

。 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Finite Element Method - application, PG_00040304								
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	2		Language of instruction			Polish			
Semester of study	3		ECTS credits			3.0			
Learning profile	general academic profile		Assessment form			assessment			
Conducting unit	Katedra Wytrzymałości Materiałów -		> Faculty of Civil and Environmental			Engineering			
Name and surname of lecturer (lecturers)	Subject supervisor								
	Teachers								
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	ect Seminar		SUM	
of instruction	Number of study hours	0.0	0.0	0.0	0.0		30.0	30	
	E-learning hours inclu	uded: 0.0							
Learning activity and number of study hours	Learning activity	Participation in classes includ plan	n didactic ed in study	Participation in consultation hours		Self-study		SUM	
	Number of study hours	30		5.0		40.0		75	
Subject objectives	Familiarizing students with selected aspects of the practical application of FEM in engineering.								
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		A student is able to assess the suitability of various FEM environments to solve specific problems.						
	[K7_U04] is able (using Finite Element Method), to define a calculation model and to perform advanced numerical analysis of complex constructions in: linear range and elementary nonlinear range, can criticaly evaluate the results of calculations.		A student can apply the appropriate numerical tools required to solve the task being analyzed.						
	[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 [K7_W01] has knowledge of higher mathematics, physics and chemistry, which is a base of subjects, such as construction theory and advanced material technology		A student is able to build appropriate models of system analysis including nonlinearities encountered in mechanics. A student understands the mathematical basis of MES.						

Subject contents							
Subject contents	Introduction to non-linear structure analysis. Methods of tracking nonlinear balance paths. Presentation of selected advanced commercial and own FEM systems. Numeric integration, locking effect. Selected application of FEM, calculation of structures. Comments on convergence of solutions, verification and interpretation of results.						
Prerequisites and co-requisites	BSP020 Mechanika budowli						
	BSP021 Metody obliczeniowe						
	BSP022 Komputerowa analiza konstrukcji						
	BSD048 Metoda Elementów Skończonych						
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria		60.0%	100.0%				
Recommended reading	Basic literature	RAKOWSKI G., KACPRZYK Z.: Metoda elementów skończonych w mechanice konstrukcji. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2005. KLEIBER M (red).: Komputerowe metody mechaniki ciał stałych. Mechanika Techniczna t. XI. PWN, Warszawa 1995. ZIENKIEWICZ O.C.: Metoda elementów skończonych. Arkady 1972. ZIENKIEWICZ O.C., TAYLOR R.L., ZHU J.Z.: Finite Element Method: Volume 1- Its Basis & Fundamentals. Volume 2 - For Solid and Structural Mechanics. Butterworth Heinemann, London 2006. BATHE KJ.: Finite Element Procedures. Prentice Hall New Jersey 1996.					
	Supplementary literature	CHRÓŚCIELEWSKI J., MAKOWSKI J., PIETRASZKIEWICZ W.: Statyka i dynamika powłok wielopłatowych. Nieliniowa teoria i metoda elementów skończonych. PAN IPPT, Biblioteka Mechaniki Stosowanej Serii A, monografie, Warszawa 2004. KREJA I.: Mechanika Ośrodków Ciągłych. Wydawnictwo CURE, Politechnika Gdańska, Gdańsk 2003.					
	eResources addresses Adresy na platformie eNauczanie:						
Example issues/ example questions/ tasks being completed	Preparation of a seminar presentation on the practical application of FEM in structure analysis.						
Work placement	Not applicable						

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