



Master's Educational Program

Name of the program

ენერგეტიკა და ელექტრონჟინერია

Energy and Electrical Engineering

Faculty

ენერგეტიკისა და ტელეკომუნიკაციის

Power Engineering and Telecommunication

Program manager(s)

Professor Tengiz Jishkariani

Qualification to be awarded

Master of Energy and Electrical Engineering with the specialization of the relevant chosen master topic:

- Master of Energy and Electrical Engineering with Thermal Power Energy Specialty
- Master of Energy and Electrical Engineering with Hydro Power Energy Specialty
- Master of Energy and Electrical Engineering with Electric Energy Specialty
- Master of Energy and Electrical Engineering with Electric Technique and Industrial Electronic Specialty
- Master of Energy and Electrical Engineering with Electric mechanic Specialty

Shall be awarded in case of performing no less than 120 credits of the educational program

Language of Instruction

Georgian

Prerequisite for admission to the program

A student with a Bachelor's or equivalent academic degree has the right to study at the master's program, who will enroll in the program on the basis of the results of the Master's Exams (Centralized Entrance Master's Exams and exam defined by GTU). Examination tasks/tests will be posted on GTU Teaching Department website <http://www.gtu.ge/study/index.php> at least one month before the exams. Enrollment in the program without

passing the Master's Exams is possible in accordance with the rule established by Georgian Legislation.

Description of the program

Master's program "Energy and Electrical Engineering" covers 120 credits and lasts for 2 years (4 semesters). The teaching component of the program is 75 credits. 5 credits from 75 credits are provided in Business Communications (in English, French, German and Russian); 5 - Credit for technical theory and practice, also in English, French, German and Russian languages. 5 credits are given to managerial subjects. The remaining 60 credits are optional specialization master's topics that are sorted by subdivisions. 45 credits are allocated for research component, in particular: Master's research project / 5 credits for prospectus, and theoretical / experimental research / colloquium - 10 credits. 30 credits are allocated for completion and defense of qualification work.

The program is elaborated with ECTS system, 1 credit equals 25 hours, which means the contact and independent work hours. The credit distribution is presented in the program curriculum. The teaching semester covers 20 weeks, from which a classroom classes are conducted for 15 weeks and one week is allocated to the midterm exams. The XVII week is a period of preparation for final exams, which are held on the XVIII-XIX week. XX week, if necessary, is allocated to add additional exams.

Teaching component

The first semester includes 5-credit 6 teaching courses; Five of them are compulsory and one is the optional course: a student can select one of the three offers.

The second semester covers 5-credit five compulsory teaching courses. In the same semester, the Master student completes Master's Research Project / Prospectus (5 credits)

The third semester covers 4 compulsory 5-credit teaching courses, in the same semester, the Master student completes Theoretical / Experimental Research / Colloquium (10 credits).

The maximum score of midterm assessment is 60 points, from which: the maximum score of the midterm exam is 30 points, minimum competence limit - 15 points, maximum score of current activity is 30 points, minimum competence limit - 15 points; The maximum score of the final / additional exam is 40 points, minimum competence limit - 20 points. The additional exam is conducted after the final examination, interval is at least 5 days.

Research component

Compulsory Elements of the Program Research Component: Master Research Project / Prospectus (5 credits), Theoretical / Experimental Research / Colloquium (10 credits), Master's thesis completion and defense (30 credits). Master student completes the research component according to the topic of the master's thesis. All elements of the research component are evaluated once with 100 points.

Master's Research Project / Prospectus represents the outcome of research and analysis, the preliminary draft of the master's thesis that the Master student must complete in the second semester. Work on Prospectus is conducted in the format of consultations with the supervisor and independent work of the Master Student.

The assessment criteria and scales are given in GTU's evaluation guidelines for the Master's Educational Program: http://gtu.ge/pdf/magistraturis_danarti_4_Sefasebis_wesi.pdf

Master student starts working on **the Theoretical / experimental research / colloquium** in the second year of the course, in the third semester. In the scope of the research he/she is obliged to prepare one colloquium. The work to be presented on the colloquium is part of a master's thesis. Colloquium covers the presentation of the material related to the master topic. The main purpose of the colloquium is systematization of Master's knowledge and presentation of the results of the work, elaboration of the ability to communicate with the professional community.

The qualification work is a major part of the research component. The completed qualification work should depict the result of independent research work. It should reflect in the theoretical / experimental research results. The public defense of the completed qualification work is necessary before the examination committee comprising 5-7 members, in the second year of study, in the fourth semester. The evaluation criteria and scales of the evaluation of colloquium, qualification work, and detailed information on the Rule of Evaluation of the Master's Education Program Research Component are given in the GTU website in the Rule of Evaluation of the Master's Educational Program:

http://gtu.ge/pdf/magistraturis_danarti_4_Sefasebis_wesi.pdf

Instruction of master's thesis design for getting Master's Degree is given on GTU website:

http://gtu.ge/pdf/magist_debuleba_dan5_2017_SD.pdf

Decree on the title of the Master's thesis and Master's supervisor is issued by the Dean in accordance with Master's Personal Work Plan: http://gtu.ge/pdf/mag_danarti_3.pdf.

Program Credit Capacity

120 credits

The purpose of the program

The master's program aims: to prepare the specialists with wide and enhanced knowledge required for organizational-normative and industrial-technological activities, who meet the requirements of the market in the fields of energy and electrical engineering and subfields, in particular: thermal energy, hydro power engineering, electric power engineering, electromechanics, electro-technics and electronics. The program gives students the fundamental knowledge in the energy production, transmission, distribution and transformation technologies. Develops the skills of quantitative assessments, energy problems analysis, forecasting, capital investment and cost calculation, environmental impact assessment, effective planning and management.

Learning outcomes / competences (general and sectoral)

Knowledge and understanding - has deep and systematic knowledge based on research in energy and electrical engineering. Apprehends the specific problems peculiar to the field and subfield and the ways of their solution. Knows - issues of utilization of hydro resources / non-traditional renewable energy sources; Technologies of transforming hydro / thermal energy into mechanical and electrical energy; Problems of transmission and distribution of electrical / thermal energy; Principles of action of energy systems, prospects of technical development and peculiarities of functioning; Designing, installation, exploitation and repair of modern energy technological appliances and complexes; International standards, regulations, normative and other manual materials relevant to the professional activities; Basics of management and marketing of energy and electrical engineering;

Ability to apply knowledge in practice – Has ability to: act in a new, unforeseen and multidisciplinary environment; To solve a complex problem independently, in the original way; Control and optimize working regimes of existing equipments and systems in the field and subfields of energy and electrical engineering (thermal energy / hydro energy / electric power engineering / electromechanics / electro-technics and electronics); Model the processes in exploitation and emergency situations, calculation-assessment of work sustainability based on modern methods. Plan and implement tasks independently on a professional level; Process the research and observation results, understand and analyse the data given in the literature; Develop and implement entrepreneurial projects.

Making Judgement – Has ability to: provide a critical approach to information innovative synthesis by using the latest data in the field and subfields of energy and electrical engineering (thermal energy / hydro energy / electric power engineering / electromechanics / electro-technics and electronics). Analyse results obtained based on fundamental and applied researches. Develop generalized versions of solving problems, caused by unsustainable work of energy system and power engineering technological appliances, their analysis, prediction of results, making solutions and realization of project. Develop an opinion based on incomplete and limited information, define problems.

Communication skills – Has ability to: communicate in native and foreign languages on the processes happening in the field and subfields of energy and electrical engineering at academic and professional level.

Conduct bibliographic works using modern information technologies; Present the results of the conducted work in the form of reports, summaries, article: prepare detailed written report; Transmit information to specialists and non-specialists in the oral form.

Learning skills – Study independently, apprehend the peculiarities of the learning process and plan strategically. Determine the directions of his/her learning direction to enhance professional knowledge and experience; Is prepared to pursue studies in doctoral studies in energy and related directions.

Values – evaluate his/her and other person's attitude towards values and contribute to the establishment of new values; Protect accepted norms of professional values, ethics and morals. Knows the ethical and legislative norms on the basis of which he/she should act in the society and in the company. Is responsible for ecological problems of environmental protection.

Forms and methods of learning outcomes

Lecture Seminar (team working) Practice work Laboratory Practice
 Course paper / project Independent work Master's thesis Consultation

Based on the specificity of the particular course, the appropriate activities of teaching-learning methods are used that are depicted in the course programs (syllabus):

1. **Discussion / debate** - one of the most common methods of interactive teaching. Discussion process increases the quality and activity of student engagement. Discussions can be overcome in the debate and this process is not limited to the questions asked by the teacher. It develops a student's ability to reason and to justify his opinion.
2. **Cooperative Teaching** – Is a teaching strategy in which each group member is obliged not only to study for himself, but also to help his team members to understand the subject better. Each member of the group works on the problem, until all of them master the subject.
3. **Collaborative Work** - This method involves dividing students into groups and giving them instruction. The group members work on the issue individually and in parallel share their opinions with other members of the group. Depending on the set objective, it is possible to divide the functions among the members of the Group during work process. This strategy ensures maximum involvement of all students in the learning process.
4. **Brain storming** - This activity promotes formation and expression of the radically different opinion, idea within the premises of the topic. The mentioned activity contributes to the development of a creative approach to the problem. Use of the method is effective in the existence of 2 large number groups of students and consists of several main stages:
 - Determining problem / issue in creative perspective; Making note without criticizing the ideas expressed by the listeners in a certain period of time (mainly on the board);
 - Determining assessment criteria to state the relevance of the idea with the aim of the research;
 - Assessing selected ideas according to the predetermined criteria;
 - Selecting the ideas that are most relevant to the issue, by the method of exclusion;
 - Identifying the idea having the highest assessment, as the best means revealing the solution of the problem.
5. **Demonstration Method** - This method involves visual representation of information. In terms of achieving the result it is quite effective. In many cases, it is best to provide the materials simultaneously with audio and visual means. The study material can be demonstrated by both - the teacher and the student. This method helps to visualize the different levels of learning material, to specify what students will have to do independently; at the same time, this strategy will visually represent the essence of the issue/problem. Demonstration may be simple.
6. **The induction method** determines the form of transmission of any knowledge when the process of thinking in the course of the study is to generalize the facts, or while transmitting the material the process goes from the particular to the general one;
7. **The deduction method** determines the form of transmission of any knowledge, which is a logical process of finding new knowledge based on general knowledge, i.e. the process is going from general to particular.
8. **Analysis Method** - Helps dissolve the learning material as part of one whole component. This will simplify detailed coverage of individual issues within a difficult problem.
9. **Synthesis** implies the creation of one whole by grouping separate issues. This activity contributes to the development of the ability to see the problem as a whole;

10. **Verbal or oral method** - Narration, speaking, etc. belong to this activity. In this process, the teacher represents the teaching material verbally, explains the teaching material, and the students perceive and acquire the material by listening, remembering and apprehending.
11. **Explanatory method** – is based on the discussion around the given issue, a teacher gives particular example being discussed in details within framework of the topic.
12. **Elaboration and presentation of the project** - While working on the project, the student uses acquired knowledge and skills to solve the real problem. The project enhances student motivation and responsibility. The work on the project involves planning, research, practical activity and the stages of presenting the results in accordance with the selected issue. The project is considered to be implemented if its results are presented in a clear and convincing way. It can be performed individually, in couples or in groups. At the same time the project can be made within the frames of one subject or several subjects (integration of the subjects); After completion, the project will be presented to a wide audience.

Student knowledge assessment system

Assessment 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 the subject and is given the right to take the additional exam once 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

With the knowledge acquired within the framework of the program, the graduates will be able to work successfully and be promoted in industrial and commercial enterprises, public organizations, governmental structures, consulting firms and agencies, international organizations, energy companies, particularly: thermal and hydropower plants, electrical systems; Distribution companies; Water Supply Systems of Town and District Centers; Metropolitan and Railway; Electrical engineering complexes; Diagnostics and certification centers for energy equipment; Agricultural product processing enterprises; Natural Gas Supply Systems; Exploitation and service centers of thermal energy systems; car gas compressor stations; Gas pipeline systems for oil and gas products and their pumping and compressor stations; Installation of power grid, repair, construction firms and manufacturing plants.

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 syllabuses. The program is provided with relevant human and material resources, CVs and additional information in the attached documentation. The program is provided with material-technical resources (the document confirming the material resource is attached): Department of Industrial Innovations and Operations Management (8th building, GTU), teaching classrooms, computer classes, GTU library.

The research works will be conducted in the laboratories and research centres of the Faculty:

- Laboratory of renewable energy and energy efficient technologies;
- Training Center "Schneider Electric-Telasi";
- Study-scientific laboratory of high-temperature thermoelectric equipment;
- Scientific-Engineering Center of Electro-technical Equipment, Complexes and Electrical Supply;
- Teaching-Scientific Center of Technical Diagnostics and Energy Efficiency of power engineering equipment;
- Scientific-Engineering Center of Electric Power Engineering;
- Scientific- Research Center of Bioenergy Technologies.

The program will be implemented by the following academic staff:

1. Gia Arabidze, Professor, Doctor of Technical Sciences, The Thermal Energy and Energy Efficiency;
2. Giorgi Gigineishvili, Associate Professor, Candidate of Technical Sciences, Thermal Energy and Energy Efficiency;
3. Evtikh Machavariani, Professor, Candidate of Technical Sciences, Thermal Energy and Energy Efficiency;
4. Ketevan Vezirishvili-Nozadze, Professor, Doctor of Technical Sciences, Thermal Energy and Energy Efficiency;
5. Luiza Papava, Associate Professor, Academic Doctor, Thermal Energy and Energy Efficiency;
6. Badri Chkhaidze, Associate Professor, Candidate of Technical Sciences, Thermal Energy and Energy Efficiency;
7. Marina Razmadze, Associate Professor, Candidate of Technical Sciences, Thermal Energy and Energy Efficiency;
8. Omar Kighuradze, Professor, Doctor of Technical Sciences, Thermal Energy and Energy Efficiency;
9. Nodar Kevkhishvili, Professor, Candidate of Technical Sciences - Thermal Energy and Energy Efficiency;
10. Levan Robakidze, Associate Professor, Candidate of Technical Sciences, Thermal Energy and Energy Efficiency;
11. Tengiz Jishkariani, Professor, Doctor of Technical Sciences - Thermal Energy and Energy Efficiency;
12. Temur Mikiashvili, Professor, Doctor of Technical Sciences - Thermal Energy and Energy Efficiency;
13. Guram Makharadze Professor, Candidate of Technical Sciences – Electric Power Engineering and Electro-mechanics;
14. Natia Arabidze, Associate Professor, Candidate of Technical Sciences, Thermal Energy and Energy Efficiency;
15. David Lolua, Associate Professor, Candidate of Technical Sciences, Thermal Energy and Energy Efficiency;
16. Shalva Nachkebia, Professor, Doctor of Technical Sciences, Electric Power Engineering and Electro-mechanics;
17. Mikheil Rukvadze, Professor, Candidate of Technical Sciences, Electric Power Engineering and Electro-mechanics;
18. Ramin Chikhladze, Professor, Candidate of Technical Sciences, Electric Power Engineering and Electro-mechanics;
18. Yakir Bijamov, Professor, Doctor of Technical Sciences, Electric Power Engineering and Electro-mechanics;
19. Demur Kokhraidze, Professor, Candidate of Technical Sciences, Electric Power Engineering and Electro-mechanics;

20. Temur Bodokia, Professor, Candidate of Technical Sciences - Electric Power Engineering and Electro-mechanics;
21. Davit Japaridze, Professor, Candidate of Technical Sciences - Management of Fuel- Energy Fields;
22. Maka Gudiashvili, Associate Professor, Candidate of Economics, Management of Fuel- Energy Fields;
23. Nanuli Samsonia, Professor, Candidate of Economics, Management of Fuel- Energy Fields;
24. Lali Bochorishvili, Professor, Candidate of Economics, Management of Fuel- Energy Fields;
25. Simon Nemsadze, Professor, Candidate of Technical Sciences, Electrotechnics and electronics;
26. Tengiz Museliani, Professor, **Candidate of** Technical Sciences, Electrotechnics and electronics;
27. Badur Chunashvili, Professor, Doctor of Technical Sciences, Power Consumption Technologies;
28. Konstantine Tsereteli, Professor, Candidate of Technical Sciences, Power Consumption Technologies;
29. Archil Vashakidze, Professor, Doctor of Technical Sciences, Power Consumption Technologies;
30. Yuri Lomidze, Professor, Doctor of Technical Sciences - Hydro-energy and Major Pipeline Systems.
31. Grigol Khelidze, Professor, Doctor of Technical Sciences - Hydro-energy and Major Pipeline Systems.
32. Lena Shatakishvili, Associate Professor, Candidate of Technical Sciences - Hydro-energy and Major Pipeline Systems.
33. Dimitri Namgaladze, Professor, Doctor of Technical Sciences - Hydro-energy and Major Pipeline Systems.

Attached syllabus number: 119

Program subjects:

№	Subject	Precondition to admission	ECTS credits			
			I Year		II Year	
			Semester			
			I	II	III	IV
Subject of “Thermal Energy” the Specialization of “Thermal Energy”			30	25	20	
1	Business Communication (English),	N/A	5	-	-	-
	Business Communications (French),					
	Business Communication (German),					
	Business communication (Russian).					
2	Theory and practice of field text translation (English),	N/A	-	5	-	-
	Theory and Practice of French Text Translation (French),					
	Theory and Practice of Field Text Translation (German),					
	Theory and Practice of Field Text Translation (Russian)					
3	Entrepreneurial and Technological Innovation Management (optional)	N/A	5	-	-	-
	Prepare and Implement Investment Projects in Energy (optional)					
	Business Processes Engineering and Management					

	(optional)					
4	Thermodynamic analysis of energy equipment	N/A	5	-	-	-
5	Thermal mass transmission processes and equipment in power engineering	N/A	5	-	-	-
6	Modern technologies for complex use of solid fuels	N/A	5	-	-	-
7	Cogeneration stations in power engineering	N/A	5	-	-	-
8	Management and forecasting of organizational-economic systems -1	N/A	-	5	-	-
9	Modern technologies for generation of electric and thermal energy	N/A	-	5	-	-
10	Planning and exploitation of thermal systems	N/A	-	5	-	-
11	Engineering experiments and measuring instruments	N/A	-	5	-	-
12	Low potential heat sources	N/A	-	-	5	-
13	Environmental Protection Technologies in power engineering	N/A	-	-	5	-
14	Thermal transmission intensification methods	N/A	-	-	5	-
15	Analytical methods of thermal conductivity theory	N/A	-	-	5	-
Subject load of “Thermal Energy” specialization Master topic “Power Engineering and Environment”			30	25	20	
1	Business Communication (English),	N/A	5	-	-	-
	Business Communications (French),					
	Business Communication (German),					
	Business communication (Russian).					
2	Theory and practice of field text translation (English),	N/A	-	5	-	-
	Theory and Practice of French Text Translation (French),					
	Theory and Practice of Field Text Translation (German),					
	Theory and Practice of Field Text Translation (Russian)					
3	Industrial and Technological Innovations Management (optional)	N/A	5	-	-	-
	Prepare and Implement Investment Projects in Power Engineering (optional)					
	Business Processes in Power Engineering and Telecommunication (optional)					
	Control System Engineering (Optional)					
4	Legal basis for energy business	N/A	5	-	-	-
5	Power Engineering and public environment	N/A	5	-	-	-
6	Power Engineering and climate change	N/A	5	-	-	-

7	Principles of Power Engineering Management	N/A	5	-	-	-
8	Renewable energy sources	N/A	-	5	-	-
9	Energy Audit in the Household Sector	N/A	-	5	-	-
10	Power Engineering security management	N/A	-	5	-	-
11	Management and forecasting of organizational-economic systems -1	N/A	-	5	-	-
12	International Law on Power Engineering and Environment	N/A	-	-	5	-
13	Energy Audit in the Industrial Sector	N/A	-	-	5	-
14	Clean Development Mechanism Projects	N/A	-	-	5	-
15	Energy efficiency and environmental protection	N/A	-	-	5	-
Subejcts of Master topic “Hydro Turbines, Pumps and Other Hydro Energy Devices of Hydro power plants” in the specialization of “Hydro Energy”			30	25	20	
1	Business Communication (English),	N/A	5	-	-	-
	Business Communications (French),					
	Business Communication (German),					
	Business communication (Russian).					
2	Theory and Practice of Technical Translation (English),	N/A	-	5	-	-
	Theory and Practice of Technical Translation (French),					
	Theory and Practice of Technical Translation (German),					
	Theory and Practice of Technical Translation (Russian)					
3	Industrial and Technological Innovations Management (optional)	N/A	5	-	-	-
	Prepare and Implement Investment Projects in Power Engineering (optional)					
	Business Processes Engineering and Management (optional)					
	Control System Engineering (Optional)					
4	Hydro-turbines and reversible hydro-machines	N/A	8	-	-	-
5	Designing of micro, mini and small hydropower plant equipment -1	N/A	5	-	-	-
6	Hydrological calculations in hydro power engineering (optional)	N/A	6	-	-	-
7	A special course of main hydro -turbine equipment	Hydro-turbines and reversible hydrocarbons	-	7	-	-
8	Rehabilitation of hydro power planst (hydro-mechanical part)	N/A	-	-	8	-
9	Designing of micro, mini and small hydropower	Designing of micro, mini and small hydro power	-	7	-	-

	plant equipment -2	plants -1				
10	Methods for calculation of water-energy regimes of hydro power regimes (optional)	N/A	-	7	-	-
11	Special course of installation, maintenance, exploitation and repair of hydro turbines (optional)	Hydro-turbines and reversible hydrocarbons; special course of main hydrobrain equipment	-	-	7	-
12	Installation and operation of pumps (optional)	Hydro-turbines and reversible hydrocarbons;	-	-	5	-
13	Mathematical Modeling of Hydro Power Parameters (Optional)	N/A	-	-	5	-
14	Hydro-mechanical transition processes in hydro power equipment (optional)	N/A	-	-	7	-
Subject load of Master topic “Electric Energy Transmission and Distribution” of specialization “Electric Power Engineering”			30	25	20	
1	Business Communication (English),	N/A	5	-	-	-
	Business Communications (French),					
	Business Communication (German),					
	Business communication (Russian).					
2	Theory and Practice of Technical Translation (English),	N/A	-	5	-	-
	Theory and Practice of Technical Translation (French),					
	Theory and Practice of Technical Translation (German),					
	Theory and Practice of Technical Translation (Russian)					
3	Industrial and Technological Innovation Management (optional)	N/A	5	-	-	-
	Prepare and Implement Investment Projects in power engineering (optional)					
	Business Processes in power engineering and Telecommunication (optional)					
	Control System Engineering (Optional)					
4	The mathematical tasks of power engineering	N/A	5	-	-	-
5	Static Stability of Electrosystem	N/A	5	-	-	-
6	Power Engineering System Automatics 1	N/A	5	-	-	-
7	Designing electrical networks	N/A	5	-	-	-
8	Dynamic stability of the electric system	Static Stability of Electrosystem	-	5	-	-
9	Power Engineering System Automatics 2	System Automation of energy system 1	-	5	-	-
10	Management of organizational-economic systems and basics of forecasting - 1	N/A	-	5	-	-
11	Dispatch management of power systems	N/A	-	5	-	-

12	Diagnostics of high voltage electric power equipment	N/A	-	-	5	-
13	Optimal management of power system regimes	Dispatch management of power systems	-	-	5	-
14	High conductivity power transmission	N/A	-	-	5	-
15	Special regimes of electric network operation	Designing electrical networks	-	-	5	-
Subject of Master topic “Electric technological devices and power supply” of Specialization “Electric energy”			30	20	20	
1	Business Communication (English),	N/A	5	-	-	-
	Business Communications (French),					
	Business Communication (German),					
	Business communication (Russian).					
2	Theory and Practice of Technical Translation (English),	N/A	-	5	-	-
	Theory and Practice of Technical Translation (French),					
	Theory and Practice of Technical Translation (German),					
	Theory and Practice of Technical Translation (Russian)					
3	Industrial and Technological Innovations Management (optional)	N/A	5	-	-	-
	Prepare and Implement Investment Projects in Power Engineering (optional)					
	Business Processes in Power Engineering and Telecommunication (optional)					
	Control System Engineering (Optional)					
4	Automatic control basics	N/A	5	-	-	-
5	Experiment planning methods	N/A	5	-	-	-
6	Low-voltage modern equipment of power supply systems	N/A	5	-	-	-
7	Electromagnetic compatibility in power engineering	N/A	5	-	-	-
8	Digital control systems of electrical equipment	N/A	-	5	-	-
9	High-voltage power equipment of Power supply systems	N/A	-	5	-	-
10	Modern control systems of electric actuator	N/A	-	5	-	-
11	Digital Devices for Power Supply System Protection 1	N/A	-	5	-	-
12	Digital systems for control of electromechanical complexes	Digital systems management of electrical equipment	-	-	5	-
13	High-voltage distribution equipment for power supply systems	Power supply systems for high power systems	-	-	5	-

14	Digital control systems of frequency-regulated electric actuator	Modern management systems of electric motor	-	-	5	-
15	Digital Devices for Power Supply System Protection 2	Digital equipment for power supply systems 1	-	-	5	-
Subjects of Master topic "Management of energy industries" of Specialization "Electric energy"			30	25	20	
1	Business Communication (English),	N/A	5	-	-	-
	Business Communication (French),					
	Business Communication (German),					
	Business communication (Russian).					
2	Theory and Practice of Technical Translation (English),	N/A	-	5	-	-
	Theory and Practice of Technical Translation (French),					
	Theory and Practice of Technical Translation (German),					
	Theory and Practice of Technical Translation (Russian)					
3	Industrial and Technological Innovations Management (optional)	N/A	5	-	-	-
	Prepare and Implement Investment Projects in Power Engineering (optional)					
	Business Processes in Power Engineering and Telecommunication (optional)					
	Control System Engineering (Optional)					
4	Energy Finances and Financial Accounting 1	N/A	5	-	-	-
5	Electricity Generation, Transmission and Distribution Technologies 1	N/A	5	-	-	-
6	Power Engineering and Society 1	N/A	5	-	-	-
7	Power supply of technological complexes	N/A	5	-	-	-
8	Energy Finances and Financial Accounting 2	Energy finances and financial accounting 1	-	5	-	-
9	Management of organizational-economic systems and basics of forecasting 1	N/A	-	5	-	-
10	Electricity Generation, Transmission and Distribution Technologies 2	Electricity Generation, Transmission and Distribution Technologies 1	-	5	-	-
11	Power Engineering and Society 2	Energy and Society 1	-	5	-	-
12	Management of organizational-economic systems and basics of forecasting 2	Management of organizational-economic systems and basics of forecasting 1	-	-	5	-
13	Economic and financial risks in power engineering	N/A	-	-	5	-
14	Energy Production (Operational) Management	N/A	-	-	5	-
15	Planning and Development of Energy Production	N/A	-	-	5	-

Subjects of Master topic “Electric machines and apparatus” of Specialization “Electric mechanics”			30	25	20	
1	Business Communication (English),	N/A	5	-	-	-
	Business Communication (French),					
	Business Communication (German),					
	Business communication (Russian).					
2	Theory and Practice of Technical Translation (English),	N/A	-	5	-	-
	Theory and Practice of Technical Translation (French),					
	Theory and Practice of Technical Translation (German),					
	Theory and Practice of Technical Translation (Russian)					
3	Industrial and Technological Innovations Management (optional)	N/A	5	-	-	-
	Prepare and Implement Investment Projects in Power Engineering (optional)					
	Business Processes in Power Engineering and Telecommunication (optional)					
	Control System Engineering (Optional)					
4	Mathematical modeling of electric machines	N/A	5		-	-
5	Electrical networks, systems and multipurpose brushless electric machines - 1	N/A	5		-	-
6	Multipurpose contactless electric apparatus - 1	N/A	5		-	-
7	Technological basis for construction of electric machines	N/A	5		-	-
8	The basics of technical electrodynamics	N/A	-	5	-	-
9	Electrical networks, systems and multipurpose brushless electric machines - 2	Electrical networks, systems and multipurpose brushless electric machines- 1	-	5	-	-
10	Multipurpose contactless electric apparatus -2	Multipurpose contactless electric apparatus - 1	-	5	-	-
11	Technological basis for construction of electric apparatus	N/A	-	5	-	-
12	Operation of electric machines in non-stationary regimes of feeder network (optional)	N/A	-	-	5	-
13	Medium and low voltage electric machines of wide use (optional)	N/A	-	-	5	-
14	Testing and reliability of electric machines (optional)	N/A	-	-	5	-
15	Specific technological processes for electric machines manufacturing (optional)	N/A	-	-	5	-
16	Dynamic stability of electric machines in network malfunction (optional)	N/A	-	-	10	-

17	Static Regulators in Electrical Network (Optional)	N/A	-	-	10	-
Subject of Master topic “Industrial Electronics” of Specialization “Electric machinery and industrial electronics”			30	25	20	
1	Business Communication (English),	N/A	5	-	-	-
	Business Communication (French),					
	Business Communication (German),					
	Business communication (Russian).					
2	Theory and Practice of Technical Translation (English),	N/A	-	5	-	-
	Theory and Practice of Technical Translation (French),					
	Theory and Practice of Technical Translation (German),					
	Theory and Practice of Technical Translation (Russian)					
3	Industrial and Technological Innovations Management (Optional)	N/A	5	-	-	-
	Prepare and Implement Investment Projects in Power Engineering (Optional)					
	Business Processes in Power Engineering and Telecommunication (Optional)					
	Control System Engineering (Optional)					
4	Power industrial electronic systems	N/A	5	-	-	-
5	Microsystems - 1	N/A	10	-	-	-
6	Built-in systems - 1	N/A	5	-	-	-
7	Microsystems - 2	Microsystems - 1	-	-	-	-
8	Built-in systems - 2	Built-in systems - 1	-	-	-	-
9	Built-in systems - 3	Built-in systems - 2	-	-	10	-
10	Calculation of electronic circuits and methods of analysis - 1 (optional)	N/A	-	-	10	-
11	Basics of Engineering Projects and Construction of Electronic Devices (Optional)	N/A	-	-	10	-
Subjects of Master topic “Electric machinery and diagnostic of energy devices” of specialization “Electric machinery and industrial electronics”			30	25	20	-
1	Business Communication (English),	N/A	5	-	-	-
	Business Communication (French),					
	Business Communication (German),					
	Business communication (Russian).					
2	Theory and Practice of Technical Translation (English),	N/A	-	5	-	-
	Theory and Practice of Technical Translation					

	(French),					
	Theory and Practice of Technical Translation (German),					
	Theory and Practice of Technical Translation (Russian)					
3	Industrial and Technological Innovation Management (optional)	N/A	5	-	-	-
	Prepare and Implement Investment Projects in Power Engineering (optional)					
	Business Processes in Power Engineering and Telecommunications (optional)					
	Control System Engineering (Optional)					
4	Theoretical Basics of Electric machinery – 1	N/A	10		-	-
5	Modern problems of electric power engineering	N/A	10		-	-
6	Theoretical Basics of Electric machinery - 2	Theoretical Basics of Electric machinery - 1	-	5	-	-
7	Management of organizational-economic systems and basics of forecasting 1	N/A	-	5	-	-
8	The quality of the electric energy	N/A	-	5	-	-
9	Diagnostics and Certification in Electric Power Engineering - 1	Theoretical Basics of Electric machinery - 2	-	5	-	-
10	Diagnostics and Certification in Electric Power Engineering - 2	Diagnostics and Certification in Electric Power Engineering - 1	-	-	5	-
11	Powerful Impulsive Current Technique (Optional)	N/A	-	-	15	-
12	Semiconductor Conversion Technique (Optional)	N/A	-	-	15	-
Research components:						
1	Master Research Project / Prospectus		-	5	-	-
2	Theoretical / experimental research / colloquium		-	-	10	-
3	Completion and defense of master thesis		-	-	-	30
Total in semester:			30	30	30	30
Total in year:			60		60	
Total:			120			

Map of learning outcomes

Nº	Subject	Knowledge and understanding	Use knowledge in practice	Judgment skill	Communication skills	Learning skills	Values
1	Business communication	+	+	-	+	+	+
2	Theory and practice of translation of the field line text	+	+	+	+	-	-
3-1	Entrepreneurial and Technological Innovation Management	+	+	+	-	-	-
3-2	Investment projects are prepared and implemented in the energy sector	-	+	+	+	+	-
3-3	Business Processes Engineering and Management	+	+	+	-	-	-
Master topic “Thermal energy” of specialization “Thermal energy”							
1	Thermodynamic analysis of energy equipment	+	+	+	+	+	+
2	Heat transfer processes and installations in power	+	+	+	+	+	+
3	Modern technologies for complex use of solid fuels	+	+	+	+	-	-
4	Cogeneration stations in power	+	+	+	-	-	-
5	Management and forecasting of organizational-economic systems -1	-	+	+	+	-	-
6	Modern technologies for generation of electric and heat energy	+	+	+	+	+	+
7	Planning and exploitation of thermal systems	+	+	+	+	+	+
8	Engineering experiments and measuring instruments	+	+	+	-	-	-
9	Low heat sources	+	+	+	-	-	-
10	Environmental Technologies in Energy	+	+	+	+	-	-
11	Methods of heat transfer intensification	+	+	-	-	-	-
12	Analytical methods of thermal conductivity theory	+	+	+	-	+	-
Master topic “ Power Engineering and Environment” of specialization “Thermal energy”							
1	Legal basis for energy business	+	+	+	-	-	-
2	Energy and public environment	+	+	+	-	-	-
3	Energy and climate change	+	+	+	-	-	-
4	Principles of Energy Management	+	+	+	-	-	-
5	Renewable energy sources	+	+	+	-	-	-
6	Energy Audit in the Household Sector	+	+	+	-	-	-
7	Energy security management	+	+	+	-	-	-
8	Management and forecasting of organizational-economic systems -1	-	+	+	+	-	-

9	International Law on Energy and Environment	+	+	+	-	-	-
10	Energy Audit in the Industrial Sector	+	+	+	-	-	-
11	Clean Development Mechanism Projects	+	+	+	-	-	-
12	Energy efficiency and environmental protection	+	+	+	-	-	-
Master topic “Hydro Turbines, Pumps and Other Hydro Energy Devices of Hydro Power Plants” of specialization “Hydro Energy”							
1	Hydro-turbines and reversible hydrocarbons	+	+	+	-	+	-
2	Designing of micro, mini and small hydropower plants -1	+	+	+	-	+	-
3	Hydrological calculations in hydropower (optional)	+	+	+	-	+	-
4	A special cycle of main hydropower equipment	+	+	+	-	+	-
5	HPP rehabilitation (hydro-mechanical part)	+	+	+	+	+	+
6	Designing of hydro-energy equipment for micro, mini and small HPPs -2	+	+	+	-	+	-
7	Methods for calculation of water-energy regimes of hydropower systems (optional)	+	+	+	-	+	-
8	Specification (optional) of installation, maintenance, maintenance and repair of hydro turbines	+	+	+	-	+	-
9	Installation and operation of pumps (optional)	+	+	+	-	+	-
10	Mathematical Modeling of Hydraulic Parameters (Optional)	+	+	+	-	+	-
11	Hydro-mechanical transition processes in hydroelectric equipment (optional)	+	+	+	-	+	-
Master topic “Electric Energy Transmission and Distribution” of specialization “Electric Energy”							
1	The mathematical tasks of energy	+	+	+	-	-	-
2	Static Stability of Electrosystem	+	+	+	-	-	-
3	Energy System Automation 1	+	+	+	-	-	-
4	Designing electrical networks	+	+	+	-	-	-
5	Dynamic stability of the electric system	+	+	+	-	-	-
6	System Automation 2	+	+	+	-	-	-
7	Management and forecasting of organizational-economic systems -1	-	+	+	+	-	-
8	Dispatch management of power systems	+	+	+	-	-	-
9	Diagnostics of high voltage electric power stations	+	+	+	-	-	-
10	Optimal management of power systems modes	+	+	+	-	-	-
11	Elevated throughput power transmission	+	+	+	-	-	-
12	Special modes of electric network work	+	+	+	-	-	-
Master topic “Electric Technological Devices and Power Supply” of specialization “Electric energy”							
1	Automatic management basics	+	+	-	-	+	-

2	Experiment planning methods	+	+	-	-	+	-
3	Low-voltage modern equipment for power supply systems	+	+	+	-	-	-
4	Electromagnetic compatibility in power generation	+	+	+	-	-	-
5	Digital systems management of electrical equipment	+	+	+	-	-	-
6	Power supply systems for high power systems	+	+	+	-	-	-
7	Modern management systems of electric motor	+	+	+	-	-	-
8	Digital Devices for Power Supply Systems 1	+	+	-	-	+	
9	Digital systems management of electromechanical complexes	+	+	+	-	-	-
10	Power supply systems for high voltage distribution equipment	+	+	+	-	-	-
11	Digital systems for frequency-regulated electric motor	+	+	-	-	+	
12	Digital Devices for Power Supply Systems 2	+	+	+	-	-	-
Master topic “Management of Energy Industries” of specialization “Electric energy”							
1	Energy Finance and Financial Accounting 1	+	+	+	+	-	+
2	Electricity Production, Transmission and Distribution Technologies 1	+	+	+	+	+	-
3	Energy and Society 1	+	+	+	+	-	-
4	Power supply of technological complexes	+		+	+	+	-
5	Energy Finance and Financial Accounting 2	+	+	+		+	-
6	Management and forecasting of organizational-economic systems -1	-	+	+	+	-	-
7	Power generation, transmission and distribution technologies 2	+	+	+	+	+	-
8	Energy and Society 2	+	+	+	+	-	-
9	Management and forecasting of organizational-economic systems 2		+	+	+	-	-
10	Economic and financial risks in energy	+		+	+	+	-
11	Energy Production (Operating) Management	+	+	+	+	+	-
12	Planning and Development of Energy Production		+	+	+	+	-
Master topic “Electric Machines and Apparatus” of specialization “Electric mechanics”							
1	Mathematical modeling of electric cars	+	+	+	+	-	-
2	Electricals, systems and a wide range of ventilated electric cars - 1	+	+	+	-	+	-
3	Wide-range contactless electric	+	+	+	+	-	-
4	Technological basis for the design of electric cars	+	+	+	+	-	-
5	The basics of technical electrodynamics	-	+	+	+	-	-
6	Electricals, systems and wide-use ventilated electric cars - 2	+	+	+	-	+	-
7	Wide-range contactless electric machines - 2	+	+	+	+	-	-
8	Technological basis for the design of electric machines	+	+	+	+	-	-

9	Electric cars work in the feeder network in non-static modes (optional)	+	+	+	+	+	-
10	Medium and low power electric machines (optional)	+	+	+	+	-	-
11	Electrical vehicles testing and reliability (optional)	+	+	+	+	+	-
12	Specific technological processes for electric cars manufacturing (optional)	+	+	+	+	-	-
13	Dynamic stability of electric machines in network crash mode (optional)	+	+	+	+	-	-
14	Static Regulators in Electrocardiogram (Optional)	+	+	+	+	-	-
Master topic “Industrial Electronics” of specialization “Electric machinery and Industrial Electronics”							
1	Power industrial electronic systems	+	+	+	-	+	-
2	Microsystems - 1	+	+	+	-	+	-
3	Built-in systems in electro-engineering - 1	+	+	+	-	+	-
4	Microsystems - 2	+	+	+	-	+	-
5	Built-in systems in electro-engineering - 2	+	+	+	-	+	-
6	Built-in systems in electro-dynamics - 3	+	+	+	-	+	-
7	Calculation of electronic circuits and methods of analysis - 1 (optional)	+	+	+	-	+	-
8	Basics of Engineering Projects and Designing of Electronic Devices (Optional)	+	+	+	-	+	-
Mater topic “Electric Machinery and Diagnostics of Energy Devices” of specialization “Electric Machinery and Industrial Electronics”							
1	Theoretical Basics of Electrotechnical Techniques - 1	+	+	+	-	+	-
2	Modern problems of electricity	+	+	+	-	+	-
3	Theoretical Grounds of Electricity - 2	+	+	+	-	+	-
4	Management and forecasting of organizational-economic systems -1	-	+	+	+	-	-
5	The quality of the electric energy	+	+	+	-	+	-
6	Diagnostics and Certification in Electricity - 1	+	+	+	-	+	-
7	Diagnostics and Certification in Electricity - 2	+	+	+	-	+	-
8	Powerful Impulse Crunch Technology (Optional)	+	+	+	-	+	-
9	Semiconductor Conversion Technique (Optional)	+	+	+	-	+	-
Reasearch component:							
1	Master Research Project / Prospectus	-	-	-	-	-	-
2	Theoretical / experimental research / colloquium	-	-	-	-	-	-
3	Completion and protection of master thesis	-	-	-	-	-	-

Program curriculum

Nº	Subject	Subject	cre dit/	Hours
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	code			Lecture	Seminar (work in group)	Practical work	Laboratory	Course paper/project	Practice	Semi-semester exam	Final exam	Independent working
1	LEH12412 G1-P	Business Communication (English)	5/125	-	-	45	-	-	-	2	2	76
	LEH12212 G1-P	Business communication (French language)	5/125	-	-	45	-	-	-	2	2	76
	LEH12612 G1-P	Business Communication (German)	5/125	-	-	45	-	-	-	2	2	76
	LEH12812 G1-P	Business Communication (Russian)	5/125	-	-	45	-	-	-	2	2	76
2	LEH12512 G1-LP	Theory and Practice of Field Text Translation (English)	5/125	15		30				2	2	76
	LEH12312 G1-LP	Theory and Practice of Field Text Translation (French)	5/125	15		30				2	2	76
	LEH12712 G1-LP	Theory and Practice of Field Text Translation (German)	5/125	15		30				2	2	76
	LEH12912 G1-LP	Theory and Practice of Field Text Translation (Russian)	5/125	15		30				2	2	76
3-1		Entrepreneurial and Technological Innovation Management	5/125	15	-	-	30	-	-	1	2	77
3-2		Investment projects are prepared and implemented in the energy sector	5/125	15	-	30	-	-	-	1	1	78
3-3		Business Processes Engineering and Management	5/125	15	15	-	15	-	-	1	2	77
Master topic "Thermal energy" of specialization "Thermal energy"												
1		Thermodynamic analysis of energy equipment	5/125	15	-	15	-	-	-	1	1	93
2		Heat transfer processes and installations in energy sector	5/125	15	-	15	15	-	-	1	1	93
3		Modern technologies for complex use of solid fuels	5/125	15	-	15	-	15	-	1	1	78
4		Cogeneration stations in power	5/125	15	15		-	15	-	1	1	78
5		Management and forecasting of organizational-economic systems - 1	5/125	15	-	15	-	15	-	1	1	78
6		Modern technologies for generation of electric and heat energy	5/125	15	-	30	-	-	-	1	1	78
7		Planning and exploitation of thermal systems	5/125	15	-	30	-	-	-	1	1	78
8		Engineering experiments and	5/125	15	-		30	-	-	1	1	78

		measuring instruments										
9		Low heat sources	5/125	15	-	37,5	-	-	-	1	1	70,5
10		Environmental Technologies in Energy	5/125	15	-	15	-	15	-	1	1	78
11		Methods of heat transfer intensification	5/125	15	-	37,5	-	-	-	1	1	70,5
12		Analytical methods of thermal conductivity theory	5/125	15	-	30	-	-	-	1	1	78
Master topic "Energy and environment" of specialization „Thermal Energy"												
1		Legal basis for energy business	5/125	15	-	15	-	15	-	1	1	78
2		Energy and public environment	5/125	15	-	30	-	-	-	1	1	78
3		Energy and climate change	5/125	15	-	30	-	-	-	1	1	78
4		Principles of Energy Management	5/125	15	-	30	-	-	-	1	1	78
5		Renewable energy sources	5/125	15	-	15	-	15	-	1	1	78
6		Energy Audit in the Household Sector	5/125	15	-	15	-	15	-	1	1	78
7		Energy security management	5/125	15	-	30	-	-	-	1	1	78
8		Management and forecasting of organizational-economic systems - 1	5/125	15	-	15	-	15	-	1	1	78
9		International Law on Energy and Environment	5/125	15	-	30	-	-	-	1	1	78
10		Energy Audit in the Industrial Sector	5/125	15	-	15	-	15	-	1	1	78
11		Clean Development Mechanism Projects	5/125	15	-	30	-	-	-	1	1	78
12		Energy efficiency and environmental protection	5/125	15	-	30	-	-	-	1	1	78
Master topic "Hydro turbines, pumps and HPP other hydro energy devices" of specialization "Hydro energy"												
1		Hydro-turbines and reversible hydrocarbons	8/200	22,5	-	-	-	45	30	1	1	100,5
2		Designing of micro, mini and small hydropower plants -1	5/125	15	-	15	-	15	-	1	1	78
3		Hydrological calculations in hydropower (optional)	6/150	15	-	15	-	22,5	-	1	1	95,5
4		A special cycle of main hydropower equipment	7/175	22,5	-	-	-	37,5	-	1	1	113
5		HPP rehabilitation (hydro-mechanical part)	8/200	22,5	-	22,5	-	22,5	-	1	1	130,5
6		Designing of hydro-energy equipment for micro, mini and small HPPs -2	7/175	15	-	15	-	30	-	1	1	113
7		Methods for calculation of water-energy regimes of hydropower systems (optional)	7/175	30	-	-	-	30	-	1	1	113
8		Specification (optional) of installation, maintenance,	7/175	22,5	-	37,5	-	-	30	1	1	83

		maintenance and repair of hydro turbines										
9		Installation and operation of pumps (optional)	5/125	15	-	30	-	-	-	1	1	78
10		Mathematical Modeling of Hydraulic Parameters (Optional)	5/125	15	-	15	-	15	-	1	1	78
11		Hydro-mechanical transition processes in hydroelectric equipment (optional)	7/175	15	-	15	-	30		1	1	113

Master topic “Electric energy transmission and distribution” of specialization “Electric energy”

1		The mathematical tasks of energy	5/125	15	-	15		15	-	1	1	78
2		Static Stability of Electrosystem	5/125	15	-	15		15	-	1	1	78
3		System Automation System 1	5/125	15	-	15	-	15	-	1	1	78
4		Designing electrical networks	5/125	15	-	15		15	-	1	1	78
5		Dynamic stability of the electric system	5/125	15	-	15		15	-	1	1	78
6		System Automation Automation 2	5/125	15	-	15	-	15	-	1	1	78
7		Management and forecasting of organizational-economic systems - 1	5/125	15	-	15	-	15	-	1	1	78
8		Dispatch management of power systems	5/125	15	-	15	-	15	-	1	1	78
9		Diagnostics of high voltage electric power stations	5/125	15	-	15	15	-	-	1	1	78
10		Optimal management of power systems modes	5/125	15	-	15		15	-	1	1	78
11		Elevated throughput power transmission	5/125	15	-	15		15	-	1	1	78
12		Special modes of electric network work	5/125	15	-	15	-	15	-	1	1	78

Master topic “Electric technological installations and energy supply” of specialization “Electric energy”

1		Automatic management basics	5/125	15	-	30	-	-	-	1	1	78
2		Experiment planning methods	5/125	15	-	30	-	-	-	1	2	77
3		Low-voltage modern equipment for power supply systems	5/125	15	-	30	-	-	-	1	1	78
4		Electromagnetic compatibility in power generation	5/125	15	30		-	-	-	1	2	77
5		Digital systems management of electrical equipment	5/125	15	-	30	-	-	-	1	2	77
6		Power supply systems for high power systems	5/125	15	-	30	-	-	-	1	2	77
7		Modern management systems of electric motor	5/125	15	-	30		-	-	1	2	77
8		Digital Devices for Power Supply	5/125	15	-	30	-	-	-	1	2	77

		Systems 1										
9		Digital systems management of electromechanical complexes	5/125	15	-	30	-	-	-	1	2	77
10		Power supply systems for high voltage distribution equipment	5/125	15	-	30	-	-	-	1	2	77
11		Digital systems for frequency-regulated electric motor	5/125	15	-		30	-	-	1	2	77
12		Digital Devices for Power Supply Systems 2	5/125	15	-	30	-	-	-	1	2	77
Master topic “Management of energy industries” of specialization “Electric energy”												
1		Energy Finance and Financial Accounting 1	5/125	15	-	15	-	15	-	1	1	78
2		Electricity Production, Transmission and Distribution Technologies 1	5/125	15	-	30	-	-	-	1	2	78
3		Energy and Society 1	5/125	15	15	15	-		-	1	1	78
4		Power supply of technological complexes	5/125	15	-	15	-	15	-	1	1	78
5		Energy Finance and Financial Accounting 2	5/125	15	-	15	-	15	-	1	1	78
6		Management and forecasting of organizational-economic systems 1	5/125	15	-	15	-	15	-	1	1	78
7		Power generation, transmission and distribution technologies 2	5/125	15	-	15	-	15	-	1	2	78
8		Energy and Society 2	5/125	15	-	30	-		-	1	1	78
9		Management and forecasting of organizational-economic systems 2	5/125	15	-	15	-	15	-	1	1	78
10		Economic and financial risks in energy	5/125	15	-	30	-	-	-	1	1	78
11		Energy Production (Operating) Management	5/125	15	-	30	-	-	-	1	1	78
12		Planning and Development of Energy Production	5/125	15	-	15	15	-	-	1	1	78
Master topic “Electric machinery and devices” of specialization “Electrical mechanics”												
1		Mathematical modeling of electric cars	5/125	15	-		30	-	-	1	2	77
2		Electricals, systems and a wide range of ventilated electric cars - 1	5/125	15	-	30	-	-	-	1	2	77
3		Wide-use contactless electric machines - 1	5/125	15	-		-	30		1	2	77
4		Technological basis for the design of electric cars	5/125	15	-	30	-	-	-	1	2	77
5		The basics of technical electrodynamics	5/125	15	-	30	-	-	-	1	2	77
6		Electricals, systems and wide-use ventilated electric cars - 2	5/125	15	-	30	-	-	-	1	2	77
7		Wide-range contactless electric machines - 2	5/125	15	-	30	-	-	-	1	2	77

8	Technological basis for the design of electric machines	5/125	15	-	30	-	-	-	1	2	77
9	Electric cars work in the feeder network in non-static modes (optional)	5/125	15	-	30	-	-	-	1	2	77
10	Medium and low power electric machines (optional)	5/125	15	-	30	-	-	-	1	2	77
11	Electrical vehicles testing and reliability (optional)	5/125	15	-	-	30	-	-	1	2	77
12	Specific technological processes for electric cars manufacturing (optional)	5/125	15	-	30	-	-	-	1	2	77
13	Dynamic stability of electric machines in network crash mode (optional)	10/250	30	-	45	-	-	-	1	2	172
14	Static Regulators in Electrocardiogram (Optional)	10/250	30	-	45	-	-	-	1	2	172

Master topic “Industrial electronics” of specialization “Electric machinery and industrial electronics”

1	Power industrial electronic systems	5/125	15	-	30	-	-	-	1	2	78
2	Microsystems - 1	10/250	30	-	60	-	-	-	1	2	158
3	Built-in systems - 1	5/125	15	-	30	-	-	-	1	2	78
4	Microsystems - 2	10/250	30	-	-	60	-	-	1	2	158
5	Built-in systems - 2	15/375	45	-	90	-	-	-	1	2	238
6	Built-in systems - 3	10/250	30	-	60	-	-	-	1	2	158
7	Calculation of electronic circuits and methods of analysis - 1 (optional)	10/250	30	-	60	-	-	-	1	2	158
8	Basics of Engineering Projects and Designing of Electronic Devices (Optional)	10/250	30	-	60	-	-	-	1	2	158

Master topic “Electric machinery and diagnostic of energy devices” of specialization “Electric machinery and industrial electronics”

1	Theoretical Basics of Electrotechnical Techniques - 1	10/250	30	-	15	15	15	-	1	1	120
2	Modern problems of electricity	10/250	60	-	15	-	-	-	1	1	173
3	Theoretical Grounds of Electricity - 2	10/250	30	-	30	-	15	-	1	1	173
4	Management and forecasting of organizational-economic systems - 1	5/125	15	-	15	-	15	-	1	1	78
5	The quality of the electric energy	5/125	30	-	-	15	-	-	1	1	78
6	Diagnostics and Certification in Electricity - 1	5/125	30	-	15	-	-	-	1	1	78
7	Diagnostics and Certification in Electricity - 2	5/125	30	-	15	-	-	-	1	1	78
8	Powerful Pulse Crunch Technology (Optional)	15/375	75	-	15	15	15	-	1	1	253

9	Semiconductor Conversion Technique (Optional)	15/375	75	-	15	15	15	-	1	1	253
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Head of the program

Tengiz Jishkariani

Head of Quality Assurance Service of
Faculty of Power Engineering and Telecommunication

Nikoloz Abzianidze

Dean of the faculty

Gia Arabidze

Approved by

At the Faculty Board Meeting of
Faculty of Power Engineering and telecommunication
03.07.2012.

Chairman of the Faculty Board

Gia Arabidze

Agreed with

GTU Quality Assurance Service

Irma Inashvili

Modified by

Faculty of Power Engineering and Telecommunication
At the Faculty Board Meeting
27.03.2018, Protocol №2

Chairman of the Faculty Board

Gia Arabidze