



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Steel bridges [N2Bud1-BDMiK>MoS]

### Course

Field of study

Civil Engineering

Year/Semester

2/3

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

10

Laboratory classes

10

Other (e.g. online)

0

Tutorials

8

Projects/seminars

10

### Number of credit points

4,00

### Coordinators

dr hab. inż. Wojciech Siekierski

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### Lecturers

### Prerequisites

steel structures, strength of materials, building mechanics

### Course objective

transfer of knowledge in the field of analysis of: a) orthotropic decks, b) box girders, c) thermal and rheological phenomena in composite bridges, d) spans made of encased steel beams, e) rigid chord in a truss girder

### Course-related learning outcomes

Knowledge:

a) knows in depth the principles of analysis, construction and dimensioning of elements and connections in selected buildings

b) has advanced detailed knowledge of material strength issues, material and structure modeling; has knowledge of the theoretical basis of the Finite Element Method and general principles of nonlinear calculations of engineering structures

c) knows the principles of design, construction and operation of selected buildings in greater depth

d) has advanced detailed knowledge of the theoretical basis of the analysis and optimization of

structures and the design of selected buildings

Skills:

- a) is able to assess and compile loads acting on simple and complex building structures
- b) is able to design elements and connections in complex construction objects, working individually or in a team
- c) can perform classic static and dynamic analysis and stability analysis of rod structures (trusses, frames and tendons) statically determinate and indeterminate and surface structures (shells, plates, membranes and shells)
- d) is able to correctly define a computer computational model and conduct an advanced linear analysis of complex buildings, their elements and connections, and apply basic techniques of non-linear calculations along with a critical evaluation of the results of numerical analysis

Social competences:

- a) is responsible for the reliability of the obtained results of his work and the work of his team
- b) is ready to independently supplement and expand knowledge in the field of modern processes and technologies in construction
- c) is aware of the need to improve professional and personal competences, is ready to critically evaluate the knowledge and content received

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:

lecture: written exam; pass mark: 50% of points

exercises: final test; pass mark: 50% of points

project: assessment of the correctness of the exercise performed

### Programme content

selected calculation methods for bridge structures

### Course topics

construction, analysis and technology of orthotropic bridges, analysis of box girder, analysis of thermal and rheological phenomena in composite bridges

### Teaching methods

lecture: multimedia presentation supported by the content provided on the blackboard

exercises: multimedia presentation supported by the content given on the blackboard and carrying out the tasks given by the teacher - practical exercises

project: carrying out a task given by the teacher

### Bibliography

Basic

Madaj A., Karlikowski J., Wołowicki W., Mosty zespolone stalowo-betonowe, WKŁ, Warszawa, 2016

Ryżyński A., Wołowicki W., Karlikowski J., Skarżewski J., Mosty stalowe. PWN, Warszawa-Poznań, 1984

Karlikowski J., Sturzbecher K., Mosty stalowe. Przewodnik do ćwiczeń projektowych. Wyd. PP, Poznań, 1993

Czudek H., Pietraszak T., Stalowe pomosty uźebrowane. Obliczenia i konstruowanie. Arkady, Warszawa, 1978

Additional

Cusens A.R., Pama R.P., Analiza statyczna pomostów. WKŁ, Warszawa, 1981

Flaga A. Mosty dla pieszych. WKŁ, Warszawa, 2011

Jarominiak A., Mosty podwieszane. Oficyna Wyd. Politechniki Rzeszowskiej, Rzeszów, 1998

Biliszczyk J., Mosty podwieszane. Projektowanie i realizacja. Arkady, Warszawa, 2005

### 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