# SYLLABUS

**Course title:** Bridges (BudAB>SI5BRIDGE19)

**Course title (in Polish):** Mosty

The syllabus is valid since the summer semester of the academic year 2025/26 and its content is not subject to changes during the semester.

## Course details:

**Unit offering the course:** Faculty of Civil Engineering

**Course designated for the unit:** The Silesian University of Technology

**Didactic cycle:** Winter semester 2025/2026

**Coordinator of the course: Dr inż. Andrzej Śliwka**

**Delivery mode:** in-person

**Number of ECTS credits:** 2

| **Language:** |
|---|
| English |
| **Course homepage:** |
| https://platforma2.polsl.pl/rb/course/view.php?id=605 |
| **Prerequisites:** |
| No requirements |
| **Short description:** |
| Introductory course on the topic of bridge engineering. The aim of the course is to familiarize students with the specifics of bridge construction, a field on which the development of transport infrastructure in the country depends to a large extent. It concerns the preliminary design with the selection of static schemes and superstructures, taking into account their slenderness. In addition, a discussion of the design requirements in accordance with the applicable regulations and recommendations. |
| **Description:** |
| **LECTURES:** 20 hours<br>Introduction to bridge construction. Structural systems with the selection of the static scheme and the determination of the span length. Bridge supports, abutments and pillars shaping. Shaping of typical concrete and steel load-bearing structures, taking into account slenderness. Overview of the equipment. An introduction to road, railway and pedestrian bridges.<br><br>**PROJECT:** 10 hours<br>Project consists of six elements:<br>- An example of an existing bridge with a given construction scheme<br>- Drawing of the traffic section<br>- Cross-section of the designed bridge with a view of the support<br>- Longitudinal section of the designed bridge<br>- Side view of the designed bridge<br>- Technical desctiption of the designed bridge |
| **Bibliography:** |

Relevant design codes:
[1] EN-1990 Eurocode - Basis of structural design.
[2] EN-1991-2 Eurocode 1: Actions on structures - Part 2: Traffic loads on bridges.
[3] EN-1992-2 Eurocode 2 - Design of concrete structures - Concrete bridges - Design and detailing rules.
[4] EN-1993-2 Eurocode 3 - Design of steel structures - Part 2: Steel Bridges.
[5] EN-1994-2 Eurocode 4 - Design of composite steen and concrete structures - Part 2: General rules and rules for bridges.

Literature in English:
[6] ICE Manual of Bridge Engineering: Second Edition, ISBN: 9780727738028, Authors: Gerard Parke and Nigel Hewson, Published: November 2008.
[7] Bridge Engineering Handbook, Second Edition: Fundamentals, ISBN: 978-1-4398-5234-7, Edited by Wai-Fah Chen and Lian Duan, CRC Press Taylor & Francis Group 2014.

Literature in Polish:
[8] Madaj A., Wołowicki W.: Podstawy projektowania budowli mostowych, WKŁ, Warszawa 2009.
[9] Madaj A., Wołowicki W.: Budowa i utrzymanie mostów. Wymagania techniczne, badania, naprawy, WKŁ, Warszawa 2013.
[10] Madaj A., Wołowicki W.: Projektowanie mostów betonowych, WKŁ, Warszawa 2010.
[11] Karlikowski J., Madaj A., Wołowicki W.: Mosty zespolone stalowo-betonowe. Zasady projektowania wg PN-EN 1994-2, WKŁ, Warszawa, 2015.

Regulations and recommendations in Polish:
[12] Rozporządzenie Ministra Infrastruktury z dnia 24 czerwca 2022 r. w sprawie przepisów techniczno-budowlanych dotyczących dróg publicznych. Dz. U. poz. 1518.
[13] Rozporządzenie Ministra Transportu i Gospodarki Morskiej z dnia 10 września 1998 r. w sprawie warunków technicznych, jakim powinny odpowiadać budowle kolejowe i ich usytuowanie. Dz. U. z dnia 15 grudnia 1998 r.
[14] Wzorce i standardy WRM do nowelizacji rozporządzenia. Rekomendacja Ministerstwa infrastruktury, Warszawa 2020.
[15] STANDARDY TECHNICZNE. Szczegółowe warunki techniczne dla modernizacji lub budowy linii kolejowych do prędkości Vmax $\leq$ 200 km/h (dla taboru konwencjonalnego) / 250 km/h (dla taboru z wychylnym pudłem). Tom III. Kolejowe obiekty inżynieryjne.
[16] WARUNKI TECHNICZNE dla kolejowych obiektów inżynieryjnych Id-2.

**Learning outcomes:**

KNOWLEDGE:
(1) Knows and understands theoretical models of materials and principles of modelling and analysis of bar structures in the field of statics, dynamics and stability, and knows selected software supporting design, also with the use of BIM technology - [learning outcome K1A_W04].
(2) Knows and understands standards and guidelines for the design of selected general and industrial buildings, as well as road and rail transport infrastructure facilities - [learning outcome K1A_W06].

SKILLS:
(3) Can define computational models of computer analysis of structures, simulate various construction variants, perform static analysis and elements of dynamic analysis of statically determinate and indeterminate bar structures, as well as critically evaluate the results of these analyzes - [learning outcome K1A_U03].
(4) Can present, assess and discuss various opinions and positions concerning structural, material and technological solutions, taking into account the cost-effectiveness and durability of the analysed solution - [learning outcome K1A_U12].

**Assessment methods and assessment criteria:**

PRELIMINARY REQUIREMENTS: no requirements

CONDITIONS FOR CREDITING THE SUBJECT:
1) active and recorded attendance in class
2) timely submission of the project
3) sufficient quality of the delivered project

FINAL GRADE:
100% (project)

In order to have partial grades rewritten, students should contact the lecturer within the first two weeks of the semester.

The syllabus is valid from the winter semester of the 2025/2026 academic year, and its content is not subject to change during the semester.

**Description of the ECTS calculation method:**

| Type of activity | Number of hours |
|---|---|
| Number of class hours, regardless of the delivery mode | 30 |
| Student's individual work 1* - *literature review* | 7 |
| Student's individual work 2* - *consultations and project defence* | 3 |
| Student's individual work 3* - *preparation of projects* | 20 |
| Student's individual work 4* - *preparation for a test* | 0 |
| Other** | - |
| **Total hours** | **60** |
| **Number of ECTS credits assigned to the course** | **2** |

Legend:
* - Student's individual work – specify the forms of activity, e.g. *preparation for classes, data interpretation, class report writing, preparation for an exam, literature review, preparation of a project, presentation development, written work, report, etc.*
** – other, e.g., *additional contact hours*