



## Subject card

Subject name and code	Autonomous mobile vehicle , PG_00039369						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2022/2023		
Education level	second-cycle studies		Subject group		Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Part-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Control Engineering -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Krzysztof Armiński				
	Teachers		dr inż. Krzysztof Armiński				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	0.0	0.0	0.0	10.0	20
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	20		20.0		60.0	100
Subject objectives	The idea is to get knowledge about the synthesis of a complex control system.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K7_W11		The student is able to use open software to test the proposed control algorithm.		[SW3] Assessment of knowledge contained in written work and projects		
	K7_W06		The student is able to design a given element of a complex control system, at the same time paying attention to the needs of its integration with other parts of the system.		[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects		
	K7_U04		The student is able to find the information needed to complete the task independently or in a group.		[SU1] Assessment of task fulfilment		
	K7_U07		The student is able to formulate the control problem and to verify the solution using the simulation methods.		[SU3] Assessment of ability to use knowledge gained from the subject		
Subject contents	The overview of mobile units with the particular emphasis on flying and floating units, their tasks and requirements. The modelling of the selected mobile units. The discussion of measuring and navigation devices. The overview of the control design task for autonomous mobile units. The description of the control synthesis for the selected mobile unit. Overview of the mobile robot path planning task.						
Prerequisites and co-requisites	Fundamentals of Automation, Control of Continuous Processes, Modeling and Identification, Informatics, Mathematics, Physics						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Presence		0.0%		10.0%		
	Synthesis of a part of the control system		50.0%		60.0%		
	Preparing of a presentation		50.0%		30.0%		

Recommended reading	Basic literature	Beard, R., & McLain, T. (2012). Small Unmanned Aircraft: Theory and Practice. Princeton Univ. Press. DOI:10.2514/1.61067 Castillo, P., Lozano, R., & Dzul, A. (2006). Modelling and Control of Mini-Flying. Springer. Fossen, T., (2002). Marine Control Systems Guidance, Navigation and Control of Ships, Rigs and Underwater Vehicles, Marine Cybernetics ISBN: 82-92356-00-2
	Supplementary literature	Murphy, R. (2000). Introduction to AI Robotics. MIT Press. Thrun, S., Burgard, W., & Fox, D. (1999). Probabilistic Robotics, MIT Press.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>Examples of tasks for groups of about 3 people:</p> <ul style="list-style-type: none"> <li>• Preparation and implementation of the flying unit in Python,</li> <li>• Preparation and implementation of measuring devices in Python language and task of state reconstruction,</li> <li>• Design and implementation of autopilot in Python</li> </ul>	
Work placement	Not applicable	