

### 3. Educational program.

Information Technology and Business Analytics (Data Science) (Master`s Degree).

The Guarantor of the educational program is Roskladka A.A, Prof., Doctor of Economic Science, Head of the Department of Digital Economy and System Analysis

#### 3. 1. Profile of the educational program of specialty 124 «System Analysis» (specialization «Information Technologies and Business Analytics (Data Science)»)

<b>1 – General information</b>	
<b>The full name of the institution of higher education and structural department</b>	State University of Trade and Economic, Faculty of Information Technologies, Department of Digital Economy and System Analysis
<b>The degree of higher education and the name of the qualification in the language of the original</b>	Degree in Higher Education - "Master" specialty - «System Analysis» Specialization - «Information Technologies and Business Analytics (Data Science) »
<b>The official name of the educational program</b>	«Information Technologies and Business Analytics (Data Science)»
<b>Type of the diploma and the volume of the educational program</b>	Master's degree, unitary, 90 ECTS credits, term of study - 1 year 4 months
<b>Presence of accreditation</b>	Accreditation is valid until 2028
<b>Cycle / Level</b>	NQF of Ukraine - level 7 FQ-EHEA - the second cycle EQF-LLL- Level 7
<b>Prerequisites</b>	Completion of a Bachelor's degree
<b>Language (s) of teaching</b>	Ukrainian, English
<b>Program validity period</b>	2 years
<b>Internet address of the permanent description of the educational program</b>	<a href="https://knute.edu.ua">https://knute.edu.ua</a>
<b>2 – The purpose of the educational program</b>	

Preparation of Masters of Systems Analysis capable for successfully performing of comprehensive business analysis in the complex systems based on the system methodology of Data Science, mathematical methods and software tools using modern information technologies.	
<b>3 - Characteristics of the educational program</b>	
<b>Subject area (branch of knowledge, specialty, specialization) (if available))</b>	Branch of Knowledge 12 « Information Technologies», Specialty 124 " System Analysis ", Specialization " Information Technologies and Business Analytics (Data Science)”
<b>Orientation of the educational program</b>	Educational and professional. 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.
<b>Educational focus of educational program and specialization</b>	Special education in the field of intelligent business analysis in complex systems of various nature based on the system methodology of <i>Data Science</i> 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.
<b>Features of the program</b>	In-depth study and knowledge of promising directions of mathematical and computer simulation of processes and systems, information technologies of intelligent data analysis.
<b>4 – Eligibility of graduates to employment and further training</b>	
<b>Eligibility for employment</b>	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.
<b>Further training</b>	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 Technologies

<b>5 – Teaching and assessment</b>	
<b>Teaching and learning</b>	Problem-oriented training, self-learning, training through practical training.
<b>Assessment</b>	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"
<b>6 – Program competencies</b>	
<b>Integral competence</b>	Ability to solve the research and innovation problems in the field of systems analysis, that involves the application of theory and methods of Data Science, business analysis, data engineering and knowledge.
<b>General competencies</b>	GC1. Ability to abstract thinking, analysis and synthesis. GC2. Ability to communicate in a foreign language. GC3. Ability to search, process and analyze information from 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 projects and manage them.
<b>Professional competence of the specialty (PC)</b>	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 architecture of the information systems PC3. Ability to develop the systems of decision support and recommendation systems. PC4. Ability to assess risks, to develop risk management algorithms in the 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.

<b>7 – Program learning outcomes</b>	
	<p>PLO 1. 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.</p> <p>PLO 2. Design and research models of complex systems and processes using methods of systems analysis, mathematical, computer and information modeling.</p> <p>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.</p> <p>PLO 4. Develop and apply methods, algorithms and tools for predicting the development of complex systems and processes of different nature.</p> <p>PLO 5. Use the risk assessment measures and apply them in the analysis of multi factorial risks in complex systems.</p> <p>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.</p> <p>PLO 7. To develop intelligent systems in the conditions of poorly structured data of different nature.</p> <p>PLO 8. Identify and evaluate the parameters for mathematical models of control objects.</p> <p>PLO 9. Develop and apply models, methods and algorithms for decision-making in conditions of conflict, unclear information, uncertainty and risks.</p> <p>PLO 10. Communicate their own knowledge, conclusions and reasoning to specialists and non-practitioners, in particular to persons who are studying clear and unambiguous.</p> <p>PLO 11. Fluently present and discuss the results of research and innovation, other issues of professional activity in the state and English languages orally and in writing,</p> <p>PLO 12..Develop the data and knowledge management models in complex systems.</p> <p>PLO 13..Perform intelligent analysis and processing of Big data by means of computer modeling.</p>
<b>8 – Resource support for program implementation</b>	
<b>Personnel support</b>	<p>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.</p> <p>The participation of foreign specialists and practitioners in the teaching of disciplines is possible.</p>
<b>Material and technical support</b>	<p>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)".</p>

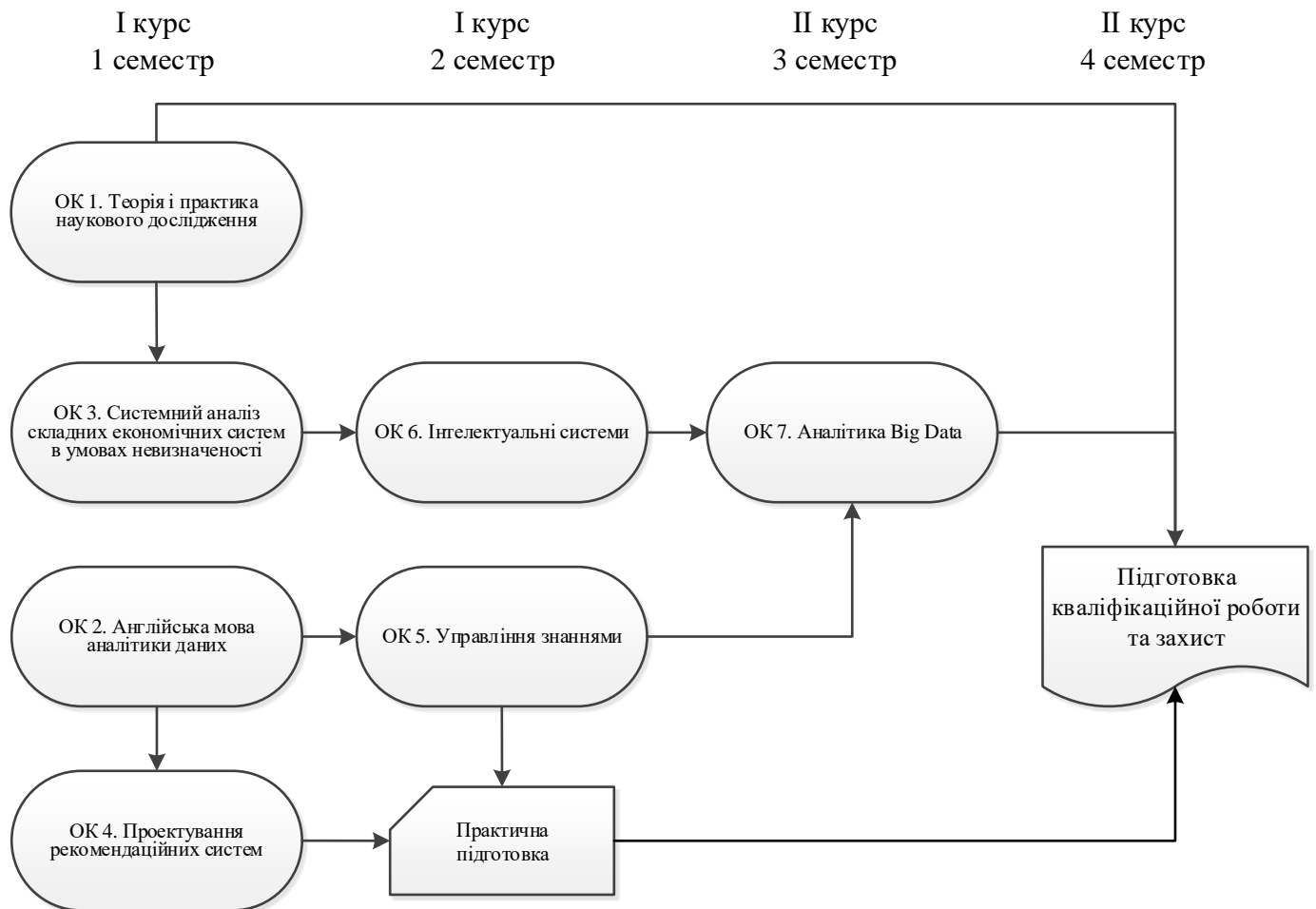
<b>Information and educational and methodological support</b>	General scientific and special sources of information from system analysis and data analysis, educational-methodical and monographic literature, information resources of the distance learning system and the Internet.
<b>9 – Academic Mobility</b>	
<b>National Credit Mobility</b>	National credit mobility is carried out in accordance with the concluded agreements on academic mobility.
<b>International Credit Mobility</b>	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 etc.
<b>Teaching foreign applicants for higher education</b>	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

Reference code of a discipline	Components of the educational program (academic disciplines, course projects (works), practices, qualification exam, qualification paper)	Number of ECTS credits
<b>Compulsory components of EP</b>		
CC 1.	Theory and practice of scientific research	6
CC 2.	English of Data Analytics	6
CC 3.	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
<b>Total credits allocated to compulsory components:</b>		<b>45</b>
<b>Selective components of EP</b>		
SC 1.	Enterprise Java programming	6
SC 2.	Life safety	6
SC 3.	Security of information systems and networks	6
SC 4.	Biometric authentication technologies in information systems	6
SC 5.	Contract law	6
SC 6.	Information policy of the state	6
SC 7.	Information wars	6
SC 8.	Cryptographic methods of information protection	6
SC 9.	Methods of video information processing	6
SC 10.	Fundamentals of cybersecurity	6
SC 11.	Applied systems analysis	6
SC 12.	Stochastic models in the economy	6
SC 13.	Internet of Things security technology	6
SC 14.	Technology of mobile application development	6

SC 15.	Project Management	6
SC 16.	Financial ecosystems	6
SC 17.	Functional and logical programming	6
<b>Total credits allocated to elective components:</b>		<b>24</b>
<b>Practical training</b>		
Practical training		9
<b>Qualifications</b>		
Preparation of qualifying work and defense		12
<b>CREDITS IN TOTAL TO COVER EDUCATIONAL PROGRAM</b>		<b>90</b>

## Structural logical scheme of Educational Program



### 3.3 Form of certification of applicants for higher education

Certification of the graduates of the educational program "Information Technologies and Business Analytics (Data Science)" of the specialty 124 "System Analysis" is carried out in the form of defense of the graduate qualification work and finishes with the issuance of the document of the established sample on awarding Master's degree with the assignment of the qualification: Master's degree in the specialty "System Analysis" specialization "Information Technology and Business Analytics (Data Science)".

### 3.4. Matrix of correspondence of the program competences to the 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 the program competences to the selective components of the educational program

Components / Competences	SC1	SC2	SC3	SC4	SC5	SC6	SC7	SC8	SC9	SC10	SC11	SC12	SC13	SC14	SC15	SC16	SC17
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		+				+	+				+					+	





