საქართველოს ტექნიკური უნივერსიტეტი
1922 წლიდან

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Bachelor's Educational Program

Program Title

მართვის სისტემები, ავტომატიზაცია და ტესტ-ინჟინერინგი
Control Systems, Automation and Test-Engineering

Faculty

ინფორმატიკისა და მართვის სისტემების ფაკულტეტი
Informatics and Control Systems Faculty

Program Head/Heads

Professor Ketevan KOTRIKADZE, Professor Zaal AZMAIPARASHVILI

Qualification to be Awarded and the Extent of the Program in terms of Credit

Bachelor of Instrumentation, Automation and Control Systems Engineering

The bachelor's qualification is awarded by combining at least 220 credits of educational courses of the relevant content of the main educational field and at least 20 credits of free components, if at least 240 credits are completed.

Language of Teaching

Georgian

Prerequisite for Admission to the Program

Only the holder of a state certificate proving complete general education, or an equivalent person enrolled in accordance with the procedure established by Georgia law, shall have the right to study at the Bachelor's Educational Program.

Program Description

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 subject load of the program. The program lasts 4 years (8 semesters, 60 credits per year) and includes at least 240 credits. The program's course content, education methods, and number of credits ensure that the objective of the undergraduate program is achieved.
In order to obtain a bachelor's degree, a student must obtain the appropriate credits in the relevant content of the main field of education in compulsory and elective courses of 220 credits and free components of 20 credits. 220 credits include 3 concentrations (30 credits each) - education courses (20 credits), corresponding bachelor's project (5 credits) and practice (5 credits.)

Educational process:

The academic educational process is two semesters. A semester includes a combination of academic weeks, a period of conducting supplementary examination(s) and assessment of student achievement on supplementary examination(s). The duration of the semester is 20 weeks. Student assessment is done through ongoing activities, mid-semester exams and final/supplementary exams. During one semester, there are 15 academic weeks - classroom classes, 1 - mid-semester exam, 1 - submitting documentary material and 3 - sessional (final and additional exams). Mid-semester and final exam dates are regulated before the start of each semester by the rector's order on the course syllabus. In a semester, a student has 30 credits to gain according to the curriculum and, accordingly, 60 credits per year.
The educational process at the Georgian Technical University is described in detail in the "Instructions for managing the educational process at the Georgian Technical University", which is located on the web page and contains information about the organization of the educational process, evaluation of student achievements, educational and financial agreements with students, and the accumulation of credit. The curriculum, mid-semester and final/supplementary exam dates are determined at the beginning of each semester by the order of the Rector, the necessary information for students is provided in detail: "Instructions for managing the educational process at the Georgian Technical University".

Program Objective

The objective of the program is for the undergraduate to:

- Be provided with broad knowledge in the modern technologies of control systems, automation and test engineering, which includes the design, operation, monitoring, practical use of control principles and analysis methods of automatic control, measuring and diagnostic systems and their included elements and nodes.
- Be provided with engineering skills to solve existing tasks and problems in the field of control systems, automation and test engineering, by means of modern computer and information technologies;
- Be given an opportunity to achieve professional success in the free labor market both individually and in a team environment.

Learning Outcomes/Competences (general and professional)

1. **Possesses** a broad knowledge of general and fundamental theories and methods characteristic of the engineering field of tool construction, automation and control systems;
2. **Analyzes** data and situations specific to management, automation and control systems using standard and some of the latest methods;
3. **Uses** versatile theoretical/practical knowledge for modern management systems and automation processes, electronic, digital, measurement and control equipment, microprocessors and microcontrollers for operation, testing and monitoring;
4. **Identifies, formulates** and **analyzes p**roblems specific to automatic management and measurement-control systems;
5. **Possesses** knowledge and practical skills in management and automation, measurement and control systems and to solve problems arising in the process of quality monitoring, in accordance with predetermined instructions;
6. **Uses** computer and information technologies to solve practical tasks in management, automation and measurement-control systems;
7. **Prepares** various types of projects/reports in the modeling of management systems, automation, measurement and control systems, in accordance with predetermined guidelines;

8. Based on the analysis, **forms** a reasoned conclusion about the devices and/or systems typical for control systems, automation and test-engineering
9. **Prepare**s a detailed written report or presentation about ideas, existing problems, ways to solve them, and conveys information orally and/or in writing to engineering community specialists, non-specialists, using modern communication technologies.

Concentration 1

1. Describes the principles of construction and modeling of non-linear automatic control systems, their features, technological processes, using theories and methods of control systems
2. Analyzes current processes in control and automation systems, data and characteristics of relevant digital, sensor equipment, using standard and some of the latest methods.
3. Identifies and analyzes control systems and automation problems during their planning.
4. Uses theoretical/practical knowledge, modern computer technologies for modeling of nonlinear control systems, planning of automatic regulation systems, operation and testing of electronic, digital equipment, microprocessors, microcontrollers necessary for automation processes.
5. On the basis of the report and analysis, he develops a justified conclusion about the state of non-linear control systems, automatic regulation systems and hardware parts;
6. In accordance with the instructions, prepares a written project/report/presentation on modeling of management systems, automatic regulation system planning, digital systems and presents it to a wide audience using modern communication technologies.

Concentration 2

1. Describes the main theories, methods and principles of metrology, standardization, certification and quality management;
2. Analyzes methods and means of quality control of measurements, metrological assurance and technological processes, with modern approaches;
3. Identifies and analyzes a pronounced problem in the process of measurements and quality monitoring;
4. Uses modern technologies of measurement, metrological examination, standardization, certification and tests to determine conformity of product quality parameters;
5. Forms a justified conclusion based on the results of metrological assurance and measurements;
6. In accordance with the instructions, prepares a written project/report for quality control, automation of technological processes and organization of inter-laboratory tests and makes a presentation to a wide audience, using modern communication technologies.

Concentration 3

1. Describes modern technologies of automation of measurements, principles of operation, operation and construction of measurement and control equipment, using theoretical and practical methods;
2. Analyzes the possibilities of using digital, analog, power electrical devices, wireless measurement technologies needed for automation of measurements.
3. Identifies the problem arising during the operation of the measuring and control equipment and analyzes the ways of its elimination;
4. Uses in practice the capabilities of measurement and control systems, devices, tools for automation of measurements based on modern expertise and computer technologies;
5. Establishes a justified conclusion, based on analysis and experiments, about the measuring and control apparatus;
6. Prepares a written report/project on automation of measurements, expert measuring techniques, in accordance with the preliminary instructions and makes a presentation in front of a wide audience, using modern communication technologies.

Methods of achieving learning outcomes (teaching-learning)

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

In the educational process, depending on the specifics of the specific educational course program, the following activities of teaching-learning methods are used, which are reflected in the relevant course programs (syllabi): Discussion/debate; cooperative learning; group (collaborative) work; case study; Brain storming; demonstration;inductive; deductive; analysis; synthesis; verbal or oral; written work; explanatory; action-oriented

learning; Project development and presentation.

Student's Knowledge Assessment System

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 of **FX,** an additional exam is scheduled, 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 mark.

Fields of employment

According to the profile of the graduate, he/she can be employed in modern enterprises, energy and telecommunications companies; in companies and firms of the appropriate profile. In general, in any institution where modern technological devices built on the basis of information technologies, programmable systems for managing production processes, conveyors, measuring and diagnostic devices and systems, process management and automation, new production technologies, software and computer systems are installed, operated, serviced, developed and implementated.

Opportunities for continuing education

Master's degree educational programs

Human and material resources needed to implement the program

The program is provided with adequate human and material resources. For additional information, please find the attached documentation.

Number of attached syllabi: 108