

CAUCASUS UNIVERSITY



Undergraduate Program in  
Computer Science

**Caucasus University**  
**Caucasus School of Technology**

<b>Program Name</b>			
	Computer Science		
<b>Degree level</b>			
	Bachelor's		
<b>Type of the educational program</b>			
	Academic		
<b>Instruction Language</b>			
	English		
<b>Expected Qualification</b>			
<b>In English:</b>	Bachelor of Computer Science	0613	
<b>In Georgian:</b>	კომპიუტერული მეცნიერების ბაკალავრი	0613	
<b>Date of Program Approval</b>			
	December 03 2020		
<b>Academic head of the Program</b>			
	Maksim Iavich PhD. Porfessor at Caucasus University		
<b>Program Volume in Credit Hours</b>			
<p>The Bachelor's Degree Program in Computer Science comprises 240 credits. Consequently, the standard official duration of the Bachelor's Degree Program is four years. 1 ECTS equals to 25 hours, which includes class hours and time spent on independent work (midterm and final examinations, as well as homework assignments).</p> <p>After expiration of the standard duration of the Bachelor's Degree Academic Program, the students having academic debts, with the view of completing the program, are allowed to continue education through additional semesters (no more than 4) by retaining the student's status.</p> <p>The Bachelor's program is envisaged as narrow sphere and free components learning courses:</p> <p><u>Learning courses of narrow sphere (182 ECTS credits):</u></p> <ul style="list-style-type: none"> <li>- Mandatory learning courses -152 ECTS credits;</li> <li>- Optional learning courses - 30 ECTS</li> </ul> <p><u>Learning courses of free component (58 ECTS credits):</u></p> <ul style="list-style-type: none"> <li>- Mandatory learning courses of university - 20 ECTS credits;</li> <li>- Optional learning courses of university - 20 ECTS credits;</li> <li>- Free credits - 18 ECTS credits.</li> </ul> <p>In case a foreign student attests the level of general English language proficiency defined by the program, he / she will be exempted from passing English language courses and will study the courses in Georgian language within these credits, but if a student also is fluent in Georgian, he / she is entitled to study courses form the program's electives or free courses</p> <p>Student can take courses in terms of "Free Course" (max. 18 ECTS credits) from other Bachelor's degree programs and/or form the Elective Courses within this program</p>			

### Admission Requirements

- Any person having a secondary education is entitled to enroll in the Undergraduate Program in Computer Science. The precondition for admission to the program is to pass the Unified National Examination. Any exceptions to the Law on Enrolment at Higher Education Institutions are allowed only in the cases prescribed by Law.
- Passing the English Language as a foreign language exam in the Unified National Examinations is a mandatory requirement for the program enrollment.
- Prospective students eligible for the program without having passed the Unified National Examinations must confirm English language B2 level proficiency (IELTS-6.0; TOEFL-78; or other relevant international certificate confirming B2 level proficiency) or he/she has to pass an English language B2 level exam administered by the University
- Mobility to the program is allowed in accordance with procedures set by the relevant law.

## Program Description

### Program Objectives

The objectives of the Program in Computer Science are to:

- Provide the student with an in-depth knowledge of the theoretical aspects of higher education disciplines, which prepares the person for further study at the Master's degree program or work with a qualification.
- Give student an interdisciplinary education in Computer Science, based on fundamental theories and principles of mathematics and Computer Science, which will enable him / her to develop professionally and contribute to the development of the field.
- Prepare high-level, competitive specialists with the broad theoretical knowledge and practice-oriented, transferable skills necessary for professional development in modern IT field in Georgia and abroad as well.

### Learning Outcomes

Upon completion of the Bachelor's degree program in Computer Science, the graduate will acquire the following competencies:

- Describes the basic concepts of computer science. Based on the knowledge of the principles of mathematical and computer technology, explains the theoretical and practical aspects of the field, the main features of the field and modern trends.
- Analyzes complex computational problems and selects the appropriate algorithm for their solution.
- Develops and implements complex software systems.
- Participates effectively in teamwork in program-related activities.
- Applies the principles of programming, computer systems, the latest approaches and technological tools in practice
- Realizes the importance of evaluating the learning process, the need to constantly update professional knowledge and acquire new knowledge, conducts oral and written communication.
- Appreciates and shares technology-related values, ethical and social responsibilities with others.

### Building a Career

#### Internships and Job Placements

The program structure allows students to be "job ready" early in the program and offers opportunities for career advancement. Students will be offered to be part of the coordinated internship programs or get a job placement through the support of the CU Career Center.

#### Career Opportunities

Program graduates will have an opportunity to work in a variety of environments such as industry, media, government, private and business organizations. As a rule, the work of graduates involves the following types of activities: analyzing problems for solutions, formulating and testing, using advanced communications or multimedia equipment, or working in teams for product development. Examples of job titles of program graduates may include: Software Developer, Computer Communications Specialist, System and Security Administrator, Data Communications Analyst, IT Business Management Consultant, Product Line Manager, Multimedia Developer, Animator etc

### Study Continuation Opportunities

The program graduates can continue their studies at any of Master's Degree programs in Georgia or abroad, in accordance with the regulation required by the law.

### Student Evaluation and Grading System

The aim of the evaluation is to assess to what extent the learning outcomes prescribed by the syllabus are reached. The student's evaluation consists of multiple components and evaluates the course goals and learning outcomes by applying measurable criteria and appropriate rubrics. The student's evaluation is based on four major principles: objectivity, trustworthiness, validity and transparency.

The students are evaluated according to two sets of evaluation: summative and formative. The aim of the summative assessment is to accurately evaluate the student's performance. It monitors quality of learning and the level of the student's achievement in relation to the goals set by the course. The formative assessment is oriented on the student's development. It gives students appropriate feedback on their achievements.

The evaluation system includes 100 points and envisages:

a) Five types of positive grades:

- a.a) (A) Excellent – 91-100 points of assessment;
- a.b) (B) Very good – 81-90 points of maximal assessment;
- a.c) (C) Good – 71-80 points of maximal assessment;
- a.d) (D) Satisfactory – 61-70 points of maximal assessment;
- a.e) (E) Sufficient – 51-60 points of maximal assessment;

b) two negative grades:

- b.a) (FX) Did not pass – 41-50 points of maximal assessment, which means the student needs to work harder and is allowed to retake the exam one more time after working independently;
- b.b) (F) Fail – 40 points or less of maximal assessment, which means the student's work is insufficient and he/she has to retake the course.

Students are awarded credits on the basis of the final evaluation comprising the scores of the interim and final exam assessments.

The attainment of student's learning outcomes considers the interim and final evaluations, for which relative proportions out of the total score (100 points) and a minimum competence level are allocated. Namely, out of 100 points, the interim results are allocated 70 points, while the final exam results are 30 points. In both of the components (interim and final) the minimum competency barrier to be reached is 51%. The interim evaluation includes assessment components, the total of which is 70 points. For each assessment component, the evaluation is based on the pre-determined learning goals, task-oriented clear criteria and the learning rubrics drawn on their basis. In the interim results Freshmen student (except B2 level English groups) has to accumulate at least 51% of the 70 points to be allowed to take the final exam. The student's final examination is passed, if he/she gets at least 51% of the total 30 points, For All the rest the student has to accumulate at least 59% of the 70 points to be allowed to take the final exam. The student's final examination is passed, if he/she gets at least 60% of the total 30 points.

In case the student fails to overcome the minimum competency barrier of the final exam, he/she is allowed to retake the final examination. The student shall retake the final examination within the period prescribed by the academic calendar no later than 5 days after announcement of the results of the final exam.

In case the student totally scores 0-50 points or fails to overcome the minimum competency barrier set for any form of the evaluation (Interim/Final exam), he/she shall be given a grade of "F-0".

### Teaching and Learning Methods

Different teaching methods are employed during the teaching process depending on the topics covered. Those include: **Discussions/debates** – one of the most common methods of interactive teaching. Quality of Students' involvement is higher; classes are more dynamic and students are more active. Any discussion can turn into a debate. The method allows professors to give questions and get answers and enables students to develop skills of discussion and debates and prepares them for justifying their opinions and points.

**Team (Collaborative) work** - the method implies dividing students into teams and assigning different tasks to them. Each team member works on the task individually and shares his/her ideas with the rest. Depending on the type of task, team members can change tasks and roles. The strategy ensures students' maximum involvement in the learning process.

**Problem Based Learning (PBL)** – a problem is given and analyzed in order to acquire knowledge.

**Cooperative Learning** – where the whole class is responsible not only for his/her own learning and understanding of the subject matter but also for aiding and assisting others in better understanding it. Each student works on a problem until he/she fully understands everything.

**Heuristic method** – is largely incremental. Students are to discover facts on their own and make links between them.

**Case Studies** – Professors and students discuss a particular case and fully comprehend an issue at hand. In Medicine it can be discussion of the medical record of a particular patient, in Political Science it can be analysis of a conflict between any two countries (e.g., Armenia-Azerbaijan), etc.

**Brain storming** – the method facilitates to generating as many ideas about a particular topic as possible. The method encourages creativity; it is particularly efficient with a large group of students and consists of a few stages:

- Creative approach to a problem/issue
- Listing the ideas generated, without any criticism, on the board.
- Identifying the ideas most closely linked with the problem/issue;

- Identifying criteria for finding which idea is more relevant to the issue/problem at hand;
- Evaluating selected ideas according to pre-selected criteria;
- Selecting the best idea – the one having the best evaluation or meeting most of the criteria;

**Role play** – students are assigned different roles, which allows them to look at a problem from different perspectives. Like debates, role play also helps students develop skills needed for giving their opinion and justifying their judgments.

**Method of Demonstration** – displaying visual materials. In majority of cases it is better to give students both audio and visual material simultaneously; the material can be given by both – professors and students; the method implies giving visual information on the whiteboard or carrying out a complex laboratory experiment.

**Induction, Deduction, Analysis, Synthesis.**

A deductive approach means that the teacher gives students a new concept, explains it and then has the students practice using the concept.

In contrast with the deductive method, inductive instruction makes use of student “noticing”. Instead of explaining a given concept and following this explanation with examples, the teacher presents students with many examples showing how the concept is used. The intent is for students to “notice”, by way of the examples, how the concept works and fits together.

With the method of analysis a problem is disintegrated into components. This method facilitates to comprehensive analysis of each of the constituent elements of a more complex problem.

Method of synthesis is opposite of the process of analysis. One whole is made by grouping its constituent elements, which allows students to look at a problem as one whole.

**Explanatory method** – discussing a particular issue, i.e., professor provides examples and discusses all sides and details.

**Action-oriented teaching** – requires active participation of both professor and students where major emphasis is put on practical interpretation of theoretical knowledge.

**E-learning** - The method combines three ways of instruction

Teaching methods complement each other during the teaching process. Course syllabus provides detailed information about teaching methods used.

#### Human Resources

The Program is implemented by the Academic and Invited Personnel: 4 (3 affiliated) Professors, 2 affiliated Associate Professors, 1 Assistant-Professor, and 25 Invited Lecturers, who, according to their qualification are ready to help students in developing the competencies, defined by the program.

#### Partnership

Caucasus University's and Caucasus School of Technology's Partner organizations: foreign and Georgian higher educational institutions, as well as governmental and non-governmental organizations are also involved into the program implementation, within the framework of a Memorandum of Cooperation.

**Partner Governmental and non-governmental organizations:**

- HR Recruitment Agency;
- Aliance Group Holding;
- Omedia;
- GITA;
- EY;
- Imobiliare;
- Silknet;
- UGT;
- Orient Logic;
- MyGPS;
- ZETEN;
- Scientific Research Institute Optica;
- Guramex;
- Georgian National Communications Commission;
- Ministry of Defence of Georgia;
- Ministry of Justice of Georgia;
- Ministry of Finance of Georgia;
- National Bank of Georgia;

- Tbilisi City Hall.

**Foreign higher educational institutions:**

- Tallinn University of Technology;
- Riga Technical University;
- Upper Austria University of Applied Sciences (Hagenberg);
- FH JOANNEUM University of Applied Sciences;
- University of Southern Denmark;
- Kaunas University Of Technology;
- University of Lodz;
- University of Alcala;
- Fairleigh Dickinson University;
- New Jersey City University;
- Ming Chuan University of Taiwan;
- Universidad Autonoma de Gvadalajara, Mexico;
- IESB, Brasilia Higher Education Institute, Brazil.

## Material and Technical Resources

For reaching the outcomes envisaged by the Program, the University infrastructure and material and technical resources unrestrictedly accessible for the students and the academic personnel, namely: Auditoria equipped with appropriate equipment and conference hall; Computer classes/labs, computers connected to the internet and intranet and specially tailored software guaranteeing smooth operation of learning/teaching process;

The material resources of the University ensure the goals set by the Program are reached and the planned, outcomes are realized:

**Premises:** the Program is conducted on the University premises where sanitary-hygiene and safety rules are adhered to. The University building fully complies with technical requirements established for Universities; the University has auditoria designed for lectures and practical classes fully equipped with appropriate equipment and devices (projectors, desks and chairs, whiteboards, etc.).

**Library:** The University library has printed and electronic fund relevant to the implementation of the Bachelor's Program. Library resource fund is accessible for the students and academic and invited personnel (20 605 printed and 10877 electronic units). The library has an electronic catalogue. The library has a Reading Room equipped with appropriate property (chairs, desks, computers). The library has one photocopier which can be used by students with the help of two library staff members. The Reading Room allows students to use internet and international electronic resources:

- ✓ [EBSCO HOST](#)
- ✓ [ScienceDirect](#)
- ✓ [Scopus](#)
- ✓ [Sci-val Funding\(Funding Institutional\)](#)
- ✓ [HeinOnline](#)
- ✓ [Taylor and Francis](#)
- ✓ [Math Scientific Publishing \(MSP\)-Journals](#)

**Information-Communication Technologies** – laboratories with computer equipment appropriate for the Bachelor's Program and corresponding to modern IT requirements are available at the University: computers are connected to the internet and can be accessed by students, academic, invited and administrative personnel. The computers are equipped with appropriate instruments/applications. The auditoria and computer classes are equipped with local net and internet.

The University operates an electronic system for organizing the educational process, which fosters academic processes and makes monitoring of the students' academic performance possible at all times. The University makes the catalogue of the educational programs and the information on implementation of the educational programs and conducting the educational process public and accessible at all times.

Currently, Caucasus University is equipped with modern computers and photocopying machines (they were replaced with the most up-to-date ones in 2018). The University has seven computer classes on A, B and C floors. Such classes are equipped with PC and Multimedia Projectors. Projectors and Computers are available in each auditorium. The University administration and practically all the employees have access to the computers and internet. The University operates a Computer Park with more than 380 units. In addition, the University has printers and scanners; a few so-called Smart Boards, photocopying machines "Kyocera" brand, color photocopying machines "HP MFD" type. Wi-Fi and IP telephone connection are accessible throughout the whole University premises. There are three modern servers in the University Server Department where appropriate net equipment is installed (with Cisco and Aruba/HP switches, Fortinet, NG Firewall, wireless controller and access point, etc.) more than 100 such devices. The University is connected to the external net and has 150/150 Mbps access to local and global connections.

The mentioned resources are freely accessible for the University students, academic, invited and administrative personnel. All the interested persons are informed on the possibility of using these resources and are familiar with the rules and procedures of their utilization.

## Financial Resources

The Budget of the program envisages revenues received from students and all the expenses required for full functioning. Financial calculations are based on following data:

- Contact hours required for teaching
- Number of course (mandatory, elective and foreign language)



- Payment of lecture hours
- Material support of students during process
- Expenditure of university administration
- Expenditure of Development/ Accreditation/ Internationalization of the program
- The unforeseen expenditure during the program.

In the budget of the program is set “University Reserve Fund”, which is to ensure to cover all expenses for the fully functioning of the program, when number of students are at minimum. In case of amendment to the program, the program budget is adjusted according to the amendment.

The budget of the program is approved by the president of Caucasus University, which is confirmed by order, attached with calculations of the program budget.

# Program Curriculum

№	Course Code	Prerequisite	Course	Year								ECTS
				I	II		III	IV				
				ECTS								
				I Semester	II Semester	III Semester	IV Semester	V Semester	VI Semester	VII Semester	VIII Semester	
Required General Educational Courses												
1.	CIS 1140		Computer Skills and Office Applications	x								5
2.	ACWR 0007		Academic Writing	x								5
3.	ENGL 0009		General English C1.0	x								5
4.	ENGL 0010	ENGL 0009	General English C1		x							5
Elective General Education Courses												
5.	CIS 1241	CIS 1140	Data Analysis		x							5
6.	ENGF 0001		General English Language Skills B2.0+	x								5
7.	ENGF 0002	ENGF 0001	General English Language Skills B2+		x							5
8.	GEO 0001		Georgian Language A1 <sup>1</sup>	x								5
9.	GEO 0002	GEO 0001	Georgian Language A2									5
10.	HIST 0001		Introduction to World History & Civilization									5
11.	POLS 0002		Political Science									5
12.	HIST 0003		History of Georgia									5
13.	SOCI 0004		Sociology									5
14.	PHIL 0005		Philosophy									5
15.	PSYC 0006		Psychology									5
16.	ENTP 0009		Entrepreneurship									5
Required Specialization Courses												
17.	MATH 0003		Calculus I	x								5
18.	MATH 0004	MATH 0003	Calculus II		x							5
19.	MATH 1240		Discrete Mathematics		x							5
20.	MATH 2240	MATH 0004	Scinetific Computing			x						5
21.	PHYS 2140	MATH 0003	Principles of Physics			x						5
22.	CTC 1141		Principles of Computer Programming I	x								5
23.	CTC 1242		Computer Architecture		x							5

№	Course Code	Prerequisite	Course	Year								ECTS	
				I		II		III		IV			
				ECTS									
				I Semester	II Semester	III Semester	IV Semester	V Semester	VI Semester	VII Semester	VIII Semester		
24.	CTC 1243	CTC 1141	Principles of Computer Programming II		x								5
25.	CTC 2141	CTC 1141	Web Technologies I			x							5
26.	CTC 2143	CTC 1242	Operating Systems			x							5
27.	CTC 3142	CTC 1243	Object Oriented Programming			x							5
28.	CTC 2144		Principles of Networking				x						5
29.	CTC 2241	CTC 2141	Web Technologies II				x						5
30.	CTC 2243		Introduction to Database Systems				x						5
31.	CTC 2244		Computer Security				x						5
32.	CTC 2245	CTC 1243	Algorithms & Data Structures I				x						5
33.	CTC 3249	CTC 2245	Algorithms & Data Structures II					x					6
34.	CTC 3149	CTC 1243	Programming Paradigms					x					6
35.	CTC 4247	CTC 1243	Python Programming					x					6
36.	PST 3240	MATH 0004	Probability & Statistics					x					6
37.	CTC 4141	CTC 1243	Software Engineering I						x				6
38.	CTC 3244	CTC 1243	.NET Technologies I						x				6
39.	CTC 4241	CTC 4141	Software Engineering II								x		6
40.	CTC 4147	CTC 2245	Artificial Inteligence								x		6
Elective Specialization Courses													
41.	ELC 2240	PHYS 2140	Electronics				x						5
42.	CTC 3143	CTC 2241	Web Technologies III					x					6
43.	CTC 3145		System Administration I					x					6
44.	SEC 3140		Usable Security					x					6
45.	SEC 3141		Etical Hacking					x					6
46.	SEC 3142		Web penetration testing					x					6
47.	DSY 3140	CTC 2245	Distributed Systems					x					6
48.	CTC 4145	CTC 2243	Database Administration					x					6
49.	CTC 3241	CTC 1243	User Interfaces						x				6

№	Course Code	Prerequisite	Course	Year								ECTS
				I		II		III		IV		
				ECTS								
				I Semester	II Semester	III Semester	IV Semester	V Semester	VI Semester	VII Semester	VIII Semester	
50.	CTC 3242	CTC 1243	Software Security						x			6
51.	CTC 3243	CTC 1243	Java Programming Language I						x			6
52.	WEB 3240	CTC 3143	Web Technologies IV						x			6
53.	CTC 3245		System Administration II						x			6
54.	PHY 3240	CTC 4247	Python Programming Language II						x			6
55.	FPR 3240	CTC 2245	Functional Programming						x			6
56.	CPL 3240	CTC 1243	Compilers						x			6
57.	ITPM 4140		IT Project Management							x		6
58.	ALGO 4140	CTC 2245	Problem-solving using algorithms and data structures							x		6
59.	MK 3140		Digital Marketing							x		6
60.	CTC 4142	CTC 3243	Java Programming Language II							x		6
61.	CTC 4143	CTC 3244	.NET Technologies II							x		6
62.	CTC 4148	MATH 2140	Cryptography								x	6
63.	CTC 4249	PST 3240	Machine Learning								x	6
64.	ITL 4140		Legal Issues of Information Technology								x	6
65.	PAR 4240		Principles Of Parallel Programming								x	6
66.	TEST 4240	CTC 2241	Principles of Test Automation Engineering								x	6
67.			Free Course <sup>2</sup>							x		6
Bachelol's Thesis												
68.	BPR 4240		Bachelol's Thesis								x	12
ECTS Credits Per Year				60		60		60		60		
Courses Per Year				12		12		10		9		

<sup>1</sup> In case a foreign student attests the level of general English language proficiency defined by the program, he / she will be exempted from passing English language courses and will study the courses in Georgian language within these credits, but if a student also is fluent in Georgian, he / she is entitled to study courses from the program's electives or free courses

<sup>2</sup> Student can take courses in terms of "Free Course" (18 ECTS) from the other Bachelor's degree programs and/or from the Elective Specialization Courses in this program.

### Distribution of Total Hours

Nº	Course Name	ECTS Credits\ Hours	Lecture / Practical Work Hours	Seminar Hours	Midterm and Final Exam Hours	Presentation Hours	Out of class preparation Hours
1.	Computer Skills and Office Applications	5/125	21	3	4	2	95
2.	Data Analysis	5/125	20	4	4	2	95
3.	Academic Writing	5/125	19	5	4	2	95
4.	General English Language Skills B2.0 +	5/125	57	4	4	3	57
5.	General English Language Skills B2 +	5/125	57	4	4	3	57
6.	General English C1.0	5/125	57	4	4	3	57
7.	General English C1	5/125	57	4	4	3	57
8.	Georgian Language A1	5/125	57	3	4	4	57
9.	Georgian Language A2	5/125	56	4	4	4	57
10.	Introduction to World History & Civilization	5/125	20	4	4	2	95
11.	Political Science	5/125	17	7	4	2	95
12.	History of Georgia	5/125	20	4	4	2	95
13.	Sociology	5/125	20	4	4	2	95
14.	Philosophy	5/125	17	7	4	2	95
15.	Psychology	5/125	20	4	4	2	95
16.	Entrepreneurship	5/125	26		4		95
17.	Calculus I	5/125	22	4	4		95
18.	Calculus II	5/125	22	4	4		95
19.	Discrete Mathematics	5/125	22	4	4		95
20.	Scientific Computing	5/125	18	6	4	2	95
21.	Principles of Physics	5/125	18	6	4	2	95
22.	Electronics	5/125	21	3	4	2	95
23.	Principles of Computer Programming I	5/125	26	6	4		89
24.	Computer Architecture	5/125	19	5	4	2	95
25.	Principles of Computer Programming II	5/125	30		4	2	89
26.	Web Technologies I	5/125	19	5	4	2	95
27.	Operating Systems	5/125	22	4	4		95
28.	Object Oriented Programming	5/125	20	4	4	2	95
29.	Principles of Networking	5/125	19	5	4	2	95
30.	Web Technologies II	5/125	27	3	4	2	89
31.	Introduction to Database Systems	5/125	20	4	4	2	95
32.	Computer Security	5/125	23	3	4		95
33.	Algorithms & Data Structures I	5/125	32		4		89
34.	IT Project Management	6/150	19	3	4	4	120
35.	Problem-solving using algorithms and data structures	6/150	26		4		120

Nº	Course Name	ECTS Credits\ Hours	Lecture / Practical Work Hours	Seminar Hours	Midterm and Final Exam Hours	Presentation Hours	Out of class preparation Hours
36	Web Technologies III	6/150	21	3	4	2	120
37	Database Administration	6/150	21	5	4		120
38	System Administration I	6/150	21	5	4		120
39	Python Programming Language II	6/150	21	5	4		120
40	Functional Programming	6/150	23	3	4		120
41	Digital Marketing	6/150	19	5	4	2	120
42	Programming Paradigms	6/150	23	3	4		120
43	Probability & Statistics	6/150	19	5	4	2	120
44	Distributed Systems	6/150	24		4	2	120
45	User Interfaces	6/150	22	4	4		120
46	Software Security	6/150	21	5	4		120
47	Java Programming Language I	6/150	21	3	4	2	120
48	Artificial Intelligence	6/150	22	4	4		120
49	System Administration II	6/150	20	4	4	2	120
50	Algorithms & Data Structures II	6/150	32		4		114
51	Software Engineering I	6/150	21	5	4		120
52	Java Programming Language II	6/150	23	3	4		120
53	.NET Technologies I	6/150	24	2	4		120
54	Python Programming	6/150	23	3	4		120
55	Usable Security	6/150	21	5	4		120
56	Etical Hacking	6/150	21	5	4		120
57	Web penetration testing	6/150	22	4	4		120
58	Cryptography	6/150	21	5	4		120
59	Machine Learning	6/150	21	5	4		120
60	Software Engineering II	6/150	21	5	4		120
61	.NET Technologies II	6/150	24	2	4		120
62	Web Technologies IV	6/150	24		4	2	120
63	Principles Of Parallel Programming	6/150	22	4	4		120
64	Principles of Test Automation Engineering	6/150	21	5	4		120
65	Legal Issues of Information Technology	6/150	21	5	4		120
66	Bachelol's Thesis	12/300	14				286

## Map of Learning Outcomes

No	Semester	Course code	Course Name	Learning Outcomes						
				Describes the basic concepts of computer science. Based on the knowledge of the principles of mathematical and computer technology, explains the theoretical and practical aspects of the field, the main features of the field and modern trends.	Analyzes complex computational problems and selects the appropriate algorithm for their solution	Develops and implements complex software systems	Participates effectively in teamwork in program-related activities	Applies the principles of programming, computer systems, the latest approaches and technological tools in practice	Realizes the importance of evaluating the learning process, the need to constantly update professional knowledge and acquire new knowledge, conducts oral and written communication	Appreciates and shares technology-related values, ethical and social responsibilities with others
1.	I	CIS 1140	Computer Skills and Office Applications					X	X	
2.	I	WRT 1140	Academic Writing						X	X
3.	I	ENGL 0009	C1.0 General English Language						X	X
4.	II	ENGL 0010	C1 General English Language						X	X
5.	I	MATH 0003	Calculus I	X	X					X
6.	II	MATH 0004	Calculus II	X	X					X
7.	II	MATH 1240	Discrete Mathematics	X	X	X				
8.	III	MATH 2140	Scientific Computing	X	X	X				
9.	III	PHYS 2140	Principles of Physics	X						
10.	III	CTC 3142	Object Oriented Programming	X	X	X				
11.	I	CTC 1141	Principles of Computer Programming I	X	X	X				
12.	II	CTC 1242	Computer Architecture	X						
13.	II	CTC 1243	Principles of Computer Programming II	X	X	X		X		
14.	III	CTC 2141	Web Technologies I	X			X	X		

№	Semester	Course code	Course Name	Learning Outcomes						
				Describes the basic concepts of computer science. Based on the knowledge of the principles of mathematical and computer technology, explains the theoretical and practical aspects of the field, the main features of the field and modern trends.	Analyzes complex computational problems and selects the appropriate algorithm for their solution	Develops and implements complex software systems	Participates effectively in teamwork in program-related activities	Applies the principles of programming, computer systems, the latest approaches and technological tools in practice	Realizes the importance of evaluating the learning process, the need to constantly update professional knowledge and acquire new knowledge, conducts oral and written communication	Appreciates and shares technology-related values, ethical and social responsibilities with others
15.	III	CTC 2143	Operating Systems	X				X		
16.	IV	CTC 2144	Principles of Networking	X						
17.	IV	CTC 2241	Web Technologies II			X	X	X		
18.	IV	CTC 2243	Introduction to Database Systems	X		X	X			
19.	IV	CTC 2244	Computer Security	X			X	X		X
20.	IV	CTC 2245	Algorithms & Data Structures I	X	X	X				
21.	V	CTC 3249	Algorithms & Data Structures II	X	X	X				
22.	V	PST 3240	Probability & Statistics	X						X
23.	V	CTC 3149	Programming Paradigms	X	X	X				
24.	V	CTC 4247	Python Programming	X	X	X	X			
25.	VI	CTC 4141	Software Engineering I	X		X	X	X		
26.	VI	CTC 3244	.NET Technologies I	X	X	X		X		
27.	VII	CTC 4241	Software Engineering II			X	X	X		
28.	VII	CTC 4147	Artificial Intelligence	X	X					
29.	VIII	BPR 4242	Bachelor's Thesis	X	X	X	X	X	X	X



### Map of Program Objectives and Learning Outcomes

<div>Program Objectives</div> <div>Learning Outcomes</div>	Provide the student with an in-depth knowledge of the theoretical aspects of higher education disciplines, which prepares the person for further study at the Master's degree program or work with a qualification.	Give student an interdisciplinary education in Computer Science, based on fundamental theories and principles of mathematics and Computer Science, which will enable him / her to develop professionally and contribute to the development of the field.	Prepare high-level, competitive specialists with the broad theoretical knowledge and practice-oriented, transferable skills necessary for professional development in modern IT field in Georgia and abroad as well.
Describes the basic concepts of computer science. Based on the knowledge of the principles of mathematical and computer technology, explains the theoretical and practical aspects of the field, the main features of the field and modern trends.	X	X	
Analyzes complex computational problems and selects the appropriate algorithm for their solution		X	X
Develops and implements complex software systems.		X	X
Participates effectively in teamwork in program-related activities.		X	X
Applies the principles of programming, computer systems, the latest approaches and technological tools in practice		X	X
Realizes the importance of evaluating the learning process, the need to constantly update professional knowledge and acquire new knowledge, conducts oral and written communication.	X	X	X
Appreciates and shares technology-related values, ethical and social responsibilities with others.	X	X	

### Academic and Invited Personnel

N	Personnel Name	Status	Course
1.	Avtandil Kavrelishvili	Professor	Introduction to Database Systems
			Database Administration
			.NET Technologies I
			.NET Technologies II
2.	Ana Gadakhabadze	Invited Lecturer	General English Language Skills B2.0 +
			General English Language Skills B2 +
3.	Giorgi Alkhazishvili	Invited Lecturer	Software Engineering I
			Software Engineering II
4.	Archil Shengelia	Invited Lecturer	Principles of Networking
			System Administration I
5.	Alina Tkabladze	Invited Lecturer	Principles of Test Automation Engineering
6.	Bekar Oikashvili	Invited Lecturer	System Administration II
7.	Giorgi Datukishvili	Professor	Computer Skills and Office Applications
			Data Analysis
8.	Giorgi Iashvili	Invited Lecturer	Computer Security
			Usable Security
			Etical Hacking
			Web penetration testing
9.	Giorgi Karanadze	Invited Lecturer	Digital Marketing
10.	Giorgi Lomidze	Invited Lecturer	Principles of Physics
			Electronics
			Computer Architecture
11.	Giorgi Pirveli	Invited Lecturer	Legal Issues of Information Technology
12.	Guranda Chelidze	Professor	Political Science
13.	Davit Magaldadze	Invited Lecturer	Web Technologies I
			Web Technologies III
			Web Technologies IV
14.	Zviad Khikhunashvili	Invited Lecturer	Probability & Statistics
15.	Zura Sekhniashvili	Invited Lecturer	Web Technologies II
16.	Tamta Mshvidobadze	Invited Lecturer	General English C1.0
			General English C1
17.	Tekla Jamrulashvili	Assistant Professor	Sociology
18.	Temur Jangveladze	Invited Lecturer	Scinetific Computing
19.	Luka Gorgadze	Invited Lecturer	Algorithms & Data Structures I
			Algorithms & Data Structures II
			Distributed Systems
			Problem-solving using algorithms and data structures
20.	Mariam Kobuladze	Invited Lecturer	User Interfaces

21.	Maxim Iavich	Professor	Software Security
			Python Programming Language
			Python Programming Language II
			Cryptography
			Principles of Parallel Programming
22.	Mikhal Malafiejski	Invited Lecturer	Principles of Computer Programming I
			Principles of Computer Programming II
			Object Oriented Programming
23.	Nikoloz Alavidze	Invited Lecturer	Operating Systems
24.	Nino Gorgadze	Invited Lecturer	IT Project Management
25.	Natia Phutkaradze	Associate Professor	Academic Writing
			Georgian Language A1
			Georgian Language A2
26.	Nodar Kankava	Invited Lecturer	Programming Paradigms
			Functional Programming
27.	Nugzar Gognadze	Invited Lecturer	Machine Learning
28.	Paata Ramishvili	Invited Lecturer	Introduction to World History & Civilization
			History of Georgia
29.	Rusudan Chachanidze	Invited Lecturer	Entrepreneurship
30.	Salome Zhvania	Invited Lecturer	Philosophy
31.	Aleksandre Lomadze	Invited Lecturer	Artificial Inteligence
32.	Soso Tsotniashvili	Invited Lecturer	Calculus I
			Calculus II
			Discrete Mathematics
33.	Sofia Katamadze	Invited Lecturer	Java Programming Language I
			Java Programming Language II
34.	Shorena Kuchuxidze	Associate Professor	Psychology