GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00050052					
Field of study	Space and Satellite Technologies, Space and Satellite Technologies					
Date of commencement of studies	February 2023		Academic year of realisation of subject		2023/2024	
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	2		ECTS credits		4.0	
Learning profile	general academic profile		Assessment form		exam	
Conducting unit	Department of Mechanics and Mechatronics -> Faculty of Mechanical Engineering and Ship Technology					
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Michał Mazur			
	Teachers					

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	0.0	0.0	60
	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	60	10.0	30.0	100

Subject objectives	Overview of issues related to mechanical vibrations with particular emphasis on the subject of space structures.

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 can formulate and solve equations of motion for vibrating systems. The student can determine the shapes and frequencies of natural vibrations by solving eigenvalues problem.	[SW1] Assessment of factual knowledge
	K7_U08	Has knowledge of identification methods and their application.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
	[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.	Is able to realize team projects.	[SK1] Assessment of group work skills

Subject contents	1. Vibrations of systems with one degree of freedom2. Vibrations of systems with two degrees of freedom3. Vibroisolation4. Vibrations of systems with many degrees of freedom5. Basics of Modal Analysis6. Experimental Modal Analysis

Prerequisites and co-requisites	Mathematics, Physics, Mechanics

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	50.0%	40.0%
	Written exam	50.0%	60.0%

Recommended reading	Basic literature	• Kaliński K.: Nadzorowanie procesów dynamicznych w układach mechanicznych. Wydawnictwo PG, Gdańsk 2012 • Gawronski W.K.: Advanced Structural Dynamics and Active Control of Structures. Springer, 1998.
	Supplementary literature	• Kaliński K.: Nadzorowanie procesów dynamicznych w układach mechanicznych. Wydawnictwo PG, Gdańsk 2012 • Gawronski W.K.: Advanced Structural Dynamics and Active Control of Structures. Springer, 1998.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Discuss the ERA method2. Residua - what is it? Physical interpretation?3. Upper and lower residua. For what? Physical interpretation4. Time windows. Examples? For what?5. Estimator H16. Estimator H27. Spectrum leak8. OMA: Pros, Cons, Inputs.9. FBS10. CMS11. MAC Disadvantages? Advantages? What counts and what does not count?12. xMIF functions - discuss why?13. What is a signal? Division.14. Assumptions of Modal Analysis15. Methods of scaling the mode of natural vibrations16. Aliasing when sampling signals - what is it? how to counteract?17. How can we check if the measurements were taken correctly?18. How can we check that the identification is correct?19. Discuss the stages of identification20. Vibration eliminator21. Vibroisolation22. What is the difference between free vibrations from vibrations forced by a harmonic signal?23. Resonance characteristics24. Frequency of the oscillating system25. The frequency of free damped vibrations26. Critical damping	
Work placement	Not applicable	