GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Engineering Mechanics, PG_00060087		
Field of study	Civil Engineering		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2022/2023
Education level	first-cycle studies	Subject group	
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	8.0
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. Ireneusz Kreja	
	Teachers	dr hab. inż. Ireneusz Kreja dr inż. Magdalena Oziębło mgr inż. Łukasz Żmuda-Trzebiatowski dr inż. Katarzyna Szepietowska mgr inż. Milena Drozdowska dr inż. Marek Skowronek dr hab. inż. Agnieszka Tomaszewska	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	60.0	0.0	0.0	0.0	90
	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	90	0.0	0.0	90

Subject objectives

Students should be able to: construct static schemes and recognize between statically determinate and statically indeterminate systems; write equilibrium equations and calculate reactions; determinate internal forces and influence lines for statically determinate beam structures; use influence lines to analyse the extreme loading conditions

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W02] Demonstrate knowledge and understanding of the processes and established methods of analysis / solution of engineering issues & problems in the field of civil engineering and of their limitations.	Basic-level background of terms and principles of classical mechanics. The use of principles of static model formation. The assessment of statical determinacy, geometric stability and the degree of structural redundancy.	[SW3] Assessment of knowledge contained in written work and projects
[K6_U02] Analyse & solve engineering issues & problems in the field of civil engineering by applying appropriate and relevant established analytical, numerical and experimental methods.	The student conducts statical analysis of a given statically determinate system under a specified load. The student draws influence lines of static response forces in a system and applies them to find extreme combinations of a specified load type.	[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject
[K6_U01] Apply knowledge and understanding of mathematics as well as sciences and engineering disciplines underlying civil engineering to solve engineering problems and issues.	Formation of equilibrium equations and determining support reactions. The ability to compose functions and diagrams of cross-sectional forces, influence lines and envelopes of cross-sectional forces in planar statically determinate systems. The application of influence lines to analyse extreme structural loading cases.	[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools

<table>
<tr><td>Subject contents</td><td>LECTURE Degrees of freedom and internal forces in Statics. Determination of reactions and internal forces in beams. Differential equations of equilibrium. Statically determinate planar structures: frames, arches, three-hinged systems, trusses and complex systems. Influence lines of reactions and internal forces for beams. Utilizing of influence lines. Influence lines for frames, arches, three-hinged systems, trusses and complex systems. Extreme loading. Envelope of internal forces. Space trusses. Grids.

TUTORIALS Solving problem related to: determination of reactions, internal forces and influence lines for beams, frames, three-hinged systems, trusses, complex systems, grids and space trusses.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Rudiments of vector algebra and analysis, differential and integral calculus.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Written exam</td><td>60.0%</td><td>100.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>1. 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</td></tr>
<tr><td>Supplementary literature</td><td>1. Hibbeler R.C. Structural analysis. Printice Hall 1995.
2. Carpinteri A. Structural mechanics. A unified approach. E & FN Spon 1997
3. Meriam J.L., Kraige, L.G., Engineering Mechanics. Statics. John Wiley & Sons 1998</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>• Draw the axial force, shear and moment diagrams for the given statically determinate structure.
• Draw the influence line for the given statically determinate structure.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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