GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Complex metal structures, PG_00041065		
Field of study	Civil Engineering		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2022/2023
Education level	second-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	Polish
Semester of study	1	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Metal Structures -> Faculty of Civil and Environmental Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Elżbieta Urbańska-Galewska	
	Teachers	dr inż. Natalia Lasowicz dr inż. Aleksander Perliński dr inż. Witold Knabe dr inż. Małgorzata Gordziej-Zagórowska dr hab. inż. Elżbieta Urbańska-Galewska prof. dr hab. inż. Robert Jankowski dr inż. Tomasz Falborski	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	15.0	0.0	60
	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	60	5.0	35.0	100

Subject objectives	To acquaint students with the structures of high-rise buildings, tanks, masts, chimneys, and towers as well as advanced methods of steel structure analysis.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W14] knows and applies building codes and obeys the Construction Law; has knowledge on environmetal impact of investment realisation	Students design steel structure elements using appropriate standards of environmental and operational impact on structures as well as standards for the design of steel structures	[SW3] Assessment of knowledge contained in written work and projects
[K7_U02] can design and dimension complex steel, concrete (including reinforced), wood and masonry construtions and its details	The student can design elements and complex metal structures	[SU1] Assessment of task fulfilment
[K7_W04] has knowledge on advanced strength of materials, modeling and optimisation of materials and constructions; has knowledge of fundamentals of Finite Element Method and general nonlinear analysis of engineering constructions and systems	Students know the principles of designing structures in a post-critical state	[SW3] Assessment of knowledge contained in written work and projects
[K7_W02] knows principles of analysis, design and dimensioning of complex constructions and its elements	The student learns the principles of analysis, construction, and dimensioning of elements of complex metal structures	[SW3] Assessment of knowledge contained in written work and projects

Subject contents

Load-bearing of steel structures elements in the postcritical state.

Dimensioning of steel plate girders. Spatial lattice structure. Design and shaping of hollow section structures.

Models and analysis of steel structure, Multi-storey buildings structures examples of implementation.

Types of tanks. Tanks for liquid fuels the relationship between the properties of the fuel and the type of tank,

Design of vertical cylindrical tanks.

Prestressed steel structures - the aim, materials and construction.

Metal sheeting acting as a diaphragm.

Chimneys, towers, masts - general characteristics, types, static calculation, design solutions.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Colloquium concerning exercises	60.0%	30.0%
Summary assessment of tests and quizzes concerning the lecture content carried out during the semester	60.0%	50.0%
active participation in classes	0.0%	12.0%
design of the steel floor	60.0%	8.0%

Recommended reading

Basic literature

1. Bródka J., Brodniewicz M. *Projektowanie konstrukcji stalowych wg Eurokodów.* PWT, Rzeszów 2009
2. Giżejowski M., Ziółko J. *Budownictwo ogólne Stalowe konstrukcje budynków projektowanie wg Eurokodów z przykładami obliczeń.* Tom V. Arkady, Warszawa 2010.
3. Witold Kucharczuk: *Stalowe hale i budynki wielokondygnacyjne*. Wydawnictwa Politechniki Częstochowskiej, Częstochowa 2004.
4. Kazimierz Rykaluk: *Konstrukcje stalowe. Kominy, wieże, maszty.* Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2004.
5. Jerzy Ziółko: *Zbiorniki metalowe na ciecze i gazy.* Arkady, Warszawa 1986.
6. Bródka J., Kozłowski A.: *Stalowe budynki szkieletowe*. Oficyna Wydawnicza Politechniki Rzeszowskiej. Rzeszów 2003.
7. PN-EN-1993-1-1:2006, PN-EN-1993-1-8:2006, PN-EN-1991-1-1:2004, PN-EN 1991-1-3:2005, PN-EN 1991-1-4:2008

	Supplementary literature	1. Bródka J., Broniewicz M.: Konstrukcje stalowe z rur. Arkady, Warszawa 2001. 2. Mieczysław Łubiński, Wojciech Żółtowski: Konstrukcje metalowe. Część II. Arkady, Warszawa 2004. 3. PN-90 / B-03200. Konstrukcje stalowe. Obliczenia statyczne i projektowanie. 4. PN-B- 03215:1998. Konstrukcje stalowe. Połączenia z fundamentami. Projektowanie i wykonanie.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Mark the effective surface on the compression I-cross section when the web is class 4 List and sketch possible failure mechanisms of truss nodes made of CHS sections List and sketch basic planar systems bracing tall buildings List the ways of preventing vibrations of steel chimneys and briefly describe the principles of their operation	
Work placement	Not applicable	

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