GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Basics of Cybernetics, PG_00047709		
Field of study	Automatic Control, Cybernetics and Robotics		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2026/2027
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	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Decision Systems and Robotics -> Faculty of Electronics, Telecommunications and Informatics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marek Tatara	
	Teachers	dr inż. Marek Tatara	

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	2.0	18.0	50

Subject objectives	The aim of the course is to acquaint students with the cybernetics. Cybernetics analyzes (finds) similarities (homologies) between the principles of action of living organisms, social systems (community) and machinery (holism), reveals the general laws common to different teachings and enables the transfer of these rights from one area to another; therefore cybernetics science is interdisciplinary, and it finds many practical applications.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W21] Knows and understands the basic methods of decision making as well as methods and techniques of design and operation of automatic regulation and control systems, computer applications for controlling and monitoring dynamic systems.	Is able to design autonomous decision making systems.	[SW1] Assessment of factual knowledge
[K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment	Implements selected problems using modern technologies associated with high-level programming languages.	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_W01] Knows and understands, to an advanced extent, mathematics necessary to formulate and solve simple issues related to the field of study	Can create cybernetics systems.	[SW1] Assessment of factual knowledge
[K6_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study	Can model systems.	[SU1] Assessment of task fulfilment

Subject contents

There will be discussed advanced control systems of robots. In particular, behavioral robotic systems and emotional ones. In addition, the evnironment modeling task, especially semantic networks and description logics will be mentioned.

Prerequisites and co-requisites

- has knowledge of the fundamental problems of computer control industrial facilities
- has knowledge of relational databases
- knows the rules of non-algorithmics decision-making
- is familiar with the methods of acquiring, analyzing and processing images and digital maps, and has knowledge of mapping methods

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Project and implementation of robotic system	60.0%	100.0%

Recommended reading

Basic literature	1. Brooks, Rodney A. (1991). "Intelligence without representation". *Artificial Intelligence* **47** (1–3): 139–59. 2. Jump upParker, Lynne E. (1995). "On the design of behavior-based multi-robot teams". *Advanced Robotics* **10** (6): 547–78. 3. Arkin Ronald C. (1998). "Behavior-Based Robotics" MIT Press Cambridge, MA, USA 4. Minsky Marvin (1974). "A Framework for Representing Knowledge" 5. Sowa John F. (1987). "Semantic Networks"
Supplementary literature	No requirements
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

Implementation of Walter's Tortoise
Determination of the trajectory of the robot in solid obstacles using neural network
Determination of the trajectory of the robot in solid obstacles using fuzzy system
The robot following the picture of a human face.
The perception of the robot using semantic web

Work placement

Not applicable