



## Subject card

Subject name and code	High concrete buildings, PG_00041301						
Field of study	Civil Engineering						
Date of commencement of studies	February 2025	Academic year of realisation of subject			2025/2026		
Education level	second-cycle studies	Subject group			Optional subject group		
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			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Engineering Structures -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Andrzej Ambroziak				
	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		5.0		35.0	100
Subject objectives	The aim of teaching the subjects is to get acquainted with the requirements for building equipment, mastering the methods of calculating and valuing valuable structural elements of reinforced concrete elements, as well as preparing price lists for the structural load-bearing capacity of reinforced concrete elements.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_K01] is aware of necessity of professional competences improvement; obeys the professional ethics code	The student has knowledge about the impact of construction investments on the environment.			[SK4] Assessment of communication skills, including language correctness [SK1] Assessment of group work skills [SK5] Assessment of ability to solve problems that arise in practice		
	[K7_U02] can design and dimension complex steel, concrete (including reinforced), wood and masonry constructions and its details	The student knows the principles of selecting static and dynamic loads affecting tall and high-rise buildings.			[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task		
	[K7_W02] knows principles of analysis, design and dimensioning of complex constructions and its elements	The student knows the principles of creating tall and high-rise buildings. The student knows the standards and guidelines for the design of high-rise buildings.			[SW3] Assessment of knowledge contained in written work and projects		
Subject contents	Preliminary issues - historical outline of tall buildings. Structural systems of residential, hotel and office buildings. Factors influencing the formation of the structure (object function, construction materials, technology, durability). Basic and exceptional loads. Building spatial stiffness - resistance to horizontal and vertical forces. Static diagrams and static quantities - classical analytical methods, FEM. Dimensioning of structural elements on the basis of existing standards and regulations, reinforcement shaping. Examples of completed tall buildings. Classic methods of calculating tall buildings. Modern methods of calculating tall buildings with the use of FEM. Types of loads acting on tall buildings with particular emphasis on horizontal forces. Methods of implementing high-rise buildings.						
Prerequisites and co-requisites							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	final test	60.0%	20.0%
	Design task	60.0%	40.0%
	Exam	60.0%	40.0%
Recommended reading	Basic literature	Pawłowski A.Z., Cała I.: Budynek wysokie, Wydawnictwo Politechniki Warszawskiej 2006.  Sieczkowski J.: Projektowanie budynków wysokich z betonu, Arkady, Warszawa 1976.  Starosolski W.: Konstrukcje żelbetowe, Wydawnictwo Naukowe PWN, Warszawa 2008.  Kiernożycki W.: Betonowe konstrukcje masywne, Polski Cement, Kraków 2003.  Zienkiewicz O.C.: <i>Metoda elementów skończonych</i> . Arkady 1972 (i inne wydania w języku np. angielskim).	
	Supplementary literature	Ambroziak A., Kłosowski P.: <i>Autodesk Robot Structural Analysis podstawy obliczeń</i> . Wyd. PG, 2010.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	1. List briefly the inventions that had a significant impact on the development of tall buildings. 2. What do you understand by tall building? 3. List and describe the main types of high-rise building structures. 4. List and describe the division into height categories of buildings according to the Regulation of the Minister of Infrastructure on the technical conditions to be met by buildings and their location of April 12, 2002 (Journal of Laws 75, item 690). 5. Give what are the recommended limits of the top inclination of the skyscraper and describe the necessity to apply these limitations. 6. List the criteria for measuring the height of buildings introduced by the Council of Tall Buildings and Urban Habitat (CTBUH). 7. List and briefly describe the main structural systems used in tall buildings. 8. What causes the phenomenon of "vortex excitation" in tall buildings and how can this phenomenon be counteracted?		
Work placement	Not applicable		

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