



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Modern bridge engineering [S2Bud1E-IOB>NBM]

Course

Field of study

Civil Engineering

Year/Semester

1/1

Area of study (specialization)

Smart and resilient buildings

Profile of study

general academic

Level of study

second-cycle

Course offered in

English

Form of study

full-time

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

15

Other

0

Tutorials

0

Projects/seminars

0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Strength of materials, structural mechanics, geotechnics, foundations, concrete structures, steel structures, bridge construction

Course objective

An overview of selected issues in contemporary bridge construction in the areas of design, construction and maintenance

Course-related learning outcomes

Knowledge:

Student:

- a) knows in detail the principles of analysing and constructing elements and connections in selected building structures
- b) has extended and detailed knowledge on modelling of materials and structures
- c) knows in detail the rules of construction and operation of selected building units

Skills:

Student:

- a) can evaluate and set load acting on building structures
- b) can select elements and connections in building structures
- c) can perform static analysis of bar structures

Social competences:

Student:

- a) takes responsibility for the reliability of working results and their interpretation
- b) is ready to autonomously complete and broaden knowledge
- c) can realise that it is necessary to improve professional and personal competence

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures - written assessment; classes - completion of tasks; grading limits according to the Study Regulations

Programme content

Selected issues in the design, construction and maintenance of bridge structures

Course topics

Lectures: bridge structural systems, steel-concrete composite structures in bridge engineering, orthotropic decks, acceptance testing and monitoring of bridge structures, bridge refurbishment, problems of the modelling of bridge structures; laboratory: analysis of the influence of cross bracing arrangement on the interaction of main girders in a multi-girder span

Teaching methods

Lecture: informational (multimedia) sessions; laboratory: problem solving

Bibliography

Basic:

Siwowski T., Turoń B., Basis of bridge design, Oficyna Wydawnicza Politechniki Rzeszowskiej, 2015
Bridge engineering handbook : superstructure design / Superstructure design ed. by Wai-Fah Chen and Lian Duan. CRC Press/Taylor & Francis Group, cop. 2014.
Bridge engineering handbook : substructure design / Substructure design ed. by Wai-Fah Chen and Lian Duan. CRC Press/Taylor & Francis Group, cop. 2014.
Concrete Bridge Engineering. Performance and Advances / Ed.by Coppe R.J. - London : Elsevier .Appl. Science, 1987.
Mondorf P. E. Concrete bridges. Taylor & Francis, cop. 2006.
Chatterjee S. ukhen. The design of modern steel bridges. Oxford : Blackwell Science, cop. 2003.
Innovative bridge design handbook : construction, rehabilitation and maintenance / edited by Alessio Pipinato. Elsevier : BH Butterworth-Heinemann An imprint of Elsevier, copyright © 2016.

Additional:

Barker R. M. Design of highway bridges : an LRFD approach . John Wiley & Sons, Inc., cop. 2007.
Karaś S. Mechanics of the integrated steel-concrete bridge girder and associated issues. Wydawnictwo Politechniki Lubelskiej, 2022.
Blakstad L. Bridge : the architecture of connection. Birkhäuser, cop. 2002.
Analysis and design of bridges / edited by Çetin Yilmaz, S. Tanvir Wasti. Martinus Nijhoff Publishers, 1984.
Svensson H. Cable-stayed bridges : 40 years of experience worldwide. Wiley-Blackwell/Ernst & Sons, cop. 2012.
Nakai H. Analysis and design of curved steel bridges. McGraw-Hill Book Company, copyright © 1988.

Breakdown of average student's workload

	Hours	ECTS
Total workload	55	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	25	1,00