Educational programs

I. Program requisites

Program name	Computer science
Level of higher education	Graduate/seventh
Detailed field name and code	Computer Science; 0613.1.2.
Qualification to be awarded	Master of Computer Science
language of instruction	English
Program volume	120 credits
Standard duration of the program	2 years / 4 semesters
Implements the program	Grigol Robakidze University
Gives qualifications	Grigol Robakidze University
Educational unit / school	Business and Management
Academic year	2026-2027

II. Program overview

The Master of Science in Computer Science at GRUNI aims to provide students with advanced theoretical knowledge, methodological rigor, and research skills to engage critically with complex computing problems. The program emphasizes independent inquiry, original contributions, and the ability to analyze and solve challenges in both theoretical and applied contexts, preparing students for leadership in research and innovation.

III. Program objectives

Program objectives:

Provide students with advanced and integrated knowledge of algorithms, computational complexity, formal methods and the theoretical foundations of computer science.

Develop the ability to engage with advanced and emerging areas of computer science such as AI, quantum computing, cybersecurity and data science.

Cultivate strong research competencies, including problem formulation, methodology design, scientific communication and the effective use of modern computational tools.

Prepare graduates for independent research, responsible professional practice, doctoral studies and leading research-oriented roles.

IV. Learning outcomes

1. Knowledge and understanding – student:

1.1 Having advanced and integrated knowledge of algorithms, computational complexity theory, and formal methods, and their role in modern computer science and system development.

1.2 Having critical awareness and scholarly familiarity with state-of-the-art research in areas such as artificial intelligence, quantum computing, cybersecurity, and/or data science.

1.3 Understanding the theoretical foundations of computer science and being able to apply them to complex practical and interdisciplinary contexts.

1.4 Having informed awareness and critical understanding of current challenges, emerging trends, and ethical considerations in the development and application of computing technologies.

2. Skill – student:

2.1 Being able to formulate, analyze, and solve complex problems in computer science using appropriate theoretical and computational methods.

2.2 Being able to design and conduct independent research projects, including problem definition, literature review, methodology, and evaluation.

2.3 Being able to apply advanced mathematical, logical, and algorithmic tools to investigate novel questions and develop innovative solutions.

2.4 Being able to communicate scientific results effectively in both written and oral forms, addressing academic, professional, and interdisciplinary audiences.

2.5 Being able to employ modern software tools, programming paradigms, and research methodologies in support of scientific inquiry and application.

3. Responsibility and autonomy – student:

3.1 Being able to take responsibility for the design, execution, and dissemination of research projects, including the master's thesis.

3.2 Being able to work autonomously and collaboratively in academic and professional environments, taking responsibility for shared outcomes.

3.3 Having professional integrity, research ethics, and a commitment to the responsible use of computational technologies.
3.4 Being ready for doctoral studies or for leading roles in research-oriented positions in academia, industry, or public institutions.

V. Prerequisites for admission/enrollment to the program

For Georgian citizens, the prerequisite for acquiring student status is the outcome of the unified national examinations.
The acknowledgment of student status at the university is contingent upon a ranking document sanctioned by the National Assessment and Examination Center. Based on this document, an agreement is formed with the student, and by no later than October 1, the rector issues a comprehensive legal act regarding the enrollment of applicants/students. This document is forwarded to the Ministry of Education and Science of Georgia within fifteen days.
Following the Minister of Education and Science of Georgia's directive on the results of the unified national exams, the university begins the student registration process within a timeframe specified by the university. Information regarding the commencement of student registration is published on the official website of the university at least ten days prior to the start of registration.
Student registration is executed in accordance with the rector's legal act, adhering to the academic calendar, and is divided into two phases: administrative registration followed by academic registration. Academic registration is facilitated through the "Nexus" Electronic Program for managing the educational process.
The documents required for initial registration to obtain student status include: A) A copy of the Identity Card; B) A copy of the military registration certificate (for males); C) A document certifying completion of General Education - the Certificate; D) Two color photographs (3X4, including an electronic version); E) In cases of minority, a copy of the legal guardian/parent's identity card (registration must be conducted in conjunction with the legal guardian).

English language proficiency at a minimum B2 level is required. Applicants who are citizens of countries where English is an official language, who have completed an English-taught educational program within the last three years with a minimum GPA of 75/100 or 3.0/4.0, or who present an internationally recognized B2-level English language certificate are exempt from internal language testing.

VI. Methods of achieving learning outcomes

The following methods are used in the learning and teaching process:
Lecture - mainly have an interactive and presentational nature, which allows for latent monitoring of the quality of understanding of the transmitted information and, accordingly, for changing accents and correcting the pedagogical strategy during the course of the lecture. Taking into account the format of the lectures, as well as the lecture of a specialist in the field.
Work in a group - the student demonstrates in-depth knowledge of the material presented at the

lecture, answers the questions, connects the problematic issues raised around the topic, exchanges information, forms different approaches and opinions, is involved in the team's work process and makes logical conclusions.
Practical training - the formation of the ability to transfer knowledge into practice, includes working on cases, situational problems and solving other practical exercises. During situational modeling, students acquire professional skills in an environment as close as possible to reality, which provides an effective means of consolidating theoretical knowledge and forming practical skills.
Teaching with electronic resources - refers to receiving consulting services from the lecturer or other types of communication using the electronic portal (Nexus), including for the purpose of providing, explaining, evaluating learning material/homework for students with special educational needs.
The directive teaching method used within the program involves the student's independent homework in the format of essays, abstracts, projects, exercises, situational tasks, cases, reports and other certain research work without consulting the teacher, which helps to independently find the necessary sources, analyze and develop the skills of writing a research paper.

VII. Knowledge assessment system

The assessment system is divided into two components - midterm and final assessments. Maximum (60 points) and minimum (21 points) limits are defined for midterm assessments. In the final assessment, the maximum limit is 40 points, and the minimum - 21 points.
The sum of the results of the midterm and final assessment gives the final/semester assessment, the minimum positive margin of which is 51 points, and the maximum is 100 points. A student is awarded credit if the minimum final/semester grade is passed.
The assessment system allows:

a) Five types of positive evaluation:
(A) Excellent - 91-100 points
(B) Very good - 81-90 points
(C) Good - 71-80 points
(D) Satisfactory - 61-70 points
(E) Sufficient - 51-60 points

b) Two types of negative evaluation:
(FX) Didn't pass
- 41-50 points, which means that the student needs more work to pass and is given the right to take an additional exam with independent work, which will be scheduled no later than 5 days after the announcement of the final exam results. In case of repeated failure, the course must be repeated.
(F) Failed
- 40 points or less means that the work done by the student is not enough and they have to study the course from scratch.
After passing the midterm or final assessment it is not allowed to retake it to increase the score. In case of missing an exam with a valid excuse, the dean is authorized to issue a retake permit.
Analytical essay - is a scientific paper written by the student within the scope of the topic specified or selected by him/her and agreed with the professor. Demonstrates the skills of understanding the problem, ways of solving it, critical analysis and innovative synthesis of information, use of material

and information technologies, formation of reasoned conclusions, independent learning and conducting research, and protection of academic honesty.
Research project (individual and/or team) - is a written research paper, which is completed by the student (individual and/or team) under the guidance of the professor within the framework of the topic agreed with him/her. It presents the student's systematic knowledge around a specific topic of a specific discipline, the methods used for analyzing and synthesizing collected data, including the adequacy of information technologies, problem vision and setting up original ways to solve it, connecting the solutions to the problem with theoretical knowledge, concise conclusions, the ability to work in a team and with an audience. Communication, structured and argumentative representation and presentation skills.
Discussion - provides information about the development and manifestation of the student's ability to seek different approaches to the same idea, the coexistence of different opinions, the importance of seeking a common opinion or group agreement to make a decision, tolerance and respect for other people's opinions. It develops critical thinking, argumentative conclusions, professional skills of understanding and oppressing values in a new way, identifying problems and finding ways to solve them.
Case analysis - demonstrates the skills of perceiving the real picture, applying knowledge in practice, dividing the given information into certain groups, evaluating the features of the problem seen by others, finding different options for solving the problem, fighting the causes of the problem and seeing the ways to solve the problem.

Quiz/Combined Test/Questionnaire - provides information about the knowledge obtained within the framework of a specific topic, the answers reveal a deep and systematic knowledge of the issue.
Situational Task - A situational task is a system of quasi-real factors that creates an imaginary situation and outlines a specific professional task. The task can be set both in written format and verbally. It shows the ability to see the problem, to search for ways to solve the problem, to understand professional values, to formulate specific argumentative positions, to evaluate individual ways of solving problems, to perceive the situational context objectively and to see the problem/complex problem, to determine the way to solve it and to take responsibility for the decision.
Filtering information - is a variety of the project, which contains information collected from different information sources within the framework of the topic specified by the professor. For the preparation of the project, the student is given a partial or no source. He is obliged to find, select/optimize and structure the received information. The paper does not involve a critical analysis of the information, a comment or a presentation of one's own opinion - it should only be a review of the information received from various sources, a general analysis. He demonstrates the skills of written communication with the professional and non-professional community, general analysis and structuring of complete and/or incomplete information, the use of material and digital information tools to find information, to distinguish between primary and secondary information, and to conduct learning independently.
Report - is a structured written work, which involves a systematic review of a book, article and other work of a creative or scientific nature, it demonstrates the skills of structured and logical presentation of a written work, adequately perceiving the issues/problems raised in analytical works, delineating one's attitude, critical analysis and innovative synthesis.
Argumentative essay - presents the author's own position/opinion on the issue and, accordingly, the arguments that will justify the superiority of the presented position/opinion. It shows the

quality of understanding the treated issue, understanding the problem and ways to solve it, forming theories related to the topic, own vision/approach, evaluation, serves to develop arguments/counter-arguments and, overall, critical thinking skills.
The assessment components defined in order to assess the achievement of the learning outcomes defined in the educational program component are: mid-term and final assessment.
Mid-term assessment is carried out at the time determined by the study plan. Its purpose is to evaluate the knowledge and skills acquired within the course material.
The final assessment is conducted at the end of the semester, in order to evaluate the acquired knowledge and skills, in the form/method determined by the curriculum.

VIII. Program structure and qualifications

The full program course is designed for four academic years. The academic year includes 38 working weeks and consists of two semesters - autumn (19 weeks) and spring (19 weeks). Of these, 30 weeks cover the learning/teaching process, 2 weeks are devoted to the preparation and passing of the mid-term assessment, and 6 weeks to consultations and the preparation and passing of the final assessment.

The program requires the student to collect at least 180 credits. 1 credit contains 25 hours. Program outcomes are achieved through the learning of individual disciplines - the relevant syllabi determine both the volume of learning material and learning/teaching and assessment methods.
The standard load of a student within the academic year is 60 credits. However, it is allowed to accumulate no more than 75 credits per year.
90 points < Diploma with Honours, 51-90 points – diploma.
The Master's program in Computer Science at GRUNI is a 2-year, 120-ECTS program (84 ECTS mandatory and 36 ECTS elective) designed to develop advanced competencies in software development, algorithmic thinking, data structures and complexity analysis, artificial intelligence and machine learning problem solving, and mathematical modelling. The curriculum integrates strong theoretical foundations with applied, project-based and research-oriented learning, enabling students to design and analyze complex computational systems, conduct independent research, and apply advanced computing methods in professional and academic contexts. The program is aligned with Georgia's NQF Level 7 and international standards, ensuring academic rigor, professional readiness, and clear pathways to doctoral studies or advanced employment in global computing and technology sectors.
Code system of study disciplines:
The code system is structured into two groups. Codes of the first group are intended for academic programs and consist of 6 characters.
The first three are letters, the next three are numbers. The first two letters of the name of the school and the first letter of the word "program" - P are used as letter symbols, while the first digit indicates the educational level, and the following digits indicate the number of the program. i.e. The program code determines which school and educational level a particular program belongs to Eg.: BMP201 – Master's Program of the School of Business and Management.
The second group of codes is aimed at identifying educational disciplines. It generally consists of 7 characters. The first three are alphanumeric characters and contain the first three letters of the program name.

The first of the numerical symbols indicates the educational level, the next two digits are the number of a specific discipline, the last letter symbol indicates the structural group of the discipline: E - optional, C - compulsory. E.g.: BUS201C refers to: the first compulsory discipline in the master's program of business administration.

IX. Program provision

The School employs 48 academic staff and 39 affiliated staff, complemented by invited personnel for specific teaching needs, ensuring sufficient human resources for teaching, research, and student support activities.

X. Employment of graduates and the possibility of continuing their studies

The field of professional activity of the graduates of the program is commercial and non-profit organizations with different organizational and legal forms of any branch of economy and public institutions, where the qualification of a manager is required within the framework of the master's degree in business administration.

University Career Office services are available to all students and graduates. Its service helps prepare students for their careers. Full information is available on the university website www.gruni.edu.ge.

Based on the ,,Law of Georgia On Higher Education", the graduate can continue studies at the next educational level, both with a business management profile and with another specialty.

Graduates are prepared for diverse roles such as software developers, data analysts, IT specialists, cybersecurity analysts, system administrators, and technical consultants. They are also well-positioned for further studies in Computer Science MA, Artificial Intelligence, or related computing fields, enabling strong employability and adaptability in national and international technology sectors.

XI. International integration

The program includes:

Within the framework of international mobility, the opportunity to participate in student competitions, raise qualifications and go on business trips to foreign countries for the purpose of teaching.

1. University of Heidenheim (Germany), https://www.heidenheim.dhbw.de/en/home;
2. ~~University of Porto (Portugal), https://www.up.pt/portal/en/~~;

3. Jan Kochanowski University (Poland), https://en.ujk.edu.pl/;

XII. Program approval

The program is approved by the order of the rector, No. 01-05/006, dated – 13.02.2026.

Curriculum Matrix

School

Educational level **Master**

Program Name **Computer Science**

Qualification **MSc in Computer Science**

Head of the Program Peter Ölveczky

Program Volume **180**

Academic year **2027**

Serial number	Name of the study course	Course code	Prerequisite Course Code	Semester	Number of credits	Lecture	Working in a group	Practical work	Laboratory	Midterm exam	Final Exam	Contact hours	Independent work	Total number of hours	Consultation	Lecturer's Surname, name
* **Mandatory component of the main field of study - # credits**																
1	Model checking	CSM-C-201		1	6	30		15		2	2	49	101	150	15	Peter Ölveczky
2	Program verification	CSM-C-202		1	6	30		15		2	2	49	101	150	15	Helmut Seidl
3	Seminar	CSM-C-203		1	6	10		35		2	2	49	101	150	15	Besik Dundua
4	Advanced Topics in Software Engineering	CSM-C-204		2	6	30		15		2	2	49	101	150	15	Hakan Ergun
5	Advanced Topics in Cybersecurity	CSM-C-205		2	6	30		15		2	2	49	101	150	15	Sedat Akleylek

6	Seminar	CSM-C-206		2	6		45			2	2	49	101	150	15	All Faculty Members
7	Advanced Topics in Network and Distributed Systems	CSM-C-207		3	6	30		15		2	2	49	101	150	15	Sergei Gorlach
8	Advanced Topics in AI and Machine Learning	CSM-C-208		3	6	30		15		2	2	49	101	150	15	Mariam Dedabrishvili
9	Seminar	CSM-C-209		3	6		45			2	2	49	101	150	15	All Faculty Members
#	Master's Thesis	CSM-C-210		4	#	30		15		2	2	49	101	150	15	All Faculty Members
Elective component of the main field of study																	
1	Rewriting Theory	CSM-E-211		1	6	30		15		2	2	49	101	150	15	Peter Ölveczky
2	Fuzzy Logic and Approximate Reasoning	CSM-E-212		1	6	30		15		2	2	49	101	150	15	Matthias Baaz
3	Proof Theory	CSM-E-213		1	6	30		15		2	2	49	101	150	15	Matthias Baaz
4	Programming Language Semantics	CSM-E-214		1	6	30		15		2	2	49	101	150	15	Tudor Jebelean
5	Topological Data Analysis	CSM-E-215		1	6	30		15		2	2	49	101	150	15	Anzor Beridze
6	Data Science	CSM-E-216		2	6	30		15		2	2	49	101	150	15	Levan Uridia
7	Lambda Calculus and Type Theory	CSM-E-217		2	6	30		15		2	2	49	101	150	15	Besik Dundua
8	Data Visualization	CSM-E-218		2	6	30		15		2	2	49	101	150	15	Tamara Mtsentlintze
9	Semantics of Concurrency and Programming Paradigms	CSM-E-219		2	6	30		15		2	2	49	101	150	15	Furio Honsell
#	Scientific Computing	CSM-E-220		2	6	30		15		2	2	49	101	150	15	Nino Demetrashvili
#	Post-Quantum Cryptography	CSM-E-221		3	6	30		15		2	2	49	101	150	15	Sedat Akleylek
#	Architectures and Programming of Modern Many-core Processors	CSM-E-222		3	6	30		15		2	2	49	101	150	15	Sergei Gorlatch
#	Quantum Computing and Quantum Algorithms	CSM-E-223		3	6	30		15		2	2	49	101	150	15	Sedat Akleylek
#	Advanced Topics in Symbolic AI	CSM-E-224		3	6	30		15		2	2	49	101	150	15	Temur Kutsia
#	Ethics and Entrepreneurship	CSM-E-225		3	6	30		15		2	2	49	101	150	15	Giga Tvauri, Vakhtang Charaia