



Subject card

Subject name and code	Bridges , PG_00048229						
Field of study	Civil Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2024/2025		
Education level	second-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	Part-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Railway Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Marcin Abramski					
	Teachers	mgr inż. Maciej Malinowski dr inż. Arkadiusz Sitarski dr hab. inż. Marcin Abramski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	0.0	0.0	10.0	0.0	20
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	20	5.0		50.0	75	
Subject objectives	Basic knowledge on structural engineering of bridge supports and spans made of concrete. Static systems, structural designing. Project of simply supported reinforced concrete bridge in grid static system.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_U02] can design and dimension complex steel, concrete (including reinforced), wood and masonry constructions and its details						
	[K7_W02] knows principles of analysis, design and dimensioning of complex constructions and its elements						

Subject contents	<p>Lecture:</p> <ol style="list-style-type: none"> 1. Prestressed concrete. Pre-tensioned and post-tensioned concrete structures. Bonded and unbonded post-tensioning. Structure safety in design process: full, reduced and partial prestressing. Prestressing tendons: wires, strands and cables. Dead-end and live-end anchorages of strands and cables. Modes of failure for prestressed concrete structures. 2. Bridge supports. Abutment: its parts and their role in carrying the loads. Soil lateral pressure on abutments. Approach slabs in abutments. Global stability of abutments and piers. Geosynthetic Reinforced Soil bridge abutments. River piers, ice aprons. Scour in river piers. Seismic hazards for bridge supports. 3. Classification of concrete bridges with regard to structure type of main girders: beam bridges, frame bridges, arch bridges, cable-stayed bridges, extradosed bridges, stressed ribbon bridges. 4. Short- and medium-span concrete beam bridges. Static schemes. Span cross-sections (including slab bridges). Using prefabricated concrete beams in bridge construction. Methods of making freely supported bridge spans fully or partially continuous. Bituminous expansion joints. 5. Other types of concrete bridges: frame bridges, arch bridges, cable-stayed bridges, extradosed bridges, stressed ribbon bridges. 6. Contemporary technics of concrete bridge construction: fully cast on falsework, with prefabricated structural members, incremental launching, balanced-cantilever method. <p>Designing:</p> <p>Project of composite (concreto-steel) road bridge</p>											
Prerequisites and co-requisites	<p>Strength of materials.</p> <p>Building mechanics.</p>											
Assessment methods and criteria	<table border="1" data-bbox="451 873 1487 981"> <thead> <tr> <th data-bbox="451 873 794 907">Subject passing criteria</th> <th data-bbox="794 873 1137 907">Passing threshold</th> <th data-bbox="1137 873 1487 907">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 907 794 940">lecture</td> <td data-bbox="794 907 1137 940">53.0%</td> <td data-bbox="1137 907 1487 940">50.0%</td> </tr> <tr> <td data-bbox="451 940 794 981">designing</td> <td data-bbox="794 940 1137 981">90.0%</td> <td data-bbox="1137 940 1487 981">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	lecture	53.0%	50.0%	designing	90.0%	50.0%
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lecture	53.0%	50.0%										
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Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Abramski M., Materiały do wykładu z Mostów Betonowych" - electronic version platform: eNauczanie. 2. Malinowski M, Szafrński M., Materiały pomocnicze do projektowania mostów zespolonych (beton-stal) - electronic version platform: eNauczanie. 3. PN-EN 1992-2:2010. Eurokod 2: Projektowanie konstrukcji z betonu. Część 2: Mosty z betonu. Obliczanie i reguły konstrukcyjne. 4. Praca zbiorowa: Podstawy projektowania konstrukcji żelbetowych i sprężonych według Eurokodu 2. DWE, Wrocław 2006. 5. Madaj A., Wołowicki W.: Mosty betonowe. Wydawnictwo Komunikacji i Łączności, Warszawa 2002. 6. PN-S-10042:1991. Obiekty mostowe. Konstrukcje betonowe, żelbetowe i sprężone. Projektowanie. 										
	Supplementary literature	<ol style="list-style-type: none"> 1. Szczygieł J.: Mosty z betonu zbrojonego i sprężonego. Wydawnictwo Komunikacji i Łączności, Warszawa 1978. 2. Ajdukiewicz A., Mames J.: Konstrukcje z betonu sprężonego. Wyd. Polski Cement, Kraków 2004. 										
	eResources addresses	Adresy na platformie eNauczanie:										
Example issues/ example questions/ tasks being completed												
Work placement	Not applicable											