GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Robotics, PG_00064913		
Field of study	Mechanical Engineering		
Date of commencement of studies	February 2027	Academic year of realisation of subject	2026/2027
Education level	second-cycle studies	Subject group	Obligatory subject group in the field of study 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	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Mechanics, Strength and Control of Complex Technical Objects - None (Existed Previously) -> Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Yurii Tsybrii	
	Teachers		

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	9.0	0.0	9.0	0.0	0.0	18
	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	18	4.0	28.0	50

Subject objectives	The aim of the lectures is to teach the students on the basic problems connected with the robotics including the robots and manipulators. These concern the methodology, methods, modeling and analysis. The aim of the course is to familiarize students with the basic issues related to the research, design and operation of industrial robots.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W12] identifies and interprets the main developmental trends and significant new achievements in the field of engineering and technical sciences and disciplines relevant to the course of study	The student possesses the ability to systematically analyze and critically evaluate the main development trends in robotics technologies, including autonomous systems, artificial intelligence, and the integration of robots in production processes and beyond. In particular, the student can identify practical applications of modern robotic solutions in mechanical engineering and machine design, such as process automation, human-robot collaboration systems, and mobile robots. Additionally, the student understands the key challenges associated with the implementation of new technologies, such as reliability, safety, energy efficiency, and integration with existing systems.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation
	[K7_K11] is aware of importance of professional acting, the need for critical verification of acquired knowledge and consulting experts opinion in case of facing difficulties with individual problem solving	The student is able to critically evaluate knowledge in the field of robotics and identify areas that require further improvement. The student is aware of the necessity of collaborating with experts when encountering difficulties in problem-solving and can effectively communicate with other specialists, conveying information about technical and engineering issues. The student has developed a habit of continuously updating knowledge in robotics and related technologies, as well as keeping track of trends and new advancements in the field of robotics.	[SK4] Assessment of communication skills, including language correctness [SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills [SK2] Assessment of progress of work
	[K7_W01] explains and describes, on the basis of general knowledge of the scientific disciplines forming the theoretical basis of Mechanics and Mechanical Engineering, the structure and principles of operation of mechanical systems and processes	The student is able to explain the structure and principles of operation of robotic systems and mechanical processes based on knowledge of mechanics, mechatronics, and the basics of automatics. The student can describe the basic components of robots, such as manipulators, drives, sensors, and control systems, and identify the relationships between their design parameters and the functionality of the system. The student is also able to characterize mechanical processes related to the operation of robots, such as motion trajectories, task planning, and force control in interactions with the environment.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation

<table>
<tr><td>Subject contents</td><td>Course content – lecture
During the lectures the following problems concerning the robotics will be presented:

- fundamentals of robotics

- robots

- robots and manipulators

- robots and manipulators - methods of solutions concernig the applied mechanics and mechatronics

- robots and manipulators - classification

- manipulators and grippers - classification

- sources of energy supply for robots

- robotic drives

- robotic sensors

- advanced simulation of robot operations

- applications of robots

- Industry 4.0</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>The student should have basic information in the field of physics and applied mathematics, mathematical analysis, numerical methods, solid state mechanics, including kinetics and dynamics, construction and construction of complex technical objects, technical drawing and the basics of programming as well as mechatronics and automation.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>half term exam, final exam</td><td>56.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>Tchon K., Muszynski R. Robotyka: Notatki do wykładów z dziedziny automatyki i robotyki, Wrocław 2018.

Craig J.J. Wprowadzenie do robotyki. Mechanika i sterowanie, Warszawa 1995.

Jakubiak J., Muszynski R., Narzędzia komputerowe w robotyce. Modelowanie kinematyki i dynamiki, Wrocław 2012.

Kalicka R. Podstawy automatyki i robotyki. Wydawnictwo Politechniki Gdańskiej, Gdańsk 2016.</td></tr><tr><td>Supplementary literature</td><td>AUVSI/ONR,2007. Engineering Primer Document for the Autonomous Underwater Vehicle (AUV) Team Competition Association for Unmanned Vehicle Systems International (AUVSI) US Navy Office of Naval Research (ONR), Version 01 - July 2007.

Szulist N., Gerigk M.K., 2015. Metodyka nadawania cech stealth małym bezzałogowym pojazdom wodnym. Logistyka, nr 4, Poznań 2015.</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
</table>

Example issues/ example questions/ tasks being completed	Quiz: 1. The mobile robot is a) a technical device designed to perform locomotive functions b) an automatic machine, which assists a human standing, walking or similar machine operation using one, two or more 'legs' and 'feet', and a single 'leg' of a 'walking' machine c) integration of naturally different construction systems: mechanisms, electrical circuits and software d) a technical device designed to perform locomotion functions of animals and insects with limbs or legs 2. The asynchronous motor has a) 3 phases b) 2 phases c) 1 phase d) 4 phases 3. The part that changes the inductance in the inductive position sensor is a) body b) coil c) tube d) ferromagnetic core ...
Practical activites within the subject	Not applicable

Document generated electronically. Does not require a seal or signature.