1. Course number and name

RB-S1-19-S10-D, **Concrete Structures III**

2. Credits and contact hours*

4 ECTS, lectures: 30 hours**, classes: 6 hours**, project: 24 hours**

3. Instructor's or course coordinator's name

Rafał Krzywoń PhD

4. Text book, title, author, and year

- Elliott K.: „Precast concrete structures". Butterworth Heinemann 2002
- Ghali A.: „Circular storage tanka and silos". E&FN Spon, London 2000
- Brown C. Nielsen J.: „Silos". E&FN Spon, London 1998

a. other supplemental materials

- EN 1992-1-1 (2004) (English): Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings

5. Specific course information

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

Lectures:

Concrete frame structures, frame detailing (corners, corbels), complex slabs and walls (openings, support conditions, specific load situations, reinforcement detailing), tanks and silos (designing and reinforcing), shells (classification, designing and reinforcing), arches (designing and reinforcing), industrial transportation infrastructure (types, loads).

Classes:

Discussing of project scope. Rules for design of concrete hall building for defined conditions (precast elements, static analysis, detailing of reinforcement). Design of industrial slab.

Project:

Design of concrete hall structure for defined conditions (length and bay width, location, crane, capacity) - preliminary drawings, - static analysis of the structure (loads arrangement, calculation of internal forces), - reinforcement design of column and footing, - preparation of reinforcement drawings.

b. prerequisites or co-requisites

No prerequisites and additional requirements

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 is able to:

- classify and calculate the loads acting on the concrete structures,
- choose the proper method of stuctural analysis,
- provide the static analysis of the building structure,
- design the structural members made of concrete.

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

K1A_U02, K1A_U04, K1A_W05, K1A_W06

7. Brief list of topics to be covered

1. RC frame structures (6 hours) – classification, cast "in situ" and precast frames, designing rules due to European Standards, reinforcement detailing of beams, columns, braces, joints, forming of hinges.
2. Tanks (4 hours) – classification, loads, design methods, reinforcement detailing, forming of joints, waterproofing.
3. Bunkers and silos (4 hours) – classification, differences between bunkers and silos, loads, design rules, reinforcing rules.
4. Arches (4 hours) – examples, classification, shaping, loads, static analysis, reinforcement design and placement.
5. Shells and folded plates (4 hours) – classification, static analysis, design methods, reinforcing rules.
6. Transportation systems (4 hours) – classification of crane transportation systems, loads, designing of crane runway beams, founding of jibs.
7. Sport infrastructure (2 hours) – examples of concrete sport infrastructure – stadiums, swimming pools, ski jump objects etc, loads, design and reinforcing examples.

*- Consultations were not included in the contact hours

**-per semester