3. Educational program
3.1. Profile of the educational program
from the specialty 126
"Information systems and technologies"
(for specialization "Information systems and technologies")

The head of the working group (the guarantor of the educational program) - Ph.D. in Physics and Mathematics, Associate Professor at the Department of Computer Science and Information Systems Filimonova T.O.).

1 – General information	
Full name of the higher educational establishment and structural unit	Kyiv National University of Trade and Economics Faculty of Information Technologies Department of Computer Science and Information Systems
Degree of higher education and the name of the qualification in the language of the original	The degree of higher education «bachelor» specialty "Information systems and technologies" specialization Information systems and technologies"
The official name of the educational program	"Information systems and technologies"
Type of diploma and the volume of the educational program	Bachelor's degree 240 ECTS credits term of training 3 years and 10 months
Availability of accreditation	Primary accreditation scheduled for 2025
Cycle / Level	NQF of Ukraine – 6th level, FQ-EHEA – first cycle, EQF-LLL – 6th level
Prerequisites	Complete general secondary education
Language(s) of teaching	Ukrainian
The validity of the educational program	
Internet address of the permanent placement of the educational program	https://knute.edu.ua

2 - The purpose of the educational program
To provide quality education in the field of information technology necessary for the development, implementation and research of information systems and technologies, formation and development of general and professional competences of information systems and technologies, which ensure the competitiveness of graduates in the labor market. To prepare students with a special interest in the current issues in the field of information technology, ready to study in the master's program.

3 – Characteristics of the educational program	
Subject area (branch of knowledge, specialty, specialization (if available))	Branch of knowledge 12 «Information technology Speciality: 126 "Information Systems and Technologies" Specialization: "Information systems and technologies"
Orientation of the educational program	Educational and professional, fundamental, applied. The main focus of the educational program is to prepare professionals who are able to perform complex tasks related to the design, creation and use of information systems and technologies with the use of network technologies and mechanisms for intelligent analysis of data, building IT-infrastructure architecture of enterprises and administration of information systems.
The main focus of the educational program and specialization	General education in the field of information technologies, specialization "Information systems and technologies". Key words: Information technologies,informatization, information systems, information systems design, algorithmization, Machine Learning, Big Data Processing, applied programming technologies, Cross-platform programming, C#, C++, Python, Java programming, system analysis, management, distributed server systems, system administration of corporate networks.
Features of the program	Availability of variable components of profession-ally-oriented disciplines for specialty "Information systems and technologies"; practical training in government agencies, enterprises and organizations. The peculiarity of the educational program "Information systems and technologies" is its content, which takes into account current trends in the field of information technology, related to advances in the field of design and development of state-of-the-art information systems based on state-of-the-art technologies and distributed server systems. The main components of the specialty of the educational program is determined by disciplines "Fundamentals of Information Systems Theory", "Design of Information Systems", "Raid-Data Arrays and Distributed Server Systems", "Technology Distributed Systems and Parallel Computing, "Cross-platform programming", "Corporate network management systems", "Computer technologies of project design and online startup management", as well as disciplines, which are related to the study of intellectual mechanisms of data processing "Artificial Intellegence", "Machine Learning". The optional part includes components related to the design and creation of intellegent control systems: "Technologies of knowledge supply and processing in intellegent systems", "The architecture of computing systems", "Information systems and technologies in economics", "Automated design systems", "Technologies of data analysis", "The theory of management in information systems". In graduation qualification projects subject area is investigated, which is associated with the development of information management systems in various areas of trade and economic activity, including, on the basis of intellectual mechanisms of data processing and analysis.

4 - Eligibility of graduates for employment and further training	
Eligibility for employment	According to the National Classifier of economic activities DK 009:2010, as well as taking into account the requirements of the labor market types of professional activity graduate is: – activities in the sphere of informatization - 72; – Provision of consultations on informatization issues - 72.1; – development of software and provision of relevant advice - 72.2 Faculty degree "bachelor" specialty "Information Systems and Techno-logies" according to the National Classifier of professions DC 003:2010 can be employed with the following professorial titles: 3121.2 Information Technology Technician; 3121.2 Software Developer; 2131.2 System Administrator; 213 Professionals in the field of computing; 2131 Professionals in the field of computing systems; 2131.2 Developers of calculating systems; 2132 Professionals in the programming industry.
Further education	Continuation of studies at the second (master) level of higher education according to the master educational programs of the field of knowledge "Information Technologies" and interdisciplinary programs
5 – Teaching and evaluation	
Teaching and learning	Lectures, practical lessons, laboratory works, seminars, self-study using textbooks, manuals and outlines, consultations with teachers, preparation of graduation qualification work. Student-centered approach to learning. Credit-transfer system of study organization. Individual trajectory of learning. Problem- oriented learning, self-study (using the resources of the library and the Internet), training through practical training. Distance learning with the use of electronic resources in the system Moodle.
Evaluation	Current control, examinations, defence of graduation qualification work. Evaluation is carried out in accordance with the "Regulations on the evaluation of the results of training students and post graduate students", "Regulations on the organization of the educational process of students
6 – Program competencies	
Integral competence	Competence to solve complex specialized tasks and practical problems in the field of information systems and technologies, or in the process of learning, which are characterized by complexity and unambiguity of conditions that require the use of theories and methods of information technology.

General competences (GC)[1]	GC 1. Aptitude for abstract thinking, analysis and synthesis.
	GC 2. Competence to use knowledge in practical situations.
	GC 3. Competence to understand the subject area and professional activities.
	GC 4. The ability to communicate in a foreign language.
	GC 5. Willingness to learn and acquire modern knowledge.
	GC 6. Competence to search, process and summarize information from different sources.
	GC 7. Competence to develop and manage projects.
	GC 8. Competence to evaluate and ensure the quality of work performed.
	GC 9. Willingness to exercise one's rights and duties as a member of the society, awareness of the values of civil development, the rule of law, the rights and freedoms of people and citizen in Ukraine.
	GC 10. The ability to preserve and multiply moral, cultural, scientific values and achievements of society on the basis of understanding of history and patterns of development of the subject area, The study of the subject area and its place in the general system of knowledge about nature and society and in the development of society, technique and technology, to use different types and forms of motional activity for active recreation and healthy life style.
Specific (professional, subject) competences (SC)	SC 1. Ability to analyze the object of design or functioning as well as its subject area.
	SC 2. Competence to apply standards in the field of information systems and technologies in the development of functional profiles, construction and integration of systems, products, services and elements of the organization's infrastructure.
	SC 3. Competence in design, development, maintenance and improvement of system, communication and hardware support of information systems and technologies, Internet of things (IoT), computer-intergrated systems and system network structure, their management.
	SC 4. Competence to design, develop and use tools for implementation of information systems, technologies and infocommunications (methodological, informational, algorithmic, technical, software and others).
	SC 5. Competence to assess and take into account economic, social, technological and environmental factors at all stages of the life cycle of information and communication systems.
	SC 6. Competence to use modern information systems and technologies (production, decision support, intelgent analysis of data, etc.), methods and techniques of security during performance of functional tasks and duties.
	SC 7. Competence to use information technology in the design, implementation and operation of the quality management system and to estimate the costs of its development and maintenance.
	SC 8. Competence to manage the quality of products and services of information systems and technologies during their lifecycle.
	SC 9. Ability to develop business solutions and evaluate new technological proposals.
	SC 10. Responsibility for the selection, design, development, integration, management, administration and maintenance of the

	organization's information systems, technologies and infocommunications, services and infrastructure. SC 11. Ability to analyze, synthesize and optimize information systems and technologies using mathematical models and methods. SC 12. Competence to manage and use modern information and communication systems and technologies (including those based on the Internet). SC 13. Ability to carry out computational experiments, to compare the results of experimental data and solutions made. SC 14. Ability to formulate new competitive ideas and implement them in projects (start-ups).
7 – Program learning outcomes(PLO)	
	PR 1. **Knowledge of** linear and vector algebra, differential and integral numbering, theory of multiple dependent functions, theory of series, differential equations for single and multiple dependent functions, operational numbering, The theory of probability and mathematical statistiSC to the extent necessary for the development and use of information systems, technologies and infocommunications, services and infrastructure of the organization. PR.2 **Apply** knowledge of fundamental and natural sciences, systems analysis and modelling technologies, standard algorithms and discrete analysis to design and use of information systems and technologies. PR 3. **Use** basic knowledge of informatiSC and modern information systems and technologies, programming skills, technologies of safe work in computer networks, methods of creating databases and Internet resources, technologies of developing algorithms and computer programs in high-level languages using object-oriented programming for solving design tasks and using information systems and technologies. PR 4. **Conduct** a systematic analysis of the design objects and justify the choice of structure, algorithms and methods of information transfer in information systems and technologies. PR 5. **Arguments for** the selection of software and hardware for building information systems and technologies based on an analysis of their features, purpose and technical characteristiSC taking into account the requirements for the system and operating conditions; **have skills in** setting and testing software and hardware of information systems and technologies. PR.6 **Demonstrate** knowledge of the current level of information systems technology, practical skills of programming and using applied and specialized computer systems and environments in order to use them in professional activities. PR.7. **Justify** the choice of technical structure and **develop** appropriate software to be a part of information systems and technologies.

	PR8. **Apply** design rules for information systems and technologies, **know** the composition and sequence of design works, taking into account the requirements of relevant regulatory documents for implementation in professional activities. PR.9 **Perform** a systematic analysis of the company's IT infrastructure architecture, design and improve its elements and structure. PR 10. **Understand and take into account** social, environmental, ethical, economical aspects, requirements of workplace safety, industrial sanitation, fire safety and current national and international standards while formulating technical tasks and

8 – Resource support for the implementation of the program	
Personnel provision	The implementation of the educational program is ensured by the teachers who have scientific degrees of candidate and doctor of sciences. The participation of foreign practitioners and practitioners in the teaching of disciplines of the cycle of vocational training is possible.
Material and technical support educational	The basis of material and technical support are specialized computer laboratories with modern hardware and software resources that provide quality training for bachelors in the educational program "Information Systems and Technologies". 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 KNTEU, including in the multimedia library of KNTEU, where access to scientometric databases SCOPUS, Web of Science; - 2000 PC workstations with Internet access + WiFi. All computer equipment is provided with basic software, special software is installed on the computers in the laboratories of the departments, necessary for conducting classes and tasks for students; - distance learning laboratory, which houses 966 educational courses; - electronic platform for student communication based on Microsoft Office 365, etc.
Informational and educational support	Full provision with teaching complexes of disciplines and other types of teaching materials. The documents that regulate the procedures of admission and study at KNUTE can be found on the official website. Higher education students have open access to information and educational and methodological resources through information management systems of the educational process and other web- services: MOODLE distance learning system (966 educational courses, provides self-study and individual training, control), - Availability of free access to the Internet and electronic mail; - Information systems "Dean's office", "Inventory-warehouse", management of WEB-resources of KNUTE; - The system of library collection management - more than 1.5 million titles of educational and scientific literature in the KNUTE library; - OPTiMA - WorkFlow electronic document management system; - corporate information environment in the form of a "private office" of KNUTE web-portal user.

	Ensuring publicity of information about educational programs, degrees of higher education and qualifications: implementation of KNUTE's informational policy of publishing on KNUTE's official website the information packages of ECTS, educational programs, timetables of classes, as well as all components of the educational process support that 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 scientific work of KNUTE staff, higher education graduates (plagiarism check of all graduate qualification works, publications, the results of the research are presented on the official site of KNUTE), observance of the Ukrainian Scientific and Technical Code of Ukraine.
9 – Academic mobility	
National credit mobility	National credit mobility is carried out in accordance with the established agreements on academic mobility.
International credit mobility	International credit mobility is implemented within the framework of cooperation agreements between KNUTE and higher education institutions of France, Great Britain, Poland, Germany. Training in the direction of CA1 with the receipt of credit at the universities of the Erasmus+ Program member countries.
Education for foreign applicants for higher education	Foreign higher education students are guaranteed all the rights and freedoms in accordance with current Ukrainian legislation and the Statute of the University. Education of foreign students of higher education is carried out on general terms with additional language training.

3.1.1 List of EP components

Code n/a	The components of the educational programme (academic disciplines, course projects (works), practices, qualification examination,	Quantity of credits
1	2	3
Required components of the EP		
RC 1.	Fundamentals of information systems theory	6
RC 2.	Discrete mathematiSC	6
RC 3.	PhysiSC	6
RC 4.	Mathematical analysis	6
RC 5.	Foreign language in a professional context	24
RC6.	Linear algebra and analytic geometry	6
RC 7.	Information systems and technologies	6
RC 8.	Algorithmization and programming	6
RC 9.	Theory of algorithms	6
RC 10.	Optimization methods and models	6
RC11.	Systems theory and systems analysis	6
RC 12.	Design of information systems	
RC 12.1	CP on design of information systems	6
RC13.	Numerical programming methods	6
RC 14.	Applied programming technologies	6
RC15.	System programming	6
RC 16.	Java Script programming	6
RC 17.	Imitation modelling	6
RC17.1	CP on imitation modelling	
RC 18.	Machine learning	6
RC 19.	Artificial intelleligence	6
RC 20.	Raid data arrays and distributed server systems	6
RC 21.	Corporate network administration systems	9
RC 22.	Computer technology for project design and management of online startup	6
RC 23.	Distributed systems and parallel computing technologies	6
Total amount of required components:		**159**
Optional components of the EP		
OC 1.	The architecture of computing systems	6
OC 2.	Life security	6
OC 3.	Vector and tensor analysis	6
OC 4.	Differential equations	6
OC 5.	Economic theory	6
OC 6.	Electronic trading	6
OC 7.	ElectrotechniSC	6
OC 8.	Engineering and computer graphiSC	6
OC 9.	Information systems and technologies in economiSC	6
OC 10.	History of Ukrainian culture	6
OC 11.	Logic	6
OC 12.	Mathematical Logic	6
OC 13.	Management	6

OC 14.	Organization of databases of knowledge	6
OC 15.	Legal Studies	6
OC 16.	Psychology	6
OC 17.	Systems of automated design	6
OC 18.	Sociology	6
OC 19.	Mobile applications development technology	6
OC 20.	Theory of information and coding	6
OC 21.	Probability theory and mathematical statistiSC	6
OC 22.	Management theory in information systems	6
OC 23.	Data analysis technologies	6
OC 24.	Technologies of knowledge presentation and processing in intellectual systems	6
OC 25.	Java technology	6
OC 26.	Software product development technologies	6
OC 27.	Philosophy	6
OC 28.	Digital systems and technologies	6
OC 29.	Digital technologies in business	6
OC 30.	Web-technologies	6
The total volume of the optional components:		**60**
Practical training		
Practical training 1		6
Practical training 2		6
Total		12
Attestation		
Preparation for certification		3
Preparation of graduation qualification work and defence		6
Total		9
TOTAL SCOPE OF THE EDUCATIONAL PROGRAMME		**240**

For all components of the educational program an examination is a form of assessment.
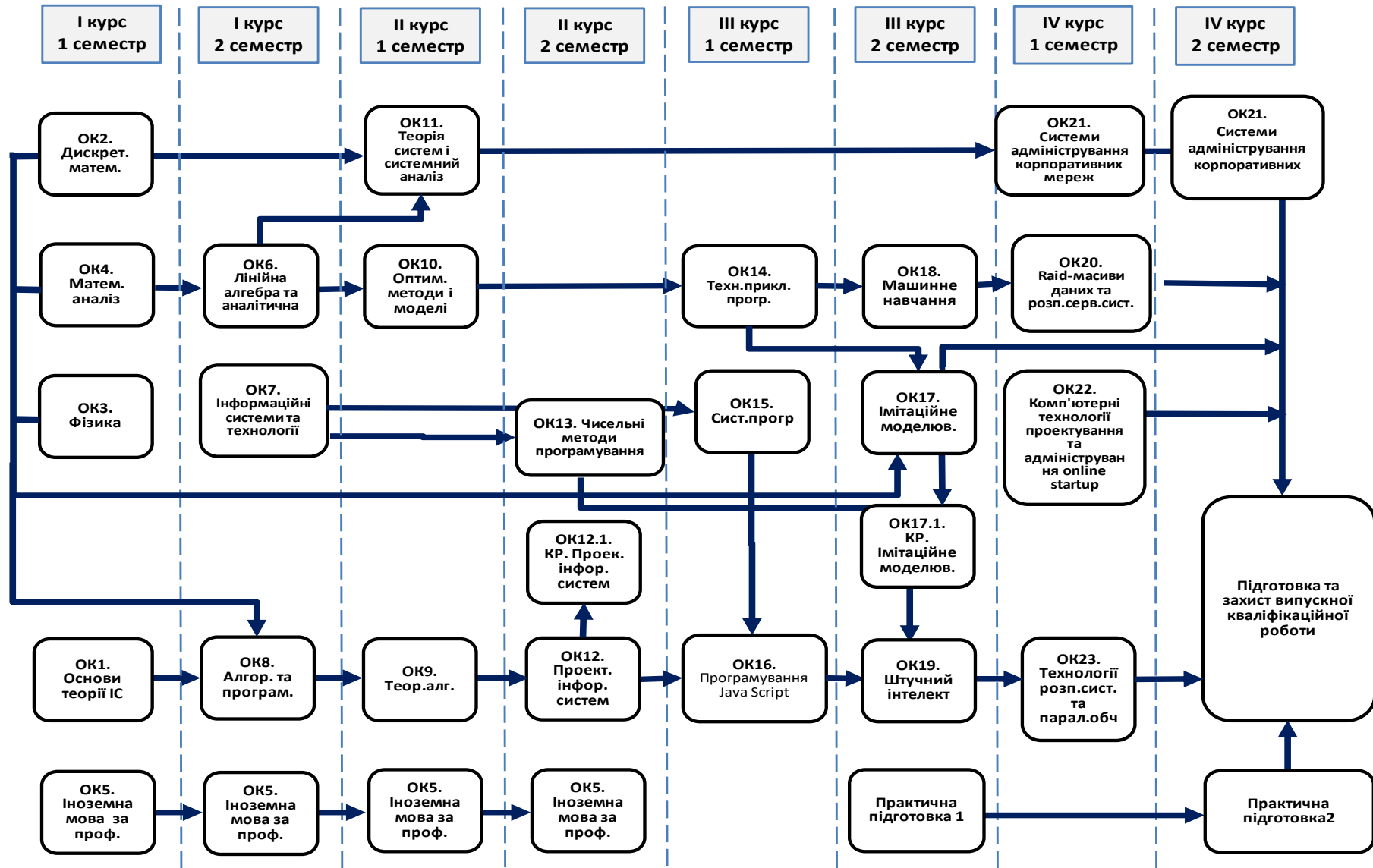
3. The form of certification of higher education applicants

The attestation is carried out in the form of a public defence of the graduation qualification work.

Graduation qualification work supposes the completing complex specialized task or practical problems in the field of modern information systems and technologies, which is characterized by complexity and unambiguity of conditions and requires the use of theories and methods of information technology.

Graduation qualification work should not be academic plagiarism, falsification and fabrication.

The graduate qualification work should be published on the official website of the institution of higher education or its structural division, or in the repository of the institution of higher education.

Components / competences	CC 1	CC 2	CC 3	CC 4	CC 5	CC 6	CC 7	CC 8	CC 9	CC 10	CC 11	CC 12	CC 13	CC 14	CC 15	CC 16	CC 17	CC 18	CC 19	CC 20	CC 21	CC 22	CC 23
GC 1	•	•	•	•		•		•	•	•	•	•	•	•				•		•	•	•	
GC 2	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
GC 3	•						•	•	•			•	•	•	•	•	•			•	•	•	•
GC 4					•																		
GC 5		•	•	•		•		•	•	•		•	•	•		•	•			•	•	•	
GC 6			•		•		•					•	•							•	•	•	
GC 7												•	•					•	•				
GC 8	•											•	•							•			
GC 9	•																						
GC 10	•		•				•					•	•			•	•						
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			•	•		•	•	•	•	•				•	•			•	•	•	•		
PC 14	•											•											

3.1. 4 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	SC 13	SC 14	SC 15	SC 16	SC 17	SC 18	SC 19	SC 20	SC 21	SC 22	SC 23	SC 24	SC 25	SC 26	SC 27	SC 28	SC 29	SC 30
GC 1	•		•						•			•									•		•		•		•			
GC 2	•		•	•	•	•	•		•		•	•		•			•			•	•	•	•	•	•			•	•	•
GC 3	•					•	•	•						•					•			•			•	•			•	•
GC 4													•																	
GC 5	•		•	•					•							•					•				•		•			
GC 6									•			•															•			
GC 7																														
GC 8									•																					
GC 9															•			•									•			
GC 10		•								•	•							•									•			
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			•	•																	•		•							
PC 14						•																•								•

3.1. 5 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	CC 8	CC 9	CC 10	CC 11	CC 12	CC 13	CC 14	CC 15	CC 16	CC 17	CC 18	CC 19	CC 20	CC 21	CC 22	CC 23
1		•	•	•		•				•				•						•			
2		•	•			•		•	•	•	•	•	•	•		•	•	•	•	•			
3	•						•	•	•			•	•		•	•	•			•	•	•	•
4								•	•		•												
5	•				•		•				•	•	•		•	•	•				•		•
6	•						•								•	•	•			•	•	•	•
7								•	•			•	•		•	•	•	•	•			•	
8												•	•										
9											•										•	•	•
10	•											•	•										
11												•	•										

3.1.6. Matrix for providing software learning outcomes   relevant elective components of the educational program

Components / Program learning outcome	SC 1	SC 2	SC 3	SC 4	SC 5	SC 6	SC 7	SC 8	SC 9	SC 10	SC 11		SC 12	SC 13	SC 14	SC 15	SC 16	SC 17	SC 18	SC 19	SC 20	SC 21	SC 22	SC 23	SC 24	SC 25	SC 26	SC 27	SC 28	SC 29	SC 30
1			•	•							•										•										
2	•		•	•			•	•			•						•					•	•	•							•
3	•						•		•					•					•						•	•				•	•
4	•									•	•											•	•								•
5									•													•			•						
6						•			•										•						•	•		•	•		
7	•							•							•							•			•						•
8		•							•				•		•					•											
9	•																														•
10		•			•				•		•				•	•		•									•				
11	•								•													•									•