



Subject card

Subject name and code	Concrete Bridges, PG_00044277						
Field of study	Civil Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2024/2025		
Education level	first-cycle studies	Subject group			Optional subject group		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	4	Language of instruction			Polish The lecture ends with a colloquium that counts.		
Semester of study	7	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Arkadiusz Sitarski					
	Teachers	dr hab. inż. Marcin Abramski dr inż. Arkadiusz Sitarski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	15.0	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		50.0	100
Subject objectives	<p>The aim of the course is to familiarize students with issues related to bridge structures and their elements made mainly of concrete. The basic types of concrete bridges, construction technologies and the specificity of used construction materials will be discussed.</p> <p>The project includes analytical calculations for a multi-girder grid static system with integrated slab, including dimensioning. The aim of this task is to familiarize students with the complex analytical determination of internal forces and to carry out the dimensioning of the selected cross-section of the calculated structure.</p>						
Learning outcomes	Course outcome	Subject outcome		Method of verification			
	[K6_W09] knows the principles of determining of loads acting on basic constructions (e.g. general, industrial, bridge, water, marine, transport objects) and rules of its constructing	Is able to recognize the type of concrete bridge structure. Can determine what loads affect the bridge structure.		[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects			
	[K6_U07] Can design and properly dimension basic elements of construction or basic foundations of general, hydrotechnical and bridge constructions	Is able to approximately determine the internal forces in the structural elements of a reinforced concrete bridge and determine the necessary reinforcement for this type of structure		[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			

Subject contents	<p>History outline of bridges made of stone, brick, concrete, reinforced concrete and prestressed concrete. Structural systems of concrete bridges. General principles of the bridge structural analysis.</p> <p>Materials used to erect the reinforced concrete and prestressed concrete bridges. Forming the bridge cross section and the longitudinal section and, as well as, in the plan.</p> <p>Contemporary structural solutions used in concrete bridges. Erection methods of concrete bridges: on scaffold, prefabrication, longitudinal pulling, concreting and cantilever erection.</p> <p>Slab bridges: structural and technological solutions (monolithic and prefab bridges), good points and flaws, applying range, forming in the cross section and in the longitudinal section, supporting solutions, general design principles.</p> <p>Girder bridges - applying range, structural solutions and principles of monolithic and prefab (composite bridges, girder arrangement, determining steel area.</p> <p>Sample concrete bridges of other structural systems (arch bridges, frame bridges, cable-stayed bridges).</p> <p>Elements of bridge fittings: dilatations types and the choice principles, bearings for concrete girder bridges and concrete slab bridges choice of bearing type, dehydration, energy consuming barriers, railings, acoustic barriers on the bridge, connecting temporary slabs..</p>											
Prerequisites and co-requisites	<p>Basics of Structural Mechanics and Strength of Materials. Dimensioning of concrete structures.</p> <p>Subjects: Bridge and Tunnels.</p>											
Assessment methods and criteria	<table border="1" data-bbox="453 595 1492 701"> <thead> <tr> <th data-bbox="453 595 794 633">Subject passing criteria</th> <th data-bbox="794 595 1136 633">Passing threshold</th> <th data-bbox="1136 595 1492 633">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 633 794 667"></td> <td data-bbox="794 633 1136 667">60.0%</td> <td data-bbox="1136 633 1492 667">50.0%</td> </tr> <tr> <td data-bbox="453 667 794 701"></td> <td data-bbox="794 667 1136 701">60.0%</td> <td data-bbox="1136 667 1492 701">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade		60.0%	50.0%		60.0%	50.0%
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Recommended reading	Basic literature	<ul style="list-style-type: none"> • Szczygieł J.: Mosty z betonu zbrojonego i sprężonego WKiŁ, Warszawa 1978 • Leonhardt F.: Budowa mostów. WKiŁ, Warszawa 1982. • Madaj A., Wołowicki W.: Mosty betonowe. WKiŁ, Warszawa 1998. • Madaj A., Wołowicki W.: Budowa i utrzymanie mostów. WKiŁ, Warszawa 1995. 										
	Supplementary literature	<ul style="list-style-type: none"> • Kmita J.: Mosty betonowe Cz I. Podstawy wymiarowania. WKiŁ, Warszawa 1984. • Kmita J.: Mosty betonowe Cz. II. Podstawy kształtowania. WKiŁ, Warszawa 1984. • Głomb J.: Technologia budowy mostów betonowych. WKiŁ, Warszawa 1982. • Czerski Z., Pajchel W.: Mosty Żelbetowe. WKiŁ, Warszawa 1969. • Czudek H., Radomski W.: Podstawy mostownictwa. PWN, Warszawa 1983. 										
	eResources addresses	<p>Uzupełniające</p> <p>Adresy na platformie eNauczanie:</p> <p>Mosty betonowe I 2024/2025 - Moodle ID: 41873</p> <p>https://enauzanie.pg.edu.pl/moodle/course/view.php?id=41873</p>										
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> - Present static schemes of beam bridges - Present static schemes of slab bridges - Present static schemes of arch bridges - Present static schemes of frame bridges <ul style="list-style-type: none"> - Common techniques of concrete bridges construction - Present known prefabricated elements for building bridges - Discuss the incremental launching method - Discuss the balanced-cantilever method - What is so-called bridge concrete? <ul style="list-style-type: none"> - Bridge abutments: types, construction, actions - Bridge pillars, types, construction, actions 											
Work placement	Not applicable											

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