GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mechatronics in Space Applications, PG_00050012		
Field of study	Space and Satellite Technologies		
Date of commencement of studies	February 2024	Academic year of realisation of subject	2023/2024
Education level	second-cycle studies	Subject group	Obligatory subject group 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	1	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	dr inż. Mariusz Dąbkowski	
	Teachers	dr inż. Mariusz Dąbkowski	

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	5.0	15.0	50

Subject objectives

The aim of the course is to familiarize students with the concepts of mechatronics design of mechatronics and mechatronic products designed for space technologies, discussion of basic measurement systems and fuels for use in mechatronics, systematization of messages associated with the use of computer simulation and optimization of the design of mechatronic devices in space applications.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K7_W03	The student has knowledge of mechatronics	[SW1] Assessment of factual knowledge
K7_U07	The student is able to estimate the cost of making a mechatronic improvement	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
K7_W06	The student knows the development trends in mechatronics in space application	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K7_K03] Can analyse and implement assigned tasks while maintaining high technical standards. Is able to work and interact in a group, taking on different roles. Adheres to the principles of professional ethics and respects the diversity of views and cultures.	The student knows how to work in a group by solving the assigned tasks	[SK1] Assessment of group work skills
K7_U09	Students can use new solutions	[SU4] Assessment of ability to use methods and tools

Subject contents	- LECTURES:Basic definitions and terms of mechatronics. Mechatronic design issues with particular emphasis on space applications. Interdisciplinarity in mechatronic design. Integration of mechanical, electrical and electronic components, control systems and software in mechatronic design. Methods of implementing mechatronic projects. Technologies for implementing mechatronic projects. Structural modeling methods in mechatronic design. Modal analysis in mechatronic design. Measurement techniques in mechatronic design tasks. Examples of mechatronics projects in space applications.DESIGN:During classes, students carry out one mechatronic project in interdisciplinary teams, with competences divided among individual team members. As part of the project, students design a mechatronic device that can be used in space exploration.	
Prerequisites and co-requisites		
Assessment methods and criteria		

Subject passing criteria	Passing threshold	Percentage of the final grade
	100.0%	60.0%
	56.0%	40.0%

Recommended reading	Basic literature	**Literatura podstawowa** 1. Heimann B., Gerth W., Popp K.: Mechatronika. Komponenty metody przykłady. Warszawa: Wyd. Nauk. PWN 2001. 2. Gawrysiak M.: Mechatronika i projektowanie mechatroniczne. Białystok: Wyd. Polit. Białostockiej 1997. 3. Projektowanie mechatroniczne. Zagadnienia wybrane. (Red. T. Uhl). Kraków: Kated. Robotyki i Mechatroniki AGH 2006, 2007, 2008, 2010, 2011.
	Supplementary literature	1. Schmidt D. (red.), Mechatronika, Warszawa 2002, REA 2. David G. Alciatore, Michael B. Histand, Introduction to Mechatronics and Measurement Systems (Engineering), Mc Graw-Hill, New York 2003 3. Tarnowski W., Podstawy Projektowania Technicznego, Warszawa 1997, WNT 4. Niederliński A., Systemy i sterowanie, Warszawa 1983, PWN 5. Wybrane zagadnienia analizy modalnej konstrukcji mechanicznych. (Red. T. Uhl). Kraków: Kated. Robotyki i Mechatroniki AGH 2005, 2006, 2008, 2009, 2010
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	-	
Work placement	Not applicable	