



Subject card

Subject name and code	, PG_00060097						
Field of study	Civil Engineering						
Date of commencement of studies	October 2025	Academic year of realisation of subject			2025/2026		
Education level	first-cycle studies	Subject group			Obligatory subject group 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			8.0		
Learning profile	general academic profile	Assessment form			exam		
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	prof. dr hab. inż. Jarosław Górski					
	Teachers						
Lesson types	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						
	eNauczenie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=3631						
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		0.0		0.0	60
Subject objectives	Understanding the operation of statically determinate bar systems and preparing their static diagrams; identifying statically determinate and indeterminate structures. The ability to determine internal forces in statically determinate bar systems and construct influence lines for static quantities and envelopes. Using influence lines in the design of building structures.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U05] Conducts research (obtaining information, simulations, experimental methods) in the field of construction in order to solve specific tasks and report research results.	Experimental research using simple physical models of structural systems. Improving structural analysis skills using the computer application "In Search of Balance".	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
	[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 understanding and mastery of the concepts and principles of classical mechanics. Knowledge of the principles of creating static diagrams. Examination of static determinacy and geometric invariance. Determination of the degree of structural stiffness.	[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 is able to perform a static analysis of a given statically determinate system under a given load. The student is able to draw influence lines for given static quantities in the system and use them to find the most unfavorable combination of a given load type.	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
	[K6_W06] Demonstrates practical knowledge and understanding of materials, devices and tools, processes and technologies in the field of civil engineering (and their limitations).	Analysis of the static structure of structures, support schemes and types of loads acting on building structures.	[SW3] Assessment of knowledge contained in written work and projects
	[K6_U01] Apply knowledge and understanding of mathematics as well as sciences and engineering disciplines underlying civil engineering to solve engineering problems and issues.	Constructing equilibrium equations and determining reactions. Ability to determine equations and diagrams of internal forces, influence lines, and envelopes for statically determinate plane bar systems. Using influence lines to analyze extreme structural loading.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
Subject contents	<p>Course content – lecture Basic concepts, Statics of material systems: degrees of freedom and internal forces, the place of structural mechanics in structural analysis, classical assumptions of structural mechanics, classification of structural systems, types of actions, static determinacy and kinematic structure of plane bar systems. Internal reactions and forces in straight beams. Differential relationships. Continuous pinned beams. Intermediate loads. Frames. Internal forces in curved beams. Differential relationships. Arches. Three-hinged systems. Pressure lines. Trusses. Complex systems. Influence lines of straight beams. Loading of influence lines. Influence lines of continuous pinned beams, frames, and arches. Influence lines of trusses, complex and mixed systems. Extreme loading of influence lines. Bending moment envelopes. Planar girders. Spatial trusses. Grids.</p> <p>Course content – exercises Solving problems involving: determining the reactions and internal forces of simple beams, continuous pinned beams, frames, arches, trusses, complex and mixed systems, horizontally broken girders, grids, and spatial trusses. Determining influence lines for simple beams, continuous pinned beams, frames, trusses, and complex systems. Extreme loading of influence lines. Envelopes of internal forces.</p>		
Prerequisites and co-requisites	Basic elements of algebra and vector analysis, differential relationships and integral calculus.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		60.0%	100.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Branicki C. (red.) Zadania z mechaniki budowli. t.1, skrypt PG (dostępny jako zbiór w formacie PDF na portalu e-nauczanie PG). 2. Chudzikiewicz A.: Statyka budowli. t.1 Układy statycznie wyznaczalne. PWN Warszawa 1976. 3. Cywiński Z., Mechanika budowli w zadaniach. t. I. PWN Warszawa 1999. 4. Lubowiecka I., Skowronek M.: Zadania z Mechaniki Budowli. Gdańsk 2000 (dostępny jako zbiór w formacie PDF na portalu e-nauczanie PG). 5. Przewłócki J., Górski J.: Podstawy mechaniki budowli, Arkady Warszawa 2009 6. Skowronek M., Górski J., Kreja I., Smakosz Ł.: Zbiór zadań egzaminacyjnych z mechaniki ogólnej - statycznie wyznaczalne układy prętowe, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2022. 	
	Supplementary literature	Konopińska-Zmysłowska V., Mleczek A., Oziębło M., Tomaszewska A., Wybrane problemy mechaniki układów prętowych. Wydawnictwo Politechniki Gdańskiej, Gdańsk 2016	
	eResources addresses		

Example issues/ example questions/ tasks being completed	Determine the degree of static indeterminacy of a system. Determine the support reactions in a given statically determinate system. Plot internal force diagrams for a given statically determinate system. Plot the influence line of a given static quantity for a given statically determinate system.
Practical activities within the subject	Not applicable

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