GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mechatronic design, PG_00033865		
Field of study	Nanotechnology		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2024/2025
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	3	Language of instruction	Polish
Semester of study	5	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Mechanics and Mechatronics -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Krzysztof Kaliński	
	Teachers	dr inż. Tomasz Fąs prof. dr hab. inż. Krzysztof Kaliński	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	15.0	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	1.0	19.0	50

Subject objectives

Acquiring basic knowledge and skills in scope of modelling of mechatronic systems and mechatronic design.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W09	The student recognizes methods designing the structure of systems mechatronic and observed signals. Student defines team tasks mechatronic design	[SW1] Assessment of factual knowledge
K6_U07	The student demonstrates mastery design methods mechatronic systems stationary and their economics use.	[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
K6_U04	The student identifies phenomena related to functioning mechatronic systems.	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools

Subject contents

LECTURES. Basic terms and features of mechatronic design. Modeling in mechatronics. Models of elements of mechatronic systems. Analogies between physical environments. Equations of dynamics in generalized coordinates. Transfer function. Static characteristics. Mechatronic design issues. Methods of implementing mechatronic projects. Modeling of multibody systems. Natural vibrations of systems with a finite number of degrees of freedom. Multidimensional control systems.

LABORATORY. Identification of mechatronic component in the projects. Propositions of mechatronic solutions and concept of their performance.

<table>
<tr><td>Prerequisites and co-requisites</td><td>Mechanics of solids and fluids.

Introduction to electronics and electrical engineering.

Fundamentals of automatic control</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>Project</td><td>100.0%</td><td>50.0%</td></tr>
<tr><td>Passing colloquium</td><td>50.0%</td><td>50.0%</td></tr>
</table>
</td></tr>
<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. Gawrysiak M.: Mechatronics and mechatronic design. Białystok: The Publication of BUT 1997 (accessible in internet).
2. Heimann B., Gerth W., Popp K.: Mechatronics. Components methods examples. Warszawa: Scientific Publication PWN 2001.
3. Mechatronic design. Chosen problems. (Ed. T. Uhl). Kraków: Chair of Robotics and Mechatronics AGH, every year since 2006.
4. Cannon R. H.: Dynamics of physical systems. Warszawa: WNT 1973.</td></tr>
<tr><td>Supplementary literature</td><td>1. Kaczorek T.: Control and systems theory. Warszawa: Scientific Publication PWN 1993.
2. Kaliński K.: A surveillance of dynamic processes in mechanical systems. Gdańsk: The Publication of GUT 2012.
3. Grzegożek W., Adamiec-Wójcik I., Wojciech S.: Computer modelling of the car vehicles dynamics. Kraków: The T. Kościuszko Cracow University of Technology 2003.</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:
Projektowanie mechatroniczne, W, Nano, Ist, sem. 05, zima, 2024/25, (PG_00033865) - Moodle ID: 40910
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40910</td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. Development of functional systems design. The tasks of mechatronic design.
2. The dissipating energy components of mechatronic systems.
3. 2-wheeled mobile robot as example of original mechatronic device.
4. Example of mechatronic design on a basis about the only systems knowledge.
5. Modelling of multi-body systems. Dynamic equations.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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