



Subject card

Subject name and code	Concrete Structures I, PG_00064179						
Field of study	Civil Engineering						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2025/2026		
Education level	first-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Engineering Structures -> Faculty of Civil and Environmental Engineering -> Wydział Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Jerzy Bobiński				
	Teachers						
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		0.0		0.0	60
Subject objectives	Learning about the mechanical properties of concrete and steel and the adhesion mechanism between these materials. Acquiring the ability to dimension bending elements and determine their load-bearing capacity. Mastering the knowledge of calculating crack widths and deflection values. Acquiring knowledge about the design of unidirectionally reinforced slabs. Learning the principles of making drawings of reinforced concrete structures.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U04] Reads and prepares construction documentation (including drawings, graphic documentation in the CAD environment), efficiently uses maps as well as architectural, construction and geodetic drawings.		Student is able to prepare construction drawings of reinforced concrete elements.		[SU3] Assessment of ability to use knowledge gained from the subject		
	[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 designing reinforced concrete elements according to Eurocode 2.		[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 design unidirectionally reinforced slabs.		[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W06] Demonstrates practical knowledge and understanding of materials, devices and tools, processes and technologies in the field of civil engineering (and their limitations).		Student can dimension bent reinforced concrete elements.		[SW1] Assessment of factual knowledge		

Subject contents	Concrete structures - introduction; history of reinforced concrete, types of concrete structures, examples of implementation. Properties of concrete; compressive and tensile strength in uniaxial and biaxial stress. Deformability of concrete, modulus of elasticity, Poisson's ratio, thermal deformation coefficient. Rheological properties of concrete; creep. Properties of reinforcing steel. Adhesion between steel and concrete. Anchorage length. Deformations and stresses according to linear reinforced concrete theory in a cross-section under bending. Stiffness in phase I. Cracking moment. Ultimate limit state of a reinforced concrete cross-section under bending. Failure mechanisms of a reinforced concrete cross-section under bending; ultimate reinforcement ratio. Design of a rectangular and T-section under bending, with singular and double reinforcement. Load-bearing capacity of a bent rectangular and T-section. Serviceability limit state; cracks and deflections in bent reinforced concrete elements. Principles of reinforcement design of unidirectional reinforced slabs and beams.		
Prerequisites and co-requisites	Basic knowledge in the areas of structural statics, strength of materials and concrete technology.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		50.0%	50.0%
		50.0%	25.0%
		50.0%	25.0%
Recommended reading	Basic literature	M. Knauff, Obliczanie konstrukcji żelbetowych według Eurokodu 2. PWN, Warszawa 2012. M. Knauff i inni., Tablice i wzory do projektowania konstrukcji żelbetowych z przykładami obliczeń. PWN, Warszawa 2013. J. Pędziwiatr, Wstęp do projektowania konstrukcji żelbetowych wg PN-EN 1992-1-1:2008. - Podstawy projektowania i algorytmy obliczeń konstrukcji żelbetowych / Andrzej Łapko, Bjarne Christian Jensen. - Warszawa : Arkady, 2006. - Konstrukcje żelbetowe według Eurokodu 2 i norm związanych. 1 / Włodzimierz Starosolski. - Wyd. 13. - Warszawa : Wydaw. Naukowe PWN, 2011. - Konstrukcje żelbetowe według Eurokodu 2 i norm związanych. 2 / Włodzimierz Starosolski. - Wyd. 13 zm. - Warszawa : Wydaw. Naukowe PWN, 2011. - Wstęp do projektowania konstrukcji żelbetowych wg PN-EN 1992-1-1:2008 / Janusz Pędziwiatr. - Wrocław : Dolnośląskie Wydaw. Edukacyjne, 2010. - Konstrukcje żelbetowe : atlas rysunków / red. nauk. Adam Zybur ; [aut. Katarzyna Domagała et al.]. - Warszawa : Wydaw. Naukowe PWN, 2009. - Zeszyty Edukacyjne Buildera. Zeszyt 2, Projektowanie konstrukcji żelbetowych / Andrzej Łapko. - Warszawa : PWB MEDIA, 2011. - Reinforced concrete design to Eurocode 2 / Bill Mosley, John Bungey, Ray Husle. - 6th ed. - Houndmills, Basingstoke, Hampshire ; New York, NY : Palgrave MacMillan, 2007. - Normy żelbetowe: PN-B-03264:2002, PN-EN-1992-1-1.	
	Supplementary literature	- Podstawy projektowania konstrukcji żelbetowych i sprężonych według Eurokodu 2, praca zbiorowa. Dolnośląskie Wydawnictwo Edukacyjne, Wrocław 2006. - Konstrukcje betonowe, żelbetowe i sprężone komentarz do normy PN-B-03264:2002, Wyd. ITB, Warszawa 2005. - K.Grabiec, Konstrukcje betonowe. Przykłady obliczeń statycznych, Wydawnictwo Naukowe PWN, Warszawa 1998.	
	eResources addresses		
	Example issues/ example questions/ tasks being completed		
Work placement	Not applicable		

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