



საქართველოს ტექნიკური უნივერსიტეტი
GEORGIAN TECHNICAL UNIVERSITY

Approved by Academic Council
of GTU on “21” “May”
2013 by Decree № 921

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Approved by Academic Counsel
of GTU on “18” “March” 2014
Decree №1115

Master’s Degree Program

Program Title

Management and Policy of Technology

Faculty

Power Engineering and Telecommunication

Program Supervisor

Associate Professor Aleksandre Abesadze

Awarded Qualification

Master of Business Administration in Technologies Management
Will be awarded in the case of passing not less than 120 credits of an educational program.

Language

English

Program Objective

The Master’s Program in Management and Policy of Technology will provide its graduates with the knowledge and skills to analyze complex sociotechnical problems, to structure and model their solutions, and to carry out the design and implementation of complex projects, programmes and policies in the technological area. The program integrates management knowledge with the fields of technology specialization, and comprises of an engineering elements, with courses in quantity analyzes, as well as courses in business planning, and economics. It emphasizes the integration of the different fields of management developing a general perspective to management problems and challenges. The program offers systematized analysis of the concepts and principles that are basic for an understanding of the technology management field. Course work relates theories and ideas to the operating practices and policies of production and operational issues at enterprises.

Programme Prerequisites

Applicant is admitted in compliance with the Georgian Legislation. Knowledge of language learning educational programme.

Learning Outcome/Competencies

- **Knowledge and understanding:** The program will equip graduates with knowledge to explore and understand technology as a corporate resource. It will show them how firms can use technology to design and develop products and services that maximize customer satisfaction on the one hand, while maximizing corporate productivity, profitability and competitiveness on the other. With the analytical, modeling, and problem solving skills, the program will provide its students with advanced technical knowledge in a particular engineering field, interesting for them. The core items of the program, consisting from questions of policy analyses and systems modeling, will give to its graduates the ability to solve large-scale and complex problems in the world of management armed with technical knowledge.
- **Applying knowledge:** Graduates will be equipped with methods, tools and techniques for creatively designing and assessing the impact of technical solutions in organizations, conducting research and analyzing of information by using the appropriate human and technological resources. They will look at both the physical technical system and at the organizational network in which a technical solution must be embedded. Graduates will be able to successfully apply knowledge in production and operational management strategy, to use tools and techniques for management decision-making and to conduct research using a variety of resources.
- **Making judgments:** Graduates can make judgments concerning using the abundant technological opportunities to affect the mission, objectives and strategies in their organizations. By analyzing of the potential of emerging technologies, they will be able to assess the commercial impact of their implementation in the organizational context of the firms. Graduates anticipating wider societal trends in which new technological production takes shape, can make decisions which markets the resulting products and services are to be sold.
- **Communication skills:** Graduates, look at both the physical system and the actors' network confronting technical challenges, management and ethical choices as well, can describe and discuss the elements of effective management in sphere innovative technologies and production operations; communicate effectively through both oral and written presentations; demonstrate the ability to work with and/or lead a diverse team toward goal accomplishment; work effectively as a team member through group projects and problem analysis; develop and/or implement a plans, as well as develop conclusive report.
- **Learning skills:** Graduates can take responsibility for their own learning; be able to learn from experiences gained in different of technology management; take into account prior knowledge, available time and the learning opportunities; avoid learning outcomes that are too broad or too narrow in scope; demonstrate an understanding of concepts and methods pertaining within a field of technology management; learn to manage learning tasks independently; learn to self-evaluate and take responsibility for continuing academic/professional development.
- **Values:** Equipped with unique combination of technical, analytical and management skills, graduates will be ready to play leading roles at all levels of contemporary society, solving complex problems that cannot be solved by technology alone. They will be aware the necessity of crossing the boundaries of technical and non-technical discipline and the intersection of technology and public policy. In professional and societal relations, the graduates will rate highly respectful attitudes

between colleagues, friendly climate for cooperation and collaboration, ethical behavior, self-responsibility and accountability, discipline and determination, critical thinking, self-honesty and self-understanding.

Forms and Methods of achieving the learning outcomes

lecture Seminar (working in the group) practical classes laboratory classes practice
 course work/project independent work

Forms and Methods of achieving the learning outcomes are included to the Educational Programme and can be found via the following link: <http://www.gtu.ge/quality/pdf/sc.pdf>

The most widely spread teaching and learning methods as well as their definitions are given below. A teacher should choose the proper method according to the concrete aim and problem.

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. **Cooperative teaching** is a teaching strategy in the process of which each member of a group not only has to learn the subject himself, but also to help his fellow-student to learn it better. Each member of the group works at the problem until all of them master the issue.
3. **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.
4. **Problem-based learning (PBL)** is a method which uses a concrete problem as the initial stage both for acquiring new knowledge and integration process.
5. **Heuristic method** is based on the step-by-step solving of a given problem. It is realized by means of independent fixing of the facts in the teaching process and determining the ties among them.
6. **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).
7. **Brain storming** – this method implies forming and presenting as many radically different ideas and opinions on a given topic as possible. This method sets conditions for developing a creative approach towards a problem. This method is effective in a large group of students and consists of the following stages:
 - using a creative approach for defining a problem/issue;
 - for a certain period of time listing (mainly on the blackboard) students' ideas on the problem without any criticism;
 - determining the evaluation criteria for stating the correspondence of the idea to the aim of the research;
 - evaluating the chosen ideas according to the previously determined criteria;
 - selecting the ideas that most of all correspond to the given issue by applying the method of exclusion;
 - revealing the best idea for solving the given problem.
8. **Role-playing games and simulations** – games played according to a previously prepared

scenario enable students to estimate the problem from different standpoints. They help students to form alternative points of view. Such games as well as discussions help students to develop skills of independently expressing their own ideas and participating in discussions.

9. **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.

10. **Inductive method** determines such a form of conveying any kind of knowledge when in the process of learning the train of thought is oriented from facts towards generalization, i.e. while presenting the material the process goes from concrete to general.

11. **Deductive method** determines such a form of conveying any kind of knowledge which presents a logical process of discovering new knowledge on the basis of general knowledge, i.e. the process goes from general to concrete.

12. **Analytical method** helps us to divide the whole teaching material into constituent parts. In this way the detailed interpretation of separate issues within the given complex problem is simplified.

13. **Synthetic method** implies forming one issue from several separate ones. This method helps students to develop the ability of seeing the problem as a whole.

14. **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.

15. **Written method** implies the following forms of activity: copying, taking notes, composing theses, writing essays, etc.

16. **Laboratory method** implies the following forms of activity: conducting experiments, showing video materials, etc.

17. **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.

18. **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.

19. **Activity-oriented teaching** implies teachers' and students' active involvement in the teaching process, when practical interpretation of the theoretical material takes place.

20. **Designing and presenting a project.** While designing a project a student applies the knowledge and skills he has acquired for solving a problem. Teaching by means of designing projects increases students' motivation and responsibility. Working on a project involves the stages of planning, research, practical activity and presenting the results according to the chosen issue. The project is considered to be completed if its results are presented clearly, convincingly, and correctly. It can be carried out individually, in pairs or in groups; also, within the framework of one or several subjects (integration of subjects); on completion the project is presented to a large audience.

21. **E-learning** implies using the Internet and multi-media means in the process of teaching. It comprises all the components of the teaching process (aims, content, methods, means, etc.); the realization of these components takes place through specific means. There are three types of e-learning:

□ Full-time tuition; when the teaching process takes place during teachers' and students' contact hours, and conveying the teaching material occurs through an e-course;

- Distant learning implies conducting the teaching process in the absence of a professor. The teaching course is conducted distantly; in the e-format;
- Hybrid (full-time/distant) – teaching is mainly conducted distantly but a certain part of it is conducted during contact hours.

Student’s Knowledge Assessment

Assessment is based on a 100 point grading scale.

Positive assessment is:

- (A) - excellent - 91% and more of the maximum grade;
- (B) - very good - 81-90% of the maximum grade;
- (C) - good - 71-80% of the maximum grade;
- (D) - satisfactory - 61-70% of the maximum grade;
- (E) - enough - 51-60% of the maximum grade;

Negative assessment is:

- (FX) - not passed - 41-50% of the maximum grades. It means that a student needs more individual work, and is given one more possibility of make up;
- (F) - failed - 40% and less of the maximum grade. It means that work performed by a student was not enough and the subject should be learnt from the beginning;

For assessment methods, criteria and scales please refer to the following link:

<http://www.gtu.ge/quality/axali/shefasebisforma.pdf>.

For assessment Research Components please refer to the following link:

http://www.gtu.ge/study/scavleba/samag_Sefas.pdf

Spheres of Employment

The Program graduates typically will find employment as consultants or project managers with international engineering, consulting and banking firms, and as strategic advisors to national governments and international organizations. Other will pursue advanced degrees or remain in academia. Most of them can work as technology managers, analysts of technological markets and entrepreneurs in highly technology-based, internationally-oriented and competitive environments for a variety of industrial sectors.

Possibilities for further continues education

Doctoral educational programs

Required human and material resources

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

The number of attached syllabi: 22

Educational Programme Scheme

	Educational and Research Components	I Year	II Year	Total
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		I Semester	II Semester	III Semester	IV Semester	Credits
	Educational Component					
1	Educational Courses	30	25	20		75
	Research Component					
2	Master's Research Project/Prospectus		5			5
3	Theoretical/Experimental Research/Colloquium			10		10
4	Master's Thesis Fulfillment and Defense				30	30
ECTS	Semester	30	30	30	30	120
	Year	60		60		120

Program in total

Nº	Course code	Course	Prerequisite	ECTS Credits			
				I Year		II Year	
				Semester			
				I	II	III	IV
1	SUDVE02	Sustainable Development for Engineers	No preconditions	5			
2	MEC1102	Managerial Economics	No preconditions	5			
3	MANEN02	Management in Engineering	No preconditions	5			
4	DMQAM02	Decision Making and Quantitative Analysis for Management	No preconditions	5			
5	MANCA02	Managerial and Cost Accounting	No preconditions	5			
6		Elective course	No preconditions	5			
7	NTREE02	New Technologies for Renewable Energy and Energy Efficiency	No preconditions		5		
8	SOMCA02	Strategic Operation Management for Competitive Advantage	No preconditions		5		
9	PRMET02	Project Management for Engineering and Technology	No preconditions		5		
10	INFTM02	Information Technologies for Management	No preconditions		5		
11		Elective course	No preconditions		5		
12	SPCQM02	Statistical Process Control and Total Quality Management	No preconditions			6	
13	FMCOM02	Fundamentals of Modern Communication	No preconditions			5	
14	CMHRM08	Contemporary Methods of Human Resources Management	No preconditions			4	

Nº	Course code	Course	Prerequisite	ECTS Credits			
				I Year		II Year	
				Semester			
				I	II	III	IV
15		Elective course	No preconditions			5	
16		Theoretical/Experimental Research/Colloquium	No preconditions		5		
17		Master's Thesis Fulfillment and Defense	Theoretical/Experimental Research/Colloquium			10	
18		Master Thesis	Master's Thesis Fulfillment and Defense				30
Per semester				30	30	30	30
Per year				60		60	
Total				120			

Elective courses

Nº	Course code	Course	Prerequisite	ECTS Credits
1	JACD08	Job Analysis and Competency design	No preconditions	5
2	MNFEN02	Manufacturing Engineering	No preconditions	5
3	TMAMS05	Material science	No preconditions	5
4	CONSY08	Control Systems	No preconditions	5
5	THMM005	Theory of Mechanisms and Machines	No preconditions	5
6	FUNME02	Fundamentals of Mechatronics	No preconditions	5
7	APELE02	Applied Electricity for Engineers	No preconditions	5
8	RWPRA02	Radiowave propagation and antennas	No preconditions	5
9	EMCOM02	Electromagnetic compatibility	No preconditions	5
10	ELEC002	Electromagnetic ecology	No preconditions	5

Map of study results

Nº	Course code	Course	Knowledge and understanding	Applying Knowledge	Making judgments	Communication skills	Learning skills	Values
1	SUDVE02	Sustainable Development for Engineers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				

2	MEC1102	Managerial Economics	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
3	MANEN02	Management in Engineering	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					
4	DMQAM02	Decision Making and Quantitative Analysis for Management	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			
5	MANCA02	Managerial and Cost Accounting	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			
6	NTREE02	New Technologies for Renewable Energy and Energy Efficiency	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			
7	SOMCA02	Strategic Operation Management for Competitive Advantage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
8	PRMET02	Project Management for Engineering and Technology	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			
9	INFTM02	Information Technologies for Management	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
10	SPCQM02	Statistical Process Control and Total Quality Management	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
11	FMCOM02	Fundamentals of Modern Communication	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					
12	CMHRM08	Contemporary Methods of Human Resources Management	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
13		Research component							
14		Master Thesis							
Elective course									
15	JACD008	Job Analysis and Competency design	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
16	MNFEN02	Manufacturing Engineering	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					
17	TMAMS05	Material science	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
18	CONSY08	Control Systems	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
19	THMM005	Theory of Mechanisms and Machines	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			
20	FUNME02	Fundamentals of mechatronics	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		
21	APELE02	Aplied Electriscity for Engineers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					
22	RWPA002	Radiowave propagation and antennas	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	
23	EMCOM02	Electromagnetic compatibility	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
24	ELEC002	Electromagnetic ecology	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	

Program curriculum

Nº	Course code	Course	Hours										
			ECTS Credit\ Hour	Lecture	Seminar (working in the group)	Practice	Laboratory Work	Field Work	Course Work/Project	Independent Work	Interin assessment	Examination	Consultation
1	SUDVE02	Sustainable Development for Engineers	5/135	15		30				72	2	1	15
2	MEC1102	Managerial Economics	5/135	15		30				72	2	1	15
3	MANEN02	Management in Engineering	5/135	15		30				72	2	1	15
4	DMQAM02	Decision Making and Quantitative Analysis for Management	5/135	15			30			72	2	1	15
5	MANCA02	Managerial and Cost Accounting	5/135	15		30				72	2	1	15
6	NTREE02	New Technologies for Renewable Energy and Energy Efficiency	5/135	15			30			72	2	1	15
7	SOMCA02	Strategic Operation Management for	5/135	15	30					72	2	1	15

№	Course code	Course	Hours											
			ECTS Credit\ Hour	Lecture	Seminar (working in the group)	Practice	Laboratory Work	Field Work	Course Work/Project	Independent Work	Interin assessment	Examination	Consultation	
		Competitive Advantage												
8	PRMET02	Project Management for Engineering and Technology	5/135	15				30			72	2	1	15
9	INFTM02	Information Technologies for Management	5/135	15				30			72	2	1	15
10	SPCQM02	Statistical Process Control and Total Quality Management	6/162	15	30						99	2	1	15
11	FMCOM02	Fundamentals of Modern Communication	5/135	15			30				72	2	1	15
12	CMHRM08	Contemporary Methods of Human Resources Management	4/108	15			15				60	2	1	15
13		Research component	15/305											
14		Master Thesis	30/540											
Elective course														
15	JACD008	Job Analysis and Competency design	5/135	15			30				72	2	1	15
16	MNFEN02	Manufacturing Engineering	5/135	15			30				72	2	1	15
17	TMAMS05	Material science	5/135	15	15						87	2	1	15
18	CONSY08	Control Systems	5/135	15	30						72	2	1	15
19	THMM005	Theory of Mechanisms and Machines	5/135	15			15	15			72	2	1	15
20	FUNME02	Fundamentals of mechatronics	5/135	15				15			87	2	1	15
21	APELE02	Aplied Electriscity for Engineers	5/135	15				30			72	2	1	15
22	RWPRA02	Radiowave propagation and antennas	5/135	15			15	15			72	2	1	15
23	EMCOM02	Electromagnetic compatibility	5/135	15			30				72	2	1	15
24	ELEC002	Electromagnetic ecology	5/135	15			30				72	2	1	15

Educational Program Supervisor

Aleksandre Abesadze

The Head of the Quality Assurance Service at the
Faculty of Power Engineering and Telecommunication

Nikoloz Abzianidze

The Dean of the Faculty

Gia Arabidze

Updated and Approved
on the Counsel of the Faculty
Power Engineering and Telecommunication
30.01.2014; Record № 2

Gia Arabidze

Agreed with
Quality Assurance Service of GTU

Giorgi Dzidziguri