

## 於。GDAŃSK UNIVERSITY 奶 OF TECHNOLOGY

## Subject card

Subject name and code	Strength of Materials, PG_00055746								
Field of study	Mechanical and Medical Engineering								
Date of commencement of studies	October 2021		Academic year of realisation of subject			2022/2023			
Education level	first-cycle studies		Subject group			Obligatory subject group in the field of study Subject group related to scientific research in the field of study			
Mode of study	Full-time studies		Mode of de	Mode of delivery			university		
Year of study	2		Language of instruction			Polish			
Semester of study	3		ECTS credits			8.0			
Learning profile	general academic profile		Assessment form			exam			
Conducting unit	Zakład Mechaniki Stosowanej i Biomechaniki -> Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology								
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Oleksii Nosko						
	Teachers		mgr inż. Katarzyna Pytka dr hab. inż. Oleksii Nosko						
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	:t	Seminar	SUM	
of instruction	Number of study hours	45.0	30.0	15.0	0.0		0.0	90	
	E-learning hours inclu	uded: 0.0							
Learning activity and number of study hours	Learning activity	Participation ir classes includ plan	n didactic led in study	Participation in consultation hours		Self-study		SUM	
	Number of study hours	90		10.0		100.0		200	
Subject objectives	The course provides students with knowledge of the basic terms, assumptions, principles and methods of Strength of Materials. Problems of tension, compression, torsion, bending and combined loading are systematically considered. Advanced problems related to static indeterminacy, buckling instability and elastoplastic behaviour are also treated. The main emphasis is on the development of skills to efficiently schematise, solve and analyse typical problems.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	[K6_U05] he/she is able to use analytic and modelling methods to formulate and solve engineering tasks related to the mechanical- medical area		Ability to perform the strength analysis of the basic problems related to the mechanical and medical engineering.			[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task			
	[K6_W05] he/she has skills in the field mechanics od rigid body, modelling of mechanical system, vibration and fundamental of strength of materials		Ability to perform the strength analysis of a bar subjected to tension or compression, torsion, bending; ability to analyse the stress state in a bar subjected to combined loading; ability to apply the energy methods.			[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects			

Subject contents	LECTURES/PRACTICAL CLASSES						
	Introduction. Geometry of cross sections. Static moments and centroid. Moments of inertia. Principal moments of inertia. Tension and compression. Stresses in an axially loaded bar. Displacements in an axially loaded bar. Stresses in a pin-joint truss. Bar systems with a rigid element. Torsion. Torsion of a circular shaft. Bending stresses. Bending moments in a beam. Stresses in a beam. Bending deflections. Deflections and slopes in a beam. Single degree statically indeterminate beams. Combined loading. Combined loading of a cross section. Bending stresses in a plane frame. Strength theories. Equivalent stress. Stresses in a frame. Energy theorems. Force method. Stability of bars. Elastoplastic behaviour.						
Prerequisites and co-requisites	Basics of elementary and linear algebra, geometry, trigonometry, vector calculus, differential calculus, integral calculus, mechanics.						
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Laboratory classes	50.0%	20.0%				
	Exam	50.0%	40.0%				
	Practical classes	50.0%	40.0%				
Recommended reading	Basic literature	IM Gere B   Goodno Mechanics of Materials: Priof Edition					
		<ul> <li>A. Pytel, J. Kiusalaas, Mechanics of Materials, 2nd ed., Cengage Learning, 2012.</li> <li>A. Jakubowicz, Z. Orłoś, Wytrzymałość materiałów, 5 wyd., WTN, 1978.</li> <li>M. Banasiak, K. Grossman, M. Trombski, Zbiór zadań z wytrzymałości materiałów, 2 wyd., PWN, 1998.</li> </ul>					
	Supplementary literature	<ul> <li>W.A. Nash, M.C. Potter, Schaums Outlines: Strength of Materials, 5th ed., McGraw-Hill, 2011.</li> <li>S. Timoshenko, Strength of Materials, 2nd ed., D. Van Nostrand Company, 1940.</li> <li>A.P. Boresi et al., Advanced Mechanics of Materials, 5th ed., John Wiley &amp; Sons, 1993.</li> <li>V.D. da Silva, Mechanics and Strength of Materials, Springer, 2006.</li> </ul>					
		Auresy na platformie elvauczanie:					
Example issues/ example questions/ tasks being completed							
Work placement	Not applicable						