



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Concrete bridges [N2Bud1-BDMiK>MB]

Course

Field of study

Civil Engineering

Year/Semester

1/2

Area of study (specialization)

Road, Bridge and Railway Engineering

Profile of study

general academic

Level of study

second-cycle

Course offered in

Polish

Form of study

part-time

Requirements

compulsory

Number of hours

Lecture

20

Laboratory classes

0

Other

0

Tutorials

0

Projects/seminars

18

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

Knowledge of structure statics, rules of live load applying, internal forces Determination, design of cross and longitudinal section of bridges, load-bearing capacity determination and reinforcement application

Course objective

he skill to design prestressed concrete bridge (with bonded and unbonded tendons), structures of a complex statics, composite structures type concrete-concrete

Course-related learning outcomes

Knowledge:

- knows the rules of prestressed concrete bridges design, as well as of bridges with a complex statics
- has the knowledge about reinforcement design in prestressed concrete bridges
- has the knowledge about reinforcement design in composite concrete-concrete bridges
- has the knowledge about reinforcement design in structures of a complex statics (e.g. box girder)
- has the knowledge about bridges construction methods, especially prestressed concrete bridges

Skills:

- a) knows how to design of cross- and longitudinal section of bridges
- b) knows how to design prestressed concrete bridge, including design of prestressing, prestressing force loss calculation and prestressing technology
- c) knows how to design a concrete-concrete composite bridge
- d) knows how to design structures of a complex statics (e.g. box girder), including their reinforcement

Social competences:

- a) is ready to solve individually tasks concerning design
- b) uses technical vocabulary properly
- c) is able to use technical literature to broaden knowledge
- d) is able to define a method to solve a technical design problem

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture: written exam, minimum grade 3,0

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

The results of the final exam depend on the percentage of correct answers on the test in relation to the maximum number of 100%. The obtained points are converted into the final grade.

Test result: Points: FINAL GRADE:

- (0 – 57%) (0-17) 2,0
- <57 – 67%) <17-20) 3,0
- <67– 75%) <20-22,5) 3,5
- <75 – 83%) <22,5-25) 4,0
- <83 – 90%) <25-27) 4,5
- <90 – 100%) <27-30> 5,0

Project: done correctly and knowledge about its content

Programme content

The idea of prestressed structures. Post-tensioned concrete and pre-tensioned concrete. Shaping of prestressed bridge structures. Prestressing design taking into account the ultimate and serviceability limits. Calculation of support zones. Prestressing force losses. Pre-tension program.

Course topics

Purpose and methods of prestressing structures, shaping prestressed spans, designing prestressing taking into account ultimate and serviceability limit states, calculating prestressing losses, ability to program prestressing of structures, calculating anchorage zones, calculating composite concrete-concrete structures

Teaching methods

lecture: multimedia presentation

project: task according to the given topic

Bibliography

Basic

1. Madaj A, Wołowicki W.: Mosty betonowe. Wymiarowanie i konstruowanie, WKŁ.
2. Madaj A., Wołowicki W.: Projektowanie mostów betonowych
3. Szczygiel J.: Mosty z betonu zbrojonego i sprężonego, WKŁ
4. Olszak W., Kaufman S., Eimer Cz., Bychawski Z: Teoria konstrukcji sprężonych PWN
5. Ajdukiewicz A., Mames J.: Betonowe konstrukcje sprężone, Wyd. Pol. Śląskiej
6. Ajdukiewicz A., Mames J.: Konstrukcje sprężone, Arkady
7. PN-EN-1992-1-1: Eurocod 2: Projektowanie konstrukcji z betonu. Część 1-1: Reguły ogólne i reguły dla budynków,

Additional

1. Leonhardt F.: Podstawy budowy mostów betonowych, WKŁ
2. Madaj A., Wołowicki W.: Żelbetowe konstrukcje mostowe. Wymiarowanie., Wyd PP

3. Skarżewski J., Wołowicki W., Sturzbecher K.: Mosty sprężone. Przewodnik do ćwiczeń projektowych., Wyd. PP
4. Praca zbiorowa: Budownictwo betonowe t. 14 Mosty , ARKADY
5. Praca zbiorowa: Budownictwo betonowe, t 3. Konstrukcje sprężone, ARKADY
6. Praca zbiorowa: Podstawy projektowania konstrukcji żelbetowych i sprężonych wg Eurokodu 2, Dolnośląskie Wydawnictwo Edukacyjne
7. Praca zbiorowa. Konstrukcje betonowe, żelbetowe i sprężone. Komentarz naukowy do PN-B-03264: 20020, ITB
7. Furtak K.: Mosty betonowe. Podstawy konstruowania i obliczania, wyd. P. Krakowskiej
8. Głomb J: Technologia budowy mostów betonowych, WKŁ. 1982
9. Radomski W.: Kierunki Rozwoju Mostownictwa, Świat i Polska, Dolnośląskie Wydawnictwo Edukacyjne, Wrocław 2019
10. Biliszczyk J., Hołowaty J., Onysyk J., Sadowski K., Toczkievicz R.: Mosty betonowe wznoszone metodą Sekcja po sekcji, Dolnośląskie Wydawnictwo Edukacyjne, Wrocław 2014
- 11 Biliszczyk J., Hildebrand J., Machelski Cz., Sadowski K., Teichgraeber M.: Mosty betonowe budowane metodami wspornikowymi, Dolnośląskie Wydawnictwo Edukacyjne, Wrocław 2018
12. Jankowiak I.: Podstawy budownictwa mostowego, wyd. PP
13. Czudek H., Radomski W.: Podstawy mostownictwa, WKiŁ

Breakdown of average student's workload

	Hours	ECTS
Total workload	105	4,00
Classes requiring direct contact with the teacher	38	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	67	2,50