GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Artifficial Intelligence, PG_00064790		
Field of study	Mechatronics		
Date of commencement of studies	February 2027	Academic year of realisation of subject	2027/2028
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	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Division of Mechatronics -> 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 hab. inż. Marek Galewski	
	Teachers	dr hab. inż. Marek Galewski mgr inż. Natalia Szarwińska	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	20.0	0.0	0.0	10.0	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	8.0	37.0	75

Subject objectives

Presenting students the most important ideas and algorithms of Artifficial Intelligence, especially Genetic Algorithms and Artifficial Neural Netoworks.

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 presents the most important trends in the development of Artificial Intelligence.	[SW1] Assessment of factual knowledge
[K7_K13] is ready for responsible performance of proffesional roles, considering ever-changing need of the society, including self developement and supporting and fullfiling work ethics	The student understands the necessity of continuously updating their knowledge due to the rapid development of AI and is aware of the changes that follow, as well as the responsibility that rests on the creators and users of AI methods.	[SK3] Assessment of ability to organize work [SK5] Assessment of ability to solve problems that arise in practice
[K7_W04] demonstrates knowledge encompassing selected issues in the field of detailed knowledge, particularly in the scope of methods, techniques, tools, and algorithms specific to Mechatronics	The student presents the operation of selected Artificial Intelligence algorithms and selects AI algorithms appropriate for solving the given problem.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects

<table>
<tr><td>Subject contents</td><td>Course content – lecture

Introduction to AI - essential terms, history, achievements, perspectives, impact of AI on the society and the individuals
Graph based method for solution search and optimisation - eleemnts of graphs, sample search algorithms (DFS, BFS, HCA, Dijkstra, A*)
Evolutionary and genetic algorithms - essential terms,applications, genetic operators, slection methods, algorithm specificity, classic genetic algorithm
Swarm intelligence - essential terms,applications,PSO, SSA and other selected algorithms
Artificial neural networksconcepts, applications, structure of an artificial neuron, network architecture, idea of backpropagation, learning algorithms, deep networks.
Expert Systems (optional)
Intelligent Agents (optional)

Course content – project

Implementation of tasks presenting the developement and operation of artificial neural networks and genetic algorithms and selected other algorithms and aspects of artificial intelligence</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Programming skills in Matlab, C, C++, Java or Python</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>Written test</td><td>53.0%</td><td>75.0%</td></tr>
<tr><td>Projects</td><td>51.0%</td><td>25.0%</td></tr>
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<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>Norvig P, Russel S, Artificial Intelligence: A Modern Approach, Global Edition, 2021</td></tr>
<tr><td>Supplementary literature</td><td>Any general book on AI, ANN (incl. Deep Learning) and genetic algorithms</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Describe Dijkstra algorithm
Describe algorithm for learning artificial neuron
Present advantages, disadvantages and limitations of ANN

Full list of examplary questions will be presented to students before the test.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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