საქართველოს ტექნიკური უნივერსიტეტი
GEORGIAN TECHNICAL UNIVERSITY

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

Amended by
Resolution №01-05-04/62 of the
Academic Council of GTU
dated June 07, 2022

Bachelor's Educational Program

Program Title

გარემოსდაცვითი ინჟინერია
Environmental Engineering

Faculty

ქიმიური ტექნოლოგიის და მეტალურგიის
Faculty of Chemical Technology and Metallurgy

Program Head/Heads

Professor Dimitri ERISTAVI

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

Bachelor of Environmental Engineering will be awarded if at least 240 credits are completed by combining 215 credits of courses with content relevant to the primary field of study and 25 credits of free components;

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 Educational Program is based on the European Credits Transfer System ECTS system. 1 credit is equal to 25 hours, which includes both contact and independent work hours. Credit distribution is presented in the program's subject loading.

Duration of Environmental Engineering program is 4 academic years, i.e. 8 semesters and 240 credits. According to the student's individual workload, the number of credits in one year can be less or more than 60 credits, but no more than 75 credits.

A bachelor's degree in Environmental Engineering is awarded upon completion of at least 240 credits. 215 credits are allocated to training courses of the content corresponding to the main field of study. Among them, 52 credits are allocated to mathematics and natural science subjects, the program includes: a block of optional study courses of the specialty with the volume of 10 credits (the student chooses 2 study courses, 5 credits each). Humanitarian training courses - 3 credits. Foreign language in the amount of 20 credits (4 blocks of optional foreign language, each in the amount of 5 credits). Practice - 5 credits, bachelor thesis - 5 credits.

Practice is integrated into three educational courses: “Techniques of atmospheric air protection”, “Methods and means of analysis of surface water protection (with educational practice)”, “Techniques of hydrosphere and soil protection”.

Practice is a necessary component of higher education, which helps the student to become a professional and allows him to develop the acquired theoretical knowledge in a practical environment. Practice gives the student an opportunity to test the acquired knowledge in a real working environment and further refine and develop the acquired competencies. Practice also aims to support students in terms of employment in practice facilities.

There is an optional block of free components in the program - in the amount of 25 credits in the VIII semester.

The program ends with the defense of a Bachelor's thesis in Environmental Engineering, which will establish the student as a specialist corresponding to modern requirements.

The rules for organizing the learning process, conducting and evaluating students' practice, the rules for completing a Bachelor's research project/thesis, evaluating student achievements, entering into educational and financial agreements with students, and accumulating credits by students, and other information are provided in the "Instructions for managing the educational process at the Georgian Technical University".

Program Objective

- To provide the graduate with broad knowledge of the field of Environmental Engineering, skills and professional competencies necessary for the field, corresponding to the modern requirements of the labor market;
- To teach the student the norms of the quality of environmental objects, the disturbance of the balance of the biosphere caused by the impact of harmful substances, as well as natural and anthropogenic factors, and climatic changes;
- Students will master the principles of ecological monitoring according to the values of polluting sources and chemical substances from the point of view of protection of environmental objects;
- To provide the student with broad knowledge of industrial aerosols and waste water purification methods, devices and means, as well as recycling of secondary materials In terms of waste-free or low-waste technology;

Learning Outcomes/Competences (general and professional)

- Discusses the theoretical and practical aspects of Environmental Engineering and ecology;
- Describes the aspects of assessing the ecological condition of environmental objects according to natural and anthropogenic impacts;
- Conducts monitoring of atmospheric air, water and soil pollution in order to carry out environmental monitoring, as well as establishes an environmental monitoring plan for the minimization of polluting substances and waste;
- Implements a relevant research or practical project/work based on the knowledge of natural sciences, technologies and mathematics in accordance with predetermined guidelines;
- Applies international standard methods for determination of polluting components of natural objects, industrial aerosols and waste water;
- Selects methods of cleaning industrial aerosols and substances in waste water according to their physical and chemical properties, devices and equipment used in the field of Environmental Engineering;
- Limits the basic technical characteristics of industrial aerosols and waste water treatment devices, marginally permissible emissions and maximum permissible ground concentrations, marginally permissible discharges;
- Makes a conclusion about the efficiency of cleaning by cleaning devices and tools;
- Evaluates the structural and quantitative changes in living conditions of living organisms in the biosphere based on the migration and transformation of harmful substances, as well as ecological damage to environmental objects;
- Provides clear and comprehensible communication about ideas, challenges and solutions related to the field of Environmental Engineering and ecology, to specialist and non-specialist audiences, in forms appropriate to the context, using information and communication technologies.

A
chieving 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):

1. Discussion/debate;
2. Cooperative teaching;
3. Group (collaborative) work;
4. Problem-based learning (PBL);
5. Case study;
6. Brain storming;
7. Role-playing and situational games;
8. Demonstration;
9. Inductive;
10. Deductive;
11. Analysis;
12. Action-oriented learning;
13. Verbal or oral;
14. Written work;
15. Laboratory;
16. Practical;
17. Explanatory;
18. Heuristic;
19. Synthesis;
20. 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 getting FX in the component of the Educational Program, GTU is obliged to schedule an additional exam at least 5 days after the announcement of the results of the final exam. The number of points obtained in the final assessment is not added to the grade received by the student in the additional exam. The grade obtained at the additional exam is the final grade and is reflected in the final grade of the Educational Program component. In case of receiving 0-50 points in the final evaluation of the educational component, or if the student fails to overcome the minimum competence limit in the final/additional exam, the student will be assigned a grade of F-0.

The program part of the assessment of the level of achievement of the student's learning results in each component consists of an intermediate assessment and a final exam. The mid-term assessment in turn includes the ongoing activity and the mid-semester exam.

Each form and component of assessment has a certain share in the final grade of the total assessment score (100 points). In particular, the maximum score of the interim assessment is no more than 60 and the maximum score of the final examination is no less than 40.

Each form of assessment includes an assessment component(s), which includes an assessment method(s), with the assessment method(s) being measured by assessment criteria.

The right to take the final exam is granted to a student who has accumulated at least the minimum positive grade in the component(s) of the intermediate evaluations (at least 30 points in total), as well as completed and submitted on time the minimum amount of work specified by the program in the form of documentary material.

Detailed information regarding the evaluation system is provided on the website of GTU. In the "Instructions for managing the educational process at the Georgian Technical University".

Fields of employment

Factories producing industrial products, the Ministry of Environmental Protection and Agriculture of Georgia, LEPL the National Environmental Agency of Georgia, as well as those ministries, organizations and institutions whose practical work is conditioned by issues of environmental engineering and ecological safety.

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: 73