



საქართველოს ტექნიკური უნივერსიტეტი
GEORGIAN TECHNICAL UNIVERSITY

Approved by
Academic Board of GTU
06.07. 2012 year
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Master's Educational Program

Name of the program

საინჟინრო გეოდეზია

Engineering geodesy

Faculty

სამთო-გეოლოგიური

Mining and geology Faculty

Program Supervisor

Associate Professor Sadunishvili Marekhi

Qualification to award

საინჟინრო გეოდეზიისა და გეოინფორმატიკის მაგისტრი
Master of engineering geodesy and geoinformatics

In case of implementation of no less than 120 credits of the educational progra

The language of teaching

Georgian

Precondition for admission to the program

A student with at least a Bachelor or equivalent degree with an academic degree will be enrolled in a Master's degree based on the results of the Master's Examinations (Exams defined by General Master and GTU). The examination issues / tests will be posted at the GTU teaching department website <http://gtu.ge/Study-Dep/> at least one month before the start of the examination. Enrollment on the program without passing the Master's exams can be made by the Ministry of Education and Science of Georgia.

Description of the program

The program is drawn in according with ECTS system, where 1 credit is equal to 25 hours, and, which includes both the contact and independent work hours. The credits distribution is presented in curriculum. The duration of the program is 2 years (4 semesters) and includes 120 credits. The study component is 75 credits, and research component - 45 credits. The master research project / prospectus - 5 credits, theoretical / experimental research / colloquium - 10 credits, master's thesis - 30 credits.

One mid-semester exam is performed during the semester. It is a necessary component of interim assessment. It is recommended to use no less than 2 (any) components considering the methods of the current activity, teaching level and specification of the study course. The quantity of the current assessment methods, Its performing form, the maximum scores, criteria and scales are determined by the author of syllabus and are described in the syllabus, same time envisaging the specifics of the subject

Each form of evaluation and component has comparative quota in the final assessment defined from the total score (100 points) of assessment.

In particular, the maximum score of the intermediate assessment is 60, the maximum score of the final exam - 40, the minimum positive score is - 20. The maximum score of the mid-semester exam is 30, the minimum positive assessment -15 points. The maximum score of the current activity is 30, the minimum sum of the positive assessment - 15 points.

The duration of the first academic year is 40 weeks (2 semesters). The magistrate will take 11 training courses. The lectures, seminars and practical exercises are performed within 30 weeks (15 weeks per semester).

The duration of the first academic year 45 credits are given to the specialty subjects, to the elective - 10, and, research component - 5 credits from the assimilating 60 credits, during the first academic year.

It will take 4 training courses. 20 credits will be dedicated to the specialty subjects, and, 40 credits - to the research component, from the assimilating 60 credits.

Elements of the research components

Master's Research Project - Prospectus is the outcome of review and analysis, the preliminary draft of the master's thesis that the master student has to complete in the second semester.

Prospectus should include actuality of the study question, theoretical and practical value of the selected topic. The author should know what types of resources (literature, statistics) should be used and where can be find these resources. Prospectus should include the outcomes from processing of the relevant literature and the necessary bibliography, as well as the history of the research. It should be briefly presented what is currently being done in this direction and what is currently being done (who works, and in what direction). The author should set out the main issues of the research and present a work plan.

In case of positive assessment of the prospectus (51 and more points), the graduate student continues to study.

In case of negative assessment of the prospectus (less than 51 points), the master will present reiteratively the work according to the existing rule.

Theoretical-experimental research / colloquium. The master student begins to work on the theoretical-experimental research / colloquium from the second year of her/his studies, it means, the thesis will be presented in the third semester, within the scope of the study, she/he is obliged to prepare one colloquium.

The paper to be presented on the colloquium is part of a master's thesis. Colloquy envisage the presentation of the material related to the master topic or its parts.

The main goal of the colloquium is to systemize the knowledge of the master student, presenting the outcome of their work, and develop the ability to communicate with the professional community.

For colloquial assessment outcomes of the research in the written form will be submitted to the faculty dean (no later than 15th week), who will create a 3-5-member commission, before the completion of the corresponding training semester. The Master student presents the outcomes of research to the commission during 10-15 minutes. Each member of the commission evaluates based on 5 components. The maximum score is 100 points.

In case of colloquial positive assessment (51 and more points), the graduate student continues to study.

In case of negative assessment (less than 51 points), the student will represent the work according to the existing rule.

Completion and defense of the master thesis. The qualification work is a major part of the research component. The thesis is the result of independent research work. It should include the theoretical/experimental research outcomes. To present the completed qualification work, public defense and final assessment procedures it has

been mandated by "provision of Georgian Technical University on Masters" (Resolution No. 704 of June 26, 2012) verified by University Academic Council. The qualification work is evaluated by 100 points.

Public defense of qualification work will be evaluated by examination commission consisting of 5-7 members.

Public defense assessment of the student is determined by the average arithmetic of scores each member of the Commission gives, as well, the qualification work is not considered to be defended if the majority of the examination commission assesses it less than 51 points. On the basis of the decision of the examination commission the protocol of the examination commission shall be drawn up.

Assessment system:

There are five types of positive assessment:

- (A) - Excellent - the rating of 91%
- (B)-Very good - - the rating of 81-90%
- (D)-Good - the rating of 71-80%
- (D)-Satisfactory - the rating of 61-70%
- (E)-Enough - the rating of 51-60

Negative grades:

- (FX) - Did not pass - 41-50 % of rating, which means that the student needs more work and is given the right to rework out the thesis and to take the defense once more
- (F) – Failed – 40% and less, which means that the work carried out by the student is not enough

(FX) In case of assessment, the master will be entitled to rework out the thesis and re-defense of the master's thesis. (F) In case of receiving the assessment, the student is losing the right to present the same paper.

The purpose of the program

The program aims to prepare graduate engineers of geodesy and geoinformatics, which will be competent in engineering geodesy (civil and industrial construction geodetic provision, drawing of geodesic projects, projecting geodesic networks, precision report, diagnostic process research), mine surveying (Underground processing, mine surveying service, under construction and exploitation of underground masking and construction) and cadaster (land fund management mechanism, land law, landslide, land cadaster, land monitoring and land control, land management Divide and divide it A) settlement of settlements, organization of various types of transactions on land, protection of land fund). Also to master the classical methods of mathematical impediments and the use of practical geodetic measurements. Acquire knowledge on key issues in the field of geoinformation systems technology. Geodetic services for surface and underground engineering buildings and preliminary structures can also be constructed during construction and operation.

Learning Outcomes and Competences (General and Sectoral)

- **Knowledge and understanding** - has a deep and systematic knowledge of engineering geodesy and geoinformatics that gives the possibility of developing new, original ideas, understanding the ways of solving individual problems;

He is aware of the theory and practice of partitioning works, has the ability to select a method of ordering the construction object and environmental conditions.

- **Ability to use knowledge in practice** - new, unforeseen environment, search for new, original ways of solving complex problems, including independent research using the latest methods and approaches:

Ability to evaluate project design and accuracy of geodesic and markside tools. Ability to monitor surface and underground engineering objects monitoring and deformations;

Ability to provide a marksuit for modern requirements in mining oil and enterprises, open quarries or underground mines;

Cadastral works, real estate planning and registration-registration skills.

- **Ability to conclude** - Based on the obtained knowledge, establishing grounded conclusions based on analysis of information:

Geodetic services for civil and industrial construction facilities, designing networks on the stage of study, assessment of accuracy and ability to prove sufficient. Ability to select methods and instruments in a reasonable manner;

Ability to formulate conclusions based on selection, processing, quality determination and analysis of methods of processing geodesic and markside results.

- **Communication skills** - Writing, writing and grammar rules. Write a detailed written report on the problems of problems, problems and solutions.

Use of geoinformation systems in the native and foreign languages, specialists and non-specialists, artillery, geodesy and winding materials and the ability to provide information through creation of visible material.

- **Learning skills** - independently conducting learning, awareness of the learning process and a high level of strategic planning. To determine professional learning and experience, determine their own learning directions; To acquire new tools and software, to determine their advantages, in order to plan for rational use in the future.

Independently seek scientific and technical literature and learn the knowledge of geodesy, cadaster and markside. Independently determine other ways to improve their qualifications in this direction (participation in seminars, professional skills and internships, academic degrees, study tours and exchange programs etc.).

Values - values to values and contribute to the establishment of new values. Protecting the standards of professional values, ethics and morals:

Understanding the professional values of land resources management;

Understanding the geodesic and markside professional values (arsenal and geodetic instructions, performance measurements in appropriate precision and selected time).

Methods of achieving learning outcomes (teaching and learning)

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, debate, presentation, group work, etc.)

1. **Discussion / debate** are one of the most common activities of interactive teaching. Discussion process increases the quality and activity of students' engagement. Discussion can be turned into arguments and this process is not limited to the questions asked by the teacher. It develops the ability of the student to reason and justify their opinion.

2. **Collaborative work** – By using this activity, teaching implies division of the students' group and assignment of teaching tasks to them. The group members individually work on the issue and in parallel share their opinions with other members of the group. Due to the set objective, it is possible to divide the functions among the members during the group's working process. This strategy provides all students maximum engagement in the learning process.

3. **Implication**. It is quite effective in terms of achieving the result. In many cases, it is better to provide the students with audio and visual materials simultaneously. The study material can be demonstrated by both the teacher and the student. This activity helps us to demonstrate different levels of learning material, to specify what students will have to do independently; at the same time, this strategy visually reflects the essence of the topic/ problem. Demonstration may be simple.

4. **Induction** is such a form of transmitting any knowledge when the process of thinking in the course of the study is directed towards generalization, in other words when delivering the material the process is going from concrete to general.

5. **Deduction** is such a form of transmitting any knowledge, which based on general knowledge represents logical process of discovering new knowledge in other words, the process is going from general to concrete.

6. **Analysis** helps us to divide the study material into constituent parts. This will simplify the detailed coverage of individual issues within a difficult problem.

7. **The synthesis** implies the composition of one whole by grouping individual issues. This activity contributes to the development of the problem to be seen as a whole.

8. **The script** implies the following activities: making extracts, records, notes, theses, abstract or essay and other
9. **Explanation** is based on the discussion on the issue. The teacher gives a concrete example from the material, which is discussed in detail within the given topic.
10. **Action-oriented training** requires active involvement of the teacher and student in the teaching process, where the practical interpretation of theoretical material is of special significance.
11. **Verbal or orally transmitted.** Narration, talking and so forth belong to this activity. In this process the teacher orally transmits and explains study material and the students actively perceive and learn it through listening, remembering and thinking.

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.

Field of employment

Civil and industrial construction, transport facilities, hydraulic facilities and other constructions; Open and underground treatment facilities; City, water, land, forest and others. cadastral processing facilities.

Opportunity to continue learning

Doctoral Educational Programs

Human and material resources necessary for the implementation of the program

The program is provided with appropriate human and material resources. For more information see attached syllables and annex.

Number of attached syllables: 28

Program Study Load

№	Course Title	Precondition of admit	ECTS Credits			
			I Year		II Year	
			Semester			
			I	II	III	IV
1	Business Communication (English)	does not have	5			
2	Business Communication (Russian)	does not have				
3	Business Communication (German)	does not have				
4	Business Communication (French)	does not have				
5	Operations Management	does not have	5			

6	Enginner Geodetic Investigation Works	does not have	5			
7	Mine surveying works in mine construction	does not have	5			
8	Geodetic measurements processing	does not have	5			
9	Cadastral works	does not have	5			
10	Theory and Practice of Specialized Translation (English)	does not have		5		
11	Theory and Practice of specialized Translation (Russian)	does not have				
12	Theory and Practice of Specialized Translation (German)	does not have				
13	Theory and Practice of Specialized Translation (Franch)	does not have				
14	Geodesey and Geoinformatic systems (GIS)	does not have		5		
15	Geodetic reference nets	Enginner Geodetic Investigation Works		5		
16	Works of mine surveying in open-cast mine	does not have		5		
17	Geodesy works in organization of the use of land	Cadastral works		5		
Engineering geodesy						
18	Cartographic projections	does not have			5	
19	Geodetic layout works	Geodetic reference nets			5	
20	Mathematic statistic elements in geodetic measurements	Geodetic measurements processing			5	
21	General geophysics	does not have			5	
Cadastrre						
22	Basics of estate relationships	does not have			5	
23	Land law	does not have			5	
24	Menagement of land resources	does not have			5	
25	GIS in cadastre	Geodesey and Geoinformatic systems (GIS)			5	
Mine survey						
26	Connecting surveying	does not have			5	
27	Management of Mining Massive Condition	does not have			5	
28	GIS in mine survey	Geodesey and Geoinformatic systems (GIS)			5	
29	Mathematic statistic elements in geodetic measurements	Geodetic measurements processing			5	
			Per semester	30	25	20
			Total:		75	
Research Component:						
	Master Research Project / Prospectus	does not have			5	
	Theoretical / experimental research / colloquium	Master Research				10

		Project / Prospectus				
	Accomplishment and Defense of Master's Thesis	All the necessary training and research components				30
Total per semester:			30	30	30	30
Total per year:			60		60	
Total:			120			

Map of learning outcomes

Nº	Course Title	Knowledge and understanding	Ability to use knowledge in practice	Making judgments	communication skill	ability to learn	Values
1	Business Communication (English)	X	X		X	X	X
2	Business Communication (Russian)	X	X		X	X	X
3	Business Communication (German)	X	X		X	X	X
4	Business Communication (French)	X	X		X	X	X
5	Operations Management	X	X	X	X		
6	Theory and Practice of Specialized Translation (English)	X	X	X	X		
7	Theory and Practice of specialized Translation (Russian)	X	X	X	X		
8	Theory and Practice of Specialized Translation (German)	X	X	X	X		
9	Theory and Practice of Specialized Translation (Franch)	X	X	X	X		
10	Enginner Geodetic Investigation Works	X	X	X		X	
11	Mine surveying works in mine construction	X	X	X		X	
12	Geodetic measurements processing	X	X	X		X	
13	Cadastral works	X	X	X		X	
14	Geodesy and Geoinformatic systems (GIS)	X	X	X	X		
15	Geodetic reference nets	X	X	X		X	
16	Works of mine surveying in open-cast mine	X	X	X		X	
17	Geodesy works in organization of the use of land	X	X	X		X	
18	Cartographic projections	X	X	X		X	
19	Geodetic layout works	X	X	X		X	
20	Mathematic statistic elements in geodetic measurements	X	X	X		X	
21	General geophysics	X	X	X		X	
22	Basics of estate relationships	X	X	X		X	
23	Land law	X	X	X		X	
24	Menagement of land resources	X	X	X		X	

25	GIS in cadastre	X	X	X	X		
26	Connecting surveying	X	X	X		X	
27	Management of Mining Massive Condition	X			X	X	
28	GIS in mine survey	X	X	X	X		
Research Component:							
	Master Research Project / Prospectus	X	X	X	X	X	X
	Theoretical / experimental research / colloquium	X	X	X	X	X	X
	Accomplishment and Defense of Master's Thesis	X	X	X	X	X	X

Program curriculum

№	Course code	Course Title	ESTS credits / hours	Hours								
				Lecture	Seminar (work in the group)	Practical classes:	Laboratory	Practice	Course paper / project	Mid-semester exam	Final exam	Independent work
1	LEH12412G1	Business Communication (English)	5/125			45				2	2	76
2	LEH12812G1	Business Communication (Russian)	5/125			45				2	2	76
3	LEH12612G1	Business Communication (German)	5/125			45				2	2	76
4	LEH12212G1	Business Communication (French)	5/125			45				2	2	76
5	BUA72703G1	Operations Management	5/125	15	30					1	2	77
6	LEH12512G1	Theory and Practice of Specialized Translation (English)	5/125	15		30				2	2	76
7	LEH12912G1	Theory and Practice of specialized Translation (Russian)	5/125	15		30				2	2	76
8	LEH12712G1	Theory and Practice of Specialized Translation (German)	5/125	15		30				2	2	76
9	LEH12312G1	Theory and Practice of Specialized Translation (Franch)	5/125	15		30				2	2	76
10	PHS21203G1	Enginner Geodetic Investigation Works	5/125	15		30				1	1	78
11	MAP44703G1	Mine surveying works in mine construction	5/125	15		30				1	1	78
12	PHS21603G1	Geodetic measurements processing	5/125	15		30				1	1	78
13	SOS10703G2	Cadastral works	5/125	15		30				1	1	78
14	PHS40903G1	Geodesey and Geoinformatic systems (GIS)	5/125	15			30			1	1	78
15	PHS21303G1	Geodetic reference nets	5/125	15		30				1	1	78
16	MAP44803G	Works of mine surveying in open-cast mine	5/125	15		30				1	1	78
17	PHS21803G1	Geodesy works in organization of the use of land	5/125	15		30				1	1	78
18	PHS21503G1	Cartographic projections	5/125	15			30			1	1	78
19	PHS21403G1	Geodetic layout works	5/125	15		30				1	1	78
20	PHS21703G1	Mathematic statistic elements in	5/125	15		30				1	1	78

		geodetic measurements										
21	PHS21103G1	General geophysics	5/125	15		30				1	1	78
22	BUA30703G2	Basics of estate relationships	5/125	15	30					1	1	78
23	LAW11303G2	Land law	5/125	15	30					1	1	78
24	BUA30603G2	Management of land resources	5/125	15		30				1	1	78
25	SOS10803G2	GIS in cadastre	5/125	15	30					1	1	78
26	MAP44903G1	Connecting surveying	5/125	15	30					1	1	78
27	MAP55803G1	Management of Mining Massive Condition	5/125	15		30				1	1	78
28	MAP45003G1	GIS in mine survey	5/125	15			30			1	1	78
29		Master Research Project / Prospectus	5/125									125
30		Theoretical / experimental research / colloquium	10/250									250
31		Accomplishment and Defense of Master's Thesis	30/750									750

Program Supervisor

Marekhi Sadunishvili

Mining and geology Faculty

Head of Quality Assurance Service

Shalva Keleptrishvili

Dean of the Faculty

Anzor Abshilava

Agreed with

Quality Assurance Service of GTU

Irma Inashvili

Approved by

Mining and geology

At the meeting of Faculty Board

30. 03. Year, Protocol №3

Chairman of the Faculty Board

Anzor Abshilava