GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Structural Design and Mechanics I, PG_00055657		
Field of study	Architecture		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2021/2022
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study
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	assessment
Conducting unit	Department of Technical Fundamentals of Architecture Design -> Faculty of Architecture		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Monika Zielińska	
	Teachers	dr inż. Monika Zielińska	

Lesson types and methods of instruction

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

E-learning hours included: 0.0

Adresy na platformie eNauczanie:

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

Understanding the behaviour of rod systems and arragement of their statical schemes, solving statically determinate beams, frames and trusses.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U04] is able to use analytical methods to formulate and solve project tasks	the student is able to use analytical methods to formulate and solve design tasks in the field of structural design and mechanics	[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
[K6_W01] knows and understands construction problems, building and engineering issues related to building design; principles, solutions, constructions and building materials used in simple engineering tasks in the field of architectural and urban design	the student knows and understands construction, building and engineering problems related to the design of buildings; principles, solutions, structures in the field of structural design and mechanics	[SW1] Assessment of factual knowledge

Subject contents

LECTURES: Introduction to the subject, structural elements. Elementary statics: scalars and vectors, principles of statics, static moment of force relative to the a point, pair of forces, reduction of plane force systems, equilibrium conditions. Impacts at construction, concentrated force, continuous load, concentrated moment. Schemes of bar systems, nodes and supports. Basic assumption of structural theory. Internal forces in statically determinate bar systems, relation between internal forces and external loading. Simple beams: free-ends beams, fixe beams, free-ends beams with bracket. Frame systems: beams with broken axis, three-hinged frames. Arch systems: internal forces in curved bars, pressure line. Plane truss systems, node counterpoise method, cross-section method. Built-up systems (jointed continuous beams, frame and truss systems, frame-truss systems). Variable loads (utilities): influence lines, loading of influence lines, extremal loading of influence lines. Envelopes of internal forces, load combination.

EXERCISES: Elementary statics. Reactions of simple beams. Internal forces in simple beams. Jointed continuous beams. Beams with broken axis. Three-hinged frames. Arch systems. Truss systems. Frame-truss systems. Influence lines. Extremal values of reactions and bending moments.

Prerequisites and co-requisites

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	55.0%	100.0%
Recommended reading	Basic literature	Kolendowicz T.: Mechanika budowli dla architektów. Arkady, Warszawa, 1993. Przewłócki J., Górski J.: Podstawy mechaniki budowli. Arkady, Warszawa, 2012.	
	Supplementary literature	Chudzikiewicz A.: Statyka budowli. Część I i II. PWN, Warszawa, 1973. Pyrak S., Szulborski K.: Mechanika konstrukcji. Przykłady obliczeń. Arkady, Warszawa, 2001.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Draw up diagrams of internal forces N, V and M in the simply supported beam. Determine the longitudinal forces in marked truss rods. Determine the extreme values of the reaction (bending moment) under the given AC and DC loads.		
Work placement	Not applicable		