



## Subject card

Subject name and code	Mechatronic design, PG_00033865						
Field of study	Nanotechnology						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2025/2026		
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	Faculty of Mechanical Engineering and Ship Technology -> Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Krzysztof Kaliński				
	Teachers		prof. dr hab. inż. Krzysztof Kaliński  dr inż. Natalia Stawicka-Morawska				
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_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		
	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_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		
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.  PROJECT. Identification of mechatronic component in the projects. Propositions of mechatronic solutions and concept of their performance.						

Prerequisites and co-requisites	Mechanics of solids and fluids.		
	Introduction to electronics and electrical engineering.		
	Fundamentals of automatic control		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Passing colloquium	50.0%	50.0%
	Project	100.0%	50.0%
Recommended reading	Basic literature	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.	
	Supplementary literature	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. Grzegózek W., Adamiec-Wójcik I., Wojciech S.: Computer modelling of the car vehicles dynamics. Kraków: The T. Kościuszko Cracow University of Technology 2003.	
	eResources addresses		
	Example issues/ example questions/ tasks being completed	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.	
Work placement	Not applicable		

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