



საქართველოს ტექნიკური უნივერსიტეტი  
GEORGIAN TECHNICAL UNIVERSITY

Approved by  
Resolution № 740 of the  
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## Bachelor's Educational Program

### Program Title

ენერგეტიკა და ელექტროინჟინერია

Energy and Electrical Engineering

### Faculty

ენერგეტიკის

Power Engineering

### Program Head/Heads

Professor Iakir BIJAMOVI

### Qualification to be Awarded and the Extent of the Program in terms of Credits

Bachelor of Energy and Electrical Engineering

The qualification will be awarded by combining 207 credits of education courses and 33 credits of free components, in case of completion of 240 credits.

### Language of Teaching

Russian

### Prerequisite for Admission to the Program

Only the holder of a state certificate confirming complete general education or a document equivalent to it, who is enrolled in accordance with the procedure established by the legislation of Georgia, has the right to study at the bachelor's level.

### Program Description

Energy is a necessary prerequisite for the social and economic well-being of society. Accordingly, the main task of the energy strategy is to provide the country's population and business sector with

safe, clean and affordable energy. In this regard, the main challenge of the energy strategy is not only the alignment of the development of the energy system with the economic development of the country, but also the sustainable development of the sector taking into account the growth of energy consumption.

In order to solve the mentioned tasks, the Russian-language undergraduate educational program "Energy and Electrical Engineering" at the Georgian Technical University serves to train qualified personnel for the free labor market, which prepares specialists with a bachelor's degree in energy and electrical engineering.

Taking into account the development trends of the field and the requirements of the labor market, the program underwent certain modifications in 2018.

The current modification stage was based on the order of the Minister of Education, Science, Culture and Sports of Georgia dated April 10, 2019 No. 69/N "On the approval of the national qualifications framework and study field classifier".

The program is compiled by the European Credit Transfer and Accumulation System (ECTS). At the Georgian Technical University, 1 credit is equal to 25 hours, which includes both contact and independent work hours. The distribution of credits according to subjects is presented in the curriculum. The program lasts 4 years (8 semesters, 60 credits per year) and includes a total of 240 credits. The content of the program's education courses, teaching methods and the number of credits ensure the achievement of the goal of the bachelor's program.

### **Program Structure**

The program consists of 207 credits of courses corresponding to the main field of study (189 credits of compulsory courses, 18 credits of elective courses) and 33 credits of free components (of which 4 credits are compulsory, 29 credits are elective). Production practice (5 credits) is provided within the program.

Organization of the educational process, assessment of student achievements, educational and financial agreements with students, accumulation of credits by the student and other necessary information is provided in the "Instructions for managing the educational process at the Georgian Technical University", which is provided on the website.

The instructions for the formation and mobility of the student contingent at the Georgian Technical University, the rules for conducting and evaluating the practice of the students of the Georgian Technical University, and the rules for completing the undergraduate research project/thesis are posted on the website of the Department of Educational Process Management: <https://gtu.ge/Study-Dep/Forms/Forms.php>

### **Program Objective**

- To provide the student with broad knowledge in modern technologies of production, transmission, distribution, consumption and transformation of thermal and electric energies into other energies, which includes general engineering education, design, installation, maintenance, testing and operation, economic and ecological aspects of thermal, hydro and electric power plants, power stations and substations, electric machines and devices, electrotechnical materials, energy-efficient technologies and the elements and nodes included in them;
- To develop engineering-practical skills to solve tasks and problems in industrial and commercial enterprises, as well as to carry out installation, maintenance, repair and fault diagnosis of electrical wiring and electrical devices in household conditions;
- To equip graduates with competencies compatible with the requirements of the labor market in the field of energy and create a basis for further education and professional development.

## Learning Outcomes/Competences (general and professional)

Bachelor of Energy and Electrical Engineering:

1. Describes the types of energy sources and the conditions for their effective use. Classifies energy objects;
2. Explains the purpose and principles of operation of thermal, hydro and electric energy devices. Owns modern methods of calculating their work modes;
3. In accordance with the predetermined instructions, analyzes the electrical, thermal and hydrodynamic processes taking place in the power plants. Forms appropriate conclusions;
4. Uses appropriate physical-mathematical and engineering knowledge, computer technologies, modern methods and tools of practical engineering activities to solve the tasks of calculation and analysis of electrical devices, objects and systems;
5. Solves the basic practical tasks in accordance with the calculation of the operating modes of power plants and their characteristics;
6. In accordance with predetermined instructions, designs and/or installs, maintains, tests and operates the elements included in electric, thermal and hydropower installations;
7. Determines ways to reduce heating costs and/or energy balance of industrial facilities, energy consumption norms, taking into account electrical and thermal loads. Collects data for the energy passport of objects;
8. Together with a group of specialists, carries out the modernization of energy facilities and their separate devices; works effectively in a group in a complex, unpredictable work environment, taking into account social and ethical norms;
9. Prepares a written report/presentation about ways to solve existing problems, both for energy field specialists and non-specialists, using modern communication technologies;
10. Conducts development-oriented activities in the field of energy and electrical engineering in accordance with ecological and economic aspects, energy-efficient and energy-saving technologies, labor protection, electrical safety and technical operation norms. Plans his/her continuing professional development and identifies learning needs.

## Methods of Achieving Learning Outcomes (teaching-learning)

Lecture  Seminar (group work)  Practical  Laboratory  
 Practice  Course work/Project  Consultation  Independent work

In the learning process, depending on the specifics of a particular study course program, the following activities of the teaching-learning methods are used, which are outlined in the relevant study course programs (syllabi):

Discussion/debate, Cooperative learning, Collaborative work, Problem-based learning (PBL), Case study, Brain storming, Demonstration method, Inductive method, Deductive method, Method of analysis, Synthesis method, Verbal or oral method, Writing work method, Explanatory method, Activity-based learning, Project development and presentation.

The student's knowledge is assessed on a 100-point scale.

Positive grades are:

- (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.

Negative grades are:

- (FX) - Failed to pass – 41-50 points, which means that the student needs more work to pass and is allowed to take an additional exam once with independent work;
- (F) - Failed - 40 points or less, which means that the work done by the student is insufficient and he/she will have to study the subject again.

In case of FX, an additional exam is prescribed, not less than 5 days after the announcement of the results. The mark obtained in the additional exam is not added to the mark obtained in the final assessment.

Detailed information is provided on the website of GTU:

Instructions for managing the educational process at the Georgian Technical University.

### **Fields of employment**

Graduates will be able to find work in: hydro and thermal power stations; in electrical systems; in power supply networks of cities, industries and villages; in distribution companies; in pumping stations of water supply systems of cities and regional centers and enterprises: in metropolitan and railways; in energy equipment diagnostics and certification centers; in agricultural products processing enterprises; in natural gas supply systems; in operational and service centers of thermal energy systems; in gas station compressor stations; in main pipeline systems of water, oil and petroleum products and their pumping stations; in energy equipment installation, repair, construction and manufacturing factories, firms and bureaus; in sectoral project organizations.

### **Opportunities for continuing education**

Master's degree educational programs

**Human and material resources needed to implement the program**

The program is provided with appropriate human and material resources. Additional information is provided in the attached documents.

**Number of attached syllabi: 83**