Computer science

Name of the Educational Programme	Computer Science
Qualification to be awarded:	Bachelor of Computer Science
Credit Value of the Programme:	240 Credits
Language of Education:	Georgian
Programme Admission Preconditions:	Enrollment of a student in an undergraduate educational program is carried out in accordance with the procedure established by the legislation of Georgia. A person with a complete general education has the right to enroll in an undergraduate educational program. A person with a complete general education has the right to enroll in an undergraduate educational program. without passing unified national exams. Conditions for admission to the program for citizens of foreign countries can be found on the link - https://iro.ibsu.edu.ge/en/home
Purpose of the Program:	Aims of the Bachelor Program in Computer Science are 1.To provide graduates with solid theoretical and practical knowledge in fundamental and modern subfields of computer science, such as mathematical foundations of computer science, algorithms and data structures, computer systems and networks and their security, databases, software engineering, computer architecture, methods of artificial intelligence and machine learning, etc.; 2. To enable graduates to respond to the challenges related to modern technology, prepare internationally competitive specialists who will be able to work in the private or public sector; 3.To enable graduates to pursue studies at the next level of academic education in computer science, computer engineering, information sciences, artificial intelligence, and information technology.
Learning Outcomes:	After completing the Bachelor Program of Computer Science, the graduate will have the following competencies necessary for his / her specialization: 1.Demonstrates extensive knowledge of theoretical and practical issues in computer science, including the development of important aspects, principles and theses in the field;

	2. Highlights the interdisciplinary nature of computer science, its practical importance for the analysis and modeling of theoretical tasks;
	3.Defines the basic principles of software engineering and the importance of applying these principles in the implementation of the life cycle of computer programs;
	4. Using different programming paradigms, formulates the problem algorithmically and realizes it in different programming languages;
	5. Describes the fundamental principles of operation of database management systems, various data models, languages of requirements and principles of data management systems administration;
	6. Describes computer architecture, principles of computer operation, physical characteristics of a computer, operating systems and their components, computer devices and their connections to operating systems;
	7.Highlights the role of artificial intelligence in modern technologies and various fields of science; Conducts experiments using machine learning methods;
	8. Analyzes complex problems and selects optimal methods for their solution; Performs mathematical modeling of problems, algorithmic problem solving, as well as software development, testing and modification;
	9. Uses computer systems to solve various field tasks, prepares technical documentation and delivers presentations to field specialists and non-specialists; Prepares a research or practical paper in accordance with the instructions of the supervisor in computer science; Recognizes the potential ethical and social consequences of creating and using technology
	10. Evaluates his / her knowledge in the field of computer science, determines the needs of further study and implements with a high degree of independence; Carries out activities in compliance with the principles of professional ethics.
Student knowledge assessment system:	The goal of evaluation is to determine student's education results qualitatively in relation to academic program goals and parameters. Student may be assessed orally and/or in a written way. A student's knowledge and skills are assessed through 100 points grading system. It consists of midterm and final evaluations, sum of which makes up 100 points. Grading system allows: 1) (A) Excellent – 91 – 100 point; 2) (B) Very good – 81-90 point;

	3) (C) Good – 71-80 point; 4) (D) Satisfactory – 61-70 point; 5) (E) Acceptable – 51-60 point. b) Two types of negative grades 1) (FX) Fail – 41-50 point, meaning that a student requires some more work before passing and is given a chance to sit an additional examination after independent work; 2) (F) Fail – 40 point and less, meaning that the work of a student is not acceptable and he/she has to study the subject anew. For the midterm and final evaluations minimal passing grade is set. The final evaluation minimal passing grade must not exceed 30% of final evaluation grade Midterm and final evaluation grade distribution, their minimal competence levels and assessment criteria are described in the corresponding syllabus. A credit can be awarded only after the attainment of learning outcomes, envisaged by the course syllabus and following requirements: a) Obtaining minimal competence levels set for midterm and final evaluations; b) Obtaining minimum 51 points out of 100 points of final grade. A student is allowed to take an additional (make-up) exam in case he/she scored 41-50 points of final 100 grade or minimum 51 points, but did not obtain minimal competence level set for final evaluation. Considering its specification, the format and the assessment criteria of mid-term and final evaluations can be determined in the specific module/course syllabus.
Field of Employment:	The undergraduate program in Computer Science will prepare internationally competitive specialists. The knowledge and skills acquired by the graduates will enable them to respond to modern technology related challenges. Graduates will be able to be employed both the private and public sectors, where they perform professional functions both independently and in teams. In particular, they will be able to work as a software developer, software engineers, data analysts, information technology specialists, network administrators, etc. Graduates can also continue their studies at the next level of academic education in the direction of computer science, computer engineering, information science, artificial intelligence and information technologies.

#	Course / Module / Internship / Research Component	Status	Credit numbers	I semester	II semester	III semester	IV semester	V semester	VI semester	VII semester	VIII semester	Lecture	Seminar / Group Work / Laboratory Work / Practical work	Midterm exam (s)	Final exam	Total number of contact hours	Independent work	Total hours
	Calculus 1	Mandatory	**6**	6								14	28	2	2	46	104	150
	Linear Algebra	Mandatory	**5**	5								15	13	2	2	32	93	125
	Principles of Programing	Mandatory	**5**	5								28	14	2	2	46	79	125
	Aspects of Computer Sciences and Technology	Mandatory	**5**	5								15	13	2	2	32	93	125
	Physics	Mandatory	**5**		5							14	14	2	2	32	93	125
	Calculus 2	Mandatory	**6**		6							14	28	2	2	46	104	150
	Databases	Mandatory	**5**		5							16	12	2	2	32	93	125

	Course	Type	Credits															
	Object Oriented Programming	Mandatory	**5**		5							28	14	2	2	46	79	125
	Computer Architecture	Mandatory	**5**			5						14	14	2	2	32	93	125
	Algorithms and Data Structures 1	Mandatory	**6**			6						29	13	2	2	46	104	150
	Software Development	Mandatory	**5**			5						14	14	2	2	32	93	125
	Discrete Mathematics	Mandatory	**6**				6					15	13	2	2	32	118	150
	Academic Writing	Mandatory	**5**				5					14	14	2	2	32	93	125
	Operating Systems	Mandatory	**5**				5					14	14	2	2	32	93	125
	Algorithms and Data Structures 2	Mandatory	**6**				6					14	14	2	2	32	118	150
	Professional English	Mandatory	**4**					4				17	11	2	2	32	68	100
	Theoretical Foundations of Computer Science	Mandatory	**6**					6				15	13	2	2	32	118	150
	Probability and Statistics	Mandatory	**6**					6				15	13	2	2	32	118	150

Course	Type	Credits														
Computer Networks	Mandatory	**4**				4				19	9	2	2	32	68	100
Software Engineering	Mandatory	**5**					5			16	12	2	2	32	93	125
Artificial Intelligence	Mandatory	**5**					5			14	14	2	2	32	93	125
Computer Systems Security	Mandatory	**5**					5			14	14	2	2	32	93	125
Machine Learning	Mandatory	**6**						6		14	14	2	2	32	118	150
Programming Paradigms	Mandatory	**5**						5		15	13	2	2	32	93	125
Internship	Mandatory	**7**						7		-	139	2	2	143	32	175
Methods and instruments for preparing papers	Mandatory	**4**						4		14	-	1	-	15	85	100
Bachelor's Thesis	Mandatory	**10**							10	-	28	1	1	30	220	250
Computer Skills	Optional	**4**	4							14	14	2	2	32	68	100
Web Programming 1	Optional	**4**	4							14	14	2	2	32	68	100

Subject	Type	Credits	Sem 1	Sem 2	Sem 3	Sem 4								
Web Programming 2	Optional	**4**	4					14	14	2	2	32	68	100
Information Technology Project Management	Optional	**4**	4					14	14	2	2	32	68	100
Geographic Information Systems	Optional	**4**	4					14	14	2	2	32	68	100
Front End Development using Angular	Optional	**4**		4				14	14	2	2	32	68	100
3D Graphics in Blender 1	Optional	**4**		4				28	14	2	2	46	54	100
Administration of databases	Optional	**4**		4				14	14	2	2	32	68	100
Backend programming	Optional	**4**			4			14	14	2	2	32	68	100
Designing and building mobile applications	Optional	**4**			4			14	14	2	2	32	68	100
3D Graphics in Blender 2	Optional	**4**			4			28	14	2	2	46	54	100
Computer game programming	Optional	**4**				4		14	14	2	2	32	68	100
Web Applications Programming	Optional	**4**				4		14	14	2	2	32	68	100
Applied Cryptography	Optional	**4**				4		14	14	2	2	32	68	100
Differential equations	Optional	**5**				5		14	14	2	2	32	93	125

Discipline	Type	Credits	1	2	3	4	5	6	7	8							
Virtualization technology	Optional	**5**						5			14	14	2	2	32	93	125
Statistical Methods in Bioinformatics	Optional	**5**						5			14	14	2	2	32	93	125
Programming on Python	Optional	**5**						5			14	14	2	2	32	93	125
Basics of Neural Networks	Optional	**5**							5		14	14	2	2	32	93	125
Essentials of Ethical Hacking and Network Security	Optional	**5**							5		14	14	2	2	32	93	125
Programming on Matlab	Optional	**5**								5	14	14	2	2	32	93	125
Natural language processing	Optional	**5**								5	14	14	2	2	32	93	125
Wireless Communication	Optional	**5**								5	14	14	2	2	32	93	125
Cloud computing	Optional	**5**								5	18	10	2	2	32	93	125
Arduino Programming	Optional	**5**								5	10	18	2	2	32	93	125
Computer vision	Optional	**5**								5	14	14	2	2	32	93	125
Free Curses Foreign Language (English, Russian, German, French, Spanish, Turkish)	Optional	**43 (15)**	5 5	5 5	6 5	5	4	5	3	10							1075

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Total		240	30	30	30	30	30	30	30	30	681	760	88	87	1630	3995	6000