საქართველოს ტექნიკური უნივერსიტეტი
GEORGIAN TECHNICAL UNIVERSITY

Approved by
The Academic Council of GTU
2012 year 6 July
Resolution # 733
Modified by
The Academic Council of GTU
2018 year 2 april
Resolution # 01-05-04/95

Doctoral Educational Program

Name of the program

Engineering geodesy

Faculty

Mining and Geology

Program Supervisor

Professor Nodar Matiashvili

Qualification to award

Doctor in Enginering
will be given if passing no less than 180 credits of the education program

Language of study

Georgian

Precondition for admission to the program

Master degree or equivalent degree with a diploma. Considering: Scientific publications; Participation in scientific conferences; Other documents and materials related to study / research activities (Certificates, diplomas, patents, etc.) Interview with faculty temporary commission.

The purpose of the program

The program was done based on ECTS system, 1 credit is equal to 25 hours, which involves both the contact and independent work hours. The credit distribution is presented in the program curriculum.

The duration of the program is 3 years (6 semesters) and includes 180 credits.
The study component - 60 credits (Including compulsory elements of study components - 15 credits, special program related to program - 15 credits, thematic seminars - 30 credits), research component - 120 credits: colloquiums (I, II and III) - total 60 credits, thesis research project / prospectus - 30 credits, completion of the thesis and defence - 30 credits.
The study process is as follows: the semester includes 20 weeks, from which the study process continues 16 weeks; XVII week is devoted to the preparation for final examination, the final exam is conducted on the XVIII-XIX week. XX week, if necessary, is devoted for an additional exam.

The first semester consists of two compulsory elements (5 and 5 credits) of study components, two special courses (5 and 5 credits) related to the program and the project of thesis research project / prospectus 1 - 10 credits.
The second semester includes one compulsory component of the study components (5 credits), a special course related to the program (5 credits), and he project of thesis research project / prospectus - 2 - 20 credits.
The third semester is dedicated to the first thematic seminar - 15 credits, the compulsory element of the educational program research component: theoretical / experimental research / colloquium - 1 (15 credits).
The fourth semester is dedicated to the second thematic seminar - 15 credits, compulsory element of educational program research component: theoretical / experimental research / colloquial - 2 (15 credits).
The fifth semester comprises the compulsory element of the educational program research component: theoretical / experimental research / colloquium -3 (30 credits).
The fifth semester is a compulsory component of the educational program research component: completion and defence of the doctoral thesis (30 credits).

The doctoral student prepares two scientific thematic seminars during the period of educational program scheme.
Dean organizes the seminar for presentation of thematic seminar. The workshop on the seminar is evaluated by a commission comprising 5-9 members, which is based on the submission of the head of the Dean Academic Department, the composition of the Commission is approved by the Faculty Order.
Based on theoretical / experimental research, PhD student is required to prepare three colloquiums in the third, fourth and fifth semester. Colloquiums reflect the findings of the doctorate study.
Completion and protection of the thesis is a major part of the research component. It reflects the scientifically justified results of the theoretical / experimental research conducted by the PhD student and / or solves the topical scientific problem. PhD student submits the dissertation work to the dissertation board consisting of 7-9 representatives of the relevant science field.

The purpose of the program

Prepare doctors in the field of engineering geodesy who will be competent to carry out their work. As well as to study theoretical and practical issues within engineering geodesic and special educational programs. Continue the scientific work, prepare specialists in the field of geodesy.

Outcomes/competences (general and sectoral)

- **Knowledge and understanding:** knowledge based on the latest achievements in the field of Engineering Geodesy, which enables the use of expansion or innovative methods (at the standard level required for a referential publication). Understanding the knowledge of renewed knowledge through re-understanding of the existing knowledge and partially revaluating;
- **Ability to use knowledge in practice** - Independent planning, implementation and supervision of innovative research. Developing new research and analytical methods and approaches that are oriented toward creating new knowledge and reflecting in international referencing publications;
- **Making judgments:** Establishing grounded conclusions based on critical analysis of complex and incomplete information (including recent research);
- **Communicating skills** - Ability to write in a concise and comprehensible manner. Ability to create logically organized written constructors, Ability to prepare relevant presentations or written information, Communication skills in native and foreign languages, Communication of information for specialists and non-specialists in Georgian and foreign languages. Ability to conduct oral speech and public speeches of complex issues.
- **Ability to learn** - Ability to study independently, to develop the new ideas or processes, learning and learning activities, within the research, based on the latest achievements,
- **Values:** Ability to maintain and establish professional values (accuracy, punctuality, objectivity, transparency, organization and etc.) Ability to protect the norms of ethics and morals

Methods of achieving learning outcomes (teaching and learning)

☒ Lecture ☐ Seminar (team working) ☐ Practical classes ☐ Laboratory ☒Scientific-thematic seminar ☒ Independent work ☒ Consultation ☒Research component ☒Design of doctoral thesis ☒ Doctoral thesis

Teaching methods. during studying process the following methods are used to study the specifics of the course, which is given in the syllabi of the course;

1. Discussion/debates. This is the most widely spread method of interactive teaching. A discussion process greatly increases the quality of students' involvement and their activity. A discussion may turn into an argument and this process is not merely confined to the questions posed by the teacher. It develops students' skills of reasoning and substantiating their own ideas.

2. Case study – the teacher discusses concrete cases together with the students and they study the issue thoroughly. E.g., in the sphere of engineering safety it can be a discussion of a concrete accident or catastrophe, or in political science it can be a study of a concrete, e.g., Karabakh problem (Armenian-Azeri conflict).

3. Demonstration method implies presenting information with the help of visual aids. It is quite effective in reaching the required result. It is frequently advisable to present the material simultaneously through audio and visual means. The material can be presented both by a teacher and a student. This method helps us to make different steps of perceiving the teaching material more obvious, specify what steps the students are supposed to take independently; at the same time this strategy visually shows the essence of an issue/problem. Demonstration can be very simple.

4. Deduction Method - Determines the form of the transformation system, which on the basis of the general knowledge of the discovery of the new mechanism of the process of production is proceeds from the general to the concrete.

5. Analysis Method - Helping the Study to Become a Part of the Matter It's easy for you.
6. Synthesis Method - implies the ability to read the questions by using a group. This is how you are experiencing the development of the problem as the disease.
7. Verbal or oral method comprises a lecture, narration, conversation, etc. During the process the teacher conveys, explains the material verbally, and students perceive and learn it by comprehending and memorizing.
8. Written method implies the following forms of activity: copying, taking notes, composing theses, writing essays, etc.
9. Practical methods unite all the teaching forms that stimulate developing practical skills in students. In this case a student independently performs different kinds of activity on the basis of the knowledge acquired e.g. field study, teaching practice, field work, etc. 7.
7. Explanatory method is based on discussing a given issue. In the process of explaining the material the teacher brings concrete examples the detailed analysis of which is made in the framework of the given topic.
10. Activity-oriented teaching implies teachers' and students' active involvement in the teaching process, when practical interpretation of the theoretical material takes place.
11. Collaborative work; using this method implies dividing students into separate groups and giving each group its own task. The group members work at their issues individually and at the same time share their opinions with the rest of the group. According to the problem raised, it is possible to shift the functions among the group members in this process. This strategy ensures the students' maximum involvement in the learning process.

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.

Doctoral thesis is to assess the 100-point system:
a) Excellent (summa cum laude) – Excellent work
b) Very good (magna cum laude) - result that exceeds the requirements in every way;
c) Good (cum laude) - result that exceeds the requirements;
d) Average (bene) - result that meets the requirements in every way;
e) Satisfactory (rite) - a result that, despite the shortcomings, still meets the requirements;
f) Unsatisfactory (insufficient) - a result that does not meet the requirements due to significant deficiencies;
g) Completely unsatisfactory (sub omni canone) - a result that does not meet the requirements completely.

Sphere of Employment

Civil and industrial construction, transport facilities, hydro technical and other construction; Open and underground treatment facilities of minerals; Chalk, water, land, forest and others. Cadastral processing facilities; Higher education institutions; Private and state research and scientific institutions.

Required human and material resources

1. Laboratories, technical installations, computing and software that are considered for the implementation of this program.

- Geodesy Laboratory: Special pumps installed (independent of the foundation of the building) for surveying, checking and correction of different geodesic measurements (for simulation);
- High precision, accurate and technical instruments: 49 optical nivelir, 3 digital nivelir, 30 theodolite, 1 light distance measuring, 2 laser distance spectrum, 1 gravimeter, 1 giroteodolite, 3 electronic tachometer, 1 global positioning system "GPS", 1 laser scanner;
- Special stand for determining the difference of the optical instruments, the cost of the tarazo, the distance coefficient, the heel of the lartqi;
- Comparator to examine high-precision instruments for metric and decimetric examination of Invar lartqi;
- Field compiler (yard of the GTU third building) for compaction of metal bars, hooves, invars
- Laboratory for studying geoinformation systems, digital monitor and network computer system;
- Remote sensing and digital photogrametric laboratory, digital monitor and network computer system
- Shaft laboratory to conducting mining survey activities

2. Academic staff (Field of activity) Estimated listing, Which will serve this program

Professor: Nodar Matiashvili; Murman Meskhi

Associate Professors: Mzia Nadiradze, David Papava, Giorgi Chiaureli.

If necessary, the doctoral program may be invited Professor from other (Georgian or foreign) University.

3. The program is attached to the program Supervisor/ Supervisors CV

Number of attached syllables: 5

Program Subject

Program Subject

№	Training component	Programme Prerequisites	ECTS credit					
			I Year		II Year		III Year	
			Semester					
			I	II	III	IV	V	VI
1	Academic writing and scientific research methods	does not have	**5**					

2	Teaching methods	does not have	**5**					
3	Assistant Professor	does not have		**5**				
4	Using geodesy	does not have	**5**					
5	The mathematical processing theory of geodetic dimensions	does not have	**5**					
6	mine-surveying Works in extraction fossil	does not have		**5**				
7	First thematic seminar	does not have			15			
8	Second thematic seminar	First thematic seminar				15		
Research component								
1	Thesis research Project / Prospectus - 1	does not have	**10**					
2	Thesis research Project / Prospectus - 2	Thesis research Project / Prospectus - 1		**20**				
3	Theoretical / experimental research / colloquium- 1	does not have			15			
4	Theoretical / experimental research / colloquium- 2	Theoretical / experimental research / colloquium- 1				15		
5	Theoretical / experimental research / colloquium- 3	Theoretical / experimental research / colloquium- 2					30	
6	Thesis Completion, presentation	All the necessary training and research components						30
		Per semester:	**60**		**60**		**60**	
		Per year:	**180**					

Educational Program Scheme

№	Training component	Knowledge and understanding	Ability to use knowledge in practice	Making judgments	Communicating skills	Ability to learn	Values
1	Academic writing and scientific research methods	X	X	X	X		
2	Teaching methods	X	X	X	X		X
3	Assistant Professor	X	X	X	X	X	X
4	Using geodesy	X		X		X	
5	The mathematical processing theory of geodetic dimensions	X		X		X	
6	mine-surveying Works in extraction fossil	X		X		X	

7	First thematic seminar	X	X	X	X	X	X
8	Second thematic seminar	X	X	X	X	X	X
Research component							
1	Thesis Research Project / Prospectus- 1	X	X	X	X	X	X
2	Thesis Research Project / Prospectus- 2	X	X	X	X	X	X
3	Theoretical / experimental research / colloquium- 1	X	X	X	X	X	X
4	Theoretical / experimental research / colloquium- 2	X	X	X	X	X	X
5	Theoretical / experimental research / colloquium- 3	X	X	X	X	X	X
6	Thesis Completion, presentation	X	X	X	X	X	X

Program curriculum

№	Subject code	Training component	ESTS credits / hours	Hours						
				Lecture	Seminar (work in the group)	Practical	Laboratory	Mid-semester exam	Final exam	Independent work
1	**HEL10712G1**	Academic writing and scientific research methods	5/125	15	30			2	2	76
2	**EDU10912G1**	Teaching methods	5/125	15	30			2	2	76
3	**PHS43603G1**	Using geodesy	5/125	45				1	1	78
4	**PHS43803G1**	The mathematical processing theory of geodetic dimensions	5/125	45				1	1	78
5	**PHS43703G1**	mine-surveying Works in extraction fossil	5/125	45				1	1	78

Educational Program Supervisor/ Supervisors — Nodar Matiashvili

Head of Quality Assurance of the Faculty
Mining and Geology — Shalva Keletpritishvili

The Dean of Faculty of Civil Engineering — Anzor Abshilava

Accepted at
Quality Assurance Service of GTU — Irma Inashvili

Agreed with
Mining and Geology

At the Faculty Council Meeting

(№ 3) 30.03.2018
Chairman of the Faculty Board — Anzor Abshilava