



Subject card

Subject name and code	Experimental Methods in Strength of Materials, PG_00044005						
Field of study	Civil Engineering						
Date of commencement of studies	October 2024		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	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Mechanics of Materials and Structures -> Faculty of Civil and Environmental Engineering -> Wydział Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Erwin Wojtczak				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	15.0	0.0	0.0	15
	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	15		2.0		8.0	25
Subject objectives	The purpose of the laboratory is experimental verification of formulas of strength of materials using model tests.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W02] Demonstrate knowledge and understanding of the processes and established methods of analysis / solution of engineering issues & problems in the field of civil engineering and of their limitations.	Student has knowledge of the statics of buildings and the strength of materials, describes the behavior of structures under external factors and examines the scope of validity of analytical models.	[SW3] Assessment of knowledge contained in written work and projects
	[K6_K03] Can effectively, clearly and unambiguously convey information, describe activities and communicate their results/ outcomes to engineers or a wider audience using appropriate communication methods and tools.	Student presents the results of research conducted in groups in an understandable way and provides clear and adequate answers to questions related to them.	[SK5] Assessment of ability to solve problems that arise in practice [SK4] Assessment of communication skills, including language correctness [SK1] Assessment of group work skills
	[K6_U05] Conducts research (obtaining information, simulations, experimental methods) in the field of construction in order to solve specific tasks and report research results.	Student examines the response of simple engineering structures to external factors, including planning and conducting experimental measurements such as selecting and using appropriate analytical models. Student prepares a report on the conducted research with a critical assessment of the differences between experimental and theoretical results and determining the reasons for these differences.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
	[K6_U01] Apply knowledge and understanding of mathematics as well as sciences and engineering disciplines underlying civil engineering to solve engineering problems and issues.	Student uses knowledge of mathematics, physics, statics of buildings and strength of materials to solve problems of structural mechanics, including obtaining experimental and theoretical data and their critical analysis.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
	[K6_W05] Demonstrate knowledge and understanding of research methods (obtaining information, simulations, experimental methods) in the field of civil engineering.	Student knows the methodology of conducting research, including planning and obtaining measurement data on experimental models such as obtaining theoretical results using appropriately selected analytical models.	[SW3] Assessment of knowledge contained in written work and projects
Subject contents	<p>The following experiments are individually carried out and analysed:</p> <ol style="list-style-type: none"> 1. Static tensile tests of carbon and hardened steel specimens. 2. Static compression tests of metal and metal alloy specimens. 3. Determination of Young's modulus and Poissons ratio of polycarbonate specimen (using strain gauges). 4. Determination of strains in selected sections of bending polycarbonate beams (T and Z sections). 5. Measurement of torsion angle of thin-walled tubes with closed and open cross sections. 6. Determination of the centre of twist of thin-walled beams. 7. Measurement of displacements in bending beam. 8. Determination of the shape of a cable. 9. Determination of critical loads for various supported columns. 10. Bending test of aluminium beam with C section. 		
Prerequisites and co-requisites	Course Engineering Mechanics should be completed. Course Basics of Engineering Programming should be completed. Course Strength of Materials should be taken. Precondition to the executing of experiments is acquaintance.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Reports	60.0%	60.0%
	Test	60.0%	40.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Chrościelewski J., Rucka M., Witkowski W.: <i>Metody doświadczalne w wytrzymałości materiałów</i>. Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2018. 2. Banasiak M.: <i>Ćwiczenia laboratoryjne z wytrzymałości materiałów</i>. PWN, Warszawa, 2000. 3. Bielewicz E.: <i>Wytrzymałość materiałów</i>, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2006. 4. Boruszak A., Sygulski R., Wrześniowski K.: <i>Wytrzymałość materiałów: doświadczalne metody badań</i>. PWN Warszawa-Poznań, 1984. 5. Burczyński T., Beluch W., John A.: <i>Laboratorium z wytrzymałości materiałów</i>. Wydawnictwo Politechniki Śląskiej, Gliwice, 2002. 6. Górski J., Iwicki P., Mikulski T.: <i>Metody doświadczalne w analizie konstrukcji</i>. Skrypt Politechniki Gdańskiej, Gdańsk, 2008. 	

	Supplementary literature	1. Dyląg Z., Jakubowicz A., Orłowski Z.: <i>Wytrzymałość materiałów, tom I</i> . Wydawnictwa Naukowo-Techniczne, 2003. 2. Dyląg Z., Jakubowicz A., Orłowski Z.: <i>Wytrzymałość materiałów, tom II</i> . Wydawnictwa Naukowo-Techniczne, 2003. 3. Szymczak Cz., Skowronek M., Witkowski W., Kujawa M.: <i>Wytrzymałość materiałów. Zadania</i> . Wydawnictwo Politechniki Gdańskiej, Gdańsk 2017.
	eResources addresses	Basic https://pbc.gda.pl/dlibra/publication/108003/edition/96871/content?ref=L2NvbGx1Y3Rpb25kZXNjcmlwdGlubi8xOA - Chróścielewski J., Rucka M., Witkowski W.: <i>Metody doświadczalne w wytrzymałości materiałów</i> . Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2018.
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> - Analyse and interpret the obtained experimental results. Compare the results of experiments with theoretical calculations. - Perform experimental tests according to the instructions in groups of three. - Draw stress diagrams for torsion of an open and closed annular bar. - Draw a graph of axial tensile test for mild and hard steel. 	
Work placement	Not applicable	

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