# CAUCASUS UNIVERSITY



 კავკასიის ტექნოლოგიების სკოლა
CAUCASUS SCHOOL OF TECHNOLOGY

## Undergraduate Program in

## Computer Science

# Caucasus University

## Caucasus School of Technology

| Program Name | |
|---|---|
| | კომპიუტერული მეცნიერების საბაკალავრო პროგრამა |

| Program Name in English | |
|---|---|
| | Bachelor's Program in Computer Science |

| Degree level | |
|---|---|
| | Bachelor's |

| Type of the educational program | |
|---|---|
| | Academic |

| Instruction Language | |
|---|---|
| | Georgian |

| Expected Qualification and Code | |
|---|---|
| In Georgian: | ინჟინერიის ბაკალავრი ინფორმატიკაში (0401) |
| In English: | Bachelor of Engineering in Informatics (0401) |

| Date of Program Approval | |
|---|---|
| | 10 May 2007 |

| Academic head of the Program | |
|---|---|
| | Maksim Iavich PhD. Porfessor at Caucasus University |

| Program Volume in Credit Hours | |
|---|---|

The program consists of 240 ECTS credits. Caucasus University uses European Credit Transfer and Accumulation System (ECTS) to describe volume of expected work from the students. A credit is a unit for volume of work that is required from the students in terms of time spent. 1 ECTS credit is worth of 25 hours of student's academic workload.

Courses in the program are allocated based on their logical structure and sequence. Courses build up on the previously studied material and, therefore, enable students to acquire necessary knowledge. Courses in the program are divided into:
- General Educational Courses - **40 ECTS** Credits  (Including Mandatory General English – Minimal Competency Level  B2)
  - Required Courses - 20 ECTS Credits
  - Elective Courses - 20 ECTS Credits
- Specialization Courses - **182 ECTS** Credits:
  - Required Courses - 92 ECTS Credits
  - Elective Courses - 78 ECTS Credits
  - Bachelor's Thesis - 12 ECTS Credits
- Free Courses - **18 ECTS** Credits

Some of the Courses are taught in English.

| Admission Requirements | |
|---|---|

Any person having a secondary education is entitled to enrol on the Undergraduate Program in Computer Science.
The precondition for the admission to the program is to pass the United National Examination held by the Legal Entity of Public Law  - The National Assessment and Examinations Center.
An exception to the general rule of admission to the higher education institutions is made only in the cases stipulated by the law.

## 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 information technology, based on fundamental theories and principles of mathematics and informatics, 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:

1. A solid knowledge of the basic concepts of information technology. Ability to understand the theoretical and practical aspects of the field, the main features of the field and modern trends based on knowledge of mathematical and computer technology principles.
2. Ability to select, create, evaluate, and develop computer-based system, process, component or program design.
3. Ability to effectively integrate ICT-based solutions with the consumer environment, identify and analyze customer needs.
4. Ability to use the principles of programming, computer systems, the latest approaches and technological tools.
5. Ability to select the best approaches and standards when developing a technology solution or application, make a situational analysis and reasoned conclusion.
6. Understanding the value of the learning process and its importance, the need of constantly updating professional knowledge and ability to acquire it, communicate orally and in the written manner as well.
7. Ability to appreciate technology-related values and share them with others, understand ethical and social responsibility and put them into practice.

## 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, Network Systems and Data Communications Analyst, IT Business Management Consultant, Product Line Manager, Telecommunications 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 Resourses

The Program is implemented by the Academic and Invited Personnel: Thirteen Professors, Three Associate Professors, one Assistant-Professor, Three Assistants and Twenty Six Invited Lecturers, who, according to their quialification are ready to help students in developing the competencies, difined 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 Goergia; 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); University of Southern Denmark; Fairleigh Dickinson University; Kaunas University Of Technology; Ming Chuan University of Taiwan; Universidad Autonoma de Gvadalajara, Mexico; IESB, Brasilia Higher Education Institute, Brazil.

## Material and Technical Resourses

For reaching the outcomes envisaged by the Program, the University infrastructure and material and technical resources urestrictedly accessible for the students and the academic personnel, namely: Auditoria equiped with appropariate 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 Universty 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 establied for Universities; the University has audtoria designed for lectures and practical classes fully equipped with apropriate equipment and devices (projectors, desks and chairs, whiteboards, etc.).

Library: - The University library has printed and electronic fund necessary for implementation of the Program accessible for the students and academic personnel. The library has an electronic catalogue. The library has a Reading Room equipped with appropriate property (chairs, desks, computers). The Reading Room allows students to use internet and international electronic resources.

Information-Communication Technologies – laboratories and computer equipment appropriate to Program meeting modern requirements, connected to the internet and accessible for the students, academic, invited and administrative personnel are available at the University. The computers are equipped with appropriate instruments/applications. The auditoria and computer classes are equiped with local net and internet.

The University operates an electronic system for organizing the educational process, which fosters academic process 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 acessible at all times.

The mentioned resources are 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 Resourses

The budjet for financial Support of the Program is developed and included in the whole budget of the University.

| № | Course Code | Prerequisite | Course | I Sem (Yr I) | II Sem (Yr I) | I Sem (Yr II) | II Sem (Yr II) | I Sem (Yr III) | II Sem (Yr III) | I Sem (Yr IV) | II Sem (Yr IV) | ECTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Required General Educational Courses** | | | | | | | | | |
| 1. | CIS 1140 | | Computer Skills and Office Applications | x | | | | | | | | 5 |
| 2. | WRT 1140 | | Academic Writing | x | | | | | | | | 5 |
| 3. | ENGL 0007 | ENGL 0006 | B2.0 General English Language | x | | | | | | | | 5 |
| 4. | ENGL 0008 | ENGL 0007 | B2 General English Language | | x | | | | | | | 5 |
| | | | **Elective General Education Courses** | | | | | | | | | |
| 5. | ENGL 0005 | | B1.0 General English Language [1] | x | | | | | | | | 5 |
| 6. | ENGL 0006 | ENGL 0005 | B1 General English Language [1] | | x | | | | | | | 5 |
| 7. | ENGL 0009 | ENGL 0008 | C1.0 General English Language | | | x | | | | | | 5 |
| 8. | ENGL 0010 | ENGL 0009 | C1 General English Language | | | | x | | | | | 5 |
| 9. | MATH 0001 | | PreCalculus [2] | x | | | | | | | | 5 |
| 10. | CIS 1241 | CIS 1140 | Data Analisis | | x | | | | | | | 5 |
| 11. | HIST 0001 | | Introduction to World History & Civilization | | | | | | | | | 5 |
| 12. | POLS 0002 | | Political Science | | | | | | | | | 5 |
| 13. | HIST 0003 | | History of Georgia | | | x | | | | | | 5 |
| 14. | SOCI 0004 | | Sociology | | | | | | | | | 5 |
| 15. | PHIL 0005 | | Philosophy | | | | | | | | | 5 |
| 16. | PSYC 0006 | | Psychology | | | | | | | | | 5 |
| | | | **Required Specialization Courses** | | | | | | | | | |
| 17. | MATH 0003 | | Calculus I | x | | | | | | | | 5 |
| 18. | MATH 0004 | MATH 0003 | Calculus II | | x | | | | | | | 5 |

| № | Course Code | Prerequisite | Course | Year I | | Year II | | Year III | | Year IV | | ECTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | I Semester | II Semester | I Semester | II Semester | I Semester | II Semester | I Semester | II Semester | |
| 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. | ELC 2240 | PHYS 2140 | Electronics | | | | x | | | | | 5 |
| 23. | CTC 1141 | | Principles of Computer Programming I | x | | | | | | | | 5 |
| 24. | CTC 1242 | | Computer Architecture | | x | | | | | | | 5 |
| 25. | CTC 1243 | CTC 1141 | Principles of Computer Programming II | | x | | | | | | | 5 |
| 26. | CTC 2141 | CTC 1141 | Web Technologies I | | | x | | | | | | 5 |
| 27. | CTC 2143 | CTC 1242 | Operating Systems | | | 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 [3] | | | | | x | | | | 5 |
| 33. | PST 3240 | MATH 0004 | Probability & Statistics [4] | | | | | | x | | | 6 |
| 34. | ITPM 4140 | | IT Project Management [5] | | | | | | | x | | 6 |
| Elective Specialization Courses | | | | | | | | | | | | |
| 35. | MATL 1240 | | Data Modelling | | x | | | | | | | 5 |
| 36. | CTC 3142 | CTC 1243 | Object Oriented Programming | | | | | x | | | | 6 |
| 37. | CTC 3143 | CTC 2241 | Web Technologies III | | | | | x | | | | 6 |
| 38. | CTC 3145 | | System Administration I | | | | | x | | | | 6 |
| 39. | CTC 3148 | CTC 2144 | Virtualization Technology | | | | | x | | | | 6 |
| 40. | CTC 3149 | CTC 1243 | Programming Paradigms | | | | | x | | | | 6 |
| 41. | SEC 3140 | | Usable Security | | | | | x | | | | 6 |
| 42. | CTC 3249 | CTC 2245 | Algorithms & Data Structures II | | | | | x | | | | 6 |
| 43. | CTC 4145 | CTC 2243 | Database Administration | | | | | x | | | | 6 |

| № | Course Code | Prerequisite | Course | I Semester | II Semester | I Semester | II Semester | I Semester | II Semester | I Semester | II Semester | ECTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 44. | CTC 4247 | CTC 1243 | Python Programming Language ENG | | | | | x | | | | 6 |
| 45. | NW 3141 | CTC 2144 | Management of Computer Networks I | | | | | x | | | | 6 |
| 46. | MK 3140 | | Digital Marketing | | | | | x | | | | 6 |
| 47. | DSY 3140 | CTC 2245 | Distributed Systems | | | | | x | | | | 6 |
| 48. | NW 3241 | NW 3141 | Management of Computer Networks II | | | | | | x | | | 6 |
| 49. | CTC 3241 | CTC 1243 | User Interfaces | | | | | | x | | | 6 |
| 50. | CTC 3242 | | Software Security ENG | | | | | | 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 3244 | CTC 1243 | .NET Technologies I | | | | | | x | | | 6 |
| 54. | CTC 3245 | | System Administration II | | | | | | x | | | 6 |
| 55. | CTC 3246 | | Network Security | | | | | | x | | | 6 |
| 56. | CTC 3247 | CTC 2144 | Corporate Wireless Networks | | | | | | x | | | 6 |
| 57. | DA 3240 | | Digital Art | | | | | | x | | | 6 |
| 58. | PRW 3240 | | Specialization Project | | | | | | x | | | 6 |
| 59. | TELC 3240 | | Theory of Telecommunications | | | | | | x | | | 6 |
| 60. | CTC 3248 | CTC 2144 | Wide Area Networking | | | | | | | x | | 6 |
| 61. | CTC 4141 | CTC 1243 | Software Engineering I | | | | | | | x | | 6 |
| 62. | CTC 4142 | CTC 3243 | Java Programming Language II | | | | | | | x | | 6 |
| 63. | CTC 4143 | CTC 3244 | .NET Technologies II | | | | | | | x | | 6 |
| 64. | CTC 4144 | CTC 3145 | System Administration III | | | | | | | x | | 6 |
| 65. | CTC 4146 | CTC 2144 | Network & Service Management | | | | | | | x | | 6 |
| 66. | CTC 4147 | CTC 2245 | Artificial Inteligence | | | | | | | x | | 6 |
| 67. | CTC 4148 | MATH 2140 | Cryptography ENG | | | | | | | x | | 6 |
| 68. | ITL 4140 | | Legal Issues of Information Technology | | | | | | | x | | 6 |
| 69. | TELC 3245 | TELC 3240 | Digital Telecommunication | | | | | | | x | | 6 |

| № | Course Code | Prerequisite | Course | Year I I Sem | Year I II Sem | Year II I Sem | Year II II Sem | Year III I Sem | Year III II Sem | Year IV I Sem | Year IV II Sem | ECTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 70. | ELC 4142 | | Wireless communication systems | | | | | | | x | | 6 |
| 71. | CTC 4241 | CTC 4141 | Software Engineering II | | | | | | | | x | 6 |
| 72. | CTC 4242 | | Voice Over IP | | | | | | | | x | 6 |
| 73. | CTC 4243 | CTC 1243 | Mobile Programming | | | | | | | | x | 6 |
| 74. | CTC 4244 | CTC 3248 | Wide Area Networking II | | | | | | | | x | 6 |
| 75. | CTC 4248 | | Blockchain Technology & Cryptocurrency | | | | | | | | x | 6 |
| 76. | PAR 4240 | | Principles Of Parallel Programming | | | | | | | | x | 6 |
| 77. | CTC 4249 | PST 3240 | Machine Learning | | | | | | | | x | 6 |
| 78. | | | Free Course [6] | | | | | | | x | | |
| **Bachelol's Thesis** | | | | | | | | | | | | |
| 79. | BPR 4240 | | Bachelol's Thesis [7] | | | | | | | | x | 12 |
| ECTS | | | Per Semester | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | |
| | | | Per Year | 60 | | 60 | | 60 | | 60 | | |
| | | | Courses Per Year | 12 | | 12 | | 10 | | 9 | | |

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[1] General English Language B1 Level is mandatory for those students who have competency lower, than the Level B2.

[2] "PreCalculus" is mandatory for those students who have low competency in Math.

[3] Student, who already has accumulated 120 ECTS credits after the first two academic years, instead of the course - Algorithms & Data Structures I, will take the course - CTC 3141 Algorithms & Data Structures (In accordance to the previous program).

[4] "Probability & Statistics" is elective before Intake 2017-2018.

[5] "IT Project Management" is elective before Intake 2016-2017.

[6] Student can take courses in terms of "Free Course" (18 ECTS) from the other Bachelor's degree programs and/or form the Elective Specialization Courses in this program.

[7] "Bachelol's Thesis" is elective before Intake 2014-2015.

[ENG] The course is taught in English.

| № | 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 | 19 | 5 | 4 | 2 | 95 |
| 2. | Data Analisis | 5/125 | 20 | 4 | 4 | 2 | 95 |
| 3. | Academic Writing | 5/125 | 21 | 3 | 4 | 2 | 95 |
| 4. | B1.0 General English Language | 5/125 | 53 | 9 | 4 | 2 | 57 |
| 5. | B1 General English Language | 5/125 | 53 | 9 | 4 | 2 | 57 |
| 6. | B2.0 General English Language | 5/125 | 58 | 3 | 4 | 3 | 57 |
| 7. | B2 General English Language | 5/125 | 57 | 3 | 5 | 3 | 57 |
| 8. | C1.0 General English Language | 5/125 | 58 | 3 | 4 | 3 | 57 |
| 9. | C1 General English Language | 5/125 | 58 | 3 | 4 | 3 | 57 |
| 10. | Pre Calculus | 5/125 | 18 | 6 | 4 | 2 | 95 |
| 11. | Introduction to World History & Civilization | 5/125 | 14 | 10 | 4 | 2 | 95 |
| 12. | Political Science | 5/125 | 17 | 7 | 4 | 2 | 95 |
| 13. | History of Georgia | 5/125 | 19 | 5 | 4 | 2 | 95 |
| 14. | Sociology | 5/125 | 20 | 4 | 4 | 2 | 95 |
| 15. | Philosophy | 5/125 | 17 | 7 | 4 | 2 | 95 |
| 16. | Psychology | 5/125 | 18 | 4 | 4 | 4 | 95 |
| 17. | Calculus I | 5/125 | 18 | 6 | 4 | 2 | 95 |
| 18. | Calculus II | 5/125 | 18 | 6 | 4 | 2 | 95 |
| 19. | Discrete Mathematics | 5/125 | 22 | 4 | 4 | | 95 |
| 20. | Scinetific Computing | 5/125 | 24 | 6 | 4 | 2 | 89 |
| 21. | Principles of Physics | 5/125 | 21 | 5 | 4 | | 95 |
| 22. | Electronics | 5/125 | 21 | 3 | 4 | 2 | 95 |
| 23. | Principles of Computer Programming I | 5/125 | 28 | 4 | 4 | | 89 |
| 24. | Computer Architecture | 5/125 | 20 | 4 | 4 | 2 | 95 |
| 25. | Principles of Computer Programming II | 5/125 | 28 | 4 | 4 | | 89 |
| 26. | Web Technologies I | 5/125 | 19 | 5 | 4 | 2 | 95 |
| 27. | Operating Systems | 5/125 | 19 | 5 | 4 | 2 | 95 |
| 28. | Principles of Networking | 5/125 | 19 | 5 | 4 | 2 | 95 |
| 29. | Web Technologies II | 5/125 | 21 | 3 | 4 | 2 | 95 |
| 30. | Introduction to Database Systems | 5/125 | 21 | 3 | 4 | 2 | 95 |
| 31. | Computer Security | 5/125 | 22 | 4 | 4 | | 95 |
| 32. | Algorithms & Data Structures I | 5/125 | 28 | 4 | 4 | | 89 |
| 33. | Specialization Project | 6/150 | 20 | | | | 130 |
| 34. | IT Project Management | 6/150 | 19 | 3 | 4 | 4 | 120 |

| № | Course Name | ECTS Credits\Hours | Lecture / Practical Work Hours | Seminar Hours | Midterm and Final Exam Hours | Presentation Hours | Out of class preparation Hours |
|---|---|---|---|---|---|---|---|
| 35. | Data Modelling | 6/150 | 22 | 4 | 4 | | 95 |
| 36. | Object Oriented Programming | 6/150 | 19 | 5 | 4 | 2 | 120 |
| 37. | Digital Art | 6/150 | 17 | 5 | 4 | 4 | 120 |
| 38. | Web Technologies III | 6/150 | 18 | 6 | 4 | 2 | 120 |
| 39. | Database Administration | 6/150 | 21 | 5 | 4 | | 120 |
| 40. | System Administration I | 6/150 | 21 | 5 | 4 | | 120 |
| 41. | Management of Computer Networks I | 6/150 | 20 | 4 | 4 | 2 | 120 |
| 42. | Management of Computer Networks II | 6/150 | 20 | 4 | 4 | 2 | 120 |
| 43. | Digital Marketing | 6/150 | 19 | 5 | 4 | 2 | 120 |
| 44. | Programming Paradigms | 6/150 | 23 | 3 | 4 | | 120 |
| 45. | Probability & Statistics | 6/150 | 21 | 3 | 4 | 2 | 120 |
| 46. | User Interfaces | 6/150 | 22 | 4 | 4 | | 120 |
| 47. | Distributed Systems | 6/150 | 24 | | 4 | 2 | 120 |
| 48. | Software Security | 6/150 | 21 | 5 | 4 | | 120 |
| 49. | Java Programming Language I | 6/150 | 20 | 4 | 4 | 2 | 120 |
| 50. | Artificial Inteligence | 6/150 | 22 | 4 | 4 | | 120 |
| 51. | Blockchain Technology & Cryptocurrency | 6/150 | 22 | 4 | 4 | | 120 |
| 52. | System Administration II | 6/150 | 20 | 4 | 4 | 2 | 120 |
| 53. | Network Security | 6/150 | 19 | 5 | 4 | 2 | 120 |
| 54. | Corporate Wireless Networks | 6/150 | 20 | 4 | 4 | 2 | 120 |
| 55. | Wide Area Networking | 6/150 | 19 | 5 | 4 | 2 | 120 |
| 56. | Algorithms & Data Structures II | 6/150 | 28 | 4 | 4 | | 114 |
| 57. | Software Engineering I | 6/150 | 21 | 5 | 4 | | 120 |
| 58. | Java Programming Language II | 6/150 | 19 | 5 | 4 | 2 | 120 |
| 59. | Theory of Telecommunications | 6/150 | 22 | 4 | 4 | | 120 |
| 60. | .NET Technologies I | 6/150 | 24 | 2 | 4 | | 120 |
| 61. | Python Programming Language | 6/150 | 23 | 3 | 4 | | 120 |
| 62. | Web Technologies IV | 6/150 | 24 | | 4 | 2 | 120 |
| 63. | Virtualization Technology | 6/150 | 21 | 5 | 4 | | 120 |
| 64. | Wide Area Networking II | 6/150 | 20 | 4 | 4 | 2 | 120 |
| 65. | System Administration III | 6/150 | 23 | 3 | 4 | | 120 |
| 66. | Usable Security | 6/150 | 21 | 5 | 4 | | 120 |
| 67. | Cryptography | 6/150 | 21 | 5 | 4 | | 120 |
| 68. | Machine Learning | 6/150 | 21 | 5 | 4 | | 120 |
| 69. | Digital Telecommunication | 6/150 | 22 | 4 | 4 | | 120 |
| 70. | Wireless communication systems | 6/150 | 22 | 4 | 4 | | 120 |
| 71. | Software Engineering II | 6/150 | 21 | 5 | 4 | | 120 |
| 72. | Network & Service Management | 6/150 | 20 | 6 | 4 | | 120 |

| № | Course Name | ECTS Credits\Hours | Lecture / Practical Work Hours | Seminar Hours | Midterm and Final Exam Hours | Presentation Hours | Out of class preparation Hours |
|---|---|---|---|---|---|---|---|
| 73. | .NET Technologies II | 6/150 | 24 | 2 | 4 | | 120 |
| 74. | Voice Over IP | 6/150 | 20 | 6 | 4 | | 120 |
| 75. | Mobile Programming | 6/150 | 21 | 5 | 4 | | 120 |
| 76. | Legal Issues of Information Technology | 6/150 | 21 | 5 | 4 | | 120 |
| 77. | Principles Of Parallel Programming | 6/150 | 22 | 4 | 4 | | 120 |
| 78. | Bachelol's Thesis | 12/300 | 14 | | | | 286 |

Map of Learning Outcomes

| № | Semester | Course code | Course Name | A solid knowledge of the basic concepts of information technology. Ability to understand the theoretical and practical aspects of the field, the main features of the field and modern trends based on knowledge of mathematical and computer technology principles. | . Ability to select, create, evaluate, and develop computer-based system, process, component or program design. | Ability to effectively integrate ICT-based solutions with the consumer environment, identify and analyze customer needs. | Ability to use the principles of programming, computer systems, the latest approaches and technological tools. | Ability to select the best approaches and standards when developing a technology solution or application, make a situational analysis and reasoned conclusion. | Understanding the value of the learning process and its importance, the need of constantly updating professional knowledge and ability to acquire it, communicate orally and in the written manner as well. | Ability to appreciate technology-related values and share them with others, understand ethical and social responsibility and put them into practice. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. | I | CIS 1140 | Computer Skills and Office Applications | | | X | | | X | |
| 2. | I | WRT 1140 | Academic Writing | | | | | | X | X |
| 3. | I | ENGL 0007 | B2.0 General English Language | | | | | | X | X |
| 4. | II | ENGL 0008 | B2 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 | | | | |
| 8. | III | MATH 2140 | Scinetific Computing | X | X | X | | | | |
| 9. | III | PHYS 2140 | Principles of Physics | | | X | | X | | |
| 10. | IV | ELC 2240 | Electronics | | | X | | | X | |
| 11. | I | CTC 1141 | Principles of Computer Programming I | X | X | X | X | | | |
| 12. | II | CTC 1242 | Computer Architecture | X | | | X | | | |
| 13. | II | CTC 1243 | Principles of Computer Programming II | X | X | X | X | | | |
| 14. | III | CTC 2141 | Web Technologies I | X | | | X | | | |
| 15. | III | CTC 2143 | Operating Systems | X | | | | X | | |

| № | Semester | Course code | Course Name | A solid knowledge of the basic concepts of information technology. Ability to understand the theoretical and practical aspects of the field, the main features of the field and modern trends based on knowledge of mathematical and computer technology principles. | . Ability to select, create, evaluate, and develop computer-based system, process, component or program design. | Ability to effectively integrate ICT-based solutions with the consumer environment, identify and analyze customer needs. | Ability to use the principles of programming, computer systems, the latest approaches and technological tools. | Ability to select the best approaches and standards when developing a technology solution or application, make a situational analysis and reasoned conclusion. | Understanding the value of the learning process and its importance, the need of constantly updating professional knowledge and ability to acquire it, communicate orally and in the written manner as well. | Ability to appreciate technology-related values and share them with others, understand ethical and social responsibility and put them into practice. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Learning Outcomes** | | | | | | |
| 16. | III | CTC 2144 | Principles of Networking | X | X | | | | | |
| 17. | IV | CTC 2241 | Web Technologies II | | | X | X | | | |
| 18. | IV | CTC 2243 | Introduction to Database Systems | X | | X | | | | |
| 19. | IV | CTC 2244 | Computer Security | | | | X | X | | X |
| 20. | IV | CTC 2245 | Algorithms & Data Structures I | X | X | X | | | | |
| 21. | V | PST 3240 | Probability & Statistics | X | | | | | | X |
| 22. | VII | ITPM 4140 | IT Project Management | | | | | X | X | X |
| 23. | VIII | BPR 4242 | Bachelol's Thesis | X | X | X | X | X | X | X |

| Program Objectives / Learning Outcomes | 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 or work with a qualification. | Give student an interdisciplinary education in information technology, based on fundamental theories and principles of mathematics and informatics, 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. |
|---|---|---|---|
| A solid knowledge of the basic concepts of information technology. Ability to understand the theoretical and practical aspects of the field, the main features of the field and modern trends based on knowledge of mathematical and computer technology principles. | X | X | |
| Ability to select, create, evaluate, and develop computer-based system, process, component or program design. | | X | X |
| Ability to effectively integrate ICT-based solutions with the consumer environment, identify and analyze customer needs. | X | | X |
| Ability to use the principles of programming, computer systems, the latest approaches and technological tools. | | X | X |
| Ability to select the best approaches and standards when developing a technology solution or application, make a situational analysis and reasoned conclusion. | | X | X |
| Understanding the value of the learning process and its importance, the need of constantly updating professional knowledge and ability to acquire it, communicate orally and in the written manner as well. | X | X | |
| Ability to appreciate technology-related values and share them with others, understand ethical and social responsibility and put them into practice. | X | X | |

# Academic and Invited Personnel

| # | Personnel Name | Status | Course |
|---|---|---|---|
| 1. | Abesalom Iashvili | Invited Lecturer | Electronics |
| 2. | Avtandil Kavrelishvili | Professor | Database Administration |
| 3. | Akaki Khvedelidze | Invited Lecturer | System Administration I |
| 4. | Aleskandre Lomadze | Invited Lecturer | Artificial Inteligence |
| 5. | Archil Shengelia | Invited Lecturer | Virtualization Technology |
| | | | Voice Over IP |
| | | | Network & Service Management |
| 6. | Gela Butbaia | Invited Lecturer | Blockchain Technology & Cryptocurrency |
| 7. | Giorgi Alkhazishvili | Invited Lecturer | Software Engineering I |
| | | | Software Engineering II |
| 8. | Giorgi Datukishvili | Professor | Computer Architecture |
| | | | Data Analisis |
| 9. | Giorgi Iashvili | Invited Lecturer | Usable Security |
| 10. | Giorgi Iashvili | Invited Lecturer | Computer Security |
| 11. | Giorgi Karanadze | Invited Lecturer | Digital Marketing |
| 12. | Giorgi Lobjanidze | Professor | Pre Calculus |
| 13. | Giorgi Nikuradze | Invited Lecturer | Digital Art |
| 14. | Giorgi Pirveli | Invited Lecturer | Legal Issues of Information Technology |
| 15. | Giorgi Cubinidze | Invited Lecturer | IT Project Management |
| 16. | Giorgi Jibladze | Invited Lecturer | Web Technologies I |
| | | | Web Technologies II |
| | | | Web Technologies IV |
| 17. | Guranda Chelidze | Professor | Political Science |
| 18. | Davit Gogolashvili | Invited Lecturer | Machine Learning |
| 19. | Ekaterine Kvachantiradze | Professor | Introduction to World History & Civilization |
| 20. | Ekaterine Chogovadze | Invited Lecturer | .NET Technologies I |
| | | | .NET Technologies II |
| 21. | Vano Otkhozoria | Associate Professor | Management of Computer Networks I |
| | | | Management of Computer Networks II |
| | | | Wide Area Networking |
| | | | Wide Area Networking  II |
| | | | Principles of Networking |
| 22. | Vano Chiaureli | Invited Lecturer | Philosophy |
| 23. | Zaza Gamezardashvili | Assistant-Professor | Algorithms & Data Structures I |
| | | | Algorithms & Data Structures II |
| | | | Principles of Computer Programming I |
| | | | Principles of Computer Programming II |
| 24. | Zurab Bragvadze | Professor | History of Georgia |
| 25. | Otar Magaldadze | Invited Lecturer | Java Programming Language I |
| | | | Java Programming Language II |
| | | | Object Oriented Programming |
| 26. | Tamar Sharashenidze-Soyucok | Invited Lecturer | B2.0 General English Language |
| | | | B2 General English Language |

| #   | Personnel Name | Status | Course |
| --- | --- | --- | --- |
| 27. | Tamta Mshvidobadze | Invited Lecturer | C1.0 General English Language |
|     |                |                  | C1 General English Language |
| 28. | Teimuraz Khutsishvili | Professor | Calculus II |
| 29. | Temur Jangveladze | Invited Lecturer | Scinetific Computing |
| 30. | Ioseb Dmanashvili | Professor | Web Technologies III |
|     |                |                  | Programming Paradigms |
|     |                |                  | Mobile Programming |
| 31. | Mariam Kobuladze | Invited Lecturer | User Interfaces |
| 32. | Maksim Iavich | Professor | Python Programming Language |
|     |                |                  | Software Security |
|     |                |                  | Cryptography |
|     |                |                  | Principles Of Parallel Programming |
| 33. | Medea Gelenava | Associate Professor | Introduction to Database Systems |
| 34. | Merab Tavartkiladze | Professor | System Administration  II |
|     |                |                  | System Administration  III |
| 35. | Mzia Tediashvili | Professor | Psychology |
| 36. | Natia Suarishvili | Invited Lecturer | Probability & Statistics |
| 37. | Nino Beradze | Invited Lecturer | Academic Writing |
| 38. | Nugzar Botchoidze | Invited Lecturer | Principles of Physics |
| 39. | Nugzar Skhirtladze | Professor | Calculus I |
| 40. | Salome Gogberashvili | Invited Lecturer | B1.0 General English Language |
|     |                |                  | B1 General English Language |
| 41. | Soso Tsotniashvili | Invited Lecturer | Discrete Mathematics |
| 42. | Ketevan Datukishvili | Professor | Computer Skills and Office Applications |
| 43. | Ketevan Mukhiguli | Associate Professor | Sociology |
| 44. | Shalva Kvirkvelia | Invited Lecturer | Corporate Wireless Networks |
| 45. | Shalva Svanishvili | Invited Lecturer | Operating Systems |
|     |                |                  | Network Security |
| 46. | Luka gorgadze | Invited Lecturer | Distributed Systems |
| 47. | Mariam Sordia | Invited Lecturer | Data Modelling |
| 48. | Nodar Ughrelidze | Professor | Theory of Telecommunications |
|     |                |                  | Digital Telecommunication |
|     |                |                  | Wireless communication systems |