



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Bridge construction

### Course

Field of study

Civil Engineering first-cycle studies

Area of study (specialization)

Civil Engineering

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/5

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

15

### Number of credit points

4

### Lecturers

Responsible for the course/lecturer:

Iwona Jankowiak, PhD

Responsible for the course/lecturer:

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Budownictwa i Inżynierii Środowiska

ul. Piotrowo 5, 61-138 Poznań

### Prerequisites

Knowledge

Knowledge of the strength of materials, structural mechanics, soil mechanics, concrete structures, steel structures, foundation design and fundamentals

Skills

Skills related to the static calculations and design of concrete and steel structures, self-learning skills

Social competencies



Ability to adapt of the type of any civil engineering structure to the communication requirements and social expectations, respect for the Polish language, understand the need for lifelong learning and group collaboration

### Course objective

Understanding the terminology used to describe bridge structure.

Understanding the structural elements of selected types of spans and bridge supports and their functions.

Knowing selected loads used to calculate the bridge structures.

Understanding of selected issues in the field of static calculations of bridge structures.

### Course-related learning outcomes

#### Knowledge

1. Students have the basics of general knowledge in mathematics, physics, chemistry, biology and other fields of science, forming theoretical principles appropriate to formulate and solve tasks related to building engineering
2. Students have detailed knowledge of theoretical mechanics, knowledge of materials? strength and general rules of structure design; know the theories explaining complex relations of structures
3. Students have advanced knowledge of construction theory and analysis of bar systems in the field of statics, dynamics, and stability
4. Students have the basics of general knowledge in the field of designing general infrastructure as well as road and railroad transport

#### Skills

1. Students are able to gather information from literature, databases and other properly selected information sources; can synthesize the obtained information, interpret and evaluate it, as well as draw conclusions, formulate, discuss and justify opinions and positions
2. Students can classify buildings building structures
3. Students are able to design selected elements and simple metal, concrete, wooden and brick constructions, working individually or as part of a team
4. Students are able to dimension basic structural elements in the units of civil, industrial, road, bridge and railroad building, working individually or as part of a team

#### Social competences

1. Students are able to adapt to new and changing circumstances, can define priorities for performing tasks assigned by themselves and by other people, acting in the public interest and with regard to the purposes of sustainable development



2. Students take responsibility for the accuracy and reliability of work results and their interpretation
3. Students are ready to autonomously complete and broaden knowledge in the field of modern processes and technologies of building engineering

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written test of the student's knowledge in the field of material presented during the lectures

Written test of the student's knowledge in the field of material presented during the seminars

Preparation of some static-strength calculation of simple road beam bridge (project) and oral test of knowledge of the range of this project

### Programme content

Lectures:

Basic definitions, main elements of bridge structure, types and elements of bridge spans, types and element of bridge supports, bridge bearings, bridge span equipment, bridge structure dimensions, bridge classifications, permanent and moving loads on bridges, basic methods of bridge span and support analysis

Laboratory:

Static analysis of some bridge spans by means of simple software based on the Finite Element Method

Projects:

Drawings of the cross-section and longitudinal and top views of simple bridge structures, the selected static calculations of bridge structural elements

### Teaching methods

Lectures: problem lecture/lecture with presentations/ case study

Tutorials: method based on usage of various source of knowlegde such us: film, photos, source files and presentations/ case study

Project method includes designing and performing simulation model and result testing

### Bibliography

Basic

1. Jankowiak I., Podstawy budownictwa mostowego, Wydawnictwo PP, Poznań 2019
2. Madaj A., Wołowicki W.: Podstawy projektowania budowli mostowych, WKiŁ, Warszawa 2007
3. Czudek H., Radomski R.: Podstawy mostownictwa, PWN Warszawa 1983



Additional

1. Madaj A., Wołowicki W.: Projektowanie mostów betonowych, WKiŁ, Warszawa 2010
2. Madaj A., Wołowicki W.: Mosty betonowe, WKiŁ 1980/2002
3. Ryżyński A., Wołowicki W.: Karlikowski J., Skarżewski J.: Mosty stalowe, PWN, Warszawa 1985
4. Karlikowski J., Sturzbecher K.: Mosty stalowe, Wydawnictwo PP 1993
5. Gałczyński S.: Podstawy budownictwa podziemnego, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2001
6. PN-EN 1991-2:2007 Eurokod 1: Oddziaływania na konstrukcje, Część 2: Obciążenia ruchome mostów
7. Furtak K., Kędracki M.: Podstawy budowy tuneli, Wydawnictwo Politechniki Krakowskiej, Kraków 2005
8. Leonhardt F.: Podstawy budowy mostów betonowych, WKiŁ, Warszawa 1982
9. Biliszcuk J.: Mosty podwieszane. Projektowanie i realizacja, Arkady 2005
10. Furtak K.: Mosty zespolone, PWN 1999

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	120	6,0
Classes requiring direct contact with the teacher	60	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	60	2,0

<sup>1</sup> delete or add other activities as appropriate