



Subject card

Subject name and code	Mechanical Vibration Theory, PG_00051279						
Field of study	Transport and Logistics, Transport and Logistics						
Date of commencement of studies	October 2020	Academic year of realisation of subject				2021/2022	
Education level	first-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery				at the university	
Year of study	2	Language of instruction				Polish	
Semester of study	3	ECTS credits				2.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Department of Hydromechanics and Hydroacoustics -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Michał Krężelewski				
	Teachers		dr inż. Michał Krężelewski dr inż. Marek Kraskowski mgr inż. Olga Kazimierska				
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		4.0		16.0	50
Subject objectives	Knowledge of the basic problems of mechanical vibrations and solve them based on the laws of mechanics vibration.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W02] has a basic knowledge in physics, including technical mechanics, fluid mechanics, solid-state physics, optics and acoustics necessary to understand basic physical phenomena occurring in transport		Applies the laws and methods of vibration mechanics.		[SW1] Assessment of factual knowledge		
	[K6_U02] can work individually and in a team, communicate through various techniques in professional environment and also record, analyse, and present the results of work, can estimate the time needed to complete a given task		Formulates the basic problems of vibration mechanics.		[SU1] Assessment of task fulfilment		
Subject contents	<p>Basic quantity and remarks.</p> <p>Viscous damping, dry friction damping, material and constructive damping. Logarithmic decrement, loss factors.</p> <p>Periodic and harmonic vibrations. Frequency and amplitude of vibrations.</p> <p>Free vibration of one-degree of freedom linear system. Critical damping.</p> <p>Vibration of one-degree of freedom linear system excited by harmonic force, harmonically moving support and rotating unbalance. Resonance phenomena and resonance curves.</p> <p>Vibration of two-degree of freedom linear system. Dynamic damper.</p> <p>Vibration of linear system with many-degree of freedom. Matrix equation of motion. Frequency spectrum and vibration modes.</p> <p>Mechanical energy of vibrating system – Rayleigh's method.</p> <p>Principles of vibroisolation and shock absorption.</p> <p>Influences of mechanical vibrations on human body and environmental. Standards.</p>						
Prerequisites and co-requisites	<p>Student passed following subjects:</p> <ul style="list-style-type: none"> - Technical mechanics I - Technical mechanics II - Strength of materials 						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Midterm colloquium		50.0%		100.0%		

Recommended reading	Basic literature	Basic literature 1. Thomson W.T.: Vibration theory and applications, Prentice-Hall Int. Inc., ISBN 013651068X 2. Thureau P., Lecler D.: An introduction to the principles of vibration of linear systems, John Wiley@sons, ISBN 0-470-27230-9 3. Kelly G.: Fundamentals of mechanical vibrations, McGraw-Hill Publ. Comp., ISBN 0-07-911533-0
	Supplementary literature	None
	eResources addresses	
Example issues/ example questions/ tasks being completed	Mechanical vibration, vibration damped, forced vibration	
Work placement	Not applicable	