. Matrix of correspondence of program competences compulsory components of the educational program

Components / Competences	CC 1	CC 2	CC 3	CC 4	CC 5	CC 6	CC 7
GC1	+		+	+		+	+
GC 2		+					
GC 3	+		+	+			+
GC 4	+	+			+		
GC 5				+		+	
GC 1	+		+		+	+	
GC 2				+		+	
GC 3				+			
GC 4			+				
GC 5	+		+	+		+	
GC 6				+	+		+
GC 7	+		+				
GC 8	+					+	
GC 9	+				+		
GC 10	+	+					
GC 11				+			+
GC 12				+			+
GC 13				+		+	+

3.5. Matrix of correspondence of program competences selective components of the educational program

Components / Competences	SC 1	SC 2	SC 3	SC 4	SC 5	SC 6	SC 7	SC 8	SC 9	SC 10	SC 11	SC 12
GC1								+	+	+		+
GC 2												
GC 3	+	+	+	+		+						
GC 4	+				+		+	+			+	
GC 5				+			+			+		+
PC 1	+				+			+	+		+	+
PC 2	+	+	+	+		+				+		+
PC 3		+	+			+		+			+	
PC 4				+					+			
PC 5								+		+		
PC 6												+
PC 7	+	+	+			+	+		+			
PC 8	+			+	+			+	+	+	+	+
PC 9							+				+	
PC 10					+			+			+	
PC 11										+		
PC 12				+				+		+		
PC 13		+	+			+				+		+

3.6. Matrix for providing software learning outcomes relevant compulsory components of the educational program

Components / Program learning outcomes	CC 1	CC 2	CC 3	CC 4	CC 5	CC 6	CC 7
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				+			+

3.7. Matrix for providing software learning outcomes relevant selective components of the educational program

Components / Program learning outcomes	SC 1	SC 2	SC 3	SC 4	SC 5	SC 6	SC 7	SC 8	SC 9	SC 10	SC 11	SC 12
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				+			+			+		