



საქართველოს ტექნიკური უნივერსიტეტი
GEORGIAN TECHNICAL UNIVERSITY

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Master's Educational Program

Name of the program

გეოლოგია

Geology

Faculty

სამთო-გეოლოგიური

Mining and Geology

Program Supervisor

Professor Marine Mardashova

Qualification to award

Master of Geology in the specialization relevant to the selected Master theme:

- a) Master of Geology in Stratigraphy specialization
- b) Master of Geology in Mineralogy specialization
- c) Master of Geology in Ore and Deposits specialization

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

The language of teaching

Georgian

Precondition for admission to the program

The studying rights on a Master's program is entitled a person who has at least a bachelor's or equivalent academic degree and with knowledge the English language at level B2, that must be approved by appropriate Certificate from the Institution with a special Accreditation, or tests providing by the University. 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 a month before the examinations -<http://gtu.ge/study/index.php>. Admission to the Master's program without passing exams is possible according to the rule established by the Ministry

of Education and Science.

Description of the program

The program was developed according ECTS system, 1 credit equals to 25 hours, which involves both: contact and independent work hours. The distribution of credits is represented in the curriculum. The duration of the program is 2 years (4 semesters) and covers 120 credits (ECTS) Core courses - 75 credits and research component – 45 credits.

Research components are the following: master's research project / prospectus - 5 credits, theoretical / experimental research / colloquium - 10 credits, master's thesis - 30 credits.

The study process is as follows: The semester includes 20 weeks, from which the training process is 16 weeks. The XVII Week is dedicated to the thematic project and preparation for the exam, the final exam is conducted during the XVIII-XIX weeks. If necessary, an additional exam will be conducted during XX week.

The first academic-year learning process duration is 40 weeks (two semesters). Master learns 12 subjects. The lectures, seminars and practical exercises take 30 weeks (15 weeks per semester). Assessment of current activity - maximum 30 points.

During the semester taking one training course Master has to pass 1 intermediate exam - 30 points and one final exam - assessment is 40 points. The student is allowed to pass the final exam in case he has collected at least 30 points in the weekly and mid-exams.

Minimum positive assessment of the final/additional exams in the training component is 20 points. In order to legalize the final positive assessment, the student is obliged to pass the final exam and overcome the minimum competency limit 51. In case of accumulation more points, while the assessment on the final exam is insufficient (minimum 20 points), the student has the right to pass the exam once more. After Less than 5 days expiration, if necessary, XX week will be added for an additional exam. Master is allowed to pass the additional exam if he could not accumulate the required number of points (at least 51 points) after his final test, but in total number of points is from 41 to 50.

The duration of the second academic-year is 40 weeks (2 semesters). The Master of Science will pass through the third semester training courses according to themes ("stratigraphy and paleontology"; "applied mineralogy, petrology and geochemistry (gemology); "geological survey and searching of minerals"; "hydrogeology"). In the second academic year, out of the 60 credits, specialty subjects are awarded 20 credits, theoretical/experimental research/colloquium - 10 and research component - 30 credits (Masters thesis completion and presentation). The order concerning the Supervisor and the theme of thesis for Master's Degree will be issued by the Dean in accordance with Master's Personal Work Plan (Master's Personal Work Plan see: http://gtu.ge/Study-Dep/Files/Pdf/mag_deb_danarTi_3_Sd.pdf)

Research Component

Student fulfills the research component according to the established plan. Research component is carried out in GTU and/or in the proper organization (based on the signed agreement with GTU and the organization)

Master Research Project - prospectus

Master Research Project - the prospectus is the outcome of review and analysis of research, master's thesis preliminary findings. The student should complete prospectus in the second semester

Theoretical/experimental research - Colloquium

Theoretical /experimental study's main goal is to graduate students for independent work skills, a clear picture of the main tasks of a professional, modern research methods training, while working independently formulate and solve the issues.

Theoretical/experimental research - Colloquium

Theoretical/experimental study's main goal is to develop student's independent working skills, to create a clear picture for solution of the fields main tasks, to teach the modern research methods. To give ability to formulate issues raised during working process and solve the problems

Qualification thesis and defense

Qualification thesis is part a major of research component. The completed qualification thesis is the result of student's independent research. Qualification thesis should content an obtained from theoretical/experimental research.

Rule of Evaluation of the Masters Educational Program Research Component:
http://gtu.ge/pdf/DanarTi_4_mag_2017.pdf

Regulation of Georgian Technical University on Magistracy:

[http://gtu.ge/Study-Dep/Files/Pdf/magistr %20debuleba 21.11.14 SD.pdf](http://gtu.ge/Study-Dep/Files/Pdf/magistr_%20debuleba_21.11.14_SD.pdf)

Instructions for submitting the paper for the Master's degree:

http://gtu.ge/Study-Dep/Files/Pdf/mag_deb_sam_naSr_gafor_wesi_dan_5_SD.pdf

The purpose of the program

Applying modern methods of research in the field of geology independently; to create a comprehensive geological project using theoretical and practical knowledge; to develop Individual Work Skills; development of ability to work in field conditions of geologic profile and make decisions individually; development of ability for fast-access of scientific information and consequent planning and implementation of geological works; to draw geological maps, sections and chart deposits and ore manifestations; to process geological data, basing on the results make grounded conclusions and relevant decisions; to use mathematical methods for solving geological issues; planning, conducting and designing hydrogeological works; to use gemological methods of research for performing expert works.

Learning Outcomes and Competences (General and Sectoral)

Knowledge and understanding

- Deep and systematic knowledge of the field of geology;
- Ability to developed new, original ideas;
- Realization of the ways of solving of certain problems in Geology
- Knowledge of the principles and valuables of geology as a natural science;
- The ability to analyze and understand the main problems of geology.

Ability to use knowledge in practice

- Providing prospective areas and territories in terms of useful mineralization;
- Study of thin sections and polished by means of microscope;
- Identification of different types of minerals (solid, liquid) and determination and evaluation of resources; study the regularity of their distribution;
- Carry out paleontological-stratigraphic studies independently;
- Purposeful laboratory research of the stone material independently taken in field geologic conditions, generalization of the results, processing and making relevant well-reasoned conclusions;
- Draw up a project basing on the knowledge obtained in the disciplines of geology and submit it;
- Drawing geological maps and sections based on field geological works and laboratory studies;
- Performing expert and diagnostic works using modern geological laboratory methods.

Making judgments

- Establishing grounded conclusions based on critical analysis of the information obtained in the field of geology;
- Ability to make grounded conclusions based on field geological and laboratory studies,
- Giving reasonable advice on the use of natural resources when drawing up projects.

communication skill

- To write laconically, clearly, complying with grammatic rules and make presentation Ability to prepare a detailed written report on solving existing problems;
- Ability to communicate in native and foreign languages;
- Verbally transmit information to specialists and nonspecialists in Georgian and foreign languages;
- Ability to conduct public speeches

ability to learn

- Direct learning independently;
- Understanding the peculiarities of the learning process
- High level of strategic planning of the learning process;

- Determining the directions of enrichment of professional knowledge and experience

Values

Assess of one's own and others' attitudes to values and making their own contribution to the foundation of new values. Protection of norms of professional values, ethics and morals.

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. **Cooperative learning** is a learning strategy when each member of the group is obliged not only to examine himself but also to help his/her team-mate to study the subject better. Each member of the group works on the problem, until all of them master the issue;
3. **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.
4. **Problem based learning** is an activity which uses a specific problem as the initial stages of obtaining new knowledge and integration process;
5. **Case study** - the teacher will discuss concrete cases with the students, and study the issue thoroughly. For example, in the safety of engineering, it can be a case of a particular accident or disaster, in the political science - concrete, for example, the Karabakh problem (Armenia-Azerbaijan conflict) analysis and etc;
6. **Brain storming** – this activity implies to form and promote radically different opinion, idea on concrete issue/problem. This activity contributes to the development of a creative approach to the problem. Its application is effective in case of a large number of students and consists of several main stages:
 - Problem / issue determination in a creative perspective;
 - In a certain period of time, without criticism, note the ideas expressed by the listeners (mainly on the board);
 - Determination of assessment criteria to determine the establish the conformity of the idea with the aim of the research;
 - Assessment of selected ideas with predetermined criteria;
 - By process of elimination, distinguish those ideas that are most relevant to the issue.
 - Demonstration of the highest evaluation idea as the best way to solve the set problem.
7. **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;
8. **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;
9. **Analysis** helps us to divide the study material into constituent parts. This will simplify the detailed coverage of individual issues within a difficult problem.
10. **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;
11. **Verbal or orally transmitted.** Narration, talking and so forth belong to this activity. In this process the teacher orally transmittes and explains study material and the students actively perceive and learn it through listening, remembering and thinking.
12. **The script** implies the following activities: making extracts, records, notes, theses, abstract or essay and other
15. **Laboratory work** is more prominent and gives an opportunity to perceive the event or process. In the

laboratory, the student studies how to conduct the experiment. During laboratory studies, the student must acquire to organize, regulate and work on the device. The skills obtained in experimental training labs allow to understand theoretical material delivered on the lectures. It implies the following types of actions: setting up the tests, showing video material, as well as the material of dynamic nature, and so forth

16. **Practice (learning and work)** helps the student to enhance and strengthen the obtained knowledge. It develops the ability to use knowledge in practice, using the methods that are used to study the subject to solve problems. It combines all the methods of learning that help the student to develop practical skills. In this case, on the basis of the acquired knowledge the student independently performs a certain action, such as pedagogical practice, field work, etc.
17. **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.
18. **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.
19. **E-learning implies teaching** by internet and multimedia means. It includes all components of the teaching process (goals, content, methods, means, etc.), which are realized by specific means. E-training is of three types:
 - Full-time learning - when the teaching process takes place within the contact hours of the teacher and students, and the training material is delivered through electronic course;
 - Distance learning means conducting the study process without the physical attendance of the professor. The whole training course is carried out electronically;
 - Hybrid (full-time / distance) - the main part of the study is carried out distantly, and a small part is carried out within the contact hours.

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

Mining Geology enterprises, architecture and construction companies, Ministry of Defense, Ministry of Environmental Protection and Agriculture, Ministry of Finance, Ministry of Economy and Sustainable Development, Ecology and Environmental protection organizations, Oil and Gas exploration companies, corresponding profile educational institutions, Municipal jobs, Emergency Management Agency, Georgian Railway Department and Roads Department of Georgia.

Opportunity to continue learning

Doctoral Educational Programs

Human and material resources necessary for the implementation of the program

Bachelors educational program is provided by corresponding human and material resources. You can find additional information in the attached file.

Number of attached syllables: 41

Program Study Load

№	Course Title	Precondition of admit	ECTS Credits			
			I Year		II Year	
			Semester			
			I	II	III	IV
1	1.1 Business Communication (English) 1.2 Business Communication (French) 1.3 Business Communication (German) 1.4 Business Communication (Russian)	N/A	5			
2	Management of Geological field	N/A	5			
3	Genetic mineralogy	N/A	5			
4	Geology of the Caucasus	N/A	5			
5	Georgian solid minerals resources	N/A	5			
6	Hydrogeology of Georgia	N/A	5			
7	7.1 Theory and Practice of Specialized Translation (English); 7.2 Theory and Practice of Specialized Translation (Franch); 7.3 Theory and Practice of Specialized Translation (German); 7.4 Theory and Practice of specialized Translation (Russian)	N/A		5		
8	8.1 Paleontology of the Vertebral; 8.2 Paleontology of the invertebrates; 8.3 Stratigraphical research methods. Biostratigraphy	N/A		5		
9	9.1 Gem identification	N/A		5		
	9.2 The Special Course in Informatics	N/A				
10	10.1 Petrography of magmatic and metamorphic rocks and lithology; 10.2 Structural Peculiarities of the Earth Crust and Origin Mechanisms of Tectonic Elements; 10.3 Regularities of formation and spatial distribution of deposits	N/A		5		
11	11.1 Hydrodynamics; 11.2 Hydrogeochemistry; 11.3 Regional Hydrogeology			5		
Master of Geology in Stratigraphy specialization "Stratigraphy and Paleontology"s Course Title						
12	Quarternary geology	N/A			7	
13	Palaeoecology and tafonomy	N/A			7	
14	Paleobotany	Stratigraphical research methods. Biostratigraphy			6	

Master of Geology in Mineralogy specialization						
“Applied Minerals, Petrology and Geochemistry (Tutorial)”’s Course Title						
15	15.1 Gem processing and handing equipment; 15.2 Gemology	N/A			5	
16	Artistic design of jewelry items	N/A			5	
17	17.1 Jewelry and assessment of jewelry; 17.2 Construction and facing Stones;	Genetic mineralogy;			5	
	17.3 Art enamel	Genetic mineralogy N/A			5	
Master of Geology in Ore and Deposits specialization						
“Geological Survey and Search Mining”’s Course Title						
18	Modern methods of ore field and deposit structural study and mineralization prediction foundations				5	
19	laboratory methods of ore testing	Geology of the Caucasus			5	
20	Modern methods of geological shooting	N/A			5	
21	Search methods of mineral deposits	N/A			5	
Master of Geology in Ore and Deposits specialization						
“Hydrogeology”’s Course Title						
22	Innovative Methods of Hydrogeological Investigations	N/A			5	
23	Estimation and Protecting of Potable Water’s Quality	N/A			5	
24	Ground Waters of Georgia and their Use	Hydrogeology of Georgia			5	
25	Prospecting of Underground Water	N/A			5	
Per semester			30	25	20	0
Total:						
Research Component:						
	Master Research Project / Prospectus	N/A		5		
	Theoretical / experimental research / colloquium	Master Research Project / Prospectus			10	
	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 (French)	X	X		X	X	X
3	Business Communication (German)	X	X		X	X	X
4	Business Communication (Russian)	X	X		X	X	X
5	Management of Geological field	X	X	X	X		
6	Genetic mineralogy	X	X	X	X	X	
7	Geology of the Caucasus	X	X			X	
8	Georgian solid minerals resources	X	X			X	
9	Hydrogeology of Georgia	X	X	X			
10	Theory and Practice of Specialized Translation (English);	X	X	X	X		
11	Theory and Practice of Specialized Translation (Franch);	X	X	X	X		
12	Theory and Practice of Specialized Translation (German);	X	X	X	X		X
13	Theory and Practice of specialized Translation (Russian)	X	X	X	X		
14	Paleontology of the Vertebral	X	X	X		X	
15	Paleontology of the invertebrates	X	X	X		X	
16	Stratigraphical research methods. Biostratigraphy	X	X	X			
17	Gem identification	X	X			X	X
18	The Special Course in Informatics	X	X			X	
19	Petrography of magmatic and metamorphic rocks and lithology	X	X	X			
20	Structural Peculiarities of the Earth Crust and Origin Mechanisms of Tectonic Elements	X	X	X		X	
21	Regularities of formation and spatial distribution of deposits	X	X			X	
22	Hydrodynamics	X	X	X			
23	Hydrogeochemistry	X	X			X	
24	Regional Hydrogeology	X	X	X			
25	Quaternary geology	X	X	X			
26	Palaeoecology and tafonomy	X	X	X			
27	Paleobotany	X	X	X		X	
28	Gem processing and handing equipment	X	X	X			
29	Gemology	X	X			X	X
30	Artistic design of jewelry items	X		X			X
31	Jewelry and assessment of jewelry	X	X	X			

32	Construction and facing Stones	X	X			X	
33	Art enamel	X	X	X	X	X	X
34	Modern methods of ore field and deposit structural study and mineralization prediction foundations	X	X	X		X	
35	laboratory methods of ore testing	X	X			X	
36	Modern methods of geological shooting	X	X	X			
37	Search methods of mineral deposits	X	X	X			
38	Innovative Methods of Hydrogeological Investigations	X	X	X		X	
39	Estimation and Protecting of Potable Water's Quality	X	X	X		X	
40	Ground Waters of Georgia and their Use	X		X		X	
41	Prospecting of Underground Water	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	LEH12412 G1	Business Communication (English)	5/125			45				1	1	76
2	LEH12212 G1	Business Communication (French)	5/125			45				1	1	76
3	LEH12612 G1	Business Communication (German)	5/125			45				1	1	76
4	LEH12812 G1	Business Communication (Russian)	5/125			45				1	1	76
5	BUA72603 G1	Management of Geological field	5/125	15	30					1	2	77
6	PHS30203 G2	Genetic mineralogy	5/125	15		30				1	1	78
7	PHS30603 G1	Geology of the Caucasus	5/125	15		30				1	1	78
8	PHS39603G-1	Georgian solid minerals resources	5/125	15			30			1	2	77
9	PHS36203 G1	Hydrogeology of Georgia	5/125	15		30				1	1	78
10	LEH12512	Theory and Practice of Specialized	5/125	15		30				2	2	76

	G1	Translation (English);										
11	LEH12312 G1	Theory and Practice of Specialized Translation (Franch);	5/125	15		30				2	2	76
12	LEH12712 G1	Theory and Practice of Specialized Translation (German);	5/125	15		30				2	2	76
13	LEH12912 G1	Theory and Practice of specialized Translation (Russian)	5/125	15		30				2	2	76
14	PHS31803 G1	Paleontology of the Vertebral	5/125	15		30				1	1	78
15	PHS31603 G1	Paleontology of the invertebrates	5/125	15		30				1	1	78
16	PHS31303 G1	Stratigraphical research methods. Biostratigraphy	5/125	15		30				1	1	78
17	PHS38503 G1	Gem identification	5/125	15			30			1	2	77
18	ICT11403G 2	The Special Course in Informatics	5/125	15			30			1	1	78
19	PHS33803 G1	Petrography of magmatic and metamorphic rocks and lithology	5/125	30		15				1	2	77
20	PHS33103 G1	Structural Peculiarities of the Earth Crust and Origin Mechanisms of Tectonic Elements	5/125	15			30			1	2	77
21	PHS31103 G2	Regularities of formation and spatial distribution of deposits	5/125	15			30			1	2	77
22	PHS31103 G2	Hydrodynamics	5/125	15			30			1	2	77
23	PHS36503 G1	Hydrogeochemistry	5/125	15		30				1	1	78
24	PHS36303 G1	Regional Hydrogeology	5/125	15		30				1	1	78
25	PHS31203 G1	Quarternary geology	7/175	30		30				1	1	113
26	PHS31103 G1	Palaeoecology and tafonomy	7/175	30		30				1	1	113
27	PHS31703 G1	Paleobotany	6/125	30		30				1	1	88
28	PHS34203 G1	Gem processing and handing equipment	5/125	15			30			1	2	77
29	PHS38403 G1	Gemology	5/125	15			30			1	2	77
30	ART20405 G1	Artistic design of jewelry items	5/125	15	30					1	1	78
31	PHS34003 G1	Jewelry and assessment of jewelry	5/125	15			30	20		1	1	58
32	PHS34103 G1	Construction and facing Stones	5/125	15		30				1	2	77
33	EET16204 G2	Art enamel	5/125	15			30			1	1	78
34	PHS33203 G1	Modern methods of ore field and deposit structural study and	5/125	15			30			1	2	77

		mineralization prediction foundations										
35	PHS39003 G1	laboratory methods of ore testing	5/125	15			30			1	2	77
36	PHS70403 G1	Modern methods of geological shooting	5/125	15			30			1	2	77
37	PHS71903 G1-LB	Search methods of mineral deposits	5/125	15			30			1	2	77
38	PHS31203 G2	Innovative Methods of Hydrogeological Investigations	5/125	15			30			1	2	77
39	PHS31303 G2	Estimation and Protecting of Potable Water's Quality	5/125	15			30			1	2	77
40	PHS36403 G1	Ground Waters of Georgia and their Use	5/125	15	30					1	1	78
41	PHS30603 G2	Prospecting of Underground Water	5/125	15		30				1	1	78

Program Supervisor

Marine Mardashova

Faculty Mining-Geology

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-Geology

At the meeting of Faculty Board

30.03.2018

Chairman of the Faculty Board

Anzor Abshilava