GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Modelling in Civil Engineering, PG_00042232		
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	3.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Building Structures and Material Engineering -> Faculty of Civil and Environmental Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Andrzej Tejchman-Konarzewski	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	15.0	0.0	0.0	45

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	45	5.0	25.0	75

Subject objectives

Make acquintance of students with different modelling methods of engineering structures.

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		[SW1] Assessment of factual knowledge
[K7_W02] knows principles of analysis, design and dimensioning of complex constructions and its elements		[SW1] Assessment of factual knowledge
[K7_U10] can analyse complicated environmental loads acting on a construction; can apply proper processes to design marine and hydroengineering constructions taking into consideration hydrological and hydraulical impact		[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
[K7_U12] can calculate and analyse the energy balance of a building		[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
[K7_U02] can design and dimension complex steel, concrete (including reinforced), wood and masonry construtions and its details		[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools

Subject contents	Behaviour of concrete and reinforced concrete under static and dynamic loads. Flat floors. Foundation on elastic subsoil.Truss models. Beam walls. Tanks. Discrete models for granular materials and concrete. Elastic-plastic theory. Failure criteria. Elasto-plastic constitutive models. Damage constitutive models. Regularization methods in FE calculations. Finite element calculation examples.
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Project	55.0%	10.0%
Exam	55.0%	90.0%

Recommended reading

Basic literature	Lectures.
Supplementary literature	1. Chen, W.-F., Saleeb, A. F. *Constitutive Equations for Engineering Materials*, Elsevier, 1994. 2. W. Ramm, W., Wörner, R. Anwendung von Stabwerkmodellen bei der Bemessung und Konstruktion von Stahlbeton- und Spannbetonbauteilen. *Skript*, Kaiserslautern, 2002. 3. Majewski, T., Bobinski, J., Tejchman, J. FE-analysis of failure behaviour of reinforced concrete columns under eccentric compression. *Engineering Structures,* 2007. 4. Malecki, T., Marzec, I., Bobiński, J., Tejchman, J. Effect of a characteristic length on crack spacing in a reinforced concrete bar under tension. *Mechanics Research Communications,* 2007. 5. Kozicki, J., Tejchman, J. Effect of aggregate structure on fracture process in concrete using 2D lattice model. *Archives of Mechanics*, 2007. 6. Marzec, I., Bobinski, J., Tejchman, J. Simulations of crack sparing in reinforced concrete beams using elastic-plasticity and damage with non-local softening. *Computers and Concrete*, 2007. 7. Tejchman, J. and Bobinski, J. *Simulations of strain localization in plain and reinforced concrete with enhanced continuum models*. Wydawnictwo PG. 2010.
eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	The most salient properties of reinforced concrete.
Work placement	Not applicable

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