COURSE DESCRIPTION CARD - SYLLABUS

Course name
Konstrukcje betonowe

Course

Field of study
Budownictwo

Year/Semester
3/6

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
polski

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
30

Other (e.g. online)

Tutorials
15

Projects/seminars

Number of credit points

5

Lecturers

Responsible for the course/lecturer:
dr inż. Jacek Ścigałło

Responsible for the course/lecturer:

Prerequisites

The student should have knowledge of mathematics, physics, chemistry, strength of materials and mechanics of buildings. He should also have the ability to obtain information from the indicated sources.

A student should have the ability to obtain information from the indicated sources, interpret them, draw conclusions, formulate and justify opinions and be ready to cooperate as part of a team.

A student should be aware of the responsibility for the reliability of the results of his / her work and their interpretation, should be ready to independently 2 supplement and expand knowledge in the field of construction, and should be aware of the need to increase professional and personal competences and understand the need for continuous training out.

Course objective

Acquiring skills in the design (construction and dimensioning) of simple bending, compression and tension elements of concrete structures in terms of the ultimate and serviceability limit states.

Course-related learning outcomes

Knowledge

1. 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 - [P6S_WG (O)]

2. Knows detailed rules of constructing and dimensioning concrete elements and building facilities - [P6S_WG(I)]

3. Have advanced knowledge of construction theory and analysis of bar systems in the field of statics - [P6S_WG (I)]

4. Know the rules of constructing and analysing civil engineering - [P6S_WG (I)]

5. Have basic knowledge of the operation of algorithms used in selected software (including applications of BIM technology) supporting calculations, design of building structures - [P6S_WG (O/I)

Skills

1. Can prepare statements of strengths influencing the building units and perform static analysis of statically determinate and non-determinate bar structures - [P6S_UW (I)]

2. Are able to correctly utilise numerical, analytical, simulation and experimental methods, in order to identify and solve problems in the field of building engineering; to obtain and verify the results - [P6S_UW (I)]

3. Are able to use advanced information and communication technologies (ICT) appropriate to perform typical engineering tasks - [P6S_UW (O/I)]

4. Are able to use modern software supporting the design decisions in building engineering, including programs based on the BIM technology; are able to critically estimate the results of numerical analysis of building facilities - [P6S_UW (O/I)]

5. Are able to design selected elements and simple concrete constructions, working individually or as part of a team - [P6S_UW (I)]

6. Can classify buildings building structures - [P6S_UW (O/I)]

Social competences

1. Understand the need of team work, are responsible for the safety of their own work and team’s work - [P6S_KO (O)]

2. Take responsibility for the accuracy and reliability of work results and their interpretation - [P6S_KK (O)]

3. Are ready to autonomously complete and broaden knowledge in the field of modern processes and technologies of building engineering - [P6S_KR (O)]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Examination of the content of the lecture in writing.

Auditorium exercises: tests (design of a reinforced concrete eccentric-compressed section taking into account slenderness and long-term loads).

Design exercises (design of reinforced concrete, monolithic frame system: substantive assessment of the project and assessment of defense.

Grading scale (max. 50 points):

45,5-50 very good (A)

42,5-45,4 good plus (B)

37,5-42,4 good (C)

32,5-37,4 sufficient plus (D)

25,0-32,4 sufficient (E)

less than 25 insufficient (F)

Programme content

Lecture:

Structural analysis in terms of Eurocode 2. Unidirectional reinforced slab and beam ceilings. Ribbed ceilings. Poles and walls. Bidirectional - reinforced ceilings. Flat ceilings. Shields. Stairs. Alloy and plate foundations. Foundation plates. Retaining walls. Framework systems. The spatial stiffness of the structure. Dilatations. Prefabricated structures. Calculation of structures in various computational situations.

Auditorium exercises:

Examples of the calculation of reinforced concrete, eccentric-compression reinforced concrete elements taking into account slenderness and long-term loads.

Design exercises:

Design of a reinforced concrete, monolithic frame system.

Teaching methods

Monographic lecture with multimedia presentation.

Auditorium exercises based on the method of demonstration and instruction. Presentation and discussion of computational examples with the practical participation of students. Credit on the basis of systematic and active participation in classes and a positive assessment of the test.

Design exercises - practical implementation of an engineering task. Preliminary discussion of the task, phased preparation of calculations and drawing documentation by students. Consulting and approving individual stages of work. Explaining repeated errors, ambiguities and doubts by the tutor to all students. The basis for passing the test is a systematic project, confirmed by an entry from the consultation, and its defense (oral or written form).

Bibliography

Basic

PN-EN 1990 Podstawy projektowania konstrukcji

PN-EN 1991-1 Oddziaływania na konstrukcje

PN-EN 1992-1 Projektowanie konstrukcji z betonu

PN-EN 1997-1 Projektowanie geotechniczne

Additional

Rawska-Skotniczy A.: Obciążenia budynków i konstrukcji budowlanych według eurokodów. PWN, Warszawa 2013.

Sekcja Konstrukcji Betonowych KILiW PAN: Podstawy projektowania konstrukcji żelbetowych i sprężonych według eurokodu 2. Dolnośląskie Wydawnictwo Edukacyjne, Wrocław 2006

Knauff M.: Obliczanie konstrukcji żelbetowych według eurokodu 2. PWN, Warszawa 2018.

Starosolski W.: Konstrukcje żelbetowe według eurokodu 2 i norm związanych. PWN, Warszawa 2011

Starosolski W.: Wybrane zagadnienia komputerowego modelowania konstrukcji inżynierskich. Wydawnictwo Politechniki Śląskiej, Gliwice 2003.

Kowalski R.: Konstrukcje żelbetowe w warunkach pożarowych. PWN, Warszawa 2019.

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,0
Classes requiring direct contact with the teacher	80	3,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	45	2,0

[1] delete or add other activities as appropriate