



Subject card

Subject name and code	Complicated concrete structures, PG_00041063						
Field of study	Civil Engineering						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2022/2023		
Education level	second-cycle studies	Subject group			Obligatory subject group in the field of study 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	1	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
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	mgr inż. Maciej Solarczyk dr inż. Paweł Piotrkowski dr inż. Marek Wesołowski 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	5.0		35.0		100
Subject objectives	Designing methods of a R-C tanks, shell structures and folded plates.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_U02] can design and dimension complex steel, concrete (including reinforced), wood and masonry constructions and its details	Student defines designing methods of a R-C tanks, shell structures and folded plates.			[SU3] Assessment of ability to use knowledge gained from the subject		
	[K7_W02] knows principles of analysis, design and dimensioning of complex constructions and its elements	Student defines designing methods of a R-C tanks, shell structures and folded plates.			[SW1] Assessment of factual knowledge		
	[K7_W15] has deep and adequate knowledge of civil engineering, within offered specialization and profile	Student defines designing methods of a R-C tanks, shell structures and folded plates.			[SW1] Assessment of factual knowledge		
	[K7_W04] has knowledge on advanced strength of materials, modeling and optimisation of materials and constructions; has knowledge of fundamentals of Finite Element Method and general nonlinear analysis of engineering constructions and systems	Student defines designing methods of a R-C tanks, shell structures and folded plates.			[SW1] Assessment of factual knowledge		
[K7_K01] is aware of necessity of professional competences improvement; obeys the professional ethics code	Student defines designing methods of a R-C tanks, shell structures and folded plates.			[SK2] Assessment of progress of work			

Subject contents	Basic types of loads and their combinations in terms of the Eurocodes. Reminder basic information about rectangular tanks for liquids. Design of cylindrical tanks and water towers. Calculation and construction of Reimbert's and Intze's reservoirs. Check the tank due to leakage, scratches and thermal influences. R-C folded plates – examples of implementation. Beam analogy method for long folded plates. The Ehlers concept of calculating of folded plates. Dimensioning and construction of reinforced concrete folded plates. Introduction of shells – examples of implementation. State of the membrane and flexion coatings, load balanced rotation. Calculation and construction of domes in various states of loads.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	50.0%	50.0%
	Project	50.0%	50.0%
Recommended reading	Basic literature	1. J.Kobiak W.Stachurski, <i>Konstrukcje żelbetowe</i> , t.3, Arkady, Warszawa 1989 2. J.Kobiak W.Stachurski, <i>Konstrukcje żelbetowe</i> , t.4, Arkady, Warszawa 1991 3. K.Grabiec, <i>Żelbetowe konstrukcje cienkościennie</i> , Wydawnictwo Naukowe PWN, Warszawa 1999 4. A.Halicka D.Franczak, <i>Projektowanie zbiorników żelbetowych</i> , t.2, Wydawnictwo Naukowe PWN, Warszawa 2013	
	Supplementary literature	5. C.Kłóś A.Mitzel J.Suwalski, <i>Zbiorniki na cieczy</i> , Arkady, Warszawa 1961 6. A.Stachowicz W.Ziobroń, <i>Podziemne zbiorniki wodociągowe</i> , Arkady, Warszawa 1986 7. K.Girkmann, <i>Dźwigary powierzchniowe</i> , Arkady, Warszawa 1957 8. H.Lundgren, <i>Powłoki walcowe</i> , Arkady, Warszawa 1963 9. W.Flügge, <i>Powłoki</i> , Arkady, Warszawa 1972	
	eResources addresses	Adresy na platformie eNauczenie: Złożone Konstrukcje Betonowe 2023 - Moodle ID: 28747 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=28747	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		