საქართველოს ტექნიკური უნივერსიტეტი
GEORGIAN TECHNICAL UNIVERSITY

Approved by
Resolution № 733 of the
Academic Council of GTU
dated July 6, 2012

Amended by
Resolution № 01-05-04/134 of the
Academic Council of GTU dated
September 30, 2022

Master's Educational Program

Program Title

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

Faculty

ინფორმატიკისა და მართვის სისტემების
Faculty of Informatics and Control Systems

Program Head/Heads

Professor Nona OTKHOZORIA

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

Master of instrumentation, automation and control systems engineering *Will be awarded upon completion of at least 120 credits of the educational program*

Teaching Language

Georgian

Prerequisite for Admission to the Program

A person with at least a bachelor's degree or an academic degree equivalent to it, who is enrolled based on the results of the master's exams, according to the rules established by the Georgian legislation, has the right to study in the master's program (general master's exam and specialty exam/exams determined by GTU). Exam questions/tests will be posted on the GTU website at least one month before the commencement of the specialty exams.

An applicant must have an internationally recognized certificate of at least B2 level, or a document of completion of a corresponding educational course at B2 level must be presented. In the absence of a certificate or other similar document, the applicant will undergo a test in the English language at the computer center of GTU.

Applicants who have received one level of higher education in English are not required to pass an exam or present a certificate;

Enrollment in the educational program is also possible on a mobility basis twice a year, in accordance with the order No. 10/N of the Minister of Education and Science of Georgia dated February 2, 2010 "Rule of transfer from a higher educational institution to another higher educational institution".

https://gtu.ge/Study-Dep/Mobility/Term-Of-Mobility.php

Applicants will also be admitted to the educational program on the basis of internal mobility. The terms and procedures of internal mobility are established by the order of the university Rector and the information is posted on the university's website: www.gtu.ge.

Enrollment in the program or transfer from a recognized higher educational institution of a foreign country is carried out in accordance with the rules defined by the legislation of Georgia.

Program Description

The program is compiled by the European Credit Transfer System (ECTS). At 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 2 years (4 semesters, 30 credits in each semester), 120 credits in total. It is allowed for the student's annual study load to exceed 60 credits, but not more than 75 credits or be less than 60 credits.

The program consists of educational and research components. In the study component, 30 credits are compulsory educational courses (first semester).

Concentrations are chosen from the second semester. Each concentration consists of 55 credits of compulsory educational courses and 5 credits of practice.

The research component - completion and defense of the master's thesis amounts to 30 credits.
The academic year consists of two semesters, fall and spring.

Academic year schedule, mid-semester and final/supplementary exam dates are determined at the beginning of each semester by the rector's order, based on the "Instructions for managing the educational process at Georgian Technical University".

The master's degree program is prepared taking into account the specifics of the field, based on the experience of foreign universities and taking into account the requirements of the labor market.

Program Objective

The objective of the program is to train highly qualified specialists who will have theoretical and practical knowledge corresponding to the requirements of the international market in order to implement the requirements in the field of tool manufacturing, control systems, automation and quality control:

- Analysis and development of management systems, automation and quality control systems and methods;
- Qualitative and quantitative assessment of features of dynamic processes of research objects based on systematic analysis and experiment planning;
- Determining the technical condition and performance of measuring devices and systems and using modern microelectronic systems.
- Identifying the problems of the field, determining the causes of their occurrence and developing ways to avoid them.

Learning Outcomes/Competences (general and professional)

1. Possesses a deep and systematic knowledge of research methods and means in the field of engineering of equipment construction, automation and control systems, which allows to improve the existing systems;
2. Describes the main principles and directions of automation, using the latest methods and approaches independently plans the operations necessary for automating the process, ways of modifying the system;
3. Justifies the validity of the methods selected for solving automation and management problems, the technical condition and performance of measuring devices and systems, the conclusion formulated on the basis of the conducted research and analysis, the direction of the selected research, the need to adjust the system scheme, the need to use modern microelectronic systems;
4. Identifies problems in automation systems, discusses their causes and ways of elimination, determines the requirements and standards for proper operation of the system;
5. On the basis of critical analysis, develops conclusions about equipment construction problems. When communicating with the academic or professional community, formulates his/her own arguments.
6. Creates field projects and prepares a written report for synthesis of management systems and automation of technical systems;
7. Shares and protects the norms of ethical and professional responsibility, presents the existing and innovative visions in the engineering of tool construction, automation and control systems.

The learning outcomes of concentrations are:

Concentration 1 - Automation and control systems

1. Analyzes current processes in management and automation systems and uses theoretical/practical knowledge to identify and solve problems;
2. Selects dynamic systems management methods and algorithms to solve optimal and adaptive management tasks;
3. Formulates the tasks of analysis and synthesis of management systems and solves the tasks of manageability, sustainability and quality research using information technologies;
4. Uses in practice modern technical means of building built-in systems for managing and automating technological processes;
5. Develops a reasoned conclusion about the effectiveness of the management and automation systems;
6. Prepares a project/report on construction, modeling, experimental and theoretical research of control and automation systems, makes a presentation to a wide audience, using modern communication technologies.

Concentration 2 - Measurement techniques, quality control and assurance technologies

1. Describes the modern technologies of automation of measurements, principles of operation, service and construction of measurement and control equipment, theoretical and practical bases of receiving, transmitting and processing measurement information;
2. Explains the essence of the experiment results, the principles of modern management and construction of measuring devices and its metrological characteristics, the main provisions of legislative metrology and normative documents, the tasks and goals of state and international standardization and certification;
3. Uses the quality management system and quality management normative documents for the efficient operation of the modern enterprise and to ensure the quality of the products;
4. Selects calibration methods and guides the calibration process of measuring systems and tools;
5. Performs modeling, designing and construction development of electronic devices;
6. In practice, the Internet of Things technology is used in data reception-transmission systems, the capabilities of measurement-control systems, devices, tools for measurement automation processes based on modern digital technologies;
7. Prepares a written report/project on measurement automation, expert measurement techniques and makes a presentation to a wide audience using modern communication technologies.

Methods of achieving learning outcomes (teaching-learning)

☒ Lecture ☒ Seminar (group work) ☒ Practical ☒ Laboratory ☐ Practice ☒
Course work/Project ☒ Master's Thesis ☒ 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): verbal or oral, analysis, action-oriented teaching, explanatory, demonstration, discussion/debate, synthesis, collaborative work, deductive, inductive, cooperative learning, role-playing and situational games, case studies, written work, 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; The additional examination is scheduled no later than 5 days after the announcement of the results. The grade obtained in the supplementary examination shall not be summarized with the grade obtained in the final assessment.
- **(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.

A student who does not agree with the assessment of the study results has the right to appeal to the dean with a reasoned complaint and request a revision of the results within five working days of being informed of the results of the evaluation.

Detailed information is provided on the website of GTU: Instruction for managing the educational process at Georgian Technical University.

The assessment of the research component is done once, during the completion and defense stage of the master's thesis, with the final evaluation.
The master's thesis presented by the master's student is assessed immediately after the defense, by each member of the examination commission, by secret ballot. Based on the decision of the examination commission, the protocol of the examination commission is drawn up.
Detailed information is provided on the website of GTU: in the instruction for managing the educational process at the Georgian Technical University

Fields of Employment

With the knowledge acquired within the mentioned program, graduates will be able to work in the positions of engineer, engineer-researcher and scientific employee: at industrial facilities, scientific-research institutions and institutes, municipal and state management analysis centers, audit-consulting firms, design and construction institutions, medical institutions, hospitals In the sector and other structures where automatic management and control systems, automation, metrology and medical equipment, modern electronic equipment, software for various purposes, computer modeling systems are developed or used.

Opportunities for continuing education

PhD educational programs

Human and material resources needed to implement the program

The program is provided with adequate highly qualified human and material resources, educational materials, computer classes, library, educational and scientific laboratory.

Technical support of the laboratory is given in the annex.

For additional information, please find the attached documentation

Number of attached syllabi: 30.