GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Bridges , PG_00048229		
Field of study	Civil Engineering		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
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 -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Marcin Abramski	
	Teachers		

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_W02] knows principles of analysis, design and dimensioning of complex constructions and its elements		
[K7_U02] can design and dimension complex steel, concrete (including reinforced), wood and masonry construtions and its details		

<table>
<tr><td>Subject contents</td><td>Lecture:

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.

Designing:

Project of composite (concreto-steel) road bridge</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Strength of materials.

Building mechanics.</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>designing</td><td>90.0%</td><td>50.0%</td></tr>
<tr><td>lecture</td><td>53.0%</td><td>50.0%</td></tr>
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</td></tr>
<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. Abramski M., Materiały do wykładu z Mostów Betonowych" - electronic version platform: eNauczanie.
2. Malinowski M, Szafrański 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.</td></tr>
<tr><td>Supplementary literature</td><td>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.</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
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</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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