



Subject card

Subject name and code	Concrete Engineering Structures, PG_00042240						
Field of study	Civil Engineering						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Concrete Structures -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marek Wesołowski					
	Teachers	dr inż. Paweł Piotrkowski dr inż. Małgorzata Lachowicz dr inż. Marek Wesołowski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	0.0	15.0	15.0	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	5.0		45.0		125
Subject objectives	Knowledge of methods of calculation of RC folded plates, suspending roofs and silos. Properties of RC confined columns and CFST, Introduction to RC structures with non - metal reinforcement.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_W14] knows and applies building codes and obeys the Construction Law; has knowledge on environmental impact of investment realisation	knows standards for designing advanced RC structures			[SW3] Assessment of knowledge contained in written work and projects		
	[K7_U06] is able to choose proper tools (measuring, analytical or numerical) to solve engineering problems, to acquire, filtrate, proces and analyse data	knows advanced computer and analytical aids for designing advanced RC structures			[SU4] Assessment of ability to use methods and tools		
	[K7_W02] knows principles of analysis, design and dimensioning of complex constructions and its elements	knows methods of designing advanced RC structures			[SW1] Assessment of factual knowledge		
	[K7_U02] can design and dimension complex steel, concrete (including reinforced), wood and masonry constructions and its details	knows to design advanced RC structures			[SU1] Assessment of task fulfilment		
Subject contents	Introduction to designing folded plates. Internal forces in folded plates of different types. Analysis of triangle multi - span folded plate. Details of reinforcement in folded plates. Suspended roofs. Methods of dimensioning. RC confined columns and CFST, Parameters determining effectiveness of confinement. Post - critical behaviour. Methods of designing. Silos. Methods of designing. Details of reinforcement. Concrete structures with non - metal reinforcement (dGFRP, AFRP, BFRP and CFRP).						
Prerequisites and co-requisites							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	60.0%	33.0%
	Exam	50.0%	67.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. M. Knauff, Obliczanie konstrukcji żelbetowych według Eurokodu 2. PWN, Warszawa 2012 2. M. Knauff i inni,, Tablice i wzory do projektowania konstrukcji żelbetowych z przykładami obliczeń. PWN, Warszawa 2013 3. J. Pędziwiatr, Wstęp do projektowania konstrukcji żelbetowych wg PN-EN 1992-1-1:2008, Dolnośląskie Wydawnictwo Edukacyjne, Wrocław 2010 4. W.Starosolski, <i>Konstrukcje żelbetowe</i>, t.I, Wydawnictwo Naukowe PWN, Warszawa 2012 5. Norma żelbetowa PN-EN 1992-1-1:2008 6. Norma żelbetowa PN-B-03264:2002 7. A. Halicka, D. Franczak: Projektowanie zbiorników żelbetowych. Zbiorniki na materiały sypkie, Wydawnictwo Naukowe PWN, Warszawa 2011 8. W. Nowacki, R. Dąbrowski, Silosy. Metody obliczeń i konstrukcja, Budownictwo i Architektura, Warszawa 1955 9. K.Grabiec, <i>Żelbetowe konstrukcje cienkościenne</i>, Wydawnictwo Naukowe PWN, Warszawa 1999 10. J.Kobiak W.Stachurski, <i>Konstrukcje żelbetowe</i>, t.3, Arkady, Warszawa 1989 <p>J.Kobiak W.Stachurski, <i>Konstrukcje żelbetowe</i>, t.4, Arkady, Warszawa 1991</p>	

	Supplementary literature	<p>1. Podstawy projektowania konstrukcji żelbetowych i sprężonych według Eurokodu 2, praca zbiorowa. Dolnośląskie Wydawnictwo Edukacyjne, Wrocław 2006.</p> <p>2. Konstrukcje betonowe, żelbetowe i sprężone – komentarz do normy PN-B-03264:2002, Wyd. ITB, Warszawa 2005.</p> <p>3. B.Bukowski T.Godycki-Ćwirko, <i>Tarczownice</i>, Politechnika Gdańska 1958</p> <p>4. F.Otto, <i>Dachy wiszące</i>, Arkady, Warszawa 1959</p> <p>5. W.K.Kaczurin, <i>Teoria konstrukcji wiszących</i>, Arkady, Warszawa 1965</p> <p>6. S.Pałkowski, <i>Konstrukcje ciągnowe</i>, Wydawnictwa Naukowo-Techniczne, Warszawa 1994</p> <p>7. K.Grabiec, <i>Konstrukcje betonowe. Przykłady obliczeń statycznych</i>, Wydawnictwo Naukowe PWN, Warszawa 1998</p> <p>8. T.Godycki-Ćwirko T.Godycki-Ćwirko, <i>Mechanika betonu</i>, Arkady, Warszawa 1982</p> <p>T.Godycki-Ćwirko i in., <i>Projektowanie elementów konstrukcji żelbetowych</i>, cz I i II, Politechnika Łódzka 1981</p>
	eResources addresses	Adresy na platformie eNauczanie: Inżynierskie Konstrukcje Betonowe 2023 - Moodle ID: 33081 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33081
Example issues/ example questions/ tasks being completed	Project of folded plate roof	
Work placement	Not applicable	

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