RĪGAS TEHNISKĀ
UNIVERSITĀTE

RTU Course "Special Electrical Machinery for Robotic Systems"
33000 null

General data

Code	EEM730
Course title	Special Electrical Machinery for Robotic Systems
Course status in the programme	Compulsory/Courses of Limited Choice
Responsible instructor	Andrejs Podgornovs
Academic staff	Elena Ketnere Kārlis Gulbis
Volume of the course: parts and credits points	1 part, 4.5 credits
Language of instruction	LV, EN
Annotation	The following topics are observed during the course: nomenclature of special electrical machinery for robotic systems (SEMRS), construction and operation principles, functions, areas of application, principles of mechatronics, safety, information SEMRS, electromagnetic couplers and breaks, SEMRS's development orientations and prospects.
Goals and objectives of the course in terms of competences and skills	The goal of the course is: - to get acquainted with SEMRS's nomenclature, construction and operational peculiarity, parameters; - to learn the ways of using the SEMRS in electric drive for robotics and control systems; - to learn how to use different SEMRS circuits, regulation and control technique. The objectives of the course are: - to get a good knowledge of SEMRS usage in different sectors of robotics; - to be able to perform the necessary measurements for determining of SEMRS's parameters and to draw up the connection scheme; - to be able to choose a correct SEMRS for performing necessary function.
Structure and tasks of independent studies	Students' independent work includes: - mastering of theoretical material; - processing and assessment of results received from practical tasks; - execution of home works.
Recommended literature	Obligati: 1. Dirba J, Ketners K. Elektriskās mašīnas. R.: RTU, 2007 2.Antonovičs U., Liepiņš M. Elektriskās mikromašīnas.R.:RTU,1982 3. Elektriskās mikromašīnas. Laboratorijas darbu uzdevumu un metodiskie norādījumi. R.: RTU, 2006 Papildus: 1.J.Dirba, N.Levins, V.Pugačevs. Vēja enerģijas elektromehāniskie pārveidotāji. R.: RTU, 2006. 2.Frederic Giamarchi. Robots mobiles programmables. Techniques avancees. Citi informācijas avoti: Citi informacijas avoti/Other sources of information: 4. Stölting H.D., Beisse A. Elektrische Kleinmaschinen. B.G. Teubner, Stuttgard., 1987 6.H. Moczala, J. Draeger, H. Krauss, H. Schok, S. Tillner. Small electric motor. London, IEE, 1988. 8. R. Crowder Electric Drives and electromechanical systems
Course prerequisites	Beckground in electricity, magnetism, energy transformation

Course contents

Content	Full- and part-time intramural studies		Part time extramural studies	
	Contact Hours	Indep. work	Contact Hours	Indep. work
Nomenclature of special electrical machinery for robotic systems, construction and operation principles, areas of application, requirements.	2	0	0	0
Principles of mechatronics. Safety.	2	0	0	0
Direct current (DC) servomotors. Operation principles, types of management, mechanical and regulation characteristics.	8	0	0	0
Alternating current (AC) servomotors. Operation principles, types of management, mechanical and regulation characteristics.	8	0	0	0
AC converter-feed controlled motor (Brushless DC motor).	6	0	0	0
Stepper motors.	6	0	0	0
Torque motors, electrical magnets.	4	0	0	0
Electromagnetic couplers and breaks.	4	0	0	0
Dynamics of servomotors.	2	0	0	0

Information SEMRS. Selsyns.	2	0	0	0
Rotary transformer.	2	0	0	0
Taho-generator. Encoder. Perspectives of SEMRS development.	2	0	0	0
Total:	48	0	0	0

Learning outcomes and assessment

Learning outcomes	Assessment methods
Ability to determine and assess SEMRS parameters.	Evaluation of accomplished laboratory and home works. Exam, evaluation of answers to the examinational questions (oral or written).
Ability to choose SEMRS for performance of concrete functions.	Evaluation of accomplished laboratory and home works. Exam, evaluation of answers to the examinational questions (oral or written).

Evaluation criteria of study results

Criterion	%
	50
	20
	30
Total:	100

Study subject structure

Part	CP	Hours			Tests		
		Lectures	Practical	Lab.	Test	Exam	Work
1.	4.5	1.5	0.0	1.5		*	