3. Educational program.

Computer Sciences (educational level “Master’s degree”). Program guarantor - Purskyi O.I., Doctor of Physical and Mathematical Sciences, Professor, head of the Department of Computer Sciences and Information Systems

3.1. Profile of Educational program “Computer Sciences” in speciality 122 “Computer Sciences”

1- General Information	
Full name of HEI (Higher Educational Institution) and structural unit	State University of Trade and Economics Faculty of Information Technology Department of Computer Sciences and Information Systems
Level of higher education and qualification name in the original language	Master's degree Specialty “Computer Sciences”
Official name of educational program	“Computer Sciences”
Compliance with the standard of higher education of the Ministry of Education and Science of Ukraine	Complies with the with the standard of higher education of the Ministry of Education and Science of Ukraine
Diploma type and volume of the program	Master diploma, a unit, 90 ECTS credits, training period 1 year 4 months
Accreditation	Certificate of educational program accreditation УД 11010045 Date of issue of Certificate of educational program accreditation 25.02.2019 Date of expire of Certificate of educational program accreditation 01.07.2024
Cycle / Level	NQF of Ukraine (National Qualifications Framework of Ukraine) – seventh level, FQ-EHEA – second cycle, EQF-LLL– seventh level
Preconditions	Bachelor’s degree (or Specialist’s degree)
Languages of instruction	Ukrainian
Program validity period	01.07.2024
Internet address for permanent placement of the program description	https://knute.edu.ua/
2 - Educational Program Aim	
Training of highly qualified specialists who have a system of knowledge in the field of information technology, know modern scientific achievements in this field, are able to formulate and solve research problems and summarize their results in their professional activities using fundamental and special applied methods of computer sciences	

3 – Educational Program Characteristics	
Description of Subject Area	*Object(s) of study and/or activity:* the processes of collecting, presenting, processing, storing, transmitting and accessing the information in computer systems. *Learning objectives:* acquiring the ability to carry out tasks of a research and/or innovative nature in the field of computer science. *Theoretical content of the subject area:* modern models, methods, algorithms, technologies, processes and methods of obtaining, presentation, processing, analysis, transmission, storage of data in information and computer systems. *Methods, techniques, technologies:* methods and algorithms for fulfilling theoretical and applied problems of computer science; mathematical and computer modelling, modern programming technologies; methods of collection, analysis and consolidation of distributed information; technologies and methods of design, development and quality assurance of information technology components, computer graphics methods and data visualization technologies; knowledge engineering technologies, CASE modelling and IT design technologies. *Tools and equipment:* distributed computing systems; computer networks; mobile and cloud technologies, database management systems, operating systems, means of developing information systems and technologies.
Educational program orientation	Educational and professional, fundamental, applied. General higher education of the second (master's) degree in the field of information technologies in speciality "Computer Science". The emphasis of the educational program is on the training of specialists capable of fulfilling complex tasks of mathematical, informational and software support of computer systems in the field of information technologies.
Main focus of the educational program	Special education in the field of information technologies with in-depth study of fundamental and applied methods of computer science related to modelling, design, development, software implementation and support of computer systems and technologies based on distributed systems and using intelligent mechanisms of presentation, processing and analysis of data and knowledge. Keywords: information technologies, computer design, data analysis technologies, cloud technologies, distributed systems, methods and models of presentation, processing and analysis of data and knowledge, intelligent systems, software.
Features of the program	The presence of a variable component of professionally oriented disciplines for computer sciences, the study of which will allow to master the theoretical knowledge and practical skills of business planning, international technical regulation, mathematical modelling and the creation of corporate distributed information systems in management. Practical training in state research institutions, enterprises and organizations.
4 – Graduates' suitability for employment and further study	
Suitability for employment	Names of professions according to the National Classifier of Ukraine: Classifier of Professions (DK 003: 2010) 213 Computing (computerization) professionals 2131 Professionals in the field of computer systems 2131.1 Researchers (computer systems) 2131.2 Developers of computer systems

	2132 Professionals in the field of programming 2132.1 Researchers (programming) 2132.2 Computer software developers 2310 Teachers of universities and higher educational institutions 2310.2 Other teachers of universities and higher educational institutions 2321 Teachers of professional (vocational and technical) education institutions; 2322 Teachers of institutions of vocational pre-higher education.
Academic rights of graduates	Acquiring education according to the educational program of the third (educational and scientific) level of higher education and obtaining additional qualifications in the adult education system.
Employment of graduates	Professional activity both as a professional in the development of mathematical, information and software of computer systems, in the field of information technologies, and as well as an administrator of distributed databases and systems.
5- Teaching and Assessment	
Teaching and training	Problem-oriented learning, self-study, training through practical training.
Assessment	Current control, written exams, defence of the final qualifying work. Assessment is carried out in accordance with the "Regulations on the assessment of learning outcomes of students and graduate students in SUTE", "Regulations on the organization of the educational process of students"
6 – Program Competences	
Integral competence (IC)	Ability to fulfil complex tasks of research and / or innovation character in the field of computer science..
General competencies (GC)	GC 1. Ability to abstract thinking, analysis and synthesis. GC 2. Ability to apply knowledge in practical situations. GC 3. The ability to communicate in the national language both orally and in written form in the terms of the subject area. GC 4. Ability to communicate in a foreign language. GC 5. Ability to learn and master modern knowledge. GC 6. The ability to be critical and self-critical. GC 7. Ability to generate new ideas (creativity).
Special (professional) competences (SC)	SK01. Understanding the theoretical basics of computer science. SK02. The ability to formalize the subject area of a certain project in the form of an appropriate information model. SK03. Ability to use mathematical methods to analyse formalized models of the subject area. SK04. The ability to collect and analyse data (including large data) to ensure the quality of project decision-making. SK05. Ability to develop, describe, analyse and optimize architectural solutions of information and computer systems for various purposes. SK06. Ability to apply existing and develop new algorithms for solving problems in the field of computer science. SK07. Ability to develop software according to formulated requirements, taking into account available resources and constraints.

	SK08. The ability to develop and implement software projects, including their creation in unpredictable conditions, with unclear requirements and the need to apply new strategic approaches, use software tools to organize teamwork on the project. SK09. Ability to develop and administer databases and knowledge bases. SK10. The ability to evaluate and ensure the quality of IT projects, information and computer systems of various purposes, to apply international standards for assessing the quality of software of information and computer systems, models for assessing the maturity of information and computer systems development processes. SK11. Ability to initiate, plan and implement the development processes of information and computer systems and software, including its development, analysis, testing, system integration, implementation and support.
7 – Program Learning Outcomes (PLO)	
	PLO1. Possess specialized conceptual knowledge that includes current scientific achievements in the field of computer science and is the basis for original thinking and conducting research, critical thinking of problems in the field of computer science and at the intersection of the fields of knowledge. PLO2. Possess specialized computer science problem-solving skills necessary for conducting research and/or conducting innovative activities to develop new knowledge and procedures. PLO3. Clearly and unambiguously convey one's own knowledge, conclusions and arguments in the field of computer science to specialists and non-specialists, in particular to persons who are studying. PLO4. Manage work processes in the field of information technologies, which are complex, unpredictable and require new strategic approaches. PLO5. Evaluate the results of teams and collectives in the field of information technologies, ensure the effectiveness of their activities. PLO6. Develop a conceptual model of an information or computer system. PLO7. Develop and apply mathematical methods for the analysis of information models. PLO8. Develop mathematical models and methods of data analysis (including large data). PLO9. Develop algorithmic and software for data analysis (including large data). PLO10. Design architectural solutions of information and computer systems for various purposes. PLO11. Create new algorithms for solving problems in the field of computer science, evaluate their effectiveness and limitations on their application. PLO12. Design and maintain databases and knowledge. PLO13. Assess and ensure the quality of information and computer systems for various purposes. PLO14. Test the software. PLO15. Identify the needs of potential customers regarding the automation of information processing. PLO16. Conduct research in the field of computer science. PLO17. Identify and eliminate problematic situations during software operation, formulate tasks for its modification or reengineering. PLO18. Collect, formalize, systematize and analyse the needs and requirements for the information or computer system being developed, operated or supported. PLO19. Analyse the current state and global trends in the development of computer sciences and information technologies.

8 – Resource support for program implementation	
Staff	The implementation of the educational program is provided by teachers who have PhD and Doctor of Sciences degrees. The participation of foreign specialists and practitioners in the teaching of disciplines of the training cycle is possible.
Material and technical support	The basis of material and technical support are specialized computer laboratories with modern hardware and software resources that provide quality training for masters in the educational program "Computer Science". Students are fully provided with material resources for teaching and research. At their service: - more than 30 thousand m2 of educational buildings; - dormitories; - 470 seats in the reading rooms of SUTE, including in the multimedia library of SUTE, where access to scient metric databases SCOPUS, Web of Science is provided; - 2000 PC workstations with Internet access + Wi-Fi. All computer equipment is provided with basic software, special software necessary for classes and tasks by students is installed on the computers in the laboratories of the departments; - distance learning laboratory, which houses 966 educational courses; - electronic platform for student communication based on Microsoft Office 365, etc.
Informational and educational-methodical support	Full provision of educational and methodical complexes of disciplines and other types of educational and methodical materials. Documents governing the procedures for admission and study at SUTE are on the official website. Open access of applicants for higher education to information and educational resources through information systems for managing the educational process and other web-services: -system of distance learning MOODLE (966 educational courses, provides independent and individual training, control), - free access to the Internet and e-mail; - information systems "Dean's Office", "Load-schedule", management of WEB-resources SUTE; - library fund management system - almost 1.5 million items of educational and scientific literature in the library of SUTE; - electronic document management system "OPTiMA - WorkFlow"; - corporate information environment in the form of a "personal account" of the user of the SUTE web portal. Ensuring publicity of information about educational programs, degrees of higher education and qualification: implementation of SUTE's information policy, publication on the official website of SUTE of ECTS information packages, educational programs, class schedules, as well as all components of the educational process, which are subject to publication in accordance with the Law of Ukraine "On Higher Education"; Ensuring an effective system of prevention and detection of academic plagiarism in the scientific works of SUTE employees, applicants for higher education (checking for plagiarism of all final qualifications, publications, publication of dissertation research on the official website of SUTE), compliance with the Code of Ethics of Ukrainian scientists.
9 – Academic mobility	

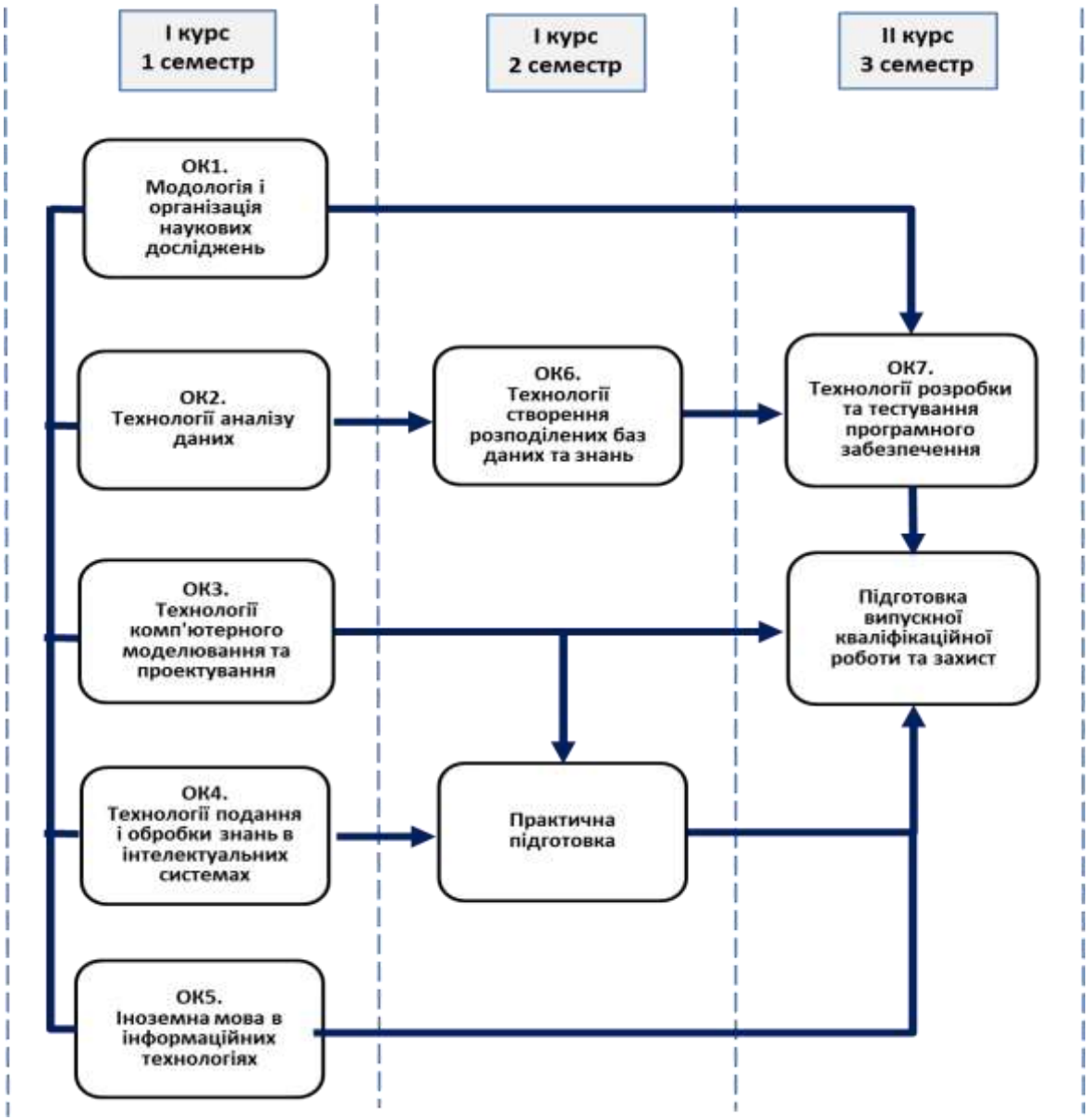
National credit mobility	National credit mobility is carried out in accordance with the concluded agreements on academic mobility.
International credit mobility	International credit mobility is implemented within the framework of cooperation agreements between SUTE and higher education institutions in France, Great Britain, Poland, Germany, within which partnership exchange and training are carried out. Training in the direction of KA1 with obtaining credits in universities of Erasmus + countries
Training of overseas students	Foreign applicants for higher education are guaranteed all rights and freedoms, in accordance with current legislation of Ukraine and the Charter of the University. Training of foreign applicants for higher education is carried out on general terms with additional language training.

3.2. List of components of the educational program and their logical sequence

3.2.1. List of educational program components.

Code	Components of the educational program (academic disciplines, term projects (papers), placement, qualification exam, final qualification work	Number of credits
1	2	3
Compulsory components of EP (CC)		
CC 1	Methodology and organization of scientific research	6
CC 2	Technologies of data analysis	6
CC 3	Computer modelling and design technologies	6
CC 4	Technologies of knowledge presentation and processing in intelligent systems	6
CC 5	Foreign language in information technologies	6
CC 6	Technologies for creation distributed databases and knowledge	7,5
CC 7	Software development and testing technologies	6
Total Number of Compulsory Components:		**43,5**
Optional Components of EP (OC)		
OC 1	Enterprise Java programming	6
OC 2	Business planning	6
OC 3	Life safety	6
OC 4	Corporate information distributed systems	6
OC 5	Intelligent systems	6
OC 6	IT law	6
OC 7	Information wars	6
OC 8	Mathematical methods and models of complex economic systems	6
OC 9	International technical regulation	6
OC 10	Data modelling under conditions of uncertainty	6
OC 11	Fundamentals of cyber security	6
OC 12	Decision-making systems	6
OC 13	System analysis of complex economic systems in conditions of uncertainty	6
OC 14	Management in information systems	6
OC 15	Functional and logical programming	6
Total volume of optional components:		**24**
Practical training:		
Industrial placement		10,5
Total		9
Attestation		
Preparation for a qualification exam and attestation		12
Total		12
Total EP volume:		**90**

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


I курс
1 семестр
I курс
2 семестр
II курс
3 семестр
ОК1.
Модологія і організація наукових досліджень
ОК2.
Технології аналізу даних
ОК6.
Технології створення розподілених баз даних та знань
ОК7.
Технології розробки та тестування програмного забезпечення
ОК3.
Технології комп'ютерного моделювання та проектування
Підготовка випускної кваліфікаційної роботи та захист
ОК4.
Технології подання і обробки знань в інтелектуальних системах
Практична підготовка
ОК5.
Іноземна мова в інформаційних технологіях

3.3. Form of attestation of applicants for higher education

Attestation of master's degree holders is carried out in the form of a public defence of the final qualification work.

The graduation thesis should involve solving a complex task of a research and/or innovative nature in the field of computer science. Graduation qualification work should not contain academic plagiarism, falsification, fabrication. The graduation thesis must be posted on the website or in the public repository of the higher education institution or its structural unit. Dissemination of final qualification papers containing information with restricted access should be carried out in accordance with the requirements of the legislation.

3.1.3 Matrix of correspondence of program competences components of the educational program

Components / Competences	EC 1	EC 2	EC 3	EC 4	EC 5	EC 6	EC 7	QC 1	QC 2	QC 3	QC 4	QC 5	QC 6	QC 7	QC 8	QC 9	QC 10	QC 11	QC 12
GC 1	•	•	•						•							•			•
GC 2	•	•	•	•			•								•		•	•	
GC 3	•		•			•			•	•		•		•	•				
GC 4					•														
GC 5	•	•		•		•					•				•		•		
GC 6			•				•		•			•						•	•
GC 7	•		•						•							•			
SC 1	•		•	•		•		•		•	•						•	•	
SC 2	•		•			•	•		•							•		•	
SC 3	•	•	•										•			•			•
SC 4		•	•	•					•						•			•	
SC 5			•				•	•		•							•	•	
SC 6		•	•	•			•	•								•	•		
SC 7			•				•	•		•						•		•	
SC 8			•			•	•	•	•					•		•		•	•
SC 9				•		•		•		•									
SC10			•				•		•			•		•					
SC 11			•	•		•	•	•	•								•		

3.5. Matrix for providing program learning outcomes with relevant components of the educational program

Components / Program learning outcomes	EC 1	EC 2	EC 3	EC 4	EC 5	EC 6	EC 7	OC 1	OC 2	OC 3	OC 4	OC 5	OC 6	OC 7	OC 8	OC 9	OC 10	OC 11	OC 12
PLO1	•		•	•			•				•								
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	•				•														