

Iliia State University  
Faculty of Business, Technology and Education  
Bachelor Program: Computer Engineering (Major)  
Curriculum

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| <b>Faculty</b>   | <b>Faculty of Business, Technology and Education</b>  |
| <b>Program Title</b>   | <b>Computer Engineering (Major)</b>   |
| <b>Awarded Academic Degree/Qualification</b>   | <b>The degree of Bachelor of Computer Engineering</b>   |
| <b>Program Duration/ECTS Credits</b>   | <b>8 Semesters, 240 Credits (1 Credit- 25 hours):</b> <ul style="list-style-type: none"> <li>• General module - 60 ECTS;</li> <li>• Major program -120 ECTS;</li> <li>• Minor program - 60 ECTS;</li> </ul> |
| <b>Language of Instruction</b>   | English   |
| <b>Head of the Program</b>   | <b>Nana Dikhaminjia, Professor</b>  |
| <b>The Date of Program development and Issues of Updating</b>  | Program is developed in 2017 and can be subject to renewal by the start of each academic semester.  |
| <b>Admission Requirements to the Program</b>   |   |
| <p>The program is designed to be offered for students interested in a bachelor level degree in computer engineering. The Georgian citizens must pass Unified National Exams. Admission for the program requires minimal competence levels in following Unified National Exams:</p> <ul style="list-style-type: none"> <li>• English Language - 70% + 1;</li> <li>• Georgian Language - determined by National Assessment and Examinations Center;</li> <li>• Mathematics - 40% + 1.</li> </ul> <p>International applicants should follow the rules and terms defined by the Ministry of Education, Science, Culture and Sports of Georgia (<a href="http://www.mes.gov.ge/content.php?id=1131&amp;lang=geo">http://www.mes.gov.ge/content.php?id=1131&amp;lang=geo</a>) according to the order №224/N (December 29, 2011). The Applicant should prove English language qualification equivalent to CEFR level B2 or higher. To prove the English qualification, the applicant must submit one of the following:</p> <p>a) An official international language certificate (the main certificates and minimum scores accepted are given below*);</p> <p>b) An English Proficiency Statement from the university, high school or college, confirming that English was the language of instruction;</p> <p>c) A certificate issued by a local or international English language instruction provider (e.g. language school), confirming the acquisition of B2 level as a result of a language course the applicant attended.</p> <p>d) Or apply and take University’s institutional paper based or online language test aligned with CEFR level B2.</p> <p>Note: The English language requirement may be waived if the applicant is a native of or graduated from an English medium high school/university in countries, official language of which is English.</p> <p><b>* The following are the minimum English test scores for admission: TOEFL</b></p> <ul style="list-style-type: none"> <li>• paper based PBT 513</li> <li>• internet based iBT 65</li> <li>• computer based CBT 183</li> </ul> <p><b>IELTS</b></p> <ul style="list-style-type: none"> <li>• Academic (Band 5.5)</li> </ul> <p><b>Cambridge ESOL (English for Speakers of Other Languages)</b></p> <ul style="list-style-type: none"> <li>• Certificate of Advanced English CAE: 160/Level B2 (also grades A/B/C)</li> </ul> |   |

- First Certificate in English FCE: 160/Grade C (also grades A/B)
- Business English Certificate (Higher) BEC: 45/Level B2 (also grades A/B/C)
- Business English Certificate (Vantage) BEC: 60/Grade C (also grades A/B)
- Business Language Testing Service BULATS: 60 overall
- PTE (General level 3)
- PTE Academic (59-75 points)

#### **TELC (The European Language Certificates)**

- TELC English B2: Pass

#### **Michigan (Cambridge Michigan)**

- Examination for the Certificate of Proficiency in English ECPE: Low Pass
- Examination for the Certificate of Competency in English ECCE: Pass
- MELAB: B2

International Students shall undergo paper or online-based entry test in **Mathematics - Ilia State University Entry-Level Maths Test 40% + 1**. The test will be administered by the University to a similar level as required by Georgian students.

### **Program Objectives**

The aim of bachelor programme is to prepare highly qualified specialist of computer engineering, who will be equipped with extensive knowledge in design, developing and operation of computer hardware, as well as the development of computer software. She/he will know the structure of computer hardware, technical characteristics and ongoing physical processes in it, ways and methods for their improvement; also will have developed professional skills, which will give him/her opportunity to get involved effectively in the production process of computer hardware.

Within the programme focus is made on necessary theoretical and practice knowledge in the field of Computer Engineering, in Mathematics, Physics, Computer Sciences and Architecture of Microcomputers and Microprocessors, also the development of practical skills in electrical engineering and programming, essential for project designing.

In addition, the programme is oriented on the development of transferable skills such as effective oral and written communication in English language, skills of quantitative discussion and critical thinking, effective teamwork, use of modern information technologies and academic studies skills.

### **Learning Outcomes and Competencies (General and Subject-specified)**

#### **1. Knowledge and understanding**

*Course graduate has knowledge:*

- About issues creating, developing and operation of computer hardware, as well as development of computer software;
- About organization of computer hardware, ongoing physical processes in it, technical characteristics of computer hardware and the ways and methods for their improvement;
- Has necessary theoretical knowledge for the field in Mathematics, Physics, Computer Sciences and in architecture of microcomputers and microprocessors;
- Has studied the fundamental essence of ongoing physical processes in electrical circuits and components, general principles of modern programming.

#### **2. To use knowledge in practice**

*Course graduate is able to:*

- Create, improve, program, implement and use computer hardware;

- Efficiently install existing computer hardware in organizations, develop optimal schemes for hardware operation;
- Work towards optimization and upgrade of computer hardware, participate in the development and implementation of new computer hardware;
- Service organizations, plan and create their computer landscape, develop and implement effective operation policies of computer hardware.
- Design, create and debug medium complexity digital and hybrid circuits, with appropriate hardware and software tools; also program microcontrollers and microprocessors.
- Hardware and Software interfacing of microcomputers with analog and digital sensors and various types of electric motors;
- Realize and manage practice project under the supervision of qualified mentor.

### 3. Conclusion making:

- Course graduate has ability to evaluate technical characteristics of computer hardware and determine the direction of his/her work to improve these technical characteristics;
- Can develop the most efficient and optimal way to solve the problem on the basis of task requirements and results of analysis;
- Can analyze the reason of poor operation of device or software which he/she created and eliminate it by minimal intervention.

### 4. Communication skills:

- Course graduate can share argumentative opinion and his/her own ideas about development, improvement and operation of computer hardware and its software with specialists and non-specialists, using modern technologies and field terminology;
- Course graduate can communicate with specialists and non-specialists about issues of the field (In Georgian/German and English languages). He/she freely uses modern information and communication technologies, efficiently and adequately uses electronic databases and resources for the purpose of getting various information. Can work efficiently in a group.

### 5. Learning skills

- Course graduate has the ability to see relationship between theoretical knowledge and practical activities, to evaluate his/her own study process, to identify and plan further study directions and needs;
- Course graduate has skills for efficient time planning and for determination of the required time to solve the problem/task.

### 6. Values:

Course graduate knows and shares that professional and ethical standards, which should be compatible with an activity of computer engineering specialist. In particular, knows requirements of computer hardware operation, prerequisites for their stable functioning, understands the importance of the integrity of information in computer hardware. Also knows and follows the safety regulations and norms of working environment.

### Teaching Methods

- Lectures and Seminars/Written and verbal method
- Demonstration method
- Analysis and synthesis method
- Problem-Based Learning
- Group work
- Laboratory Work

- Practical Work
- Project
- Experiential learning

*Specific teaching methods are identified for each individual program component and are listed in relevant syllabi.*

## Program Structure

### Structure of Computer Engineering bachelor program:

- General module - 60 credits
- Major program -120 credits
- Minor program - 60 credits

### General Module:

- Introduction to the Modern Thought I - **6 credits**
- Introduction to the Modern Thought II - **6 credits**
- Academic Techniques - **6 credits**
- C1 Course Programme - **6 credits**
- C1 + Course Programme - **6 credits**
- Calculus I - **6 credits**
- Calculus II - **6 credits**
- Introduction to Programming - **6 credits**
- Practical Course of Georgian for Foreigners (A1.1)/Practical Course of German A1.1 - **6 credits \***
- Practical Course of Georgian for Foreigners (A1.2)/Practical Course of German A1.2 - **6 credits \***

\* Foreign students must pass both Practical Courses of Georgian, Georgian students must pass Practical Courses of German.

### Major Program:

- Mandatory courses of Computer Engineering Bachelor program - **96 credits**
- Mandatory-elective courses of Computer Engineering Bachelor Program - **24 credits**

During the last semester of study student must participate in Senior Design Project (6 credits). The main purpose of the project is to improve the students' technical skills, communication skills by integrating writing, presentation and teamwork opportunities. Senior-design teams will generally consist of 3 to 6 students under the direction of a faculty mentor/supervisor. For detailed information students can see concept of Senior Design project.

At the final step of Bachelor Program students will be involved in Internship (6 credits) in partner organizations. Detailed description and assessment of Internship is described in syllabus of Internship.

Students are offered an opportunity to enroll in their Minor program and accumulate 60 credits. Students enroll in their Minor program starting from the third semester of their studies.

## Student Evaluation

### Student assessment should be based on a 100-point grading scale:

91-100 Excellent

81-90 Very Good

71-80 Good

61-70 Satisfactory

51-60 Sufficient

(FX) 41-50 Unsatisfactory - meaning a student needs more effort to pass an examination and is given an extra chance to pass an additional examination through independent work.

(F) Failure - 40 and less of the maximum of grades, meaning the student's effort is not enough and he has to learn the subject anew.

*Note: The detailed assessment components and criteria are described in more detail in the respective syllabus of each course of the program.*

### Employment Opportunities

Course graduate can be employed in a variety of organizations which specializes on operation, repair, improvement and/or production of computer hardware. For example:

- Diagnostics and repair of a wide range of equipment (household, medical, military, etc.);
- Measurement system design and experiment automation in research institutions;
- Companies specializing in computer hardware installation and firmware programming services;
- Companies specializing in computer network design and installation;
- Companies, specializing in the production and support of electronic hardware.

### Necessary auxiliary conditions /resources for learning

The faculty has the **material resources** that are used in teaching and technical preparation:

- Auditoriums for lecture
- Computer Engineering teaching laboratories
- Computer classes
- University Library
- Choice environment provision system of University „Argus”

Partner organizations, supporting development and implementation of the program:

- San Diego State University Georgia
- EMC Laboratory, Department of Electrical and Computer Engineering, Missouri University of Science and Technology
- LEPL State Military Scientific-Technical Center "DELTA"
- Innotec GEORGIA LLC
- GIS and RS consulting Center GeoGraphic
- IDEA Design Group
- VRex Immersive Inc