GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mobile Robots, PG_00049082		
Field of study	Automatic Control, Cybernetics and Robotics		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2028/2029
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 Electronics Telecommunications And Informatics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Piotr Fiertek	
	Teachers	dr inż. Piotr Fiertek	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
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 didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	45	3.0	27.0	75

Subject objectives

Understading theoretical and practical aspects of modern mobile robotics.

Learning outcomes

Course outcome	Subject outcome	Method of verification

Subject contents

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. 14. Passive localization 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.

Prerequisites 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	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

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