RTU Course "Industrial Process Automation (study project)"

33000 Faculty of Computer Science, Information Technology and Energy

General data

Code	EEI502
Course title	Industrial Process Automation (study project)
Course status in the programme	Compulsory/Courses of Limited Choice; Courses of Free Choice
Responsible instructor	Ingars Steiks
Academic staff	Leonīds Ribickis
Volume of the course: parts and credits points	1 part, 3.0 credits
Language of instruction	LV, EN
Annotation	Design and project tasks of production process, automation problem, automation system elements. Practical realization of industrial process automation elements, control systems, CNC machinery automation.
Goals and objectives of the course in terms of competences and skills	To be able practically realize the industrial process automation tasks, understand the principles of the project and realize them.
Structure and tasks of independent studies	The student develops a project for a CNC lathe and milling machine and submits its result. The student independently develops an industrial automated sudy work / project, which includes an industrial robot and an industrial CNC machine tool, demonstrates its practical implementation.
Recommended literature	Obligāta / Obligatory - K.L.S. Sharma. Overview of Industrial Process Automation. Elsevier, 2017, ISBN 978-0-12-805354-6 - B.R. Mehta, Y.J. Reddy. Industrial Process Automation Systems. Butterworth-Heinemann, Elsevier, 2015, 978-0-12-800939-0 - N.Odrey, M.Weiss, M.Groover, R.Nagel, A.Dutta. Industrial Robotics -Technology ,Programming and Applications, McGraw Hill Education, 2017, ISBN: 978-1-25-900621-0 Papildus / Additional - N.Mozga, A.Kamols. Mašīnbūves elastīgās automatizētās ražošanas projektēšanas pamati. Rīgas Tehniskā universitāte. Mācību līdzeklis. RTU izdevniecība, Rīga-2006. - 92 lpp. - Fr.Sudenieks, A.Kamols, O.Liniņš, I.Boiko. Ražošanas Automatizācijas pamati. Rīgas Tehniskā universitāte. Mašīnbūves tehnoloģijas institūts, Rīga-2006. - 119 lpp. - Sabri Cetinkunt. Mechatronics. University of Illinois at Chicago. Jon Willwy & sons, inc. 2007 - Festo Didactic. Pneimatika, 4th Edition. Mācību grāmata. - 219 lpp. - A.Kaķītis, A.Galiņs, P.Leščevičs. Sensori un mērīšanas sistēmas. Latvijas Lauksaimniecības universitāte.Tehniskā fakultāte. Mehānikas institūts. Jelgava-2008. - 395 lpp. - Lexicon of Control Technology. Festo Didactic KG, Esslingen, 1991. - 262 p.
Course prerequisites	Knowledge of electrical drives, electrical devices, programming technology.

Course contents

Content	Full- and part-time intramural studies		Part time extramural studies	
	Contact Hours	Indep. work	Contact Hours	Indep. work
Intruduction. Learning materials. Documentation.	2	0	1	0
Research and practical implementation of industrial CNC turning machine.	6	6	3	9
Research and practical implementation of industrial CNC milling machine.	6	6	3	9
Research and practical implementation of the principles of industrial robot control processes.	10	14	5	20
Research analysis of full industrial process automation project.	4	12	2	14
Final work. Practical realization of industrial process automation project.	4	10	2	12
Total:	32	48	16	64

Learning outcomes and assessment

Learning outcomes	Assessment methods
To be able to explain and practical realization of CNC turning project.	Practice with industrial CNC turning machine.
To be able to explain and practical realization of CNC milling project.	Practice with industrial CNC milling machines.
To be capable of practical realization of industrial robot control process projects.	Practice with industrial robot.
To be able describe industrial process and manufacturing system elements, to realize fully automated industrial process automation project.	Final study work.

Evaluation criteria of study results

Criterion	%
Completed practical work with CNC turning machine	20
Completed practical work with CNC milling machine	20
Practical work with an industrial robot has been completed.	20
Completed practical work with full automation of industrial processes.	40
Total:	100

Study subject structure

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