



RTU Course "Automated Electrical Drive"

11103 Department of Industrial Electronics and Electrical Technologies

General data

Code	EEP433
Course title	Automated Electrical Drive
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Undergraduate Studies
Course type	Professional
Field of study	Power and Electrical Engineering
Responsible instructor	Jānis Valeinis
Academic staff	Anastasija Žiravecka
Volume of the course: parts and credits points	1 part, 3.0 Credit Points, 4.5 ECTS credits
Language of instruction	LV
Annotation	Electrical drives and automation by usage of the DC, AC induction and synchronous type motors. Tracking drives, programmable, adaptive and self-organizing systems. Electric magnets, electric-magnetic clutches. Choice of the motors and its protection. Reliability of the systems.
Goals and objectives of the course in terms of competences and skills	The aim of the subject is to study modern systems of adjustable electric drives and main principles of their control. To master in details drive systems and control systems, modeling processes with the help of computer. To study how to select motors and calculate the parameters of regulators. To investigate features of the drives operation under different loading conditions.
Structure and tasks of independent studies	Modeling of drive systems, laboratory works.
Recommended literature	W. Leonhard Control of Electrical Drives, Springer, 2001, 453 p.
Course prerequisites	Basics of electrical drive and regulation theory

Course outline

Theme	Hours
Elements of adjustable electric drive AED.	2
Power electronic converters and their application in AED.	2
Design of closed-loop AED control systems.	2
Four-quadrant DC AED system of reversible rectifier.	2
Two-quadrant system of DC AED with transistor pulse-regulator.	2
Four-quadrant system of DC AED with transistor pulse regulator.	2
Dynamic models of DC AED and control of processes.	2
Single-loop and multi-loop DC AED regulation systems.	2
Basic principles of DC AED modeling.	2
Frequency regulation of asynchronous AED.	2
Forming of frequency-voltage interconnection for asynchronous electric motor.	2
Basic principles and realization of vector control.	2
Dynamic models of induction motor drive.	2
Control of processes of induction motor drive.	2
Basic principles of induction motor drive modeling.	2
AED with contactless synchronous motors.	2
Calculation and investigation of structure model of closed-loop DC AED.	4
Investigation of closed-loop DC AED with pulse-regulator.	4
Investigation of double-loop DC AED with thyristor rectifier.	4
Investigation of induction motor AED with frequency regulation.	4

Learning outcomes and assessment

Learning outcomes	Assessment methods
The students are able to calculate and select motors necessary for particular regimes of defined loading conditions.	Assigned home tasks. Passed an exam
The students are able to calculate parameters of regulators for the control systems.	The students complete and defend virtual laboratory works. Passed an exam
The students are able to select and develop a model of drive systems and their control systems .	Developed computer model and assigned tasks on the basis of these models. Passed an exam

Study subject structure

Part	CP	Hours per Week			Tests		
		Lectures	Practical	Lab.	Test	Exam	Work
1.	3.0	2.0	0.0	1.0		*	