Caucasus University

FAIRLEIGH DICKINSON UNIVERSITY

Joint Bachelor Program in Computer Science

Program Name	
	Joint Program in Computer Science
Program Name in Georgian	
	კომპიუტერული მეცნიერების ერთობლივი საბაკალავრო პროგრამა
Degree level	
	Bachelor's
Type of the educational program	
	Academic
Instruction Language	
	English
Expected Qualification	
From Caucasus University	In English - Bachelor of Science in Computer Science, 0613
	In Georgian - მეცნიერების ბაკალავრი კომპიუტერულ მეცნიერებაში, 0613
From Fairleigh Dickinson University	In English - Bachelor of Science
	In Georgian - მეცნიერების ბაკალავრი
Date of Program Approval	
	18 November, 2022 (Order №01/01-65)
Academic head of the Program	
	Maksim Iavich PhD. Professor at Caucasus University

Program Volume in Credit Hours

200 ECTS (120 US credits) credits are envisaged to achieve the results of the Joint Bachelor's Program in Computer Science and the standard duration of the Program is 3 (three) academic years, the first two years (150 ECTS / 75 ECTS a year) at Caucasus University and the last 3rd year (50 ECTS / 30 US credits) at FDU.
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).
The program is envisages a narrow sphere and free components learning courses:

Learning courses of a narrow sphere (159 ECTS credits)

- Mandatory learning courses -119 ECTS credits;
- Optional learning courses - 15 ECTS
- Concentration - 25 ECTS

Learning courses of free component (41 ECTS credits)

- University Mandatory learning courses - 30 ECTS credits;
- University Optional learning course - 5 ECTS credits;
- Free courses - 6 ECTS credits;

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 in the Unified National Examinations is a mandatory requirement for 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 Caucasus University;
  - Pass an exam in Mathematics administered by the Caucasus 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 a relatively deep knowledge of theoretical aspects of higher-level learning disciplines than the complete general education, which prepares the person for further study at the Master's degree program or work with a received qualification.
- Give the student 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 activities in modern CS field in Georgia and abroad as well.

Learning Outcomes

Upon completion of the Bachelor's degree program in Computer Science, the graduate:

1. 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;
2. Analyzes complex computational problems and selects the appropriate algorithm for their solution;
3. Develops and implements complex software systems;
4. Participates effectively in teamwork in program-related activities;
5. Applies the principles of programming, computer systems, the latest approaches and technological tools in practice;
6. Realizes the importance of evaluating the learning process, the need to constantly update professional knowledge and acquire new knowledge, conducts oral and written communication;
7. Appreciates and shares computer science-related values, ethical and social responsibilities with others;

With a concentration in Big Data Analytics additionaly:

8. Analyzes data analytics algorithms and Big Data analytics frameworks;
9. Appies data and Big Data analytics methods to projects and products;

With a concentration in Game and Mobile Application Development additionaly:

8. Applies multimedia data processing algorithms;
9. Develops applications on different platforms.

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, 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.

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.

Program Curriculum

№	Course Code	Prerequisite	Course	Year						ECTS
				I		II		III		
				Semester						
				I	II	III	IV	V	VI	
Learning courses of a narrow sphere										
Mandatory learning courses -119 ECTS										
1.	CALC 1140		Calculus I	x						6
2.	DSM 1140		Discrete Mathematics	x						5
3.	PCP 1140		Principles of Computer Programming I	x						5
4.	ICS 1140		Introduction to Computer Science	x						5
5.	IDB 1140		Introduction to Database Systems	x						5
6.	CALC 1240	CALC 1140	Calculus II		x					6
7.	PCP 1240	PCP 1140	Principles of Computer Programming II		x					5
8.	NW 1240		Principles of Networking		x					5
9.	OS 1240		Operating Systems		x					5
10.	CARC 1240		Computer Architecture		x					5
11.	ALGE 2140	CALC 1240	Linear Algebra			x				5
12.	PHS 2140	CALC 1240	Physics I (Lecture and Lab)			x				6
13.	ALGO 2140	PCP 1240	Data Structures & Algorithms			x				5
14.	STAT 2140	CALC 1240	Probability & Statistics			x				5
15.	MT 2140		Modern Technologies			x				5
16.	PHS 2240	PHS 2140	Physics II (Lecture and Lab)				x			6
17.	CPL 2240	PCP 1240	Compilers				x			5
18.	CSCI 2247		Introduction To Assembly Language					x		5
19.	CSCI 4384		Preparation for Computer Science Senior Project					x		2
20.	CSCI 3251		Design of Software Systems					x		5
21.	ENGR 2286		Digital System Design					x		5
22.	CSCI 2235		Survey of Computing Security						x	5
23.	CSCI 3255	DSM 1140	Mathematical Foundations of Computer Science						x	5
24.	CSCI 4386		Computer Science Senior Project						x	3

№	Course Code	Prerequisite	Course	Year						ECTS
				I		II		III		
				Semester						
				I	II	III	IV	V	VI	
Optional learning courses -15 ECTS										
25.	WEB 1240	PCP 1140	Web Technologies I		x					5
26.	DMK 1240		Digital Marketing							5
27.	NET 2140	PCP 1240	.NET Technologies I			x				5
28.	WEB 2140	WEB 1240	Web Technologies II							5
29.	SYS 2140	OS 1240	System Administration I							5
30.	NET 2240	NET 2140	.NET Technologies II				x			5
31.	SYS 2240	OS 1240	System Administration II							5
32.	ITPM 2240		IT Project Management							5
Concentration - Big Data Analytics – 25 ECTS										
33.	ML 2240	STAT 2140	Machine Learning				x			5
34.	CSCI 3331	IDB 1140	Advanced Database					x		5
35.	CSCI 3485	IDB 1140	Big Data Analytics					x		5
36.	CSCI 3318	ICS 1140	Cloud Computing						x	5
37.	CSCI 3460	IDB 1140	Data Warehouse and Data Mining						x	5
Concentration - Game and Mobile Application Development – 25 ECTS										
38.	AI 2240	ALGO 2140	Artificial Inteligence				x			5
39.	CSCI 3314	PCP 1240	Mobile Application Development					x		5
40.	CSCI 3444	ICS 1140	Programming for the Internet					x		5
41.	CSCI 3317	PCP 1240	Computer Game Programming						x	5
42.	CSCI 4380	PCP 1240	System Development with Java						x	5
Learning courses of free component										
University Mandatory learning courses - 30 ECTS										
43.	ACWR 1140		Academic Writing I	x						5
44.	ACWR 1240	ACWR 1140	Academic Writing II		x					5
45.	TCOM 2140		Technical Communication			x				5
46.	GL 2240		Global Issues				x			5
47.	CULT 2240		Cross-cultural Perspectives				x			5
48.	MEEA 2240	CALC 1240	Managerial/Engineering Economic Analysis				x			5

№	Course Code	Prerequisite	Course	Year						ECTS
				I		II		III		
				Semester						
				I	II	III	IV	V	VI	
University Optional learning course - 5 ECTS										
49.	HIST 0001E		Introduction to World History & Civilization	x						5
50.	PHIL 0005E		Philosophy							5
51.	PSYC 0006E		Psychology							5
52.	ENTP 0009E		Entrepreneurship							5
Free Courses – 6 ECTS										
53.			Free Credit	x		x				3
			ECTS Credits Per Year	75		75		50		
			Courses Per Year	15		15		11		