

RTU Course "The Basics of Control Theory"

13107 null

General data

Code	TRT273
Course title	The Basics of Control Theory
Course status in the programme	Compulsory/Courses of Limited Choice
Responsible instructor	Nikolajs Bogdanovs
Academic staff	Aleksandrs Ipatovs
Volume of the course: parts and credits points	1 part, 2.0 Credit Points, 3.0 ECTS credits
Language of instruction	LV, EN
Annotation	The study course is intended to gain knowledge about control systems and regulation competent, which will enable students not only to understand the basics and principles of regulation theory, but also to apply this knowledge in automation for solution development, considering their limitations of the regulation system.
Goals and objectives of the course in terms of competences and skills	The aim of the study course is to acquaint with theoretical and practical knowledge about regulation systems and regulation competent, as well as to teach students to describe control systems, orientate in the characteristics and parameters of control systems. Tasks of the study course: <ul style="list-style-type: none"> • to provide basic knowledge of the structure of regulatory systems and regulatory authorities; • to teach to create a control system with set parameters; • to provide skills to create regulatory system framework based on the given parameters; • to teach to be able to determine the stability of the control system and analyse it; • to teach to use a simulation tool for the development and analysis of a control system; • to provide knowledge of management and automation solution development.
Structure and tasks of independent studies	Independent studies of study literature. Acquisition of additional material on the structure, parameters, application peculiarities of various control systems, according to electronic data materials. Preparation of theoretical substantiation for each laboratory work. Preparation for the exam and laboratory work.
Recommended literature	Obligātā/Obligatory: 1. Raņķis, V. Bražis, "Regulēšanas teorijas pamati" Rīga: RTU Izdevniecība, 2007. 93 lpp. 2. V. Klimavičius, "Automātiskā vadība" Rīga: RTU Izdevniecība, 2002. 231 lpp. 3. M. Moudgalya, "Digital Control" England: John Wiley & Sons, 2007. 544 p. 4. A. Šnīders, A., "Automātiskās vadības pamati: mācību līdzeklis automātikas pamatos. Jelgava: LLU, 2008. 159 lpp. Papildu/Additional: 1. R. Baldwin, M. Cave, M. Lodge, "Understanding Regulation", 2013. - 568p. 2. Praktisko darbu apraksti ORTUS mācību vidē.
Course prerequisites	Mathematics, physics.

Course contents

Content	Full- and part-time intramural studies		Part time extramural studies	
	Contact Hours	Indep. work	Contact Hours	Indep. work
Control system design principles.	5	5	0	0
Section equations and response.	7	8	0	0
Integrating and differentiating section types and their response. PID section.	8	7	0	0
Connecting sections. Closed-loop system transfer function.	7	8	0	0
Control system stability.	8	7	0	0
Control system adjustment.	5	5	0	0
Total:	40	40	0	0

Learning outcomes and assessment

Learning outcomes	Assessment methods
Is able to describe the control system.	Practical and laboratory work. Student is proficient in control system characteristics and parameters.
Is able to analyse the structure of the control system.	Laboratory work, exam. Student is able to competently describe the control systems and the work of their components. Test.
Is able to establish a regulatory system to the parameters.	Exam, laboratory work. Student can create regulatory system framework based on the given parameters. Test.
Knows the structure and control components of the control system.	Exam.

Evaluation criteria of study results

Criterion	%
Tests	30
Laboratory works	30
Exam	40
Total:	100

Study subject structure

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