

**Title of the Program:** Computer Science

**Academic Degree Offered:** PhD in Computer Science

**Head of the PhD program:** Gia Sirbiladze, Full Professor, Doctor of Math. Sciences, Doctor of Sciences; Tbilisi State University, Faculty of Exact and Natural Sciences, Department of Computer Sciences (+995) 822 30-47-84, (+995) 899-58-86-58; [gia.sirbiladze@tsu.ge](mailto:gia.sirbiladze@tsu.ge),

**Qualification of the program:**

**a) Goals and Aims of the Program:** The significant role of a computer in modern society requires a PhD student in Computer Science to have general understanding in the field as well as an in-depth knowledge of his/her direction to conduct scientific research independently.

PhD degree in Computer Science is the highest academic degree awarded in this field at Iv.Javakhishvili Tbilisi State University and provides the theoretical knowledge and modern scientific research experience that is in line with the third highest education level. The major component of the program is a dissertation (Ph.D. thesis) conducted with supervision of an experienced researcher. Successful graduates are able to choose either industrial or academic careers, where they'll be the leaders possessing practical experience and professional skills.

At the department of Computer sciences a PhD fellow is able to conduct his/her research in the following directions (directions might be increased):

**A. Algorithms** (ACM Computing Classification System: F2. Analysis of Algorithms and problem complexity, F.2.1 Numerical Algorithms and Problems, F.2.2. Nonnumerical algorithms and problems)

**B. Information and Intellectual Systems** (ACM Computing Classification System: H-Information Systems; H.1.1-Systems and Information Theory-General Systems Theory; H.4-Information Systems Application- Decision Support Systems I.2- Artificial Intelligence; I.2.8-Problem Solving, Control Methods; I.2.4-knowledge Representation Formalisms and Methods; I.2.3-Deduction and theorem Proving; I.2.11-Distributed Artificial Intelligence. I.5-Pattern Recognition. I.6-Simulation and Modeling; I.6.1-Simulation Theory; I.6.7-Simulation Support Systems; I.6.8-Types of Simulation... K.6-Management of Computing and Information Systems H.2 DATABASE MANAGEMENT, H.2.1 Logical Design -Data models, H.2.2 Schema and subschema.

**Information Security and Protection.** (ACM Computing Classification System: E.3. Data Encryption, E.4. Coding and Information Theory)

Knowledge received during PhD studies extends general and specialized knowledge gained during the Master's studies. In addition to this, PhD fellows will become qualified as independent researchers and combine it with the ability to present their research results. (Publications in high level scientific magazines, international forums, conferences and etcetera)

**b) Learning outcomes:**

1. Have knowledge of fundamental concepts in computer sciences, be able to use this knowledge to solve practical problems and also possess the skills to deliver this knowledge to students.

2. Be able to solve fundamental theoretical, industrial or applied scientific problem in the field or in conjugate area of his/her specialization. The results of the research should be Published in peer-reviewed journals having impact-factor or published as conference proceedings.
3. Be able to present his/her conclusions, research results clearly.

**c) Employment opportunities:** The field of computer science is quite dynamic and demanding on a job-market. To the successful PhD graduate it gives good opportunities for career building and research activities in such areas as system software development and design, software marketing and etc.

Professional workplace examples:

1. Educational and scientific-research positions at industrial and research institutions.
2. Software solution development companies;
3. New technology application industrial production and many more.

**Preconditions for Admission to the PhD Program:** To be accepted as a PhD fellow one should possess a master's degree or equivalent in Computer Science, Mathematics, Physics or other related fields.

#### **Education Component:**

**A) PhD Fellow Colloquium:** PhD Fellow Colloquium is an open seminar, where a PhD Fellow should present his/her research overview (research results, investigated literature, and obstacles and ways of solution) once or twice every year.

Evaluation Commission, that consists of 3 people at least, must attend the colloquium of a PhD fellow. The supervisor of PhD fellow has to be a member of this commission. If a supervisor is unable to attend the colloquium (because of some objective reasons), he/she has to present a letter of evaluation regarding the PhD student's research activities.

After attending a PhD student's Colloquium, the commission assesses his/her speech and gives appropriate credits.

**B) Subject Table:** PhD Education component consists of the following subjects. Each student together with his supervisor will define his own specific credit plan.

#### **Structure of the PhD Program**

<b>Name</b>	<b>Status</b>	<b>Number of Credits</b>
Modern Teaching methods	obligatory	5 credits
Assistant to Professor	obligatory	5 credits
Ph D colloquium I	obligatory	5 Credits
Ph D colloquium II	obligatory	5 Credits
Modern Teaching methods	Elective	5-10

Research methods		5-15 credits
Science management	Elective	5 credits
University education courses	Elective	5-30 credits
practice	Elective	5-10 credits
education course attended at other Georgian accredited Higher Education Institution	Elective	5-15 credits
Education course attended at a foreign accredited Higher Educational Institution	Elective	5-60 credits
Assistant to professor Professorship	Elective	5-30 credits
Academic Writing	Elective	5 credits
Information-communication technologies in research/education and creation of electronic courses	Elective	10 credits
specific trade courses	Elective	5-15 credits
other		

**Research Component:** The Thesis has to demonstrate students' ability to carry out a scientific research project in a self-responsible and independent manner.

Doctoral Thesis – 120 credits

**Facilities for the scientific research:** The Program will be conducted on the base of the department of computer sciences (Faculty of Exact and Natural Sciences). Mainly academic staff members of institution will be involved in the program. Classes with modern Technologies and Internet access will provided for a PhD student, and a rich e-library will be available for them.

In addition to this every PhD student will be able to use material-technical base of a partner organizations (EM consultations and software, EMCoS). The company is well equipped with modern computer systems, with all necessary software installed. There is connection with two computer clusters.

Above all, there is a laboratory fully equipped with modern technologies:

- 3 GHz Network analyzer HP 8752A
- 10 GS/s Oscilloscope LeCroy WaveRunner 204Xi
- Several function Generators
- Oszilloscopes
- EMC Measurement Equipment
- Antennas

Number of PhD Fellows: Maximum PhD positions available positions at the Department of Computer Sciences are 10.