

Ilia State University
 Faculty of Business, Technology and Education
 Bachelor Program: Electrical and Electronic Engineering (Major)
 Curriculum

Faculty	Faculty of Business, Technology and Education
Program Title	Electrical and Electronic Engineering (Major)
Awarded Academic Degree/Qualification	Bachelor of Science in Electrical and Electronic Engineering
Program Duration/ECTS Credits	8 Semesters, 240 ECTS (1 ECTS - 25 hours) <ul style="list-style-type: none"> • General Education – 72 ECTS (including 6 ECTS electives); • Major Program - 168 ECTS (including 24 ECTS electives).
Language of Instruction	English
Head of the Program	Giorgi Veshapidze, Professor
The Date of Programme Development and Issues of Updating	Program is developed in 2019 and can be subject to periodic revision

Admission Prerequisites to the Programme (Requirements)

The Georgian citizens must pass the Unified National Exams. Admission for the program requires minimal competence levels in the following Unified National Exams:

- English Language - 70% + 1;
- Georgian Language determined by National Assessment and Examinations Center;
- Mathematics - 40% + 1 or Physics - 40%+1.

International applicants should follow the rules and terms defined by the Ministry of Education, Science, Culture and Sports of Georgia (<http://www.mes.gov.ge/content.php?id=1131&lang=geo>) 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:

- a) an official international language certificate (the main certificates and minimum scores accepted are given below*);
- b) an English Proficiency Statement from the university, high school or college, confirming that English was the language of instruction;
- 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.
- d) Or apply and take University's institutional paper-based or online language test aligned with CEFR level B2.

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.

*** The following are the minimum English test scores for admission: TOEFL**

- paper-based PBT 513
- internet-based iBT 65
- computer-based CBT 183

IELTS

Academic (Band 5.5)

Cambridge ESOL (English for Speakers of Other Languages)

- Certificate of Advanced English CAE: 160/Level B2 (also grades A/B/C)
- 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 a paper or online-based entry test in Mathematics or Physics - Entry-Level Test 40% + 1 . The test will be administered by the University to a similar level as required by Georgian students.

Program Objectives

The mission of the Program:

The mission of the Electrical and Electronic Engineering program is to prepare our students for careers in their chosen area of specialization. As such, the program aims to provide quality instruction, advisory services and student support to ensure students achieve their goals and gain the knowledge and experience required to succeed in the demanding field of Electrical and Electronic Engineering.

The Program Educational Objectives of the Electrical and Electronic Engineering program are closely aligned with Ilia State University's mission to generate, disseminate and apply knowledge to advance science and benefit society both, locally and globally. The program aspires to achieve a high level of internationalization and future cooperation between the graduates across borders.

Besides focusing on providing necessary professional skills to the graduate, the program delivers several courses to endow graduates with broad insight that would prepare them to function efficiently and live in harmony, in the society, in general. Some of these courses will enhance the critical thinking of the aspirants, and some will give a basic education in the field of natural sciences. With such broad background graduates will be well-positioned to fill in the growing demand for problem solvers and leaders in the electrical engineering fields of microelectronics, signal processing, telecommunications, electronic, control and power engineering. To advance their job oriented skills, students will have an opportunity to develop their managerial skills that are instrumental to a successful professional career.

Within the program, fundamental courses in math, physics and statistics build to later courses in engineering design. The program is structured to ensure adequate incremental practical and theoretical knowledge in the field of Electrical and Electronic Engineering. Program graduates will be competitive professionals in Georgia or abroad in areas of project and engineering design and management. They will also be able to continue their education at the master level of studies.

In addition, the program is oriented towards the development of transferable skills such as effective oral and written communication in at least one other non-native speaking language so as to develop multicultural awareness. We expect that our graduates will use these skills in whichever sector they consider advancing their careers, be it either in the private, government or educational.

Program Educational Objectives:

The Program has the following Educational Objectives (PEOs):

1. Graduates successfully apply their solid knowledge, skills and experience in a competitive professional environment, have a successful Electrical Engineering career and serve the increasing needs of the professional and civil society;
2. Graduates are equipped with appropriate skills to be efficient team leaders as well as team members;
3. Graduates pursue lifelong learning in order to stay current with contemporary issues and recent advances in the field for sustained success in their professional carriers.

Learning Outcomes and Competencies (General and Subject-specified)

The program learning outcomes aim at equipping students with:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Teaching Methods

- Lectures and Seminars;
- Written and Verbal Method;
- Analysis and Synthesis Method;
- Problem-Based Learning;
- Group Work;
- Laboratory Work;
- Practical Work;
- Flipped Classroom;
- Reflection;
- Project Work Individually and in Teams.

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

Program Structure

The Electrical and Electronic Engineering program curriculum consists of consecutive required

and elective courses culminating in a major engineering design experience at the end of the studies. The curriculum devotes adequate attention and time to mathematics, basic sciences and general education.

The Electrical and Electronic Engineering curriculum requires a total of **240 ECTS**.

8 Semesters, 240 ECTS (1 ECTS - 25 hours)

- General Education – 72 ECTS (including 6 ECTS electives);
- Major Program – 168 ECTS (including 24 ECTS electives).

The elective courses provide advanced knowledge in specialized areas. However, it is the senior design course described below that assures the major culminating design experience. Students are offered to enrol at least in one Business Administration or Basic Sciences course as a part of their electives.

During the last two semesters of study students must participate in a Senior Design Project (6 ECTS each). 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.

Student Evaluation

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

(A) 91-100 Excellent

(B) 81-90 Very Good

(C) 71-80 Good

(D) 61-70 Satisfactory

(E) 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 details in the respective syllabus of each course of the program.

Employment opportunities

Graduates of Electrical and Electronic Engineering bachelor program can work in variety of industries. Below is a non-comprehensive list:

Automotive industry

Electrical engineers in the automotive industry are required to work on a variety of components including engine and power units, interior and exterior lighting, air conditioning, safety systems, seating controls (movement, heating and cooling), start/stop technology, braking systems and infotainment systems. Their skill set is also important in the development of autonomous, connected and electrified (ACE) vehicles.

Built environment industry

Electrical engineers in the built environment sector can work on projects ranging from hospitals, offices and shopping malls to airports, universities and railway stations. They are responsible for designing various systems including electrical power, emergency power, communications, fire alarms, security, CCTV and lighting. As they mature professionally, they often take on

responsibility for other technical disciplines to produce coordinated designs that meet client requirements.

Defence industry

Electrical engineers in the defence industry are involved in electrical power and network architecture or the optimisation of hardware and software design concepts, developing sophisticated design processes and testing complex products to ensure the equipment is fit for the air, sea or land operating environments. Activities could include: equipment design, assessment of equipment behaviour, fault diagnosis, assessment of new technologies, simulation and modelling, and data analysis.

Oil and gas industry

Electrical engineers in the oil and gas industry design, develop, test, maintain and improve electrical systems and components, including generators, transformers and electric motors, making sure that they meet the right standard of safety, reliability and efficiency and can withstand extreme conditions such as depth, temperature and pressure. This can involve making small alterations or large-scale equipment changes.

Power generation industry

An electrical engineer in the power generation industry will design, build and maintain the electrical plant items such as switchgear, generators, transformers, motors, cables, HVAC (heating, ventilation and air conditioning), UPS (uninterrupted power supply) and lighting.

Rail industry

An electrical engineer in the rail industry could work in a number of areas, including signalling, power, point heating and lighting. Their job will involve writing specifications for power distribution systems, reviewing designs and answering technical queries. On the maintenance side, they will be going out onto the rail network to test equipment or replace components.

Necessary auxiliary conditions/resources for learning

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

- Auditoriums for lecture;
- Electrical and Electronic Engineering teaching laboratories;
- Computer classes;
- University Library;
- Electronic platform of the University - Argus;
- Teaching and Learning Staff Development Center.

Partner organizations, supporting development and implementation of the program:

San Diego State University Georgia;

Innotec Ltd.

Kartli Generation Ltd.

Edison Ltd.

Geographic Ltd.

The highest quality of facilities available to Electrical and Electronic Engineering students will be ensured with the financial and human resources cooperation and investments of SDSU and The Millennium Challenge Corporation (MCC).