**RĪGAS TEHNISKĀ
UNIVERSITĀTE**

RTU Course "Autonomous systems and robots"
33000 null

General data

Code	DSP715
Course title	Autonomous systems and robots
Course status in the programme	Compulsory/Courses of Limited Choice
Responsible instructor	Ilze Andersone
Volume of the course: parts and credits points	1 part, 4.5 credits
Language of instruction	LV
Annotation	The study course provides knowledge about autonomous systems and robots. The study course consists of lectures and five practical tasks that enable the application of the most essential methods for autonomous robot control.
Goals and objectives of the course in terms of competences and skills	The aim of the study course is to provide theoretical knowledge about autonomous systems and robots, practical use of their mathematical models, as well as to provide practical skills in the development of autonomous robot control algorithms. The tasks of the study course are to provide knowledge and skills: - to develop and apply mathematical models of robot dynamics; - to use robot models and control functions in navigation tasks; - to use multi-robot control methods and algorithms; - to use card merging techniques to create a global map.
Structure and tasks of independent studies	The study course includes five assignments: - Mapping; - Robot navigation; - Decision making in autonomous systems; - Robot team mapping; - Map merging.
Recommended literature	Obligātā/Obligatory: 1) S.Sam Ge, F.L.Lewis Autonomous Mobile Robots: Sensing, Control, Decision Making and Applications, Taylor & Francis Group, 2006 2) R.Siegwart, R. Naurbaghsh Introduction to autonomous mobile robots, MIT Press, 2004. Papildu/Additional: 3) S.Russell, P.Norvig Artificial intelligence: a modern approach 4th edition, Pearson Education Inc., 2021.
Course prerequisites	Mathematics

Course contents

Content	Full- and part-time intramural studies		Part time extramural studies	
	Contact Hours	Indep. work	Contact Hours	Indep. work
Introduction, terms of autonomous systems and robots, autonomous mobile robots.	4	0	0	0
Sensors, sensor merging.	10	6	0	0
Mapping and path planning.	22	16	0	0
Decision making in autonomous systems.	10	16	0	0
Autonomous robot teams.	14	16	0	0
Examples and applications of autonomous systems.	6	0	0	0
Total:	66	54	0	0

Learning outcomes and assessment

Learning outcomes	Assessment methods
Is able to recognize and describe autonomous systems.	Corresponding exam questions.
Is able to describe the sensors of autonomous systems and their applications.	Corresponding exam questions.
Is able to describe and apply the main mapping approaches and path planning algorithms.	Corresponding exam questions, practical tasks.
Is able to describe and apply decision making methods in autonomous systems.	Corresponding exam questions, practical task.
Is able to describe and apply the main robot team mapping approaches.	Corresponding exam questions, practical task.

Evaluation criteria of study results

Criterion	%
Practical work	75
Exam	25
Total:	100

Study subject structure

Part	CP	Hours			Tests		
		Lectures	Practical	Lab.	Test	Exam	Work
1.	4.5	2.0	1.0	0.0		*	