COURSE DESCRIPTION CARD - SYLLABUS

Course name
Concrete structures I [S1Bud1>KB1]

Course

Field of study
Civil Engineering

Year/Semester
3/5

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other (e.g. online)
0

Tutorials
15

Projects/seminars
15

Number of credit points

4,00

Coordinators

dr inż. Teresa Grabiec-Mizera
teresa.grabiec-mizera@put.poznan.pl

Lecturers

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 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 design selected elements and simple concrete constructions, working individually or as part of a team - [P6S_UW (I)]
3. Are able to use advanced information and communication technologies (ICT) appropriate to perform typical engineering tasks - [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:

Learning outcomes presented above are verified as follows:
Auditorium exercises: tests (design of a reinforced concrete bending section, calculation of deflection and cracks)
Design exercises (design of a reinforced concrete slab-rib ceiling): 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

LECTURES - the lecture program included the design of cross-sections in concrete structures according to Eurocode2 and information about structural materials.
CLASSES AND PROJECTS - in accordance with the lecture program.

Course topics

Lecture:
Construction materials. Adhesion. Anchoring the reinforcement. Phases of work of bending elements. Methods of dimensioning reinforced concrete sections. Computational situations. Ultimate limit states - general method. Ultimate limit states - simplified method. Single and double-reinforced bending sections. Shear. Puncture.
Static and material envelope.
Serviceability limit states. Cracking of RC sections. Deflections of reinforced concrete elements. Requirements and recommendations for reinforcement and construction of elements.
Auditorium exercises:
Examples of calculating reinforced concrete, bending rectangular and T-sections, single and double reinforced. Calculation of crack widths and deflections of bending elements.
Project:
Design of a reinforced concrete, monolithic slab-beam floor.

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
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.
Knauff M., Golubińska A., Knyziak P.: Przykłady obliczania konstrukcji żelbetowych. Budynek ze stropami płytowo-żebrowymi. PWN, Warszawa 2015.
Knauff M., Grzeszykowski B., Golubińska A.: Przykłady obliczania konstrukcji żelbetowych. Zarysowanie. PWN, Warszawa 2018.
Łapko A., Jensen B. C.: Podstawy projektowania i algorytmy obliczeń konstrukcji Żelbetowych. Arkady, Warszawa 2005

Breakdown of average student's workload

	Hours	ECTS
Total workload	120	4,00
Classes requiring direct contact with the teacher	60	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	60	2,00