GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Structural Dynamics, PG_00048222		
Field of study	Civil Engineering		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2025/2026
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	Part-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	7.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department Of Mechanics Of Materials And Structures -> Faculty Of Civil And Environmental Engineering -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marek Jasina	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	20.0	0.0	0.0	0.0	50

E-learning hours included: 0.0

Adresy na platformie eNauczanie:

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	50	7.0	118.0	175

Subject objectives

The aim of the course is to solve problems of structural dynamics using discrete models with one and n degrees of freedom.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U03] can perform classic statical and dynamical analysis of rod structures stability (trusses, frames and ties), both statically determined and undetermined as well as surface structures (plates, membranes and shells)	Student creates dynamic models of plane frames and trusses. Student computes stiffness and flexibility matrices of dynamic system. Student compute the frequency of vibrations of the structure.	[SU1] Assessment of task fulfilment
[K7_W03] knows basics of Continuum Mechanics, knows rules of static analysis, stability and dynamics of complex rod, shell and volume structures, both in linear and basic nonlinear regime	Student designs simple engineering structures considering free and forced vibration due to initial conditions and external excitation.	[SW1] Assessment of factual knowledge

Subject contents

Introduction. Basic definitions. Modelling of dynamic systemsBasic dynamics laws. Forces in dynamic systems. Equation of motion. Introduction to MATLABFree vibrations of 1-DOF systemsForced vibrations of 1-DOF systems.Design of 1-DOF system under dynamic loadingFree vibration of N-DOF systems.Forced vibrations of N-DOF systemsVibration measurement technology. Vibrations reduction systems in engineering structuresExperimental dynamic analysis

Prerequisites and co-requisites

Completion of previous courses: Mechanika Ogólna, Wytrzymałość Materiałów, Mechanika Budowli.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	exam	60.0%	50.0%
	tests	60.0%	50.0%
Recommended reading	Basic literature	1. Chopra A.K.: Dynamics of structures. Upper Saddle River, New Jersey: Prentice Hall 2001	
	Supplementary literature	1. Clough R.W., Penzien J.: Dynamics of structures. McGraw-Hill Inc. 1993	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Determine the natural frequency of a frame system with one dynamic degree of freedom.Determine the damping ratio based on the measured displacement of free vibrations.Determine the frequencies and mode shapes of the frame system with n-dynamic degrees of freedom		
Work placement	Not applicable		

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