GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mechatronics and Mechanism Theory, E:41022W0						
Field of study	Space and Satellite Technologies						
Date of commencement of studies	February 2025		Academic year of realisation of subject	2024/2025			
Education level	second-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery	at the university			
Year of study	1		Language of instruction	English			
Semester of study	1		ECTS credits	2.0			
Learning 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	prof. dr hab. inż. Edmund Wittbrodt					
	Teachers	prof. dr hab. inż. Edmund Wittbrodt dr hab. inż. Krzysztof Lipiński					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	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		0.0	0.0	30	
Subject objectives	Extension of the knowledge and experience gained in the framework of general mechanics with the isssues related to space applications.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W01] has extended knowledge of selected areas of mathematics making it possible to solve computational problems and develop research results of technical tasks.	The student has knowledge of mathematics enabling the implementation of tasks in the field of mechatronics and mechanisms theory.	[SW1] Assessment of factual knowledge
K7_U03	Student is able to recognize, formulate and, to a basic extent, solve scientific problems in the field of mechatronics and mechanism theory.	[SU3] Assessment of ability to use knowledge gained from the subject
K7_U09	Student is able to evaluate and use typical methods and tools for calculating mechanics as well as modify the existing methods.	[SU1] Assessment of task fulfilment
[K7_K01] is aware of the constant necessity of improving and broadening their knowledge; can inspire and organise the teaching and learning process.	He is aware of the constant need to supplement and expand his knowledge in the field of mechatronics and mechanism theory.	[SK2] Assessment of progress of work
[K7_W02] has ordered and theoretically grounded knowledge of selected aspects of astronomy and astrophysics constituting the basis for solutions in the field of space and satellite technologies.	He has ordered and theoretically grounded knowledge of selected aspects of astronomy and astrophysics constituting the basis for solutions in the field of space and satellite technologies.	[SW1] Assessment of factual knowledge
K7_W03	He has structured, theoretically based knowledge of mechatronics in space applications, as well as mechanical technologies and the design of space mechanisms and structures.	[SW1] Assessment of factual knowledge
K7_U06	Student is able to formulate and test hypotheses related to the problems of mechatronics and mechanism theory.	[SU2] Assessment of ability to analyse information
K7_U13	He is able to select a kinematic structure and design a mechanical structure for it to perform specific tasks, and is able to select and verify the correctness of the selection of basic materials for solutions in space engineering.	[SU1] Assessment of task fulfilment

Subject contents

Extension of the knowledge gained in the framework of general mechanics (statics, kinematics, dynamics). Familiarization with the description of the kinematics and dynamics of movement and any spherical body, the point of moving complex issues collisions, dynamic systems with variable mass and the basics of analytical mechanics (general equation of dynamics, the principle of virtual work, Lagrange equations I and type II); Theory of machines and mechanisms in the construction space. Method of vector and matrix to describe the geometry of mechanisms, known methods of kinematic analysis of planar mechanisms and Denavit-Hartenberg notation; Spacecraft structures; Finite Elements Method; Robotics, automatics, system control, manipulators kinematics, sensors and actuators, design robotic devices for use in space; Modeling methods in design: Broaden and consolidate knowledge in the field of machine design. Practical utilization FEM software.

Prerequisites and co-requisites

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Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
exam	50.0%	50.0%
exercises	50.0%	50.0%

Recommended reading

Basic literature	Students will receive a reading list at the beginning of the semester.
Supplementary literature	-
eResources addresses	Adresy na platformie eNauczanie: Mechatronics and Mechanism Theory, L, EMSS, st. II, summer 2024/2025 - Moodle ID: 45843 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=45843

Example issues/ example questions/ tasks being completed

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Work placement

Not applicable