



Subject card

Subject name and code	Strength of materials towards applications , PG_00053661						
Field of study	Mechanical Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2025/2026		
Education level	first-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Wiktoria Wojnicz				
	Teachers		dr hab. inż. Wiktoria Wojnicz				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	0.0	0.0	30
	E-learning hours included: 0.0						
	eNauczanie source addresses: Moodle ID: 4375 Strength of materials towards applications, DAPE,spring 25-26, (M:320407W0) https://enauczanie.pg.edu.pl/2025/course/view.php?id=4375						
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	30		0.0		0.0	30
Subject objectives	The aim of the subject is to acquire knowledge referring to the advanced problems of Mechanics of Materials (Strength of Materials)						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_U07	The students uses acquired engineering knowledge to solve complex problems related to design and to check function of mechanical systems used in machine industry	[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_U01	To design a mechanical system and to present a functionality of this system the student uses specific databases and specific engineering literature	[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_W12] possesses basic knowledge necessary to understand the ex-technical conditions of engineering activity, possesses basic knowledge on management, including quality management and running commercial enterprise, within the range of protection of intellectual property and patent law; knows general principles of creating and developing forms of individual entrepreneurship and basic HSE rules applicable to machine industry	The students uses acquired engineering knowledge to solve complex problems related to design and to check functionality of mechanical systems used in machine industry along with assessment of external influence of proposed solution	[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects
	K6_W06	The students uses knowledge referring to automatics and robotics to design mechanical systems used in machine industry	[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects

Subject contents	<p>Course content – lecture Lectures (15h) + Tutorials (15h)</p> <p>Fundamentals of Strength of Materials: summarizing.</p> <p>State of stress (3D and 2D).</p> <p>Strain stress - Strain rosettes.</p> <p>Stress and Strain relations: Generalized Hooke's law.</p> <p>Finite Element Method: application to solve chosen problems (bars, beams, planar elements).</p> <p>Review of Failure criteria.</p> <p>Fatigue and Fracture mechanics.</p> <p>Prandtl Stress Function.</p> <p>Herz contact stress.</p> <p>Rayleigh-Ritz Method.</p>		
	<p>Course content – exercises Lectures (15h) + Tutorials (15h)</p> <p>Fundamentals of Strength of Materials: summarizing.</p> <p>State of stress (3D and 2D).</p> <p>Strain stress - Strain rosettes.</p> <p>Stress and Strain relations: Generalized Hooke's law.</p> <p>Finite Element Method: application to solve chosen problems (bars, beams, planar elements).</p> <p>Review of Failure criteria.</p> <p>Fatigue and Fracture mechanics.</p> <p>Prandtl Stress Function.</p> <p>Herz contact stress.</p> <p>Rayleigh-Ritz Method.</p>		
Prerequisites and co-requisites	The student should have fundamentals related to the applied physics, applied mathematics and mechanics of materials.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Examination	56.0%	100.0%

Recommended reading	Basic literature	<ul style="list-style-type: none"> Hibbeler R.C. Mechanics of materials, 10th edition, Pearson Prentice Hall, USA, 2014. S. Seangathith, Advanced mechanics of materials, School of Civil Engineering Institute of Engineering, Suranaree Nniversity of Technology, 2001. Ansel C. Ugural, Saul K. Fenster, Advanced Mechanics of Materials and Applied Elasticity, Sixth Edition, Pearson, 2020. Muvdi B.B., McNabb J.W.: Engineering Mechanics of Materials. Third edition. Springer-Verlag 1991. Da Silva, Vitor Dias: Mechanics and Strength of Materials. Springer 2006.
	Supplementary literature	<ul style="list-style-type: none"> Timoshenko S.: Strength of Materials. Part I. Elementary Theory and Problems. USA 1940. Timoshenko S.: Strength of Materials. Part II. Elementary Theory and Problems. USA 1940
	eResources addresses	
Example issues/ example questions/ tasks being completed	<p>Spatial state of stress and planar state of stress: explain the way to assess a general state of stress in 2D space and 3D space.</p> <p>State of strain: explain application of strain gauge system.</p>	
Practical activities within the subject	Not applicable	

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