GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Engineering Mechanics , PG_00058748		
Field of study	Environmental Engineering		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	Obligatory subject group 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	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Structural Mechanics -> Faculty of Civil and Environmental Engineering -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Violetta Konopińska-Zmysłowska	
	Teachers		

Lesson types

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	33.0	83

Subject objectives

Student is able to recognize kinds of structures with respect to theoretical model and construct schemes of statically determined systems. Student is able to write equilibrium equations and calculate reaction forces and internal forces.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W08] has elementary knowledge of construction: including building materials, their strength, construction mechanics and building physics, moisture migration in buildings, heat transfer through building partitions	Student has basic knowledge of simple engineering structures. Student knows basic types of loads of structures and is able to prepare static schemes of basic structures. Student is able to calculate reaction forces and internal forces for statically determinate beams and frames.	[SW1] Assessment of factual knowledge
[K6_W02] has knowledge of physics, including mechanics, thermodynamics, optics, electricity and magnetism, nuclear physics and solid state physics, including knowledge necessary to: 1) understand the basic physical phenomena related to material durability, fluid mechanics and hydraulics, building physics, geodetic measurements ; 2) understanding the principles of operation of basic electrical devices and systems; 3) solving project tasks of the sanitary industry;	Student has basic knowledge of simple engineering structures. Student knows basic types of loads of structures and is able to prepare static schemes of basic structures. Student is able to calculate reaction forces and internal forces for statically determinate beams and frames.	[SW1] Assessment of factual knowledge

Subject contents

Course content – lecture
Principles of statics and basic definitions of structural mechanics. The use of vector calculus in mechanics, reduction of the system of forces, planar system of forces. Classification of structural systems. Static schemes of real engineering structures, types of support, classification of loads. Static determination of bar systems. Differential relations of internal forces. Equilibrium equations of structure and determination of support reactions. Internal forces (axial, shear and bending moment) in elementary structures such as: beams, frames, complex systems, trusses. System deformation under load.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Rudiments of vector algebra and analysis, differential calculus.</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Midterm colloquiums</td><td>60.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">Konopińska-Zmysłowska V., Pestka (Mleczek) A., Oziębło M., Tomaszewska A.: Wybrane problemy mechaniki układów prętowych, zbiór zadań, Wydawnictwo Politechniki Gdańskiej 2016, 2017, 2018.

McGill D.J.: Engineering Mechanics, PWS Publishers, Boston, 1985</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">Seely F.B., Ensign N.E., Jones P.G.: Analytical Mechanics for Engineering, Wiley, New York, 1958</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">Formulate the basic principles of statics;

Give the differential relationships between the functions of transverse load, shear forces and bending moments of a straight bar;

Calculate the degree of static indeterminacy of a given bar system;

Propose a static scheme of a given structural system;

Static analysis (support reactions, distribution of internal forces) of a given beam system under a given load;

Draw the deformation of the given system under the influence of an external load;

Determine the maximum and minimum axial force generated in a given truss system under the influence of an external load;</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="3">Not applicable</td></tr>
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