GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Aspects of robotics in artificial intelligence, PG_00053335
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering

Date of commencement of studies	February 2025	Academic year of realisation of subject	2024/2025
Education level	second-cycle studies	Subject group	Optional subject group Specialty 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	1	Language of instruction	Polish
Semester of study	1	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment

Conducting unit	Department of Biomedical Engineering -> Faculty of Electronics, Telecommunications and Informatics

Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Grzegorz Jasiński
	Teachers	dr inż. Grzegorz Jasiński

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	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	30	5.0	40.0	75

Subject objectives	The aim of the course is to familiarize students with issues from the border of robotics and artificial intelligence. Both hardware aspects and issues related to their practical use will be presented. Typical algorithmic and hardware solutions will be discussed. Typical solutions of robotic systems carrying out typical tasks will be shown.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of advanced technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment	Student dobiera zależnie od aplikacji rozwiązania wykorzystywane w budowie systemów robotycznych. Student testuje działanie wybranych rozwiązań sprzętowych i algorytmicznych. Student buduje i konfiguruje wybrane systemy robotyczne realizujące typowe zadania. Student tworzy oprogramowanie sterujące pracą robotów.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject
	[K7_K02] is ready to provide critical evaluation of received content and to acknowledge the importance of knowledge in solving cognitive and practical problems	The student explains the basic differences between the various hardware solutions. The student analyzes the operation of selected algorithms used to carry out typical tasks in robotics.	[SK3] Assessment of ability to organize work [SK5] Assessment of ability to solve problems that arise in practice
	[K7_K03] is ready to meet social obligations, inspire and organise activities for the social environment, initiate actions for the public interest, think and act in an entrepreneurial way	The student explains the meaning of the basic concepts related to robotics. The student indicates and explains the basic conditions for the design and use of robotic systems using artificial intelligence algorithms.	[SK5] Assessment of ability to solve problems that arise in practice

Subject contents	Introduction to Robotics. Sensors and sensor networks. Signal processing from sensors, artificial intelligence techniques for sensors. Video tracking of objects, classification of objects. Localization of autonomous mobile robots. Creating on-line maps with the use of autonomous mobile robots. Sensor-assisted collision avoidance systems. Map representations, navigation (position and course estimation). Electronic systems of robotic platforms. Examples of robotic platforms. Programming robots. Programming the robot's sensors. Programming motors and servos. Autonomous robots. An example of robotic solutions related to biomedical engineering.		
Prerequisites and co-requisites	There are no requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	laboratory	50.0%	30.0%
	written exam	50.0%	70.0%
Recommended reading	Basic literature	Rishal Hurbans, Algorytmy sztucznej inteligencji. Ilustrowany przewodnik, Helion, 2021 Kimmo Karvinen, Tero Karvinen, Czujniki dla początkujących. Poznaj otaczający Cię świat za pomocą elektroniki, Arduino i Raspberry Pi, Helion, 2015 Craig J. J.: Wprowadzenie do robotyki, WNT, Warszawa, 1995 Bodo H., Gerth W., Popp K.: Mechatronika - komponenty, metody, przykłady, PWN, Warszawa, 2001	
	Supplementary literature	HONCZARENKO J.: Roboty przemysłowe: budowa i zastosowanie. WNT, Warszawa, 2004 MORECKI A., KNAPCZYK J.(red.): Podstawy robotyki : teoria i elementy manipulatorów i robotów. wyd.3zm. i rozsz., WNT, Warszawa 1999 Buratowski T.: Teoria robotyki. AGH	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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