

GDAŃSK UNIVERSITY

Subject card

Subject name and code	Mobile Robots, PG_00049082								
Field of study	Automatic Control, Cybernetics and Robotics								
Date of commencement of studies	October 2024		Academic year of realisation of subject			2027/2028			
Education level	first-cycle studies		Subject group			Optional subject group Subject group related to scientific research in the field of study			
Mode of study	Full-time studies		Mode of delivery			at the university			
Year of study	4		Language of instruction			Polish			
Semester of study	7		ECTS credits			3.0			
Learning profile	general academic profile		Assessment form			assessment			
Conducting unit	Department of Automatic Control ->		Faculty of Elec	tronics, Teleco	ommunio	cations and Informatics			
Name and surname	Subject supervisor		dr inż. Piotr Fiertek						
of lecturer (lecturers)	Teachers dr inż. Piotr Fiertek								
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
of instruction	Number of study hours	30.0	0.0	15.0	0.0		0.0	45	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity	Participation in classes includ plan	n didactic ed in study	Participation in consultation hours		Self-study		SUM	
	Number of study hours	45		3.0		27.0		75	
Subject objectives	Understading theoret	ical and practic	al aspects of n	nodern mobile	robotics	-			
Learning outcomes	Course outcome Subject outcome Method of verification						ication		
	[K6_U05] can plan and conduct experiments related to the field of study, including computer simulations and measurements; interpret obtained results and draw conclusions		They independently carry out several selected practical tasks requiring the construction and/or use of mobile robots.			[SU1] Assessment of task fulfilment			
	[K6_W03] knows and understands, to an advanced extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum		Students will be familiar with basic methods of design, construction and programming of mobile robots mobile robots, i.e. machines that autonomously plan and performing the movements necessary for the execution of assigned tasks.			[SW1] Assessment of factual knowledge			
Subject contents Prerequisites	1. Design principles of mobile robots (MR) and autonomous guided vehi-cles (AGV). 2. Overview of applications - performing tasks in hostile environments. 3. Overview of applications service and inspection tasks. 4. Locomotion systems wheeled systems. 5. Locomotion systems tracking systems. 6. Locomotion systems legged mechanisms. 7. Overview of legged mechanisms. 8. Ultrasonic sensors. 9. Ultrasonic range finders and their characteristics. 10. Optical sensors. 11. Infrared sensors. 12. Tactile and scent sensors 13. Machine vision systems (GPS). 17. Radionavigation methods. 15. Active localization methods. 16. Global positioning systems (GPS). 17. Radionavigation systems 18. Sensor fusion. 19. Databases and models of the world used in mobile robotics. 20. Maps (grid, geometric, topological). 21. From measurements to maps. 22. Map-based robot localization procedures. 23. Formulation of the path-planning problem. 24. Path planning the visibility graph approach. 25. Path planning the Voronoi diagram approach. 26. Path planning the cell decomposition approach. 27. Path planning - the artificial potential field approach. 28. Path planning - the diffusion field approach. 29. Trajectory smoothing. 30. Multi-level robot control architectures. 31. Robot effectors. Selected problems of kinematics and dynamics of control. 32. Structure of the control system, on-board computer and communication systems. 33. Operating systems used in mobile robotics. 34. Robot simulators and their role in the design process. 35. Man-machine interface.								
and co-requisites									

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade			
	Midterm colloquium	50.0%	40.0%			
	Practical exercise	50.0%	60.0%			
Recommended reading	Basic literature	iterature Tchoń K. i inni, "Manipulatory i roboty mobilne", Akademicka Oficyna Wydawnicza PLJ, 2000.				
	Supplementary literature	"Podstawy robotyki", praca zbiorowa pod redakcją A. Moreckiego i J. Knapczyka, WNT, 1993.				
	eResources addresses	Adresy na platformie eNauczanie:				
Example issues/ example questions/ tasks being completed						
Work placement	Not applicable					