GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Fundamentals of mechatronics and artificial intelligence, PG_00055061		
Field of study	Management and Production Engineering		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2023/2024
Education level	first-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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Ryszard Jasiński	
	Teachers	dr hab. inż. Ryszard Jasiński dr hab. inż. Marek Galewski	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	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	45	4.0	26.0	75

Subject objectives	Providing the students essential definitions and methods in the fields of Mechatronics and Artificial Intelligence

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U08] can assess the usefulness of routine methods and tools for solving practical production tasks in measuring in order to supervise processes and analyze the functioning of production systems	Student selects proper techniques for modelling and mechatronic design as well as adopts Ai algorithms adequate to the given task	[SU1] Assessment of task fulfilment
	[K6_U07] is able to conduct a preliminary economical analysis of undertaken engineering activities, is able to can conduct a critical analysis and evaluation of existing production processes and courses of selected sections of manufacturing systems, is able to identify the needs of the application of technical solutions for automation and / or robotization production stations and formulate the specifications of the resulting benefits and limitations	Student formulates sepcifiaction for simple mechatronic projects	[SU5] Assessment of ability to present the results of task
	[K6_W02] has knowledge of materials, their properties and research methods, including construction materials used in the machinery industry, has ordered, theoretically founded knowledge of mechanics including modeling of mechanical systems in the field of statics, kinematics and dynamics, and has an ordered, theoretically founded knowledge in the field of strength analysis materials and products	Student develops simulation models of basic elements of mechatronic systems	[SW1] Assessment of factual knowledge
	[K6_U06] when formulating and solving engineering tasks a student can see aspects of system management and organization of individual and as a team, taking into account the human factor, has necessary peparation for work in an industrial environment, and knows the rules and standards related to occupational health and safety	Student presents principles of interdisciplinary approach to mechatronic design	[SU3] Assessment of ability to use knowledge gained from the subject
	[K6_K01] feels the need for self-realization by learning throughout life, is looking for modern and innovative solutions in their actions, is able to think creatively and act in an entrepreneurial way	Student kows current state od AI developement and is aware of a high progrss rate in ths field	[SK4] Assessment of communication skills, including language correctness
Subject contents	Introduction to mechatronics Essential problems of mechatronic design Interdiciplinaru design in mechatronics Integration of various elements in mechatronic systems Signal processing and analysis Introduction to Artificial Intelligence Core AI methods Evolutionary algorithms Artificial Neural Networks and Deepl Learning Laboratory - modelling of mechatronic system elemnts - Artificial Neural Networks and Deep Learning		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Finishing of tasks given during laboratory classes	60.0%	40.0%
	Written test	55.0%	60.0%
Recommended reading	Basic literature	Mechatronika i projektowanie mechatroniczne. Białystok: Wyd. Polit. Białostockiej 1997. Rutkowski L., Metody i techniki sztucznej inteligencji, PWN, Warszawa, 2018	

	Supplementary literature	AI tutorials for Matlab at mathworks.com
	eResources addresses	Adresy na platformie eNauczanie: Podstawy mechatroniki i sztuczna inteligencja, WL, ZIP I st., sem. 04, 23/24 (PG_00055061) - Moodle ID: 36185 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36185
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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