RĪGAS TEHNISKĀ UNIVERSITĀTE

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Study programme "Smart Power Systems"

Main attributes

Title	Smart Power Systems
Identification code	EGR0
Education classification code	47522
Level and type	Professional Master Study
Higher education study field	Power and Electrical Engineering, Electrical Technologies
Head of the study field	Oskars Krievs
Deputy head of the study field	Pāvels Gavrilovs
Department responsible	Faculty of Electrical and Environmental Engineering
Head of the study programme	Aleksandrs Dolgicers
Professional classification code	-
The type of study programme	Full time
Language	Latvian, English
Accreditation	14.09.2022 - 15.09.2028; Accreditation certificate No 2022/21-A
Variant 1	
Volume (credit points)	80.0
Duration of studies (years)	Full time studies - 2,0
Degree or/and qualification to be obtained	Professional master degree in power and electrical engineering / leading electrical engineer
Qualification level to be obtained	The 7th level of European Qualifications Framework (EQF) and Latvian Qualifications Framework (LQF)
Programme prerequisites	Professional bachelor degree in electrical science and qualification of electrical engineer, or second-level professional higher education (first cycle professional higher education) and qualification of electrical engineer
Variant 2	
Volume (credit points)	100.0
Duration of studies (years)	Full time studies - 2,5
Degree or/and qualification to be obtained	Professional master degree in power and electrical engineering / leading electrical engineer
Qualification level to be obtained	The 6th level of European Qualifications Framework (EQF) and Latvian Qualifications Framework (LQF)
Programme prerequisites	Bachelor degree of engineering science in electrical science, energy or electronics and automatics, or comparable education

Description

Abstract	The study programme has been designed as a united and optimised professional master programme that is open both to graduates of the professional bachelor programme and graduates of the second-level higher professional study programme. The master programme is aimed at meeting the requirements of electric power systems and networks as well as the power utilities sector of the labour market in the Republic of Latvia and abroad with the necessary specialists. The graduate of the programme will be able to identify the needs of the power sector and to apply smart technologies for economical and efficient use of electric power, integrating the knowledge gained in the study process within the field of modern-day electric power systems.
Aim	Training of a new generation of graduates in the fields of electric power networks and systems, recording and monitoring of their operation modes, as well as stability and reliability, by actively implementing smart technologies, namely: • optimal control technologies, applicable to the energy market, as well as to generation, transmission, distribution, consumption, and energy saving; • expertise in energy demand and saving, techniques for efficient use of energy in construction, manufacturing, the primary sector, and transport; • development and integration of various control systems and energy efficiency models.
Tasks	The main task is to prepare well-qualified specialists for successfully addressing future problems: •monitoring and control of operation modes for all the participants involved in the process of energy generation, transmission and consumption (producers, traders, large and small consumers); •quick response to changes in various parameters of the power system as well as reliable power supply in the transmission and distribution networks, with a large proportion of produced wind and solar power; •achievement of effective and modern decentralised control of a distributed power system; •educational work among passive consumers (the small consumers of renewable energy sources), turning them into active participants of the demand response process as prosumers, in order to ensure effective implementation of the gains.

Learning outcomes	The study programme is planning to provide the students with in-depth knowledge in power and electric engineering during lectures, practical classes, laboratory work and internship, and to ensure skills in the fundamentals of scientific research work as well as to develop research skills and train highly qualified specialists in the field of smart power systems (including the specializations of power supply, control of electric power networks and systems, or electric machinery and apparatus) and to prepare the students for further doctoral studies.
Final/state examination procedure, assessment	By the end of the study programme, the students have to write a master thesis, which is related to theoretical, experimental or practical analysis of certain electric power systems and their elements (power transmission lines, plants and substations, generating equipment, electric wiring, electric power systems' control and protection elements, electromechanical converters and electric apparatus), and evaluation of various implementation alternatives and possibilities, both analytically and experimentally. The master thesis is to be defended at an open session of the State Examination Commission. The thesis is evaluated by a commission consisting of a chair, a secretary and not less than three ordinary members. The master thesis and its defence reflect the following knowledge and skills of the student: •to prepare a qualification paper containing an engineering study of the operating principles of an electric power system and its equipment and their implementation alternatives and possibilities; •to draw up technical documentation; •to defend their solutions.
Description of the future employment	Studying according to the study programme, the student acquires a stable base knowledge and understanding regarding the theoretical and practical issues within the power and electric engineering field, required for starting practical work at power and electric engineering enterprises of various types and for continuing studies at study programmes of a higher level.
Special enrollment requirements	-
Opportunity to continue studies	Entitled to pursue further studies at PhD programmes.

Courses

No	Code	Name	C.p. [1]	C.p. [2]
A		**Compulsory Study Courses**	**22.0**	**22.0**
1	EES702	Power System Dynamics	4.0	4.0
2	EES700	Principles of Protective Relaying of Electric Power Systems	4.0	4.0
3	EES708	Power Plants, Electric Stations and Substations	4.0	4.0
4	EES754	Design of Smart Power Supply Systems	4.0	4.0
5	EES712	Management and Development Planning of Electrical Networks and Systems	3.0	3.0
6	EEM553	Diagnostics of Electrical Equipment	3.0	3.0
B		**Compulsory Elective Study Courses**	**26.0**	**22.0**
B1		**Field-Specific Study Courses**	**19.0**	**15.0**
1	IDA304	Occupational Safety and Environmental Protection	2.0	2.0
2	ICA301	Civil Defence	1.0	1.0
3	EES701	Computer Application in Power Engineering	4.0	4.0
4	EES716	Optimisation of Smart Power Systems	2.0	2.0
5	EES703	Electronic Devices of Power System	2.0	2.0
6	EEA701	Electrical Installation of Buildings	2.0	2.0
7	EES713	Control Systems in Electric Power Engineering	2.0	2.0
8	EES711	Reliability of Power Systems	2.0	2.0
9	EEM559	Modern Electromechanical Converters	2.0	2.0
10	EEM560	Optimization of Modern Electromechanical Converters	2.0	2.0
11	EEM558	Mathematical Methods for Electrical Equipment Diagnostics	2.0	2.0
12	EES714	Power System Optimization Methods	2.0	2.0
B2		**Humanities and Social Sciences Study Courses**	**3.0**	**3.0**
1	IEU534	Project Quality and Risk Management	3.0	3.0
2	BTC503	Fundamentals of Business Administration	3.0	3.0
3	IRO455	Organization of Small and Medium-Size Business	3.0	3.0
B6		**Languages**	**4.0**	**4.0**
1	HVD414	The English Language	4.0	4.0
C		**Free Elective Study Courses**	**2.0**	**2.0**
D		**Practical Placement**	**10.0**	**26.0**
1	EES706	Practical Placement	10.0	
2	EES704	Practical Placement		20.0
3	EES718	Practical Placement		6.0
E		**Final Examination**	**20.0**	**30.0**
1	EES710	Master Thesis	20.0	20.0
2	EES748	Engineering Design Project		10.0

K.p.[*] kredītpunkti studiju programmas variantā