საქართველოს ტექნიკური უნივერსიტეტი
GEORGIAN TECHNICAL UNIVERSITY

**Approved by**
Resolution # 733 of the
Academic Council of GTU
Dated July 6, 2012

**Amended by**
Resolution # 01-05-04/169 of the
Academic Council of GTU
dated November 26, 2021

# Master's Educational Program

**Program Title**

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| მშენებლობა |
| Construction |

**Faculty**

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| სამშენებლო |
| Civil Engineering |

**Program Head/Heads**

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| Professor Tamaz KHMELIDZE |

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

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| Master of Construction Engineering<br>Will be awarded in case of completion of at least 120 credits of the educational program |

**Language of Teaching**

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| Georgian |

**Prerequisite for Admission to the Program**

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| A person with at least a bachelor's degree or equivalent academic degree, who is enrolled based on the results of the master's exams (common master's exam and exam/exams determined by GTU), has the right to study in the master's program. Exam questions/tests will be posted on the website of GTU Teaching Department http://www.gtu.ge/study/index.php at least one month before the exams. Enrollment in the program without passing the master's exams is possible according to the rules established by the Ministry of Education and Science of Georgia.<br><br>It is mandatory to present a certificate/document confirming knowledge of a foreign language at the B2 level (English, German, French, Russian). Applicants who have received education abroad (have completed a foreign language education course/program) are not required to pass an exam or present a certificate; |

The applicant, who cannot present the mentioned certificate, is obliged to pass the test in one of the foreign languages (English, German, French, Russian) at the computer center of GTU.

**Program Description**

**Study duration:**

The duration of the program is determined by 2 years (4 semesters)

The semester includes 20 weeks. There are 15 academic weeks (auditory classes) and 5 sessional (mid-semester, final and additional exams) during one semester at GTU. Practice, depending on its specificity, can be carried out both during academic weeks and at other times.

**Program volume in credits:**

The program is designed according to the European Credit Transfer System (ECTS), 1 credit equals 25 hours and includes contact and independent work hours. The distribution of credits is presented in the curriculum. According to the master's educational program, the student acquires at least 120 (ECTS) credits. The educational program includes both educational and research components: educational component - 90 (ECTS) credits, research component - 30 (ECTS) credits;

**Program structure:**

Program includes:

1. Compulsory courses of content corresponding to the main field of study: 55 (ECTS) credits;

2. Concentrations: (which implies the grouping of education courses of the relevant content of the main field of study by focusing on a specific topic/subject) - the volume of each concentration is 65 (ECTS) credits, taking into account the completion of the master's thesis and the defense component;

The program includes 7 elective concentrations.

The student has the opportunity to choose one of the available concentrations according to his/her desire:

- Civil and industrial construction
- Strengthening-reconstruction of buildings
- Hydrotechnical construction
- Road construction
- Construction of bridges and transport tunnels
- Construction of water systems
- Construction of heating and air supply and ventilation systems

**Research component:**

It involves research work aimed at developing the master's student's ability to make independent theoretical and practical reasoning and conclusions. The research component is an integral part of the concentration and is completed by focusing on the chosen concentration topic.

## Program Objective

The objective of the master's program is to prepare a highly qualified specialist in the field of construction engineering with a systematic and in-depth knowledge of sustainable construction.

**1**: To provide graduates with technical, engineering, management and leadership skills to lead new strategic approaches to installation, construction and maintenance technologies of public, commercial, residential and/or industrial structures (as well as their equipment);

**2:** To provide graduates with knowledge based on modern achievements using the latest methods and approaches to change and develop the construction industry, adhering to the mandatory goals of construction sustainability and the principles of reducing the negative impact on the environment;

**3:** To provide graduates with a solid foundation for continuing their studies at the next level and independently conducting continuous professional development.

## Learning Outcomes/Competences (general and professional)

1. In accordance with the share volume of the chosen concentration, has a deep and systematic knowledge of the latest technologies in the field of construction engineering, in the direction of installation, construction and/or maintenance of construction products (residential, public, commercial and industrial buildings, hydrotechnical and transport infrastructure, their equipment, engineering systems);
2. Compatible with the share volume of program concentrations, with deep, systematic knowledge of construction product installation and construction technologies, operation, modern building materials and techniques, independently implements/manages complex engineering activities in an unfamiliar or multidisciplinary environment.
3. In an unfamiliar/multidisciplinary environment, independently solves complex construction engineering problems using state-of-the-art approaches, critically analyzing complex or incomplete information (including recent research).
4. Determines and rationalizes the appropriateness of the company's investment decisions, relevant strategic approaches related to project management and construction organization management, and independently conducts construction expertise.
5. With knowledge of relevant managerial strategies and effective communication, he/she is involved in multidisciplinary team activities and takes responsibility for the activities and professional development of team members when necessary.
6. Adhering to the standards of academic ethics, presents his/her arguments and conclusions in the field of construction engineering to both specialist and non-specialist audiences;
7. Independently plans the further directions of continuing his/her education and directs it.

In relation to the first and second learning outcomes of the program, by overcoming groups of subjects focused on a connected topic, as well as in relation to the 3rd - 7th learning outcomes of the program with equal strength, the learning outcomes of each concentration are concentrated in the following direction:

**Concentration 1 - civil and industrial construction**

- Has a deep and systematic knowledge of residential, public, commercial and industrial building installation, the latest construction technologies; knowledge of modern maintenance/operational approaches.
- Independently manages complex construction processes using systematic knowledge of installation and construction technologies of residential, public, commercial and industrial buildings in an unfamiliar or multidisciplinary environment.

**Concentration 2 strengthening-reconstruction of buildings**

- Has a deep and systematic knowledge of modern technologies of residential, public, commercial and industrial building strengthening-reconstruction, maintenance/operation; has knowledge of modern methods of installation and construction of residential, public, commercial and industrial buildings.
- In an unknown or multidisciplinary environment, he/she independently manages complex construction processes by using systematic knowledge of modern technologies of strengthening-reconstruction, maintenance/operation of residential, public, commercial and industrial buildings.

**Concentration 3 - hydrotechnical construction**

- Has deep and systematic knowledge of the latest technologies of installation, construction and maintenance of hydrotechnical structures.
- Using systematic knowledge of the latest technologies of installation, construction and maintenance of hydrotechnical structures in an unknown or multidisciplinary environment, manages complex construction processes independently.

**Concentration 4 - road construction**

- Has a deep and systematic knowledge of the latest technologies of installation, construction and maintenance of roads and railways and artificial structures
- Independently manages complex construction processes using system knowledge of the latest technologies of installation, construction and maintenance of highways and railways and artificial structures in an unknown or multidisciplinary environment.

**Concentration 5 - construction of bridges and transport tunnels**

- Has a deep and systematic knowledge of the latest technologies of installation, construction and maintenance of bridges and transport tunnels
- Independently manages complex construction processes using systematic knowledge of the latest technologies of installation, construction and maintenance of bridges and transport tunnels in an unknown or multidisciplinary environment.

**Concentration 6 - Construction of water systems**

- Has deep and systematic knowledge of the latest technologies of installation, construction and maintenance of water supply and drainage systems
- Independently manages complex construction processes using the system knowledge of the latest technologies of installation, construction and maintenance of water supply and drainage systems in an unknown or multidisciplinary environment.

**Concentration 7 - Construction of heating and air supply and ventilation systems**

- Has deep and systematic knowledge of the latest technologies of installation, construction and maintenance of engineering systems of buildings
- In an unknown or multidisciplinary environment, independently manages complex construction processes using the latest technologies of installation, construction and maintenance of engineering systems of buildings.

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

☒ Lecture ☒ Seminar (group work) ☒ Practical ☒ Laboratory☒ Practice
☒ Course work/Project ☒ Master's thesis ☒ Consultation ☒ Independent work

Activities corresponding to teaching-learning methods: 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.
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).

**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.

Research component: completion and defense of the master's thesis - a person who has completed all the educational components provided by the educational program will be allowed to defend the master's thesis. The completed qualifying thesis is the result of the independent research work of the master's student. The submission, public defense and evaluation of the completed qualification work are performed once, the evaluation is done with 100 points. The evaluation rule and procedure are determined by the "Rule for evaluation of the research component of the master's educational program" approved by the Academic Council of the University on June 26, 2012, by Resolution No. 704.

Before submitting the master's thesis to the defense, the master's student, along with the master's thesis, must submit to the dean a written conclusion of the supervisor, as well as a request to check the presence of plagiarism in the master's thesis.

**Fields of employment**

Graduates of construction engineering will be able to be employed in the management positions of the construction of public (community), commercial, industrial and residential structures (as well as their equipment), where they implement infrastructure and sustainable development projects, namely: installation construction and maintenance technologies that create office, industrial, administrative, public and residential buildings, highways and railways, bridges, tunnels, airfields, water supply systems and hydrotechnical structures. Graduates will work in construction companies and corporations, engineering consulting, supervision and inspection firms, government agencies, municipalities and ministries, in infrastructure, supervision and urban development services.

**Opportunities for continuing education**

Doctoral educational programs

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

The master's educational program is provided with appropriate human and material resources. See the attached documentation for more information.

**Number of attached syllabi: 73**