საქართველოს ტექნიკური უნივერსიტეტი
GEORGIAN TECHNICAL UNIVERSITY

Approved by
Resolution № 740 of the
Academic Council of GTU
dated September 5, 2012

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Resolution № 01-05-04/166 of
the Academic Council of GTU
dated October 12, 2020

Bachelor's Educational Program

Program Title

Engineering geodesy
Engineering Geodesy

Faculty

სამთო - გეოლოგიური
Mining and Geology

Program Head/Heads

Associate Professor Giorgi CHIAURELI

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

Bachelor of Geodesy and Geoinformatics Engineering wll be awarded by combining relevant education courses (218 credits) of the educational program's primary specialty and free components (22 credits) if not less than 240 credits are completed.

Language of Teaching

Georgian

Prerequisite for Admission to the Program

Only the holder of a state certificate confirming complete general education or an equivalent document 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 lasts 4 years (8 semesters) and includes 240 credits, of which 218 credits are courses with content corresponding to the primary field of study and 22 are free components. According to the ECTS system, 1 credit includes 25 hours.

Each academic year includes 60 credits. The teaching process of each year lasts 40 weeks, I semester - 20 weeks and II semester - 20 weeks. The subject is taught for 15 weeks each semester.

The first academic year within 60 credits (2 semesters) to be mastered: the student will take 14 courses with content corresponding to the primary field of study (60 credits), where 10 credits are assigned to an elective foreign language.

The second academic year within 60 credits (2 semesters) to be mastered: the student during the two semesters will take 15 courses with content corresponding to the primary field of study, of which 3 are blocks of elective courses (14 credits total) and 10 credits are elective foreign language.

In the third academic year out of 60 credits to be mastered: 10 credits are assigned to concentration education courses (a total of five concentrations Geoinformatics-GIS, Mine Surveying-MS, Engineering Geodesy-EG, Remote Sensing-RS, and Cadastre-CAD), 7 credits are assigned to free components (semester VI), and 43 credits are assigned to the courses with content corresponding to the primary field of study, of which one is a block of elective courses (5 credits).

In the fourth academic year, out of 60 credits to be mastered, 15 credits (2 education courses, including the Bachelor's thesis in engineering geodesy) are devoted to the concentration, 15 credits to the free components, 5 credits to the practical training in engineering geodesy, and the remaining 25 credits to the courses with content corresponding to the primary field of study, of which 2 are the blocks of elective courses (10 credits total).

Program Objective

To provide the student with a broad knowledge in the field of engineering geodesy and geoinformatics at the stages of design, construction and operation of engineering objects of various specifications.

To provide the student with professional skills in the use of technical and technological means of classical and modern land surveying and geodetic support, meeting the requirements of the constantly updated labor market.

To develop skills in processing space and aerial photographs of the Earth's surface, sorting and cadastral registration of the obtained data, as well as their graphical representation.

Learning Outcomes/Competences (general and professional)

Specifies basic provisions of mathematics and mechanics, principles of land and urban cadastre and mining geometry, basic issues of geodetic gravimetry and urban planning theory, basic concepts of remote sensing;

Describes the size and shape of land, safe working environment, rights and responsibilities of land users, cadastral surveying, tools used in geodesy and gravimetry, basic components of remote sensing, methods of mine surveying service, basic principles of 2D and 3D modeling;

Determines: location of a point in space and on a plane, angles of spread and slope of a layer, types of external signs of points of geodetic networks and their constructions, zones of influence of deformation processes, parameters of construction of a digital terrain model;

Draws conclusions: on the basis of processing of balanced materials, on the basis of search and identification of various digital data of remote sensing;

Discusses issues of remote sensing and photogrammetry, cadastral design, technical support of urban planning, server-based geographic information systems, labor legislation and industrial sanitation requirements, tasks of mine surveying service in tunneling, and land management design methods;

Uses: rock characteristics, .NET platform in C# and C++, raster and vector data in various formats, ArcGIS Server Web ADF and ArcGIS Engine components, approximate and accurate methods of estimating the accuracy of a control geodetic network project, terminology observed in photogrammetry and GIS;

Analyzes the capabilities of modern technologies in geoinformatics, technical characteristics of mining sites, results of instrumental observations, and the capabilities and benefits of using ERDAS and Leatlet tools;

Establishes geoinformation data models, cadastral survey drawings and land registration materials, systematically organized databases, topographic plans and maps, three-dimensional digital surface models, plans and graphic documentation of mine surveying service of open and closed mining operations;

Selects: topographic map elements, Map Resource web application template, elevation and plan, control geodetic networks, types and characteristics of deformations of engineering structures, tunnel design methods, drawings and geodetic observations of deformations, least-squares balancing and accuracy assessment methods;

Identifies and groups geodata, compiles 2D and 3D models, mathematical processing of geodetic measurements, construction and balancing of a phototriangulation network, geodetic, cadastral and land surveying observations, processing of space and aerial photographs, and tracking of project elements (in-kind transfer);

All five concentrations provided by the program with learning outcomes of education courses with corresponding content of the optimally chosen name (Geoinformatics-GIS, Mine Surveying-MS, Engineering Geodesy-EG, Remote Sensing-RS, and Cadastre-Cad) are integrated into the learning outcomes of the educational program.

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):
Verbal or oral, discussion/debate, cooperative learning, collaborative work, demonstration, analysis, synthesis, case study, written work, explanatory, inductive, deductive, action-oriented learning, brain storming, project development and presentation.
Detailed information about teaching-learning methods and relevant activities is provided on the website of the Quality Assurance Service of GTU.

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 receiving FX, an additional examination is indicated, not less than 5 days after the announcement of the results. In addition, the grade obtained on the exam is considered as an improvement to the grade obtained in the assessment.
Detailed information is provided on the website of GTU:

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

Fields of Employment

- ✓ Construction organizations, design and measurement companies;
- ✓ Oil and gas exploration and production companies;
- ✓ Companies that collect, process, analyze, visualize and exchange spatial data.
- ✓ Mining enterprises: shafts, mines, quarries. Organizations engaged in the design, construction and operation of shafts, mines and other underground structures.
- ✓ Organizations of civil and industrial construction profile: high-rise buildings, bridges and tunnels, pipelines, high-voltage transmission lines. Organizations engaged in the design, construction and safe operation of ropeways, technological lines, dams and others.
- ✓ Organizations engaged in: registration, study and conservation of cultural heritage monuments; with cadastral works.
- ✓ State structures:
  - ✓ Ministry of Regional Development and Infrastructure of Georgia,
  - ✓ Ministry of Justice of Georgia,
  - ✓ Ministry of Economy and Sustainable Development of Georgia,
  - ✓ Ministry of Agriculture for Environmental Protection of Georgia,
  - ✓ Ministry of Defense of Georgia, and municipalities

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: 99