COURSE DESCRIPTION CARD - SYLLABUS

Course name
Design of structures [S2Bud1E-IPB>PK]

Course

Field of study
Civil Engineering

Year/Semester
1/1

Area of study (specialization)
Construction Engineering and Management

Profile of study
general academic

Level of study
second-cycle

Course offered in
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
45

Laboratory classes
30

Other
0

Tutorials
0

Projects/seminars
30

Number of credit points

6,00

Coordinators

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Lecturers

Prerequisites

Student knows the basic methods of mathematical analysis, has a basic knowledge of structural mechanics and strength of materials. Knows the basic materials used in building constructions.

Course objective

Acquire and develop skills related to modeling and dimensioning of different types of building structures based on the PN-EN European Standards.

Course-related learning outcomes

Knowledge:
Student knows the principles of modeling and analysis of selected structural elements of buildings.
Student knows the software and calculation procedures used in the design process.
Student knows the standards for the design of building objects and their elements.
Student knows the basic provisions of building law regarding the design of structures.

Skills:
Student is able to use building standards regarding structural loads.

Student can design the main building components using the principles of European PN-EN standards.
Student is able to perform basic static and strength calculations of building structural elements.

Social competences:
Student is responsible for the reliability of the results obtained.
Student is aware of the need for sustainable development of his personal competence.
Student is aware of the importance of design work and its impact on the safety of people and property.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Written test in the last class. Passing requirement: 50% of points. Obligatory individual reports on completed design and laboratory tasks.

Programme content

The main principles and regulations of the construction law on the design of structures.
Making static calculations of structural elements.
Principles of dimensioning structures made of timber, steel and concrete.
Principles of design of selected structural elements of a building.
Design of industrial hall structures
Dynamic analysis of selected building structures.
Analysis of initial stability.

Course topics

Duties and requirements for civil engineers.
The main principles and provisions of the construction law on the design of structures.
Making static calculations of structural elements, construction of the calculation model, static schemes, collection of loads (climatic and service), verification of sections.
Principles of dimensioning of structures made of elements
wooden, steel and concrete elements according to European standards (limit states).
Design of structural elements of a building: beams, columns, slabs, etc.
Dynamic analysis of selected building structures.
Determination of critical load factors and buckling length factors of simple bar systems.

Teaching methods

1. Lecture: multimedia presentation, illustrated with examples on the board.
2. Laboratory exercises: performing the tasks given by the teacher - practical exercises.
3. Design exercises: solution of design tasks given by the teacher - practical exercises.

Bibliography

Basic
1. S. Trahair, M.A. Bradford, D.A. Nethercot, L. Gardner (2007): The Behaviour and Design of Steel Structures to EC3, Balkema.
2. A.J. Bond et al. (2006), How to Design Concrete Structures using Eurocode 2. CCIP.
3. J. Sobon, R. Schroeder (1984), Timber frame construction: all about post and beam building. Garden Way Pub.
Additional
1. J.R. Underwood, M. Chiuini (1998), Structural Design: A Practical Guide for Architects. John W aley & Sons.
2. Alan Williams (2011), Steel structures design. The McGraw-Hill.

Breakdown of average student's workload

	Hours	ECTS
Total workload	150	6,00
Classes requiring direct contact with the teacher	105	4,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	45	1,50