Subject card

Subject name and code	Finite Element Method, PG_00048233
Field of study	Civil Engineering

Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	Optional subject group
Mode of study	Part-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	5.0
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	dr inż. Bartosz Sobczyk
	Teachers	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	0.0	0.0	20.0	0.0	40
	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	40	5.0	80.0	125

Subject objectives	Student learns the basics of finite element method and learns how to use selected FEM codes.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[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 learns the basics of finite element method and learns how to use selected FEM codes.	
	[K7_U06] is able to choose proper tools (measuring, analytical or numerical) to solve engineering problems, to acquire, filtrate, proces and analyse data	Student learns the basics of finite element method and learns how to use selected FEM codes.	
	[K7_W03] knows basics of Continuum Mechanics, knows rules of static analysis, stability and dynamics of complex rod, shell and volume structures, both in linear and basic nonlinear regime	Student learns the basics of finite element method and learns how to use selected FEM codes.	

Subject contents	Lectures:
	Introduction to FEM, FEM basics, Basics of Continuum Mechanics, Definition of approximation and interpolation. Selected applications of FEM.
	Tutorials/Project:
	Student learns basisc of Abaqus code and learns how to use it to solve simple problems in the field of analysis of civil engineering structures.

Prerequisites and co-requisites	Structural Mechanics, Strength of Materials		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	laboratory test	60.0%	20.0%
	project	60.0%	50.0%
	lecture test	60.0%	30.0%

Recommended reading	Basic literature	KLEIBER M.: Wprowadzenie do metody elementów skończonych. Bibl. Mech. Stosowanej IPPT PAN, PWN Warszawa 1989. CHRÓŚCIELEWSKI J., BURZYŃSKI S., DASZKIEWICZ K., SOBCZYK B., WITKOWSKI W.: Wprowadzenie do modelowania MES w programie Abaqus. Wyd. PG, Gdańsk 2014.
	Supplementary literature	RAKOWSKI G., KACPRZYK Z.: Metoda elementów skończonych w mechanice konstrukcji. Oficyna Wyd. PW, Warszawa 2005. DACKO M., BORKOWSKI W., DOBROCIŃSKI S., NIEZGODA T., WIECZOREK M.: Metoda elementów skończonych w mechanice konstrukcji. Arkady Warszawa 1994. ZIENKIEWICZ O.C.: Metoda elementów skończonych. Arkady 1972 (i inne wydania w języku np. angielskim). CHRÓŚCIELEWSKI J., MAKOWSKI J., PIETRASZKIEWICZ W.: Statyka i dynamika powłok wielopłatowych. Nieliniowa teoria i metoda elementów skończonych. Bibl. Mech. Stosowanej IPPT PAN, Serii A, monografie, Warszawa 2004. BATHE K.J.: Finite Element Procedures in Engineering Analysis. Englewood Cliffs: PrenticeHall 1982.
	eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable