



Subject card

Subject name and code	, PG_00072921						
Field of study	Civil Engineering						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2026/2027		
Education level	second-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	1		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Metal Structures -> Faculty of Civil and Environmental Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Dariusz Kowalski				
	Teachers		dr inż. Dariusz Kowalski dr inż. Aleksander Perliński dr hab. inż. Karol Winkelmann dr inż. Witold Knabe dr inż. Tomasz Heizig dr hab. inż. Piotr Iwicki dr inż. Natalia Korcz-Konkol				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	E-learning hours included: 0.0						
	eNauczanie source addresses: Moodle ID: 8286 2026_2027 Złożone konstrukcje metalowe I - KBI https://enauczanie.pg.edu.pl/2025/course/view.php?id=8286						
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	30		3.0		17.0	50
Subject objectives	The objective of the course is to present students with the principles of design, detailing, and load conditions for advanced types of engineering structures, such as: • tall structures: towers, masts, chimneys; • shell structures: tanks, silos, bins, hoppers, pipelines; • prestressed structures. Additionally, aspects of the dynamics of metal structures will be covered. The design component includes a FEM laboratory, where numerical analyses of the designed solutions will be performed.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W04] analyses in-depth complex problems on the basis of reliable data and appropriately chosen methods, reaching logical conclusions	Analyzes in an advanced manner complex problems of stress, stability, and joint stiffness in structural steel systems based on reliable material and load data, deriving logical engineering conclusions.	[SW1] Assessment of factual knowledge
	[K7_U02] interprets, in an in-depth way, phenomena and relationships between processes in the construction industry, using modern knowledge in line with the main trends in the development of scientific disciplines related to the field of study	Interprets in depth the relationships between joint/connection stiffness and the global static-dynamic performance of metal structures, following modern trends in computational modeling and structural design.	[SU1] Assessment of task fulfilment [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
	[K7_U03] uses, to a deeper extent, appropriately selected analytical, numerical and experimental tools and methods to carry out tasks in the construction industry	Applies in an advanced range appropriately selected numerical tools and methods (e.g., FEM), analytical methods, and design standards for modeling, static, non-linear, and dynamic analysis of shell, prestressed, and tall tower or chimney structures.	[SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
	[K7_W01] identifies in-depth the phenomena related to the field of study and the theories describing them, indicating reliable sources of knowledge and information relevant to the issues analysed	Identifies and describes in depth the physical phenomena and theories related to complex metal structures — including the behavior of shell, prestressed, and tall structures (chimneys, towers), as well as dynamic and non-linear phenomena, referencing relevant codes, literature, and technical knowledge sources.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
Subject contents	Course content – lecture Modeling and Analysis of Steel Structures Joint Stiffness and Its Influence on Structural Systems Selected Special Structures: Steel Tanks Prestressed Structures – Purpose, Material, and Structural Solutions <i>Steel Chimneys</i> Dynamics of Metal Structures		
	Course content – laboratory Numerical analyses of selected metal structures: • Class 4 plate-girder elements • Built-up members • Structural dynamics		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written test on lecture topics	60.0%	50.0%
	Laboratory project	60.0%	50.0%
Recommended reading	Basic literature	PN-EN 1993 – Projektowanie konstrukcji stalowych (seria norm EC3) Łubiński M., Filipowicz A., Żółtowski W.: Konstrukcje metalowe. Część I i II. Arkady, Warszawa 2006/07. Giżejowski M., Ziółko J.: Budownictwo ogólne, tom 5. – Stalowe konstrukcje budynków projektowanie wg Eurokodów z przykładami obliczeń, Arkady, Warszawa 2010. Ziółko J. Utrzymanie i modernizacja konstrukcji stalowych. Arkady 1991. Ziółko J. i inni: Stalowe konstrukcje specjalne. Arkady, Warszawa 1995. Biegus A.: Stalowe budynki halowe. Arkady, Warszawa 2003. Kozłowski A.: Konstrukcje stalowe. Przykłady obliczeń wg PN-EN 1993-1. Oficyna wydawnicza Politechniki Rzeszowskiej. Rzeszów 2009 Bródka J. Przebudowa i utrzymanie konstrukcji stalowych. Politechnika Łódzka 1995. Praca zbiorowa.: Poradnik projektanta konstrukcji metalowych. Arkady, Warszawa 1982. Rykaluk K.: Konstrukcje stalowe. Kominy, wieże, maszty. OWPW, Wrocław 2004. Kucharczuk W., Labocha S. Konstrukcje zespolone stalowo-betonowe budynków. Arkady. Warszawa 2007. PN-90/B-03200 - Konstrukcje stalowe. Obliczenia statyczne i projektowanie.	

	Supplementary literature	Pałkowski Sz.: <i>Konstrukcje stalowe. Wybrane zagadnienia obliczania i projektowania</i>, Wydawnictwo Naukowe PWN, Warszawa 2001 Praca zbiorowa pod red. A. Kozłowskiego: <i>Konstrukcje stalowe. Przykłady obliczeń według PN-EN 1993-1. Część pierwsza. Wybrane elementy i połączenia</i>. Oficyna Wydawnicza PRz, Rzeszów 2009. Część druga. <i>Stropy i pomosty</i>. Oficyna Wydawnicza PRz, Rzeszów 2011. Rykaluk K.: <i>Konstrukcje stalowe. Podstawy i elementy</i>. DWE, Wrocław 2001. Rykaluk K.: <i>Konstrukcje stalowe. Kominy, wieże, maszty.. OWPW</i>, Wrocław 2004
	eResources addresses	
Example issues/ example questions/ tasks being completed	Principles of design for steel shell structures – tanks, silos, bins, pipelines, bunkers Principles of design for tall steel structures – masts, towers, chimneys, power transmission towers Principles of modeling for metal objects, structures, and components Principles of design for prestressed steel structures Principles of structural dynamics analysis for metal structures	
Practical activities within the subject	Not applicable	

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