



Subject card

Subject name and code	Concrete Engineering Structures, PG_00042240						
Field of study	Civil Engineering						
Date of commencement of studies	February 2024		Academic year of realisation of subject		2024/2025		
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	Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Marek Wesołowski				
	Teachers		dr inż. Małgorzata Lachowicz dr inż. Paweł Piotrkowski 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_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 designig 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_W14] knows and applies building codes and obeys the Construction Law; has knowledge on environmetal impact of investment realisation	knows standards for designig advanced RC structures		[SW3] Assessment of knowledge contained in written work and projects			
	[K7_U02] can design and dimension complex steel, concrete (including reinforced), wood and masonry construtions 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. Suspendand roofs. Methods of dimensioning. RC confined colomns and CFST, Parameterd determining effectiveness of confinement. Post - critical behaviour. Methods o designing. . Silos. Methods of designing. Details of reinforcement. Concrete structures with non - metal reinforcement (diGFRP, AFRP,, BFRP and CFRP).						
Prerequisites and co-requisites							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory	50.0%	10.0%
	Exam	50.0%	60.0%
	Project	50.0%	30.0%
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 cienkościennie</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 2024 - Moodle ID: 40885 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40885
Example issues/ example questions/ tasks being completed	Project of folded plate roof	
Work placement	Not applicable	

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