RTU Course "Design of Power Electronics Systems"

11103 Industriālās elektronikas un elektrotehnol.katedra

General data

Code	EEP524
Course title	Design of Power Electronics Systems
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Post-graduate Studies
Course type	Professional
Field of study	Power and Electrical Engineering
Responsible instructor	Ivars Raņķis
Academic staff	Viesturs Bražis
Volume of the course: parts and credits points	1 part, 3.0 Credit Points, 4.5 ECTS credits
Language of instruction	LV, EN, RU
Possibility of distance learning	Not planned
Abstract	The subject is proposed for full and part-time RTU academic master study program „Computerized Control of Electrical Technologies" students. The power electronics system main converter design and calculation are considered. It is desribed the design and calculation of controllable rectifier, net inverter, DC pulse converter and autonomous inverter power and control schemes.
Goals and objectives of the course in terms of competences and skills	Acquire the design basics of modern power electronics converters, teach students to develop the semiconductor converter power schemes and control systems.
Structure and tasks of independent studies	Design of power and control system schemes for power electronics system converters. Converter device calculation and drawing of their characteristics. Independent performance monitoring of the previous work completed to describe protocol is carried out prior to the current presentation of the next practical work.
Recommended literature	I.Raņķis,I.Buņina Energoelektronika, Rīga,RTU, 2007, 186 lpp. Mohan N., Undeland T., Robbins W. Power Electronics: Converters, Application and Design. – NY:John Wiley and sons, 2003, 802 p.
Course prerequisites	Power electronics, Industrial Electronic Equipment.

Course outline

Theme	Hours
Power electronics converter systems and their elements.	2
Design of grid frequency converter system with DC bus.	2
Design of controllable rectifier.	2
Design of net inverter.	2
DC/DC thyristor pulse converter calculation.	2
Transistor pulse converter calculation.	2
Design of autonomous inverters.	4
Practical work Nr.1 Design of AC converter system.	16
Practical work Nr.2 Design of DC and autonomous converters.	16

Learning outcomes and assessment

Learning outcomes	Assessment methods
Able to design power and control schemes of power electronics devices.	Mastered essence of the matter is sufficiently deep in understanding of power electronics converters. Passed an exam
Able properly calculate the AC net converters - controllable rectifier and net inverter.	Passed test of practical work Nr.1. Passed an exam
Able to explain the calculation features of multiple converter system.	Mastered essence of the matter is sufficiently deep in understanding the basic principles of power electronic converters. Passed an exam
Able to calculate the DC/DC converters. Able to calculate autonomous inverter power schemes.	Passed test of practical work Nr.2. Passed an exam
Able to synthesize control schemes of power electronic converters.	Mastered essence of the matter is sufficiently deep in understanding the basic control principles of power electronic converters. Passed an exam

Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work

1.	3.0	4.5	2.0	1.0	0.0		*	