GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Two-dimensional structures and reliability of engineering structures, PG_00044333		
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 Subject group related to scientific research in the field of study
Mode of study	Part-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	4	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Structural Mechanics Department -> Faculty of Civil and Environmental Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marek Skowronek	
	Teachers		

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	10.0	0.0	0.0	0.0	20
	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	20	7.0	48.0	75

Subject objectives	
	2D structures: theoretical background and analytical examples of 2D structures in Cartesian and polar systems **Reliability of engineering structures**: uncertainty analysis in civil engineering, defining basic random variables of selected problems, reliability definition, three levels of reliability assessment, random approach to loads and resistances, examples of structural reliability assessment

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W16] knows methods of diagnostics of engineering objects, has knowledge about different kinds of defects in constructions and its reasons; knows means of fixing and reinforcing of constructions.	The student identifies structural work of various construction types	
[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	The student recognizes and identifies the 2D Continuum Mechanics models	
[K7_U03] can perform classic statical and dynamical analysis of rod structures stability (trusses, frames and ties), both statically determined and undetermined as well as surface structures (plates, membranes and shells)	The student is able to analyze selected structural types under external actions	
[K7_U11] is able to plan and execute laboratory experiments to evaluate quality of construction materials and to determine strength of construction elements	The student recognizes the estimation methods essential in engineering process	
[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	The student shows a background on structural modelling	

Subject contents

2D structures:
* theoretical background on 2D structures - plane stress analysis in Cartesian and polar systems, Airy stress function
* plates at bending - theory and examples

Reliability of engineering structures:
* basic random variables of a variety of structural problems,
* definitions of reliability
* three levels of reliability assessment,
* random approach to loads and resistances,
* examples of structural reliability assessment

Prerequisites and co-requisites

Engineering Mechanics, Structural Mechanics, Strength of Materials

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test	60.0%	80.0%
activity, including presentation	60.0%	20.0%

Recommended reading

Basic literature	1. Girkmann K.: Dźwigary powierzchniowe. Arkady, Warszawa 1957, tłumaczenie R. Dąbrowski. 2. Kączkowski Z.: Płyty obliczenia statyczne. Arkady, Warszawa 1980 3. Kmiecik M., Wizmur M., Bielewicz E.: Analiza nieliniowa tarcz i płyt. PG, Gdańsk 1995 4. Murzewski J.: Niezawodność konstrukcji inżynierskich. Arkady, Warszawa, 1989. 5. Woliński S., Wróbel K.: Niezawodność konstrukcji budowlanych. Wydawnictwo Politechniki Rzeszowskiej, 2001.
Supplementary literature	no items
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	draw the stress diagrams along the thickness of 2D plane stress structure and the plate at bending enlist and characterize three levels of reliability assessment
Work placement	Not applicable