



## Subject card

Subject name and code	, PG_00070568						
Field of study	Civil Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2025/2026		
Education level	first-cycle studies	Subject group			Optional subject group		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	4	Language of instruction			Polish		
Semester of study	8	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Engineering Structures -> Faculty of Civil and Environmental Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Ireneusz Marzec					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	0.0	0.0	30
	E-learning hours included: 0.0						
	eNauczanie source address: <a href="https://enauczanie.pg.edu.pl/2025/course/view.php?id=4330">https://enauczanie.pg.edu.pl/2025/course/view.php?id=4330</a>						
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	30		0.0		0.0	30
Subject objectives	The aim of the course is to acquire knowledge of the correct modeling and calculation of reinforced concrete structures with aid of engineering software within Finite Element Method (FEM).						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U05] Conducts research (obtaining information, simulations, experimental methods) in the field of construction in order to solve specific tasks and report research results.	The student is able to perform numerical simulations of reinforced concrete structures using FEM software (ARSAP), critically evaluate calculation results and formulate engineering conclusions.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
	[K6_W03] Demonstrate knowledge and understanding of the processes, established standards and design methods in the civil engineering subject area and of their limitations.	The student knows the principles of modelling and analysis of reinforced concrete structures using the finite element method and is aware of the limitations of the applied computational models.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[K6_K01] Is aware of the key aspects of professional, ethical and social responsibility related to management, business operation, decision making and opinion formulation in civil engineering.	The student is aware of the professional and ethical responsibility associated with making design decisions based on the results of numerical calculations of reinforced concrete structures.	[SK5] Assessment of ability to solve problems that arise in practice
	[K6_K04] Engages in independent lifelong learning and individually follows the development of science and technology in the field of civil engineering.	The student independently broadens their knowledge in the field of FEM applications in reinforced concrete structural analysis, following the development of engineering software.	[SK2] Assessment of progress of work
[K6_K03] Can effectively, clearly and unambiguously convey information, describe activities and communicate their results/ outcomes to engineers or a wider audience using appropriate communication methods and tools.	The student is able to clearly and unambiguously present the results of numerical analysis of reinforced concrete structures in the form of a laboratory report.	[SK4] Assessment of communication skills, including language correctness	
Subject contents	<p>Course content – laboratory</p> <p>Analysis of selected problems of modeling reinforced concrete structures using the Finite Element Method (FEM). Principles of numerical calculation of slab-beam systems: assuming the FE mesh, different modeling of the connection between the slab and the supporting beams, the influence of the way of the support and supports compliance on the internal forces and deformations. Modeling and calculation of flat slabs: shaping of the support zone, modeling of the columns, the influence of support compliance, approximate calculation methods (Equivalent Frame Method). Calculation of deflections of RC slabs using FEM, with taking into account the reduction of the stiffness of the reinforced concrete section after cracking.</p>		
Prerequisites and co-requisites	Basic knowledge about reinforced concrete structures. Familiar with the Finite Element Method (FEM).		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		50.0%	30.0%
		50.0%	30.0%
		50.0%	40.0%
Recommended reading	Basic literature	<p>1. W. Starosolski: "Wybrane zagadnienia komputerowego modelowania konstrukcji inżynierskich", Gliwice 2003.  2. W. Starosolski: "Konstrukcje żelbetowe według eurokodu 2 i norm związanych", Warszawa 2019.  3. Z. Kacprzyk, P. Czumaj, S. Dudziak: "Modelowanie konstrukcji budowlanych", Warszawa 2021.</p>	
	Supplementary literature	-	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<p>1. Application of FEM for modeling reinforced concrete structures  2. Application of FEM for the calculation of deflections of reinforced concrete slabs</p>		

Practical activities within the subject	Not applicable
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