



## Subject card

Subject name and code	Aspects of robotics in artificial intelligence, PG_00053335						
Field of study	Biomedical Engineering						
Date of commencement of studies	February 2026		Academic year of realisation of subject		2025/2026		
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 -> Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Grzegorz Jasiński				
	Teachers		dr inż. Grzegorz Jasiński mgr inż. Magdalena Madej				
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_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		
	[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.		[SK5] Assessment of ability to solve problems that arise in practice [SK3] Assessment of ability to organize work		
	[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.		[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information		

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
	written exam	50.0%	70.0%
	laboratory	50.0%	30.0%
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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