RTU Course "Power Electronics"

33000 Faculty of Computer Science, Information Technology and Energy

General data

Code	EEL301
Course title	Power Electronics
Course status in the programme	Compulsory/Courses of Limited Choice
Responsible instructor	Iļja Galkins
Academic staff	Ivars Raņķis Inna Buņina Anastasija Žiravecka Igors Ščukins Genadijs Zaļeskis
Volume of the course: parts and credits points	1 part, 3.0 credits
Language of instruction	LV, EN
Annotation	Powerful semiconductor elements and its application. Rectifiers, control, operation regimes, the AC regulation, DC pulse regulation, inverters, control, modulation.
Goals and objectives of the course in terms of competences and skills	Show to students possibilities of electrical parameters convertation using semiconductor diodes, thyristors, transistors elements, teatch them methods of simplified calculations with aim to provide calculations and evalautions in converters circuits
Structure and tasks of independent studies	At home must be done 10 individual calculations tasks on converters and evaluation of results in Virtuallab computer space
Recommended literature	I.Raņķis, I. Buņina Energoelektronika, Rīga ,RTU, 2007., 186 lpp.
Course prerequisites	Theorethical bases of electrical engineering

Course contents

Content	Full- and part-time intramural studies		Part time extramural studies	
	Contact Hours	Indep. work	Contact Hours	Indep. work
Classification of semiconductor converters, Semiconductor diodes, its characteristicss	2	0	0	0
Characteristics of converters' currents and voltages, schemes of uncontrolled rectifiers	2	0	0	0
Principial parameters of schemes of uncontrolled rectifiers	2	0	0	0
Calculation of transformers of uncontrolled rectifiers	2	0	0	0
Analyzis of current shape for uncontrolled rectifiers, commutation processes in uncontrolled rectifiers	2	0	0	0
Thyristor, operation principles, characteristics	2	0	0	0
Operation principle of controlled rectifier, regulation characteristics of controlled rectifier	2	0	0	0
Invertor operation case in controlled rectifier	2	0	0	0
Power factor of controlled rectifier	2	0	0	0
Transistors and its characteristics	2	0	0	0
Pulse Regulators of the DC voltage, filters of pulse regulators	2	0	0	0
Reversible pulse regulator	2	0	0	0
Single phase voltage inverters	2	0	0	0
Three phase voltage inverters	2	0	0	0
Sinus modulation of voltage inverters	2	0	0	0
Current source inverters	2	0	0	0
Total:	32	0	0	0

Learning outcomes and assessment

Learning outcomes	Assessment methods
To be able draw and carry up the basic calculations in circuits of uncontrolled rectifiers	Succesfully worked out two home calculations tasks on uncontrolled rectifiers
To be able explaine comutation processes in uncontrolled rectifiers	Succesfully worked out home calculation task on comutation processes in uncontrolled rectifiers
To be able explaine operation principle of controlled rectifier and its regulations characteristics	Succesfully worked out 2 home calculation tasks on controlled rectifiers
To be able explaine load characteristics of controlled rectifiers and its invertation regime	Succesfully worked out home calculation task on DC transmission

To be able explaine operation of DC pulse regulators and carry out its calculation	Succesfully worked out two home calculation tasks on DC pulse regulators
To be able explaine operation principle of voltage and current inverters and carry out its calculation	Succesfully worked out two home calculation tasks on inverters

Study subject structure

Part	CP	Hours			Tests		
		Lectures	Practical	Lab.	Test	Exam	Work
1.	3.0	2.0	0.0	0.0		*	