GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00069216		
Field of study	Civil Engineering		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	4	Language of instruction	Polish
Semester of study	7	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Engineering Structures -> Faculty of Civil and Environmental Engineering -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Krzysztof Żółtowski	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	30.0	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	10.0	70.0	125

Subject objectives

The aim is to familiarize students with contemporary principles of designing and modeling engineering structures. The classes will cover interesting structures and their theoretical models used for analyzing forces, stresses, and deformations. The classes will focus on steel, reinforced concrete, and prestressed structures. A field trip is planned.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_K04] Engages in independent lifelong learning and individually follows the development of science and technology in the field of civil engineering.	Practice in independently searching for data or solutions useful for achieving the objective	[SK5] Assessment of ability to solve problems that arise in practice
[K6_K03] Can effectively, clearly and unambiguously convey information, describe activities and communicate their results/ outcomes to engineers or a wider audience using appropriate communication methods and tools.	Becoming acquainted with general principles regarding the shaping of structures as a system and as a detail	[SK5] Assessment of ability to solve problems that arise in practice

Subject contents	Course content – lecture Fundamentals of mechanics of bar, surface, and solid structures in practice Examples of realized cable structures descriptions of theoretical models Examples of realized beam structures descriptions of theoretical models Examples of realized shell structures descriptions of theoretical models Examples of realized solid structures descriptions of theoretical models Course content – exercises Finite Element Modeling of Structural Components Assumptions, Limitations, and Verification Procedures. Beam Model Analysis of a Structure Consequences of Modeling and Elements of Model Verification. Truss Structure Consequences of Modeling and Elements of Model Verification. Structural Prestressing Consequences of Modeling and Elements of Model Verification. Buckling Analysis Modeling and Basic Calculations.
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Evaluation of the substantive content prepared by the student in the form of an essay on a selected topic related to modern engineering structures.	60.0%	100.0%

Recommended reading	Basic literature	Czudek H., Radomski W.: Fundamentals of Bridge Engineering. PWN, Warsaw, 1983. Leonhardt F.: Bridge Construction. WKiŁ, Warsaw, 1982. Madaj A., Wołowicki W.: Construction and Maintenance of Bridges. WKiŁ, Warsaw, 1995. Furtak K.: Composite Bridges. PWN, WarsawKraków, 1999. Hydzik J.: Railway Bridges. WKiŁ, Warsaw, 1986. Ryżyński A., Wołowicki W., Skarżewski J., Karlikowski J.: Steel Bridges. PWN, WarsawPoznań, 1984. Danielski L.: Metal Bridges. Wrocław University of Technology, Wrocław, 1983. Biliszczuk J.: Cable-Stayed Bridges. ARKADY, Warsaw, 2005. Frei Otto, Dachy wiszące, Arkady 1959 TOMLOW J. Designing and constructing the Olympic roof (Munich 1972). *International Journal of Space Structures*. 2016;31(1):62-73. ALLEN E., ZALEWSKI W, *Form and Forces: Designing Efficient, Expressive Structures*. John Wiley & Sons, Inc. 2009

	Supplementary literature	Cholewo J., Sznurowski M.: Railway Bridges and Foundation Engineering. WKiŁ, Warsaw, 1965. Korelewski J.: Steel Bridges. Cracow University of Technology, Kraków, 1980. Szelągowski F.: Metal Bridges. WKiŁ, Warsaw, 1966. Pszenicki A.: Riveted Steel Bridges. Wydawnictwa Komunikacyjne, Warsaw, 1954. Furtak K.: Composite Bridges. PWN, WarsawKraków, 1999. Jarominiak A.: Cable-Stayed Bridges. Publishing House of the Rzeszów University of Technology, Rzeszów, 1997. Karlikowski J., Sturzbecher K.: Steel Bridges. Girder and Composite Bridges. Design Exercise Guide. Poznań University of Technology, Poznań, 2003. GÖPPERT, K., HASPEL, L.. National Stadium Warsaw, Poland. *Structural Engineering International*, 23(3), 311316, 2013 ŻÓŁTOWSKI K., TOMASZ S..: Recent steel structures in Poland - the selected projects, W: *13th International Conference on Metal Structures (ICMS)*, 2016,
	eResources addresses	
Example issues/ example questions/ tasks being completed	Provide an example of a modern engineering structure. For the presented structure, explain the main characteristics of its structural behavior (load-carrying mechanism). For the presented structure, identify the elements that carry the loads resulting from self-weight. For the presented structure, identify the elements that carry the loads resulting from temperature effects. For the presented structure, identify the elements that carry the loads resulting from wind.	
Practical activites within the subject	Not applicable	

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