



Subject card

Subject name and code	LIGHT MATAL STRUCTURES, PG_00042239						
Field of study	Civil Engineering						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Optional subject group Subject group related to scientific research 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			exam		
Conducting unit	Department of Metal Structures -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Elżbieta Urbańska-Galewska					
	Teachers	dr inż. Patryk Deniziak dr hab. inż. Elżbieta Urbańska-Galewska dr inż. Aleksander Perliński					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	0.0	0.0	45
	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	45		5.0		25.0	75
Subject objectives	To acquaint students with the principles of designing steel structures made of cold-bent sections, plate girders with profiled webs, castellated beams and aluminum sections						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_W14] knows and applies building codes and obeys the Construction Law; has knowledge on environmental impact of investment realisation	The student knows standards for the design of cold-bent steel structures and aluminum structures			[SW1] Assessment of factual knowledge		
	[K7_U02] can design and dimension complex steel, concrete (including reinforced), wood and masonry constructions and its details	The student can design elements of cold-formed sections			[SU1] Assessment of task fulfilment		
	[K7_W02] knows principles of analysis, design and dimensioning of complex constructions and its elements	The student knows the principles of advanced analysis of light metal structures (including elements made of cold-fold sections) and aluminum			[SW1] Assessment of factual knowledge		

Subject contents	<p>Content of lectures:</p> <p>Definition of light metal structures, scope of the subject</p> <p>Theoretical basis of cold formed sections design.</p> <p>Bearing capacity of cold-formed elements under compression and bending</p> <p>Connectors and connections in structures with cold-formed profiles.</p> <p>Stress skin design.</p> <p>Structural systems with cold formed profiles.</p> <p>Roof renovations using light steel construction</p> <p>Plates with corrugated webs. Castellated beams.</p> <p>Aluminum structures.</p> <p>Content of exercises:</p> <p>General rules in accordance with EN 1993-1-3</p> <p>Idealized cross-section (working example)</p> <p>Rules for distortional buckling calculation (working example)</p> <p>Axial compression, tension and bending resistance calculations (working examples)</p> <p>Shear force (working example)</p> <p>Local transverse forces (working example)</p> <p>Combined tension and bending</p> <p>Working example on purlin connected to the roof sheathing by self-drilling screw</p>											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="453 1749 796 1778">Subject passing criteria</th> <th data-bbox="799 1749 1142 1778">Passing threshold</th> <th data-bbox="1145 1749 1492 1778">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 1783 796 1812">Exam</td> <td data-bbox="799 1783 1142 1812">60.0%</td> <td data-bbox="1145 1783 1492 1812">60.0%</td> </tr> <tr> <td data-bbox="453 1816 796 1845">Colloquium</td> <td data-bbox="799 1816 1142 1845">60.0%</td> <td data-bbox="1145 1816 1492 1845">40.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Exam	60.0%	60.0%	Colloquium	60.0%	40.0%
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Exam	60.0%	60.0%										
Colloquium	60.0%	40.0%										
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Bródka J., Broniewicz M., Giżejowski M.: <i>Kształtowniki gięte - Poradnik projektanta</i>, Polskie Wydawnictwo Techniczne, Rzeszów, 2006. 2. Bródka J., Garncarek R., Miłaczewski K.: <i>Blachy fałdowe w budownictwie stalowym</i>, Arkady, Warszawa, 1999. 3. Goczek J., Supel Ł.: <i>Kształtowniki gięte w obudowie hal</i>, Wydawnictwo Politechniki Łódzkiej, Łódź, 2007. 4. PN-EN 1993-1-3 Eurokod 3: Projektowanie konstrukcji Stalowych. Część 1-3: Reguły ogólne dla konstrukcji z kształtowników i blach profilowanych na zimno. 										

	Supplementary literature	Gwóźdź M.: Stany graniczne konstrukcji aluminiowych. Wydawnictwo Politechnika Krakowska , Kraków 2007.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>Explain with a sketch what the reinforcement effect is and what parameters affect the final result. Explain the concept of distortion instability</p> <ol style="list-style-type: none"> 1. Check the compression resistance of thin-walled element made out of cold-formed C-section. 2. Check the bending resistance of thin-walled element made out of cold-formed Z-section. 3. Check the shear resistance of thin-walled element made out of cold-formed SIGMA-section. 	
Work placement	Not applicable	