GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Concrete Structures II, PG_00065726		
Field of study	Civil Engineering		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2024/2025
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	6	ECTS credits	6.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department Of Engineering Structures -> Faculty Of Civil And Environmental Engineering -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Ireneusz Marzec	
	Teachers	dr inż. Anna Kopańska dr inż. Małgorzata Lachowicz mgr inż. Maciej Solarczyk dr inż. Patryk Ziółkowski mgr inż. Beniamin Kondys dr hab. inż. Ireneusz Marzec prof. dr hab. inż. Krystyna Nagrodzka-Godycka dr hab. inż. Jerzy Bobiński mgr inż. Marek Kin mgr inż. Patryk Chodkowski	

Lesson types and methods of instruction							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	30.0	0.0	75
	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	75	0.0	0.0	75

Subject objectives	
	Student can determine the effect of transverse forces on the support zone of a reinforced concrete beam, knows the cracks morphology and failure mechanisms of reinforced concrete beams and the principles of dimensioning transverse reinforcement. Can calculate the required theoretical reinforcement in an eccentrically compressed column. Knows the design principles of reinforced concrete frames, hinges, column and beam supports. Student has knowledge of reinforced concrete frame design, dimensioning of reinforcement for bending, shear, eccentric compression, calculation of structures in terms of SGN and SGU, shaping of reinforcement of beams, columns.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U07] Design and build engineering structures in a sustainable manner, with care for the natural environment and a minimum carbon footprint	The student is able to optimise the design of a reinforced concrete structure in terms of material consumption (reinforcement and concrete) and execution technology, minimising the environmental impact.	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
[K6_W03] Demonstrate knowledge and understanding of the processes, established standards and design methods in the civil engineering subject area and of their limitations.	Student knows the principles of design of reinforced concrete elements according to Eurocode, understands the limitations of the methods used and the influence of the static scheme on the calculation results.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K6_U03] Design engineering objects and details, processes and engineering systems by applying appropriate standards and methods of design.	Student is able to calculate and design reinforcement in reinforced concrete beams subjected to bending and shear and in eccentrically compressed columns. Design reinforced concrete hall frame elements including structural details (nodes, hinges, cantilevers).	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
[K6_W07] Understand the investment's impact on the environment and the interrelationships and dependencies between the building structure and the natural environment	Students will be familiar with the principles of sustainable design of reinforced concrete structures, and will be able to identify design elements affecting the environment (e.g. quantity of materials, construction technology).	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

Subject contents

Shear in reinforced concrete bar elements: outline of the problem in the context of theory and experimental studies, methods of dimensioning shear reinforcement for beams, principles of shear reinforcement design. Calculation and design of reinforcement in eccentrically compressed bar elements. Reinforced concrete frame halls - corners, nodes, collapsed rafters, hinges, pressure. Structural elements of frames including reinforced concrete cantilevers.

Prerequisites and co-requisites

no requirements

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	50.0%	20.0%
	50.0%	30.0%
	50.0%	50.0%

Recommended reading

Basic literature

1. M. Knauff, Obliczanie konstrukcji żelbetowych według Eurokodu 2, PWN Warszawa 2012
2. M. Knauff, A. Golubińska, P. Knyziak: Tablice i wzory do projektowania konstrukcji żelbetowych z przykładami obliczeń, PWN 2013
3. M. Knauff, B. Grzeszczykowski, A. Golubińska, Przykłady obliczania konstrukcji żelbetowych zarysowanie zeszyt 3, PWN, Warszawa 2018
4. W. Starosolski, Konstrukcje żelbetowe według Eurokodu 2 i norm związanych, tom 1,2,3 Wydawnictwo Naukowe PWN, Warszawa 2011-2012
5. Konstrukcje betonowe, żelbetowe i sprężone, Komentarz naukowy do normy PN-B-03264 t. I i II, ITB Warszawa 2005
6. Podstawy projektowania konstrukcji żelbetowych i sprężonych wg Eurokodu 2 praca zbiorowa pod red. M. Knauffa, Dolnośląskie Wydawnictwo Edukacyjne, 2006
7. A. Łapko, B.Ch. Jensen, Podstawy projektowania i algorytmy obliczeń konstrukcji żelbetowych, Arkady 2005
8. Norma europejska EN-1992-1-1:2004, oraz wersja polska PN-EN-1992-1-1:2008: Projektowanie konstrukcji z betonu . Reguły ogólne i reguły dla budynków
9. Norma PN-B-03264:2002, Konstrukcje betonowe, żelbetowe i sprężone
10. Nagrodzka-Godycka, Badanie właściwości betonu i żelbetu w warunkach laboratoryjnych, Arkady, W-wa 1999,
11. Ł. Drobiec, R. Jasiński, A. Piekarczyk Diagnostyka Konstrukcji Żelbetowych, Metodologia, Badania polowe, badania laboratoryjne betonu i stali, Wydawnictwo Naukowe PWN, tom 1, 2010

	Supplementary literature	1. J. Kobiak W.Stachurski, *Konstrukcje żelbetowe*, t.1, Arkady, Warszawa 1984 2. J.Kobiak W.Stachurski, *Konstrukcje żelbetowe*, t.2, Arkady, Warszawa 1987 3. J.Kobiak W.Stachurski, *Konstrukcje żelbetowe*, t.3, Arkady, Warszawa 1989 4. T. Godycki-Ćwirko, *Mechanika betonu*, Arkady, Warszawa 1982 5. T. Godycki-Ćwirko, *Ścinanie w żelbecie*, Arkady, Warszawa 1968 6. W. Starosolski, Komputerowe modelowanie betonowych ustrojów inżynierskich-wybrane zagadnienia, Wydawnictwo Politechniki Śląskiej, Gliwice 2013, tom i i II 7. A. Ajdukiewicz, Eurokod 2 -Podręczny skrót dla projektantów konstrukcji żelbetowych, Stowarzyszenie Producentów Cementu - Polski Cement, Kraków 2009 8. K. Nagrodzka-Godycka, *Badanie właściwości betonu i żelbetu w warunkach laboratoryjnych*, Arkady, W-wa 1999, 9. Ł. Drobiec, R. Jasiński, A. Piekarczyk Diagnostyka Konstrukcji Żelbetowych, Metodologia, Badania polowe, badania laboratoryjne betonu i stali, Wydawnictwo Naukowe PWN, tom 1, 2010
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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