

Computer science

Name of the Educational Programme:	Computer Science
Awarded Qualification:	Bachelor of Computer Science/კომპიუტერული მეცნიერების ბაკალავრი
Credit Value of the Programme:	240 ECTS
Language of Education:	English
Programme Admission Preconditions:	<p>According to the Georgian law, passing Unified National Exams is required to be admitted to the educational program. Passing Unified National Exams in English language and mathematics or Physics is required. Moreover, for the English exam passing 50% + 1 is the passing threshold. Student of a bachelor program can become anyone with secondary education.</p> <p>Admission to the educational program without passing Unified National exams may be allowed only in cases considered by the Georgian law. admission Preconditions for the foreigners can be found on the following link: (https://iro.ibsu.edu.ge/en/home).</p>
Purpose of the Programme:	<p>Aims of the Bachelor Program in Computer Science are:</p> <ol style="list-style-type: none"> (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 outcome

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. Formulates the problem algorithmically using different programming paradigms and implements 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

Evaluation Criteria

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:

a) Five types of positive grades

- 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.
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#	Course / Module / Internship / Research Component	Status	Credit number	Distribution of credits per courses and semesters								Distribution of Hours							
				I Year		II Year		III Year		IV Year		Contact Hours					Tota l num ber of hou rs		
				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	
1	Calculus 1	Obligatory	6	6									14	28	2	2	46	104	150
2	Linear Algebra	Obligatory	5	5									15	13	2	2	32	93	125
3	Principles of Programming	Obligatory	5	5									28	14	2	2	46	79	125

4	Aspects of Computer Science and Technology	Obligatory	5	5							15	13	2	2	32	93	125
5	Physics	Obligatory	5		5						14	14	2	2	32	93	125
6	Calculus 2	Obligatory	6		6						14	28	2	2	46	104	150
7	Databases	Obligatory	5		5						16	12	2	2	32	93	125
8	Object Oriented Programming	Obligatory	5		5						28	14	2	2	46	79	125
9	Computer Architecture	Obligatory	5			5					14	14	2	2	32	93	125
10	Algorithms and Data Structures 1	Obligatory	6			6					29	13	2	2	46	104	150
11	Software Development	Obligatory	5			5					14	14	2	2	32	93	125
12	Discrete Mathematics	Obligatory	6				6				15	13	2	2	32	118	150
23	Academic Writing	Obligatory	5				5				14	14	2	2	32	93	125
14	Operating Systems	Obligatory	5				5				14	14	2	2	32	93	125
15	Algorithms and Data Structures 2	Obligatory	6				6				14	14	2	2	32	118	150
16	Professional English	Obligatory	4					4			17	11	2	2	32	68	100

17	Theoretical Foundations of Computer Science	Obligatory	6					6			15	13	2	2	32	118	150
18	Probability and Statistics	Obligatory	6					6			15	13	2	2	32	118	150
19	Computer Networks	Obligatory	4					4			19	9	2	2	32	68	100
20	Software Engineering	Obligatory	5					5			16	12	2	2	32	93	125
21	Artificial Intelligence	Obligatory	5					5			14	14	2	2	32	93	125
22	Computer Systems Security	Obligatory	5					5			14	14	2	2	32	93	125
23	Machine Learning	Obligatory	6					6			14	14	2	2	32	118	150
24	Programming Paradigms	Obligatory	5					5			15	13	2	2	32	93	125
25	Internship	Obligatory	7					7			-	139	2	2	143	32	175
26	Methods and instruments for preparing papers	Obligatory	4					4			14	-	1	-	15	85	100
27	Bachelor's Thesis	Obligatory	10						10		-	28	1	1	30	220	250
28	Computer Skills	Elective	4	4							14	14	2	2	32	68	100
29	Web Programming 1	Elective	4	4							14	14	2	2	32	68	100
30	Web Programming 2	Elective	4		4						14	14	2	2	32	68	100

31	Information Technology Project Management	Elective	4		4						14	14	2	2	32	68	100
32	Geographic Information Systems	Elective	4		4						14	14	2	2	32	68	100
33	Front End Development using Angular	Elective	4		4						14	14	2	2	32	68	100
34	3D Graphics in Blender 1	Elective	4		4						28	14	2	2	32	68	100
35	Administration of databases	Elective	4		4						14	14	2	2	32	68	100
36	Backend programming	Elective	4		4						14	14	2	2	32	68	100
37	Designing and building mobile applications	Elective	4		4						14	14	2	2	32	68	100
38	3D Graphics in Blender 2	Elective	4		4						28	14	2	2	32	68	100
39	Computer game programming	Elective	4		4						14	14	2	2	32	68	100
40	Web Applications Programming	Elective	4		4						14	14	2	2	32	68	100
41	Applied Cryptography	Elective	4		4						14	14	2	2	32	68	100
42	Differential equations	Elective	5		5						14	14	2	2	32	93	125

43	Virtualization technology	Elective	5						5			14	14	2	2	32	93	125
44	Statistical Methods in Bioinformatics	Elective	5						5			14	14	2	2	32	93	125
45	Programming on Python	Elective	5						5			14	14	2	2	32	93	125
46	Basics of Neural Networks	Elective	5						5			14	14	2	2	32	93	125
47	Essentials of Ethical Hacking and Network Security	Elective	5						5			14	14	2	2	32	93	125
48	Programming on Matlab	Elective	5							5		14	14	2	2	32	93	125
49	Natural language processing	Elective	5							5		14	14	2	2	32	93	125
50	Wireless Communication	Elective	5							5		14	14	2	2	32	93	125
51	Cloud computing	Elective	5							5		18	10	2	2	32	93	125
52	Arduino Programming	Elective	5							5		10	18	2	2	32	93	125
53	Computer vision	Elective	5							5		14	14	2	2	32	93	125
	Free Curses		43	5	5	6	5	4	5	3	10	-	-			-	-	
	Foreign Language (English, Russian, German, French,	Elective	(15)	5	5	5								-	-			1075

Spanish, Turkish)																		
Total	240	30	30	30	30	30	30	30	30	30	30	681	760	88	87	163	399	6000
																0	5	

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