Subject card

Subject name and code	Mechanics, PG_00055877					
Field of study	Power Engineering					
Date of commencement of studies	October 2024		Academic year of realisation of subject		2024/2025	
Education level	first-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		5.0	
Learning profile	general academic profile		Assessment form		exam	
Conducting unit	Structural Mechanics Department -> Faculty of Civil and Environmental Engineering					
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Marcin Kujawa			
	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	9.0	56.0	125

Subject objectives	The course covers issues related to the basic principles of design of energy engineering structures in the field of statics with elements of strength of materials and structural dynamics.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U01] can obtain information from literature and other sources, organize, interpret it and draw and formulate conclusions; has the ability to self-educate, interprets the results of completed engineering tasks, is able to design simple energy systems and their systems	The student obtains information from the literature and other sources. The student interprets the results of his/her work.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
	[K6_W01] has basic knowledge of mathematics necessary to describe the phenomena related to the processes of energy conversion and transfer; uses information technology to solve mathematical problems	Students solve basic engineering design problems using mathematical methods.	[SW3] Assessment of knowledge contained in written work and projects
	[K6_W04] has structured knowledge of mechanics, including the issues of material strength and general principles of shaping structures, necessary to conduct basic strength analyzes and design simple mechanical or construction systems for power industry or environmental engineering; knows the basics of machine construction and the most commonly used construction and operating materials	The student knows the algorithm of static analysis of basic bar structures with elements of strength of materials. The student performs the task of static and dynamic analysis of engineering structures.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[K6_W16] has an elementary knowledge about energy and environmental construction including building materials, their strength, construction mechanics and building physics, moisture migration in buildings, heat transfer through building partitions, has a basic knowledge of marine and inland hydrotechnical structures; has knowledge of the hydraulic and hydrological conditions of designing facilities and building structures, photogrammetry, remote sensing, hydrography, and spatial analysis.	The student names and identifies basic structures and structure elements within engineering structures used in the energy industry.	[SW1] Assessment of factual knowledge

Subject contents	
	Statics: basic of structural mechanics (static determinability and indeterminability; kinematic variation; determination of reactions and internal forces in plane bar systems - beams; frames, trusses, arches) numerical examples **Strength of materials:** elements of strength of materials (center of gravity; moments of inertia; stresses; stability; displacements in plane bar systems) numerical examples **Dynamics:** systems with one dynamic degree of freedom, free vibration without damping, forced vibration without damping, forced vibration with damping, free vibration with damping numerical examples

Prerequisites and co-requisites	

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exam	50.0%	60.0%
	Project	50.0%	40.0%

Recommended reading	Basic literature	1. R.C. Hibbeler, Engineering Mechanics: Statics and Dynamics, Macmillan Publishers 2. D.J. McGill, W.W King, Engineering Mechanics: An Introduction to Statics and Dynamics

	Supplementary literature	Nimal Rajapakse, Dietmar Gross, Werner Hauger, Jörg Schröder, Wolfgang A. Wall: Engineering Mechanics 1. Springer-Verlag Berlin Heidelberg 2009, https://doi.org/10.1007/978-3-540-89937-2 w wersji elektronicznej dostępny poprzezBibliotekę Główną Politechniki Gdańskiej
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		Discuss the division of structures based on their geometry.What is the limit state method? What is the difference between ultimate limit state and serviceability limit state?How to determine the degree of static indeterminacy of a structural system? What is kinematic variation/non-variation of the structural system? Discuss and briefly characterize the concepts of stress state and internal forces. What is a influence line?

State Hook's law.What is flexural stiffness? What is the period of vibration? What is frequency of vibration? What is natural frequency of vibration?What is resonance region in the dynamics of engineering structures? |
| Work placement | | Not applicable |