COURSE DESCRIPTION CARD - SYLLABUS

Course name
Concrete Structures

Course

Field of study
Civil Engineering

Year/Semester
III/6

Area of study (specialization)
Civil Engineering

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
18

Laboratory classes

Other (e.g. online)

Tutorials
10

Projects/seminars
10

Number of credit points

5

Lecturers

Responsible for the course/lecturer:
dr inż. Teresa Grabiec-Mizera

Responsible for the course/lecturer:

Prerequisites

Knowledge: A student knows the basic physical sense: a force, stress, strain, strength. A student has the knowledge of mathematics, physics, chemistry, general mechanics and strength of materials in the field of study Civil Engineering.

Skills: A student converts algebraic and arithmetic expressions. A student uses mathematical analysis and basic formulae fluently in the field of structural mechanics and strength of materials. A student is able to compose possible loads. A student knows how to use simple software.

Social competencies: A student understand the need for lifelong learning and knows how to interact and work in a group.

Course objective

The aim of the subject is to teach students how to according to obligatory standards calculate concrete and reinforced concrete elements working in different ways.

Course-related learning outcomes

Knowledge

1. History of concrete and reinforced concrete, examples of carried out RC structures, basic properties of concrete and steel. - [K_W04, K_W14]

2. Ultimate limit state - rules of calculation: bending, shear and compression elements. - [K_U07]

3. Serviceability limit state - rules of calculation: width of vertical cracks, deflections of RC elements. - [K_U07]

4. Basic requirements of concrete elements reinforcement - [K_U08]

Skills

1. A student is able to compose possible loads - [K_U02]

2. A student can calculate internal forces at designed RC section of beams, columns and slabs - [K_U04]

3. A student can calculate rectangular and T-beam sections of bending beams with tension steel and tension and compression steel - [K_U06, K_U07]

4. A student can calculate RC sections loaded by moment and compression force - [K_U05, K_U07]

5. A student can calculate and design one-way slabs, beams, columns - [K_U06, K_U07]

Social competences

1. A student understand the need for lifelong learning; able to inspire and organize the learning process of others - [K1_K06]

2. A student able to interact and work in a group - [K1_K01]

3. A student correctly identifies and resolves dilemmas associated to his profession - [K1_K07]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

-Lectures - test in written form -1,5h

Exercises classes - test in written form (1,5h per semester)

Design classes - evaluation of individual student projects combined with an oral defense of the thesis, test in the exercises (1 per semester - 1.5 hours)

test in the lectures. (1 per semester - 1.5 hours)

The evaluation scale:

more than 100 excellent

91-100 very good (5)

81 - 90 good plus (4,5)

71 - 80 Good (4)

61 - 70 is sufficient plus (3,5)

51 - 60 satisfactory (3)

insufficient under 50 (2)

Programme content

Material properties - concrete and steel

Issue: the bond, the anchorage

Behavior of RC beam under increasing load, design situations.

Method of calculation RC sections

Ultimate limit state (calculation according equivalent rectangular stress distribution method)

Design of bending beams with tension steel and tension and compression steel.

Shear

Method of calculation RC sections loaded by moment and compression force

Serviceability limit state - cracking and deflection

Detailing of reinforcement - general rules.

Teaching methods

Lecture - multimedia presentations, calculations and examples- conventional method (blackboard and chalk)

Classes and projects - multimedia presentations, calculations and examples- conventional method (blackboard and chalk), tutorial

Bibliography

Basic

1. PN-EN 1992-1-1 Eurokod 2. Projektowanie konstrukcji z betonu. Część 1-1: Reguły ogólne i reguły dla budynków.

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

3. Knauff M., Golubińska A.: Tablice i wzory do projektowania konstrukcji żelbetowych z przykładami obliczeń, PWN Warszawa 2013

Additional

1. Sekcja Konstrukcji Betonowych KILiW PAN Podstawy projektowania konstrukcji żelbetowych i sprężonych według Eurokodu 2. Dolnośląskie Wydawnictwo Edukacyjne.

2. Łapko A., Jansen B.C.: Podstawy projektowania i algorytmy obliczeń konstrukcji żelbetowych, Arkady, Warszawa 2005

3. Mosley B., Bungey J., Hulse R.: Reinforced concrete design to Eurocode 2, Palgrave Macmillan New York 2009.

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,0
Classes requiring direct contact with the teacher	38	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	87	3,0

[1] delete or add other activities as appropriate