საქართველოს ტექნიკური უნივერსიტეტი
GEORGIAN TECHNICAL UNIVERSITY

Approved by
Academic Council of GTU
2014 25 June Order №1181
Modified
Academic Council of GTU
2022 24 November Order
№ N01-05-04/152

Master's Educational Program

Program Title

წყლის ინჟინერია

Water Engineering

Faculty

სამშენებლო

Civil Engineering

Program Supervisor

Professor Irma Inashvili

Qualification to award

Master of Water Engineering
Will be awarded in the case of passing not less than 120 credits of an educational program.

The language of teaching

English

Admission Prerequisites to the Program

The studying right on a Master's program is entitled person who has at least a bachelor's or equivalent academic degree. The person will be enrolled according the results of the Graduate Record Examination (based on the Graduate Record Examinations, and tests in specialty submitted in the English language). Sample tests will be posted up on the website of the Department of Education of GTU at least one month before the start of the examinations -http://www.gtu.ge/study/index.php. Admission to the Master's program without passing the examination may be established by the Ministry of Education and Science.

It is mandatory to present a certificate/document confirming the knowledge of English at the B2 level or to pass an internal university test. Applicants who have been educated abroad (have completed a foreign language training course/program) are not required to pass an exam or present a certificate.

Program Description

The program was developed according ECTS system, 1 credit is equal to 25 hours, which is meant as a contact, as

well as independent work hours. The MA program includes 120 credits (ECTS). In the course of one academic year - 60 credits, 30 credits in the semester;
The student's annual workload may exceed 60 credits, but not more than 75 (ECTS) credits or less than 60 credits; Study component - 90 credits and research component 30 credits.

The master's education program lasts 2 years (4 semesters) and ends with the defense of a qualifying thesis. The duration of a specific semester is determined by the order issued by the Rector "Semester Study Schedule".

The educational component of the program does not exceed 90 credits and consists of the following training courses:

The first semester: compulsory study components - 25 credits and elective courses - 5 credits; In the same semester, the master's student, within the framework of the compulsory study component (Water resources engineering - 5 credits) passes practice;

Third semester: compulsory study components - 30 credits;

Fourth semester: the research component of the program is completion and defense of the master's thesis - 30 credits. Master's thesis is evaluated once.
Detailed information about the master's degree is provided on the STU website: "Regulations of the Georgian Technical University on the master's degree", "Rules for evaluating the research component of the master's educational program" and "Personal work plan of the master's student"
https://gtu.ge/Learning/debuleba_magistraturis_sesaxeb.php
Organization of the educational process, student achievements, assessment, educational and financial agreements with students, accumulation of credits by the student and other necessary detailed information is provided on the website of STU: "Instructions for managing the educational process at the Technical University of Georgia"
https://gtu.ge/Study-Dep/Forms/Forms.php

Program Objective

The aim of the educational program is to:

1. prepare a competitive specialist who meets modern requirements, has leadership skills, is oriented towards design and practical-operation activities, has an engineering education, able to independently carry out research, design and operation activities of water bodies in compliance with construction norms and rules;
2. provide graduates with deep and systematic knowledge of designing, constructing and operating water resources management systems; use the modern computer programs in order to manage water resources; consideration of risk factors in the regulation process;
3. provide graduates with the basis for continuing their studies at the next level and independently conducting continuous professional development.

The Learning Outcomes/Competence (general and field-specific)

1. Determines the physical, chemical and biological characteristics of typical water pollutants with deep knowledge of the field; physiological, bacteriological and biological processes of water and requirements for water quality; establishes relations between technical and environmental issues; stages of engineering design and technical means of management; solves complex issues related to water monitoring systems;
2. Uses modern methods of surface and ground water research during design process, taking into account global, economic, environmental and social requirements;
3. In order to develop a successful project and independently solve specific engineering-practical tasks of logical schemes, he/she finds the necessary data for hydrological research;
4. In order to solve complex problems in water engineering, he/she successfully uses modern engineering computer programs and innovative technologies at the design stages;
5. Processes statistical data focused on the analysis of large volumes of data in water engineering and selects an appropriate engineering solutions;

6. Independently solves engineering tasks in water engineering using modern software;
7. Based on the calculation and analysis of engineering structures, formulates well-founded conclusions;
8. In compliance with the standards of academic ethics, he/she present progress reports, project proposals, own conclusions, arguments and research results to a wide technical and academic audience;
9. Independently searches for educational and informational means to plan the post-study strategy;
10. Coordinates the multidisciplinary team and is responsible for the team's coordination, synchronous work process in compliance with ethical norms.

Methods (teaching - learning) of Achieving Learning Outcomes

☒ Lecture ☒ Seminar (work in group) ☒ Practical ☒ Laboratory ☒ practice ☒ Course paper / project ☒

Master's paper ☒ Consultation☒ Independent work

Based on the specific course of study in the learning process, the relevant below listed activities of the teaching-learning methods are used, which are reflected in the relevant training courses (syllabus):

- Discussion/debates.
- Cooperative teaching
- Collaborative work
- Problem-based learning (PBL)
- Case study
- Demonstration
- Analytical
- Synthetic
- Verbal or oral
- Written
- Laboratory
- Practical
- Explanatory
- Activity-oriented teaching
- Designing and presenting a project

Student Knowledge Assessment System

Grading system is based on a 100-point scale.
Positive grades:

- **(A)** - Excellent - the rating of 91-100 points;
- **(B)** – Very good - - the rating of 81-90 points
- **(C)** - Good - the rating of 71-80 points
- **(D)** - Satisfactory - the rating of 61-70 points
- **(E)** - Enough - the rating of 51-60 points

Negative grades:

- **(FX)** - Did not pass - 41-50 points of rating, which means that the student needs more work to pass and is given the right to take the exam once more with independent work;
- **(F)** – Failed - 40 points and less, which means that the work carried out by the student is not enough and he/she has to learn the subject from the beginning.

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. Submission, public defense and evaluation of the completed qualification paper 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.

See the rules for evaluating the research component of the master's educational program at the following email address:https://gtu.ge/Study-Dep/Files/Pdf/mag_dan5_181119_SD.pdf
See the rule for evaluating the educational component of the master's educational program at the following email address: https://gtu.ge/Study-Dep/Files/Pdf/sasw_proc_mart_inst_18.1119_SD.pdf

See the procedure for checking the plagiarism of the thesis completed at the Technical University of Georgia at the following email address: shorturl.at/lsPW7

Sphere of Employment

The knowledge acquired by graduates of the program can successfully work in water supply and wastewater systems companies, industrial and commercial enterprises, civil organizations, government agencies, consulting firms and agencies, energy companies, in corresponding, Ministries and their affiliated agencies; Supervision and Architecture Service of municipality; construction agencies, municipal utility services, water supply agencies, regional, municipal and national sewerage organizations and other organizations and educational organizations.

In such organizations as:

- Structural subdivisions of the Ministry of Environment Protection and Agriculture, such as: National Environment Agency, Department of Integrated Environmental Management, Department of Protected Areas, Department of Supervision, Local Government and Regional Environmental Services of the Ministry;
- Structural subdivisions of the Ministry of Economy and Sustainable Development;
- Emergency and Emergency Management Agency;
- Ministry of Regional Development and Infrastructure;
- Central and regional water resources management services.

Potential for Further Education

Doctoral Educational Programs

Human and Material Resources Required to Implement the Program

The program provides the appropriate human and material resources. For more information see the attached documents

The Number of Syllabi Attached: 19

Courses in the Program

№	Course	Admission prerequisites	ECTS Credits			
			I Year		II Year	
			Semester			
			I	II	III	IV
	Educational Component:					
1	Hydrology of Surface and Groundwater	N/A	**7**			
2	Water Resources Assessment	N/A	**5**			
3	Water Quality Assessment	N/A	**5**			

4	Water Resources Engineering	N/A	**8**			
Elective courses						
5.1	Environmental Chemistry	N/A	**5**			
5.2	Management of Design of Water Supply and Wastewater Systems	N/A				
5.3	Modern Technologies of Wastewater Treatment	N/A				
6	Water Resources Monitoring	Water Resources Assessment; Water Quality Assessment		**7**		
7	Environment Protection and Sustainable Development	N/A		**5**		
8	Water Resources Planning	N/A		**8**		
9	Geographic Information Systems (GIS) in Water Resources	Hydrology of Surface and Groundwater		**5**		
Elective courses						
10.1	Design, Construction and Exploitation of Industrial and Agrarian Water Supply, Wastewater and Irrigation Systems	N/A		**5**		
10.2	Environmental Engineering	N/A				
10.3	Watershed Management	N/A				
11	Water Systems Modeling	Water Quality Assessment; Water Resources Assessment.			**8**	
12	The Integrated Management of Water Resources	N/A			**7**	
13	Design and management of irrigation systems	Water Resources Engineering			**5**	
14	Design and management of drainage systems	Water Resources Engineering			**5**	
15	Methods of Research and there Use in Water Engineering	N/A			**5**	
Research Component:						
1	Accomplishment and Defense of Master's Thesis	-				30
		Total per semester:	**30**	**30**	**30**	**30**
		Total per year:	**60**		**60**	
		Total:	**120**			

Program curriculum

№	Course code	Subject	ESTS credits / hours	Hours								
				Lecture	Seminar (work in the group)	Practical classes:	Laboratory	Practice	Course paper / project	Mid-semester exam	Final exam	Independent work
	Educational Component:											
1	**AAC92501E1-LP**	Hydrology of Surface and Groundwater	7/175	30		30				1	2	112
2	**AAC92601E1-LS**	Water Resources Assessment	5/125	15	30					1	2	77
3	**AAC92701E1-LS**	Water Quality Assessment	5/125	15	30					1	2	77
4	**AAC92801E1-LPR**	Water Resources Engineering	8/200	30		23		15		1	2	129
	Elective courses		7/175	30	30					1	2	112
5.1	**ENV12201E1-LS**	Environmental Chemistry	5/125	15	30					1	2	77
5.2	**BUA76501E1-LP**	Management of Design of Water Supply and Wastewater Systems	8/200	30		30				1	2	137
5.3	**AAC92201E1-LP**	Modern Technologies of Wastewater Treatment	8/200	30		23			15	1	2	129
9	**AAC92901E1-LS**	Water Resources Monitoring	7/175	30	30					1	2	112
10	**AAC93001E1-LS**	Environment Protection and Sustainable Development	5/125	15	30					1	2	77
11	**ENV12901E1-LP**	Water Resources Planning	8/200	30		30				1	2	137
12	**PHS45901E1-LP**	Geographic Information Systems (GIS) in Water Resources	5/125	15		30				1	2	77
	Elective courses											
10.1	**AAC92301E1-LP**	Design, Construction and Exploitation of Industrial and Agrarian Water Supply, Wastewater and Irrigation Systems	5/125	15		30				1	2	77
10.2	**ENV12201E1-LS**	Environmental Engineering	5/125	15	30					1	2	77
10.3	**BUA76501E1-LP**	Watershed Management	5/125	15	30					1	2	77
11	**AAC92301E1-LP**	Water Systems Modeling	8/200	30		23			15	1	2	129
12	**EET27001E1-LS**	The Integrated Management of Water Resources	7/175	15		45				2	2	111
13	**BUA76601E1-LS**	Design and management of irrigation systems	5/125	15					30	1	2	77
14	**AAC92201E1-LP**	Design and management of drainage systems	5/125	15					30	1	2	77
15	**AAC47001E3-LP**	Methods of Research and there Use in Water Engineering	5/125	15		30				1	2	77

Program Supervisor — Irma Inashvili

Head of Quality Assurance Service of
The Faculty of Civil Engineering — Marina Javakhishvili

Dean of the Faculty — Zurab Gvishiani

Approved
Faculty of Civil Engineering
At the Session of the Faculty Council
19.05.2014 №7

Agreed with
Quality Assurance Service of GTU — Khatuna Mkheidze

Modified
Faculty of Civil Engineering
At the Session of the Faculty
Council N9. 22.11.2022

Chairman of the Faculty Council — Zurab Gvishiani