GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00064179		
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	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		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jerzy Bobiński	
	Teachers	dr inż. Anna Kopańska mgr inż. Maciej Solarczyk dr inż. Małgorzata Lachowicz mgr inż. Beniamin Kondys mgr inż. Marcin Burdziński dr hab. inż. Jerzy Bobiński	

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_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
[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_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_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

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%	25.0%
	50.0%	25.0%
	50.0%	50.0%

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, Warsawa 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 Zybura ; [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

Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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