GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Technical Mechanics 1, PG_00049762		
Field of study	Power Engineering, Power Engineering		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2021/2022
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	English
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Structural Mechanics Department -> Faculty of Civil and Environmental Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Maciej Kahsin	
	Teachers	dr inż. Maciej Kahsin	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	0.0	0.0	0.0	45

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	45	5.0	25.0	75

Subject objectives

The background in theoretical and technical mechanics (strength of materials)

Formulation and solution of problems of mechanics of structural systems

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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	Student is able to identify mechanical problem, anticipate and formulate mathematical and design form of solution	[SW1] Assessment of factual knowledge
[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	Student is able by hem/herself acquire and master required knowledge pertaining solution of technical problem	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information
[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.	Student is able to choose appropriate design solution based on characteristic of material properties	[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	Student is able to solve basic structural problems with use of mechanics approach	[SW3] Assessment of knowledge contained in written work and projects

Subject contents

STATICS: Force projection on to an axis. Moment of a force about a point and an axis. Parallel shifting of a force, reduction of a set of forces. Equilibrium conditions and equations for a rigid body within plane and space systems. Mass and gravity centers of a set of particles, curves and solids.

KINEMATICS: Kinematics of a particle, track of motion, velocity, acceleration, particle motion along a straight line, circular track, normal and tangential components of acceleration. Planar kinetics of a rigid body, instantaneous center of zero velocity and acceleration, planar mechanisms. Compound motion, absolute and relative motion analyses,.

DYNAMICS: Dynamics of a particle, direct and inverse problems, differential equations of motion, integration of a planar motion analytical solutions, dAlembert principle, momentum and angular momentum conservation laws, energy conservation law, constrained motion. Dynamics of a set of particles, equations of motion of the mass center. Dynamics of continuous systems, planar motion of a rigid body, rotation about a fixed axis, moments of inertia, parallel-axis theorem

Prerequisites and co-requisites

Mathematics, physics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Test - theory	51.0%	40.0%
Test - numerical problems	51.0%	60.0%

Recommended reading

Basic literature	Hibbeler R.C.: Engineering Mechanics Statics, Dynamics. Prentice Hall 2010. Hibbeler R.C.: Statics and mechanics of materials. Prentice Hall 2004
Supplementary literature	no items

	eResources addresses	
Example issues/ example questions/ tasks being completed	Compute constraint forces in a static system, reduce the force system to a point	
Work placement	Not applicable	