



1. Course number and name

RB-S1-19-W10-3, **Concrete Structures I**

2. Credits and contact hours*

4 ECTS, lectures: 30 hours**, classes: 5 hours**, project: 20 hours**

3. Instructor's or course coordinator's name

Grzegorz Wandzik PhD, DSc/University Professor

4. Text book, title, author, and year

- J.B. Jacobs: Eurocode 2 Commentary, European Concrete Platform ASBL, 2008
- B. Mosley, J. Bungey, R. Hulse: Reinforced Concrete Design to Eurocode 2, Palgrave Macmillan, 2007
- G. Wandzik: Concrete Structures, teaching materials, 2015.

a. other supplemental materials

- EN 1990:2002 Eurocode: Basis of Structural Design.
- EN 1991-1-1: 2001. Eurocode 1: Actions on structures. Part 1-1: General actions. Densities, self-weight, imposed loads for buildings.
- EN 1992-1-1:2004. Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings.
- EN 1992-1-2:2004. Eurocode 2: Design of concrete structures - Part 1-2: General rules - Structural fire design.

5. Specific course information

a. brief description of the content of the course (catalog description)

Lectures:

(1) Concrete structures – concept and examples, (2) Properties of concrete and steel, (3) Durability of concrete structures, (4) Methods of analysis, (5) Sections under flexure, (6) Members under eccentric compression and tension, (7) Shear and torsion design, (8) Cracking and deflection control.

Classes:

Presentation of two projects. Project No 1 – Beam design, Project No 2 – Column design.

Project:

There are two projects to complete: Project No 1 – Beam design according to EN 1990, EN 1991 and EN 1992 including static calculations (combination of actions), sections analysis, support zone design for shear, SLS control, beam detailing, : Project No 2 – Column design according to EN 1992 including buckling control, second order effects, sizing sections for bending moments accompanying by axial force.



b. prerequisites or co-requisites

Fundamentals of Structural Design, Mechanics of Materials

c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

Required.

6. Specific goals for the course

a. specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic

The student can:

- evaluate the importance of the properties of materials for bearing capacity and serviceability of RC structural members,
- recognize failure modes related to various types of actions,
- practically apply methods of RC elements analysis
- calculate the required reinforcement in bending and eccentrically compressed elements according to Eurocode 2,
- control the crack width and deflection of reinforced concrete elements,
- place the reinforcement correctly and prepare technical drawing of RC beam.

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

K1A_W05, K1A_W06, K1A_U02, K1A_U04

7. Brief list of topics to be covered

1. Concrete structures.
2. Properties of concrete and steel.
3. Durability of concrete structures.
4. Methods of analysis.
5. Sections under flexure.
6. Members under eccentric compression and tension.
7. Shear and torsion design.
8. Cracking and deflection control.

*- Consultations were not included in the contact hours

** - per semester