GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mechatronic design, PG_00057483					
Field of study	Mechanical and Medical Engineering					
Date of commencement of studies	February 2023		Academic year of realisation of subject		2022/2023	
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	1		ECTS credits		4.0	
Learning profile	general academic profile		Assessment form		exam	
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. Szymon Grymek			
	Teachers		dr hab. inż. Szymon Grymek			

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	15.0	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	10.0	45.0	100

Subject objectives	The aim of the course is to introduce students to the concepts of mechatronics and mechatronic product, presenting problems of mechatronic design and mechatronic products designed for the needs of medicine, discussion of basic measurement systems and drives for use in mechatronics, systematising of information related to the use of computer simulation and optimization in the design of mechatronic devices.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U03] He/she can prepare an elaboration and presentation related to the general and specific engineering tasks located in Polish and foreign languages	Student is able to develop a report on the construction, design and principles of operation of mechatronic medical devices and use foreign language sources.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
	[K7_W06] He/she in-depth knowledge related to construct, design and build of mechanical devices and mechanical-medical devices	The student has a thorough knowledge of machinery design and construction.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	[K7_W08] He/she broad knowledge related to understand social, economic, legal, ecological and other outer techniques conditions of engineering activities in mechanical-medical engineering	The student has an extended knowledge in the field of non-technical conditions of engineering activities in mechanical and medical engineering.	[SW1] Assessment of factual knowledge
	[K7_U07] He/she can see systematic and outer technique aspects while stating and solving the tasks	The student is able to see systemic aspects when solving engineering tasks.	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment

Subject contents	Mechatronics idea, basic concepts and definitions. Interdisciplinarity and integration in mechatronic products. Mechatronic products in medicine. Basic concepts of mechatronic design. Sensors in mechatronic objects. Actuators in mechatronic objects. Controllers and control in mechatronic objects. Modelling of mechatronic objects. Simulation. Optimization. User interface in mechatronic products.

Prerequisites and co-requisites	Basic knowledge of mechanics, automatic control, metrology, electronics and computer science.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exam	50.0%	50.0%
	Laboratory reports	100.0%	25.0%
	Design	100.0%	25.0%

Recommended reading	Basic literature	Heimann B., Gerth W., Popp K., Mechatronika, Warszawa 2001, PWN Schmidt D. (red.), Mechatronika, Warszawa 2002, REA David G. Alciatore, Michael B. Histand, Introduction to Mechatronics and Measurement Systems (Engineering), Mc Graw-Hill, New York 2003 Tarnowski W., Podstawy Projektowania Technicznego, Warszawa 1997, WNTNiederliński A., Systemy i sterowanie, Warszawa 1983, PWN Gawrysiak M.: Mechatronika i projektowanie mechatroniczne. Białystok: Wyd. Polit. Białostockiej 1997
	Supplementary literature	Mrozek B., Mrozek Z., MATLAB i Simulink. Poradnik użytkownika. 2004, Helion Pratap R., MATLAB7 dla naukowców i inżynierów, 2009, PWN http://wiki.octave.org/
	eResources addresses	Adresy na platformie eNauczanie: Projektowanie mechatroniczne, W/L/P, IMM II, sem. 1 letni 22/23 (PG_00057483) - Moodle ID: 28860 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28860

Example issues/ example questions/ tasks being completed	1. What is a mechatronic system?2. Are the different scalar objective function and utility function. Give examples.3. What is SCADA? Give examples.4. Explain the principle of operation of the cascade control.5. Enter the most common criteria of control quality.6. Give and briefly comment types of drives used in mechatronics.
Work placement	Not applicable