*Ivane Javakhishvili Tbilisi State University*
*Faculty Exact and Natural Sciences*
*Department of Computer Sciences*

Bachelor Program

# Computer Science
## კომპიუტერული მეცნიერება

Academic degree:
*Bachelor of Informatics*
*ინფორმატიკის ბაკალავრი*

*Tbilisi*
*2019*

| Faculty | Faculty Exact and Natural Sciences |
|---|---|
| **Program name** | Computer Science |
| **Program volume in credits** | 240 ECTS |
| **Language of teaching** | English |
| **Academic degree awarded** | Bachelor of Informatics |
| **Prerequisite to access to the program** | The Georgian citizens must pass Unified National Exams. Admission for the program requires minimal competence levels in following Unified National Exams:<br>• English Language - 69% + 1<br>• General Aptitude – minimum competence levels is determined by National Assessment and Examinations Center<br>• Georgian Language - minimum competence levels is determined by National Assessment and Examinations Center<br>• Mathematics/Physics - minimum competence levels is determined by TSU faculty Exact and Natural Sciences<br><br>Foreign applicants should follow the rules and terms defined by the Ministry of Education and Science of Georgia (http://www.mes.gov.ge/content.php?id=1131&lang=geo) according to the order №224/N of the Minister of Education and Science of Georgia (December 29, 2011). The Applicant should prove English language qualification equivalent to CEFR level B2 or higher. |
| **Program Heads** | Manana Khachidze<br>Alexandre Gamkrelidze<br>Gia Sirbiladze<br>Koba GelaSvili<br>(Full CV see in Appendix 1) |
| **Program Coordinator** | Magda Tsintsadze<br>(Full CV see in Appendix 1) |
| **Tution fee** | 3 500$ or 9000 GeL one academic year |

**Program Educational Objectives**

The educational objectives of the undergraduate program "Computer Science" are to issue graduates who will

1. be productive, responsible computing science professionals conducting research and/or design developing and maintaining projects in the various areas of Computer Science,
2. understand and apply ethical issues and social aspects of computing science in performing their duties as computer science professionals,
3. continue the learning of new technologies in the computer science area through self-directed professional development or post-graduate education.

## Student Outcomes

Department of Computer Sciences adopted ABET CAC Student outcomes:

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Apply computer science theory and software development fundamentals to produce computing-based solutions.

| ABET CAC Student outcomes | Knowledge and understanding | Skills | Autonomy and Responsibility |
|---|---|---|---|
| 1. **Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.** | ▓ | | |
| 2. **Design, implement and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.** | | ▓ | |
| 3. **Communicate effectively in a variety of professional contexts.** | | | ▓ |
| 4. **Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.** | | | ▓ |
| 5. **Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.** | | ▓ | |
| 6. **Apply computer science theory and software development fundamentals to produce computing-based solutions** | ▓ | | |

*Performance Indicators for Student Outcomes*
Student Outcomes:
1.  Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
    PI 1:  Analyze a complex computing problem to identify a solution
    PI 2: Apply principles of computing to identify a solution to a complex computing problem
    PI 3: Apply principles of relevant disciplines to identify a solution to a complex computing problem

2.  Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
    PII1: Design a software solution to meet a given set of computing requirements
    PII2: Implement a software solution to meet a given set of computing requirements
    PII3: Evaluate a computing-based solution to meet a given set of computing requirements

3.  Communicate effectively in a variety of professional contexts
    PIII1: Participate effectively in group discussions
    PIII2: Prepare an effective presentation
    PIII3: Write an effective project report

4.  Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
    PIV1: Recognize professional responsibilities in computing practice based on legal and ethical principles.
    PIV2: Make informed judgment in computing practice based on legal and ethical principles

5.  Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
    PV1: Effectively engaged in team as member or leader
    PV2: Contributes effectively for common task

6.  Apply computer science theory and software development fundamentals to produce computing-based solutions.
    PVI1: Apply computer Science theory to produce a solution
    PVI2: Apply software development fundamentals to produce a solution

**Level Of Learning Achievement**
- The learning outcomes are defined in the disciplines envisaged by the Bachelor Program of "Computer Science", which are taught in I-VIII semester. To reach this level means:

- Knowledge of fundamental principles and theories in computer science;

- Ability to use key and fundamental algorithms of computer science in different fields of science and practice;

- Ability to use modern programming languages and tools;

- Ability to operate and use different purpose tools of computer science and information technology.

## Fields of Employment

Fields of employment of Bachelor of Computer Science are: Governance bodies, educational institutions and organizations of different forms of ownership which use computer technologies for their activities. Bachelor of computer science is predominantly prepared for the development and use of modern methods in the field of economy, management and financial activities. Bachelor of Computer Science can occupy any position that according to the laws of Georgia require higher education. The presented bachelor program takes care of graduates' employment, by means of providing opportunities for continues education, as well as by means of invited lectures participating in the program: most of them are representatives of big employers at Georgian labor market, their tight relationship with students increases the chance of employment of successful students with favorable conditions.

## The Possibility To Continue Learning

Bachelor of Computer Science will be able to continue their study at master degree programs, such as "Computer Science", "Information systems", "Information technologies", which represent the extension of the undergraduate program. The graduates can continue their education also at master programs in mathematics, engineering, and other Natural Sciences those prerequisite are programming and mathematical knowledge.Major specialty choosing deadline

The third semester is the deadline for choosing major specialty (optimal is the second semester). If students change their mind, they will be able to continue learning at other bachelor programs being carried out at the faculty (mathematics, electronics).

## Program Delivery Modes

The Computer Science program is offered as an on-campus day time program. Our academic year is divided into two semesters (fall and spring). Each semester 15 weeks of instruction, with the sixteenth week used for final examinations. The number of contact hours (lecture/practice/workshop/lab) correspond to 5 ECTS and usually meet for three 50-minute periods each week.

The required courses in computer science are offered in every semester, and the most of elective ones are offered at least once a year. Most undergraduate courses are offered during daytime.

There are three basic program delivery modes:

Lectures: verbal, problem-based learning (PBL), demonstration method, induction, deduction, analysis and synthesis.

Seminars, practical and laboratory teaching: verbal, book-based method, laboratory and demonstration methods, practical methods, induction methods, analysis method, and synthesis method, electronic attending (E-learning).

Team Projects: Verbal, PBL, E-learning, cooperative learning, collaborative work.

## Grading scheme and grade distribution guidance

The student's knowledge is being evaluated according to the following system: "Excellent", "Very good", "Good", "Satisfactory", "Sufficient", "Marginal fail" and "Fail"
A student is evaluated in accordance with the following principle:

| Scores | Evaluation | Classification of Evaluation | GPA of Evaluation |
|---|---|---|---|
| 91% and more | (A) "Excellent" | Positive | 4.0 |
| 81 -90% | (B) "Very good" | Positive | 3.0 |
| 71 -80% | (C) "Good" | Positive | 2.0 |
| 61 -70% | (D) "Satisfactory" | Positive | 1.0 |
| 51 -60% | (E) "Sufficient" | Positive | 0.5 |
| 41 -50% | (FX) "Marginal Fail" | Negative | 0 |
| 40% and below | (F) "Fail" | Negative | 0 |

The student's final mark in a specific subject is determined by the number of point collected by him/her in the different components (lecture, seminar, practical studies, laboratory exercises) in the course of interim and final (examination) evaluation.

The maximum a viable point in each course is 100. Final exam does not exceed 40 points, interim evaluation represents a combination of test scores, presentation in the class, and team or individual projects. The weight of each components are different for different course and are defined in syllabuses

Grading System of the CS Program is consistent with the TSU standard grading system:

| Evaluation | Scores | GPA |
|---|---|---|
| A | 91-100 | 4.0 |
| B | 81-90 | 3.0 |
| C | 71-80 | 2.0 |
| D | 61-70 | 1.0 |
| E | 51-60 | 0.5 |
| F-FX | 0-50 | 0.0 |

# *Curriculum*

**Full volume of 240 ECTS. from here:**

145 ECTS - Computer Science subjects;
20 ECTS - Natural Sciences subjects;
30 ECTS - General education.

Faculty: *Faculty of Exact and Natural Sciences*
Institute / Department / Chair / Direction: Computer Sciences
Name of the Program: *Computer Science*
Level of training: a bachelor
Heads of Program: Manana Khachidze
Coordinator: Magda Tsintsadze
Date of approval of the Academic Council, Resolution Number:
Date of the enrollment of the academic year (academic year): 2019-2020

| | Course | Subject status | ECTS | hours | Lecture / Practice / Work / Lab | Prerequisite | I Semester | II Semester | III Semester | IV Semester | V Semester | V I Semester | VII Semester | VIII Semester |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CS101 | ICT Literacy | **R** | 5 | 30/95 | 1/0/0/2 | N/R | ▓ | | | | | | | |
| CS102 | Basics of Programming | **R** | 5 | 45/80 | 1/1/0/1 | N/R | ▓ | | | | | | | |
| CS103 | Introduction to Algorithms | **R** | 5 | 60/65 | 2/2/0/0 | N/R | ▓ | | | | | | | |
| MaTh101 | Calculus | **R** | 5 | 60/65 | 2/2/0/0 | N/R | ▓ | | | | | | | |
| GE | Language 1 | **R** | 5 | 60/65 | 0/4/0/0 | N/R | ▓ | | | | | | | |
| SC | Elective Intr Sc.1 | **SR** | 5 | 60/65 | 2/2/0/0 | N/R | ▓ | | | | | | | |
| | | | | | | | | | | | | | | |
| CS104 | Object Oriented Programming 1 (C ++) | **R** | 5 | 60/65 | 1/2/0/1 | CS102 | | ▓ | | | | | | |
| CS105 | Data Structures | **R** | 5 | 45/80 | 1/1/0/1 | CS103, CS102 | | ▓ | | | | | | |
| CS106 | Algorithm Design | **R** | 5 | 60/65 | 2/1/0/1 | CS103 | | ▓ | | | | | | |
| MaTh102 | Algebra for Computer Sciences | **R** | 5 | 60/65 | 2/2/0/0 | N/R | | ▓ | | | | | | |
| GE | Language 2 | **R** | 5 | 60/65 | 0/4/0/0 | Language 1 (Gerogian) | | ▓ | | | | | | |
| SC | Natural Sciences | **SR** | 5 | | | | | ▓ | | | | | | |
| | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CS202 | CS212  Object Oriented Programming 2 (C# )   or<br><br>CS222  Object Oriented  Programming 2 (Java)   or<br><br>CS242  Objec Oriented Programming 2 (C++) | | 5 | | 1/2/0/0<br><br>2/0/0/1<br><br>1/1/0/1 | CS104 | | | | | | | | | | | |
| CS203 | Computer Architecture and Organization | **R** | 5 | 45/80 | 1/0/1/1 | CS104 | | | | | | | | | | | |
| MaTh201 | Discrete Mathematics | **R** | 5 | 4580 | 2/2/0/0 | MaTh101 MaTh102 | | | | | | | | | | | |
| SC | Natural  Sciences | **SR** | 5 | | | | | | | | | | | | | | |
| GE | General Education | **R** | 5 | 60/65 | 0/4/0/0 | | | | | | | | | | | | |
| GE | General Education | **S** | 5 | | | | | | | | | | | | | | |
| CS204 | Data Base | **R** | 5 | 60/65 | 1/0/1/2 | CS104, | | | | | | | | | | | |
| CS205 | Data Analysis and Statistics | **R** | 5 | 60/65 | 1/0/2/1 | MaTh201 | | | | | | | | | | | |
| CS206 | Mathematical Programing | **R** | 5 | 45/80 | 1/2/0/0 | MaTh201 | | | | | | | | | | | |
| MaTh202 | Calculus for Computer Science | **R** | 5 | 45/80 | 2/1/0/0 | MaTh102 | | | | | | | | | | | |
| SC | Natural  Sciences | **SR** | 5 | 60/65 | 2/00/2 | | | | | | | | | | | | |
| GE | General Education | **S** | 5 | | | | | | | | | | | | | | |
| CS301 | Operations Research | **R** | 5 | 45/80 | 1/1/0/1 | CS206 | | | | | | | | | | | |
| CS302 | Operating systems | **R** | 5 | 45/80 | 1/0/1/1 | CS104 | | | | | | | | | | | |
| CS303 | Modeling and Simulation | **R** | 5 | 60/65 | 1/0/2/1 | CS205 | | | | | | | | | | | |
| CS310 | Algorithms and Complexity | **R** | 5 | 45/80 | 2/1/0/0 | CS106 | | | | | | | | | | | |
| CS | CS elective | **SR** | 5 | | | | | | | | | | | | | | |
| GE | General Education | **S** | 5 | | | | | | | | | | | | | | |

| CS304 | Web Programming | R | 5 | 45/80 | 1/0/0/2 | CS104 | | | | | | | | | |
| CS305 | Network Technologies and Communications | R | 5 | 45/80 | 1/0/1/1 | CS302 | | | | | | | | | |
| CS 512 or CS 505 | Formal Language and Automata or Functional Programing | SR | 5 | 30/95<br><br>45/80 | 1/0/1/0<br><br>1/0/1/1 | CS104, CS106<br><br>CS104 | | | | | | | | | |
| CS | CS elective | SR | 5 | | | | | | | | | | | | |
| CS | CS elective | SR | 5 | | | | | | | | | | | | |
| GE | General Education | S | 5 | | | | | | | | | | | | |
| CS401 | Software Engineering | R | 5 | 30/95 | 1/0/1/0 | CS202 | | | | | | | | | |
| CS402 | Project Preparation | R | 5 | 30/95 | 1/0/1/0 | 165 ECTS | | | | | | | | | |
| CS 512 or CS 505 | Formal Language and Automata or Functional Programing | SR | 5 | 30/95<br><br>45/80 | 1/0/1/0<br><br>1/0/1/1 | CS104, CS106<br><br>CS104 | | | | | | | | | |
| CSEL | CS elective | SR | 5 | | | | | | | | | | | | |
| GE | General Education | S | 5 | | | | | | | | | | | | |
| SC | Natural Sciences | SR | 5 | | | | | | | | | | | | |
| CS403 | Intelligent Systems | R | 5 | 45/80 | 1/0/1/1 | CS201, CS104 | | | | | | | | | |
| CS404 | Computer law and Ethics | R | 5 | 30/95 | 1/0/1/0 | | | | | | | | | | |
| CS405 | Team Projects | R | 5 | 30/95 | 0/0/2/0 | CS401, CS402 | | | | | | | | | |
| CSEL | CS elective | SR | 5 | | | | | | | | | | | | |
| SC | Natural Sciences | SR | 5 | | | | | | | | | | | | |
| GE | General Education | S | 5 | | | | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |

# Elective Cources

| Course | | Subject status | ECTS | hours | Lecture / Practice / Work / Lab | Prerequisite | I Semester | II Semester | III Semester | IV Semester | V Semester | V I Semester | VII Semester | VIII Semester |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Natural Sciences Courses** | | | | | | | | | | | | | | |
| Ph101 | Introductory Physics | SR | 5 | 60/65 | 2/2/0/0 | N/R | ▓ | | ▓ | | ▓ | | ▓ | |
| Che101 | Introduction to Chemistry | SR | 5 | 45/80 | 2/0/1/0 | N/R | ▓ | | ▓ | | ▓ | | ▓ | |
| Bio101 | Introduction to Biology | SR | 5 | 60/65 | 2/0/2/0 | N/R | ▓ | | ▓ | | ▓ | | ▓ | |
| Geo101 | Introduction to Geography | SR | 5 | 60/65 | 2/2/0/0 | N/R | ▓ | | ▓ | | ▓ | | ▓ | |
| Geol101 | Introduction to Geology | SR | 5 | 60/65 | 2/2/0/0 | N/R | ▓ | | ▓ | | ▓ | | ▓ | |
| Bio501 | Genetics and Molecular Biology | SR | 5 | 60/65 | 2/0/0/2 | N/R | | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| Bio502 | Human and Animal Physiology | SR | 5 | 60/65 | 2/0/0/2 | Bio101 | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| Bio503 | Food and Health | SR | 5 | 60/65 | 2/1/0/0 | Bio101 | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| Geo501 | Biogeography | SR | 5 | 45/80 | 1/0/2/0 | Geo101 | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| Geo502 | Hydrology | SR | 5 | 45/80 | 1/2/0/0 | Geo101 | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| Ph501 | Mechanics | SR | 7 | 120/55 | 3/2/0/3 | Ph101 | | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| Ph502 | Electromagnetism | SR | 7 | 120/55 | 3/2/0/3 | Ph501 | | | | ▓ | ▓ | ▓ | ▓ | ▓ |
| **General Education** | | | | | | | | | | | | | | |
| GE101 | Georgian Language for Foreigners 1 | **R** | 5 | 60/65 | 0/4/0/0 | N/R | ▓ | | ▓ | | ▓ | | ▓ | |
| GE102 | Georgian Language for Foreigners 2 | **R** | 5 | 60/65 | 0/4/0/0 | GE101 | | ▓ | | ▓ | | ▓ | | ▓ |
| GE501 | Georgian Language for Foreigners 3 | **S** | 5 | 60/65 | 0/4/0/0 | GE102 | | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| GE502 | Foundations of British Studies | **S** | 5 | 30/95 | 1/0/1/0 | N/R | | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| GE503 | Georgian Mythology | **S** | 5 | 45/80 | 2/0/1/0 | N/R | | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| GE504 | Practicum in Sociolinguistics | **S** | 5 | 45/80 | 1/0/2/0 | N/R | | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| GE506 | Public Speaking | **S** | 5 | 45/80 | 1/0/2/0 | N/R | | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| GE507 | Introduction to Psychology | **S** | 5 | 60/65 | 2/0/2/0 | N/R | | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| GE508 | Principles of Macroeconomics | **S** | 5 | 45/80 | 1/0/2/0 | N/R | | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |
| GE509 | Principles of Microeconomics | **S** | 5 | 45/80 | 1/0/2/0 | N/R | | | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ |

## Computer Science Elective courses

| Code | Course | | | | | Prerequisites |
|------|--------|----|---|-------|---------|---------------|
| CS501 | Algorithmic Information Theory | SR | 5 | 30/95 | 1/1/0/0 | CS102, CS105, CS106 |
| CS502 | Algorithms for Computational Topology | SR | 5 | 30/95 | 1/1/0/0 | CS102, CS105, CS106 |
| CS503 | Introduction to Complexity Theory | SR | 5 | 30/95 | 1/1/0/0 | CS102, CS105, CS106 |
| CS506 | ADO.NET technology - data access from NET application | SR | 5 | 30/95 | 1/1/0/0 | CS212, CS204 |
| CS508 | Advanced course of Algorithms | SR | 5 | 45/80 | 1/0/0/2 | CS104 (71 points or more), CS105, CS106 |
| CS510 | Programming with Java (Advanced Course) | SR | 5 | 45/80 | 2/0/0/1 | CS204, CS222 (minimal score of 60 poins) |
| CS511 | Information Management | SR | 5 | 45/80 | 2/0/1/0 | CS101 |
| CS513 | Genetic Algorithms | SR | 5 | 45/80 | 1/1/0/1 | CS102, CS106 |
| CS514 | Neural Networks | SR | 5 | 45/80 | 1/1/0/1 | CS102, CS106 |
| CS515 | Behavioral models of discrete systems | SR | 5 | 45/80 | 1/2/0/0 | CS205 |
| CS516 | The Technologies of the Information Security | SR | 5 | 45/80 | 1/1/1/0 | CS102, CS103 |
| CS517 | Cryptographic Algorithms | SR | 5 | 45/80 | 1/1/1/0 | MaTh202 |
| CS518 | Information Theory and Coding | SR | 5 | 45/80 | 1/2/0/0 | MaTh202 |
| CS 519 | Information Models and Systems | SR | 5 | 45/80 | 1/0/1/1 | CS105 |
| CS520 | Network Technologies and Communications 2 | SR | 5 | 45/80 | 1/0/0/2 | CS305 |
| CS521 | Operating System Linux for Servers | SR | 5 | 45/80 | 1/0/0/2 | CS302 |
| CS536 | Introduction To Scientific Modeling | SR | 5 | 45/80 | 1/0/0/2 | CS302 |
| CS538 | Algorithms for Numerical Analysis | | 5 | SR | 1/0/0/2 | CS302 |

*CS Program Course Mapping to Program SLOs.*

| CS Program Courses | PI 1 | | | PI 2 | | | PI 3 | | | PI 4 | | PI 5 | | PI 6 | |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | P1.1 | P1.2 | P1.3 | P2.1 | P2.2 | P2.3 | P3.1 | P3.2 | P3.3 | P4.1 | P4.2 | P5.1 | P5.2 | P6.1 | P6.2 |

| Course | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CS 101 ICT Literacy | | | | | | | | L | L | L | | | | | | |
| CS 102 Basics of Programming | L | L | | | L | | | | | | | | | | L | |
| CS 103-Introduction to Algorithms | L | L | | | | L | L | | | | | | | L | | L |
| CS 104 Objects Oriented Programming 1 (C ++) | M | | | M | L | | | | | | | | | L | | L |
| CS 105 Data Structures | L | | L | L | L | | M | | | | | | | | | |
| CS 106 Algorithm Design | L | L | | M | | | M | M | | | | | M | | | |
| CS 201- Algorithms and Complexity | M | L | | | | | M | M | | | | | M | | | M |
| CS 202(2012, 222, 232) Objects Oriented Programming 2 (Java, C#, VBA) | H | H | | M | M | H | | | | | | | | H | | M |
| CS 203-Computer Architecture and Organization | M | | | M | M | M | M | | M | | | | | | | |
| CS 204 Data Base | H | | | M | H | M | | | M | | | H | | | | |
| CS 205 Data Analysis and Statistics | H | | | M | M | M | M | M | | | | | | | | M |
| CS206- Mathematical Programming | H | | | M | H | | | | | | | | | | M | |

| Course | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CS 301 Operations Research | H | | | H | H | | | | | | | | | H | |
| CS 302 Operating systems | H | | M | H | | H | | H | | | | | | H | |
| CS 303 Modeling and Simulation | M | H | | H | H | H | H | H | | | | | | H | | H |
| CS 304 Web Technology | | H | | H | H | M | | | | | | | | H | H |
| CS 305 Network Technologies and Communications | H | M | | M | H | M | L | | H | | | | | H | H |
| CS 401 Software Engineering | H | | | H | H | H | H | | | | | | | H | H |
| CS 402 Project Preparation | | | H | | | | H | H | | H | H | H | H | | |
| CS 403 Intelligent Systems | H | | | H | H | H | | | | | | | | | |
| CS 404 Computer law and Ethics | | | | | | | | | | H | H | | | | |
| CS 405 Team Projects | | H | H | H | H | | H | H | H | | H | H | H | H | H |

H- High

M - Middle

L – Low

Necessary auxiliary conditions /resources for learning
The Department of Computer Science has nine open labs for students (rooms 407-415 and 417-419 in XI building) and one computer Lab (room 409) with Sisco research equipment. Open labs can be used by all university students including computer science students. There are 250 pieces of hardware including computers, projectors and printers in the department inventory list. Following is a list of the hardware and software in each open lab:

**Room 407**
**Windows – 16 machines**
**Room 408**
**Windows – 16 machines**
**Room 409**
**Windows – 16 machines**
**Room 410**
**Windows - 16 machines**
**Room 411**
**Windows – 24 machines**
**Room 412-413**

**Windows – 31 machines**
**Room 414-415**
**Windows – 31 machines**
**Room 417**
**Windows – 16 machines**
**Room 418**
**Windows – 16 machines**
**Room 419**
**Windows – 16 machines**

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**Overall 198 computers.**

**The following programs are running on all computers:**
- **Operating systems Windows7 or Windows 10**
- **Operating system Linux;**
- **Windows Server 2016;**
- **Microsoft Office 2013, Office 2016;**
- **Visual Studio 2015, 2017;**
- **SQL Server 2012;**
- **Adobe Photoshop CS5;**
- **Adobe Dreamviewer;**
- **WAMP;**
- **Sublime;**
- **MATLAB;**
- **MATLAB & Simulink;**
- **WMware Workstation;**
- **Wolfram Mathematic 11;**
- **Microsoft Azure;**
- **Emu8086;**
- **Little Man Computer;**
- **CPU emulator;**
- **GNS3;**
- **Cisco Packet Tracer;**
- **Virtual Box 5.0;**
- **Sublime Text;**
- **Vamp Server;**
- **SPSS 20;**
- **Wire shark;**
- **Code::Blocks**
- **Shadow Defender;**
- **WinRAR;**
- **Adobe Reader.**

## Program  Heads CV

| **Manana Khachidze** |
|---|

| *Education* |
|---|
| ☐ Master's degree (equal) in Mathematical software of ACS,  Tiblisi State University, Faculty of Cybernetic and Applied Mathematic , 1982-1987. |
| ☐ Doctor (PhD - Technological Science),  Academic doctor (equal), Candidate of Technical Sciences. Georgian Technological University,1998. |

| *Academic experience* |
|---|
| ☐ I.Javakhishvili Tbilisi State University; Faculty of Exact and Natural Sciences, Computer Sciences Department,  Professor, head of department, 2006 – up now,   full time; |
| ☐ I.Javakhishvili Tbilisi State University; Faculty of Applied Mathematics and Computer Science, Senior ticher, 1999-2006, part time. |

| *Non-academic experience* |
|---|
| ☐ A.Eliashvili Institute of Control Systems, Department of Machine Intelligence Problems; Senior scientist, 1988 -2010, full time (1988-20060,  part time (2006-2010); |
| ☐ Rescue-Guide Service of Georgia Tourism Department, Information Department,  Head, 2000 – 2003, part time; |
| ☐ Georgian Academy of Sciences,  journal "Metsniereba da teqnika" (Science and Technology), IT Department,  Head, 1993-1998 , part time. |

| *Current membership in professional organizations* |
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| ☐ Member of the TSU Senate (since 2010); |
| ☐ Member of Georgian Academy of Natural Sciences; |
| ☐ Adviser of Georgian Academy of Engineering; |
| ☐ Board Member of Georgian Speleologists Union; |
| ☐ Fellow of LEAD International (International Program - Leadership for Environment and Development) (1996-1998), www.lead.org. |
| ☐ ACM (Association for Computing Machinery) Professional Membership |

| *Service activities* |
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| ☐ Accreditation and authorization expert of National Center for Educational Quality Enhancement Georgia (since 2010); |
| ☐ Supervisor for master degree's students; |
| ☐ Member  of master degree certification commission; |
| ☐ Reviewer of master thesis. |

| *Briefly list the most important publications and presentations from the past five years* |
|---|

- ☐ M. Khachidze, M.Tsintsadze, M. Archuadze, G. Besiashvili. Complex system state generalized presentation based on concepts. Application of Information and Communication Technologies (AICT), 2014 IEEE 8th International Conference on, At Astana. DOI: 10.1109/ICAICT.2014.7035999
- ☐ M.khachidze, G.Besiashvili. Pollution and Pollutin Source Definition on the Basis of Data Conceptual Analysis. International Conference "TBILISI-SPRING-2014" - Nuclear Radiation Nanosensors and Nanosensory Systems.
- ☐ M.khachidze, G.Besiashvili, M. Archuadze, M.Cincadze. Sensor data Full Application Circle Planning International Conference "TBILISI-SPRING-2014-Nuclear Radiation Nanosensors and Nanosensory Systems. 2014
- ☐ T.Tatrishvili, N.Jalagonia, K. Gelashvili, M.Khachidze, E.Markarashvili, J.Aneli, O.Mukbaniani. Quantum Chemical calculations of Hydrosilytation Reaction of Oligomethylhydrosiloxane to Allyl Cyanide and Polymer Electrolyte Membranes on their Basis. Oxidation Communications 38, No1, 2015. pp. 13-24.
- ☐ M.khachidze, M.Tsintsadze, M. Archuadze, G.Besiashvili. Concept Pattern Based Text Classification System Development for Georgian Text Based Information Retrieval. Baltic J. Modern Computing, Vol. 3 (2015), No. 4, pp. 307–317.
- ☐ P.J. Kervalishvili, M. G. Khachidze, A. Chirakadze. Novel Achievements in Information Science and Technology as basis of Secure Society Sustainable Development. Series:NATO Science for Peace and Security Series - E: Human and Societal Dynamics. Ebook: Volume 120: Engaging the Public to Fight the Consequences of Terrorism and Disasters. 2015. pp. 27-39.
- ☐ P.J. Kervalishvili, M.G. Khachidze. Quantum Approach to Sensory Information Processing for Modeling of Disasters. Book - NATO Science for Peace and Security, Series B: Physics and Biophysics. Nuclear Radiation Nanosensors and Nanosensory Systems. 2016, pp.1-8.
- ☐ M.khachidze, M.Tsintsadze, M. Archuadze. Natural Language Processing (NLP) Based Instrument for Classification of Free Text Medical Records. BioMed Research International. Volume 2016 (2016), Article ID 8313454, 10 pages. http://dx.doi.org/10.1155/2016/8313454

| *Briefly list the most recent professional development activities* |
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- ☐ 2016 - I.Javakhishvili Tbilisi State University. Document Classification Engine Model for Georgian Information. Supervisor.
- ☐ 2015.03 – 2015.12 - I.Javakhishvili Tbilisi State University. Georgian Documents Classification Methods. Supervisor
- ☐ 2009 –2010 - NATO "Science for Peace and Security", HSD.EAP.CLG. 983694. "Information, Synergy and Security". Team Leader.
- ☐ 2009-2011. GNSF, # 1-7/73; Creation of Modeling Software of Molecular Systems – Materials of Molecular Nanotechnology and Spin electronic. Coordinator.
- ☐ 2005-2006, INTAS Nr 04-77-7067. Medical Image processing – Theoretical Bases and Technological Aspects. Team Leader.
- ☐ Participation in Erasmus+ Program
- ☐ "Mobility For Double Diploma" - Erasmus+ - International Credit Mobility. Polytechnic Institute of Bragança (IPB), Portugal, 28 February – 12 March 2016.

- International Week for Academic and Administrative Staff. Bialystok University of Technology , 15 -19 May 2017, Białystok, Poland.
- Academic and Administrative Staff mobility. 14-16 June, 2017. INSA Rennes, member of the INSA Group, France

| Magda Tsintsadze |
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### Education

Candidate of Phys-math Sciences (Math.Cybernetics), TSU, Georgia, 2006
Post-Doctoral research, ATEI of Thessaloniki, Computer Science, Greece, 2008-2009

### Academic experience

- 2017-current: San Diego State University Georgia, Invited Professor (part time)
- 2009- to present : Associate Professor at Iv. Javakhishvili Tbilisi State University/ Department of Exact and Natural Sciences (Full Time)
- 2015: Invited Lecturer for summer course teaching - The University of A Coruña, Spain
- 2014: Invited Lecturer for short course teaching (graduate level) Department of Computer Sciences (Infogeolog), Lodz University, Poland
- 2011-2012: Faculty-associate at Computer Science Graduate School of SUNY Stony Brook, NY, USA
- 2010-2011 – New Gelati American Academy - Invited lecturer for Calculus and Elementary Mathematics; Part Time
- 2006-2009: Assistant Professor at Iv. Javakhishvili Tbilisi State University/ Department of Exact and Natural Sciences
- 2005, 2006(June-August) – Dortmund University/ Faculty of Informatics -Guest Scientist (PhD fellow)

### Non-academic experience

The Parliament of Georgia Senior Specialist at the Department of Informatics, 2002- 2009, Full Time

### Certifications or professional registrations

- Certificate in Web Designing (Shriram Institute of Business and Information Technologies, New Delhi, India)
- Certificate -English language for Academic Purposes – CELOP, Boston University, USA

### Current membership in professional organizations

Affiliate Member of AMS, Member of ACM and AAAI

### Honors and awards

- 2005- INTAS Grant for YS
- 2008- President Grant for Young Scientists
- 2008-2009: Erasmus Mundus Post-Doctoral Fellowship grant
- 2011-2012 - Fulbright Faculty development Grantee
- 2014- Poland Scientific Foundation Grantee ( (POLK-04,03.00-00-050/12)
- 2015-Georgisn High Education Component (MCC/MCA/San Diego)

- 2013-2016 - Shota Rustaveli National Foundation Grant for Fundamental Research (Key Researcher
- 2015-2016 - Shota Rustaveli National Foundation Grant for Summer School (Main Personnel)

## *Service activities*

- 2017- current : Abet Accreditation Team Member (Coordinator)
- 2016 -  Iv.Javakhishvili Tbilisi State University. Document Classification Engine Model for Georgian Information.   Coordinator.
- 2015.03 – 2015.12 - Iv.Javakhishvili Tbilisi State University.  Georgian Documents Classification Methods. Coordinator
- Reviewer -  Current Journal of Applied Science and Technology , Asian Journal of research in Computer Science, editorial board member of "The research Journal of Compputer Science and Information Technology"
- Supervisor for master degree's students;
- Member of master degree certification commission;
- Reviewer of master thesis.

## *Briefly list the most important publications and presentations from the past five years*

- M.Tsintsadze - "Shapely Entropy Generalization for Fuzzy Measures Used in Uncertain Information Presentation", CEWIT 2013,  SUNY Stony Brook
- M.Khachidze, M.Tsintsadze,  M.  Archuadze, G.  Besiashvili.  Complex  system  state generalized  presentation  based  on  concepts.  Application  of  Information  and Communication Technologies (AICT), 2014 IEEE 8th International Conference on, At Astana. DOI: 10.1109/ICAICT.2014.7035999
- Magda Tsintsadze , Nana Odishelidze - On one contact problem of plane elasticity theory with partially unknown boundary- PAMM Volume 15, Issue 1, October 2015, Pages: 235–236, DOI: 10.1002/pamm.201510108
- M.Khachidze, M.Tsintsadze, M. Archuadze. Natural Language Processing (NLP) Based Instrument  for  Classification  of  Free  Text  Medical  Records.  BioMed  Research International.    Volume 2016 (2016),    Article    ID 8313454,    10    pages. http://dx.doi.org/10.1155/2016/8313454

## *Briefly list the most recent professional development activities*

- 2017: Participation in Erasmus+ Program : Academic and Administrative Staff mobility. INSA Rennes, member of the INSA Group, France
- 2015:  Invited Lecturer for summer course teaching -  The University of A Coruña, Spain
- 2015: Fellow – Volunteer at San Diego State University , USA
- 2014:  Invited Lecturer for short course teaching (graduate level) Department of Computer Sciences (Infogeolog), Lodz University, Poland
- 2011-2012: Faculty-associate at Computer Science Graduate School of SUNY Stony Brook, NY, USA