GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Complex concrete structures, PG_00072524		
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	Obligatory subject group in the field of study Subject group related to scientific research 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	1	ECTS credits	2.0
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 inż. Anna Kopańska	
	Teachers	dr inż. Paweł Piotrkowski dr inż. Marek Wesołowski mgr inż. Maciej Solarczyk	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	10.0	0.0	0.0	10.0	0.0	20

E-learning hours included: 0.0

eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=8524

Moodle ID: 8524 Złożone konstrukcje betonowe https://enauczanie.pg.edu.pl/2025/course/view.php?id=8524

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	20	2.0	28.0	50

Subject objectives

The student is able to design a rectangular liquid-retaining tank founded on the ground and has become familiar with the design of reinforced concrete arches.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U06] develops innovative solutions to complex problems and designs advanced construction processes, systems and facilities	The student interprets the results of calculations and numerical analyses, evaluating their accuracy and engineering significance.	[SU1] Assessment of task fulfilment
[K7_W06] demonstrates in-depth preparation for the design of advanced construction processes, systems and facilities, taking into account the technical, environmental, economic, legal and ethical contexts	The student is able to design reinforced concrete arch structures and rectangular liquid-retaining tanks in accordance with applicable design standards, taking into account the requirements of structural safety, serviceability, and durability.	[SW3] Assessment of knowledge contained in written work and projects

Subject contents	Course content – lecture Discussion of the principles for determining loads acting on arch structures, including permanent loads, imposed loads, snow loads, and wind loads, in accordance with applicable design standards. Discussion of the design principles for reinforced concrete arches subjected to eccentric compression. Analysis of the effects of arch geometry, member slenderness, and load eccentricity on the distribution of internal forces and stress states. Presentation of methods for accounting for second-order effects and procedures for stability assessment, including buckling phenomena. Discussion of the detailing and design of reinforcement for reinforced concrete arches in accordance with the requirements of Ultimate Limit States (ULS) and Serviceability Limit States (SLS). Presentation of topics related to the design and analysis of rectangular reinforced concrete liquid-retaining tanks. Discussion of the principles for determining hydrostatic pressure loads and their effects on the behaviour of walls, base slabs, and stiffening elements. Presentation of procedures for the verification of load-bearing capacity and serviceability requirements of liquid-retaining tanks. Course content – project Presentation of topics related to the design and analysis of rectangular reinforced concrete liquid-retaining tanks. Discussion of the principles for determining hydrostatic pressure loads and their effects on the behaviour of walls, base slabs, and stiffening elements. Presentation of procedures for the verification of load-bearing capacity and serviceability requirements of liquid-retaining tanks. Discussion of the design principles for reinforced concrete shear walls. Presentation of methods for determining internal forces and stress distributions in deep beams.
Prerequisites and co-requisites	The student is able to design reinforced concrete members subjected to eccentric compression and bending, in accordance with applicable design standards, considering the requirements of Ultimate Limit States (ULS) and Serviceability Limit States (SLS).

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test	50.0%	40.0%
project	50.0%	60.0%

Recommended reading

Basic literature	W. Starosolski, Konstrukcje żelbetowe według Eurokodu 2 i norm związanych, t.4 PWN, Warszawa 2026. A. Halicka, D. Franczak, Projektowanie zbiorników żelbetowych, t.2, Wydawnictwo Naukowe PWN, Warszawa 2013. M. Knauff, Obliczanie Konstrukcji Żelbetowych według Eurokodu 2, Wydanie III poszerzone, PWN 2. J.Kobiak, W.Stachurski, Konstrukcje żelbetowe, t.3, Arkady, Warszawa 1989. J.Kobiak, W.Stachurski, Konstrukcje żelbetowe, t.4, Arkady, Warszawa 1991.
Supplementary literature	Sekcja Konstrukcji Betonowych KILiW PAN, Podstawy projektowania konstrukcji żelbetowych i sprężonych według Eurokodu 2, DWE, Wrocław, 2006. T. Godycki-Ćwirko, Mechanika Betonu, Arkady, Warszawa, 1982. F. Leonhardt - R. Walther: Leonhardt F, Walther R. Wandartige Träger. Deutscher Ausschuss für Stahlbeton, nr 178 F. Leonhardt, E. Mönnig Vorlesungen über Massivbau. Zweiter Teil und Dritter Teil, Springer-Verlag, Berlin.
eResources addresses	

Example issues/ example questions/ tasks being completed	
Practical activites within the subject	Not applicable

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