SYLLABUS

Course title: Concrete Structures (RB-S1-19-S10-E)

Course title (in Polish):

The syllabus is valid since the summer semester of the academic year 2025/26 and its content is not subject to changes during the semester.

Course details:

Unit offering the course: Faculty of Civil Engineering

Course designated for the unit: The Silesian University of Technology

Specialization: Structural Engineering

Didactic cycle: Summer semester 2025/2026 - the third year of first degree studies

Coordinator of the course: Ph.D. Marek Węglorz

Delivery mode: in-person/hybrid

Number of ECTS credits: 5

Language:
English
Course homepage:
Distance Education Platform https://platforma2.polsl.pl/rb/course/view.php?id=265
Prerequisites:
No requirements
Short description:
Learning rules of precast pretensioned concrete (PPC) design. Design example is focused on design of the precast pretensioned concrete member.
Description:
LECTURES: 15 hours Concepts of prestressing; Development of general idea; Materials and equipment; Technical problems of modern solutions: post-tensioning and pre-tensioning; Losses of prestressing force; Methods of analysis: ultimate limit state (ULS), serviceability limit state (SLS); stress and strain control; Flexural design of PC members: post-tensioned and pre-tensioned; Web reinforcement design procedure for shear; Examples of the precast, pretensioned concrete members and structures. **PRACTICAL CLASSES: 6** hours Design rules of pretensioned concrete members according to Eurocodes. **PROJECT: 22** hours Design of precast, pretensioned concrete member - static calculations and detailed drawing. Spreadsheet, BIM.
Bibliography:
[1] Ajdukiewicz A., Mames J.: „Konstrukcje z betonu sprężonego". Polski Cement, Kraków 2008.

[2] Nawy E.G: „Prestressed Concrete – Fundamental Approach". Prentice Hall, New Jersey, 2006.
[3] Naaman A.: : „Prestressed Concrete – Analysis and Design". Ann Arbor, Michigan, 2005.
[4] EN 1990:2002. Eurocode 0: „Eurocode - Basis of structural design". Comité Européen de normalisation.
[5] EN 1991-1-1:2002. Eurocode : „Actions on Structures. General actions. Densities, self- weight, imposed loads for buildings". Comité Européen de normalisation.
[6] EN 1992-1-1: 2004. Eurocode 2: „Design of Concrete Structures. Part 1-1: General Rules and Rules for Buildings". Comité Européen de normalisation.

Learning outcomes:

KNOWLEDGE
(1) Student understands the aim and the rules of concrete prestressing (learning outcome K1A_W05).
(2) Student knows basic design rules of the prestressed concrete members according to Eurocodes (learning outcome K1A_W06).
(3) Student knows the rules of construction of the precast, prestressed concrete structures (learning outcome K1A_W06).

SKILLS
(4) Student can calculate loads acting on the pretensioned concrete members (learning outcome K1A_U02).
(5) Student can calculate internal forces and evaluate the results of the pretensioned concrete members static analysis (learning outcome K1A_U04).
(6) Student can design the precast, pretensioned concrete members (learning outcome K1A_U04).
(7) Student can make calculations and technical drawings of pretensioned concrete members (learning outcome K1A_U04).

Assessment methods and assessment criteria:

PREREQUISITES: none.
RULES FOR EVALUATION:
1) active attendance,
2) project defence,
3) exam passing.
FINAL MARK:
Project: 40% + Exam: 60%
To have partial grades transferred, students should contact the teacher within the first two weeks of the semester.
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