SYLLABUS

Name: ***Concrete Structures (BudAB>SI8CONSTR19)***
Name in Polish:
Name in English: ***Concrete Structures***

Information on course:

Course offered by department: Faculty of Civil Engineering
Course for department: Silesian University of Technology
Term: Summer semester 2024/2025
Cordinator of course edition: Dr inż. Radosław Kupczyk

Default type of course examination report:

ZAL

Language:

English

Course homepage:

https://platforma.polsl.pl/rb/course/view.php?id=796

Short description:

The aim of the course is to broaden students' knowledge of the properties of building materials and affect on them, accidental design loads, the durability and demolition of buildings and structures, the computer design of buildings
structures. Demonstration by laboratory tests selected properties of building materials and the theory of reinforced concrete structures.

Description:

LECTURE: 15 hours
Factors influencing on anchoring of reinforcement bars in concrete - standard requirements and experimental results.
Influence of fire on the properties of building materials and design of constraction elements. Examples of objects in which a fire occurred - causes and effects.
Explosions in / around buildings - examples, effects, conclusions.
Designing simple and complex structures using computer calculators and advanced MES computational methods, including buckling analysis.
Todays methods creating the drawing documentation - 2D and 3D modeling and introduction to BIM.
Construction of a simple, real object - assumptions, design, implementation.

CLASSES: 5 hours
Create a NED - MED interaction graph for non - typical shapes of cross section concrete. Calculation of the length of anchoring of steel reinforcing bars in concrete.

LABORATORY: 25 hours
Active learning during:
- determination of the bond stress between the reinforcing bar and concrete in the pull-out method, including the test of compressive strength of concrete
- determination of the properties of reinforcing bars by the tensile test in the hydraulic press,
- experimental presentation of the destruction mechanism of reinforced concrete beam due to shear or bending.
Discussion of the construction of a modern building - assumptions, design, implementation.

Bibliography:

[1] Kliszczewicz R.: Konstrukcje betonowe. Politechnika Śląska.
[2] Starosolski W.: Konstrukcje żelbetowe według Eurokodu 2 i norm związanych. Tom I i III. PWN.
[3] Neville A. M.: Właściwości betonu. Polski Cement.
[4] PKN: PN-EN 1992-1-1:2008 Eurokod 2: Projektowanie konstrukcji z betonu. Część 1-1: Reguły ogólne i reguły dla budynków. PKN.
[5] PKN: PN-EN 1992-1-2:2008 Eurokod 2: Projektowanie konstrukcji z betonu. Część 1-2: Reguły ogólne. Projektowanie z uwagi na warunki pożarowe. PKN.
[6] PKN: PN-EN 10002-1:2004 Metale. Próba rozciągania. Część 1: Metoda badania w temperaturze otoczenia. PKN.
[8] PKN: PN-EN 10080:2007 Stal do zbrojenia betonu. Spajalna stal zbrojeniowa. Postanowienia ogólne. PKN.
[9] ITB: Instrukcja ITB 409/2005, Projektowanie elementów żelbetowych i murowych z uwagi na odporność ogniową. ITB.
[10] Drobiec Ł., Jasiński R., Piekarczyk A.: Diagnostyka konstrukcji żelbetowych. Metodologia, badania polowe, badania laboratoryjne betonu i stali. PWN.

Learning outcomes:

KNOWLEDGE:
(1) Knows and understands principles of construction, dimensioning, strengthening of reinforced concrete construction elements - [directional effect K1A_W05].
(2) Knows and understands standards and guidelines for the design of selected general and industrial buildings - [directional effect K1A_W06].

SKILLS:
(3) Is able to perform the load combination and the standard load combination for the construction works in accordance with the relevant design situations at the limit state - [directional effect K1A_U02].
(4) Is able to size selected structural elements and design simple reinforced concrete structures - [directional effect K1A_U04].

Assessment methods and assessment criteria:

PREREQUISITES: No requirements

CONDITIONS FOR PASSING THE COURSE:
1) passing a test (maximum 3 attempts) from lectures, exercises and laboratory [checking learning outcomes: (1), (2), (3) and (4)];
First attempt - test (40 "closed" questions).
Second and third attempts - test (5 "open" questions).
2) correct completion of 2 exercises [checking learning outcomes: (1) and (4)].

Final grade from TEST:
- first time test: positive grade (3) from 21 points (out of 40 points possible);
- second and third test: grade from 3 to 5;

The final grade from EXERCISES is calculated as follows: exercise no. 1 + exercise no. 2
Exercise no. 1: grade from 3 to 5;
Exercise no. 2:
- submitted in the first "attempt" - grade 0;
- submitted in the second or subsequent "attempt" - grade -0.5.
In the event of obtaining a grade from exercise no. 1: 3 and from exercise no. 2: -0.5, the final grade from exercises is 3.

Final grade from the subject: rounded up (50% test + 50% exercises)

In order to transfer partial grades, the student should contact the instructor within the first two weeks of the semester.

The syllabus is valid from the summer semester of the 2025/2026 academic year, and its content is not subject to changes during the semester.

Information on course edition:

Default type of course examination report:

ZAL

Bibliography:

missing bibliography in English

Details of classes and study groups

lecture (15 hours)

Study groups details

Group number 1

Class instructors:

Dr inż. Radosław Kupczyk

classes (5 hours)

Study groups details

Group number 1

Class instructors:

Dr inż. Radosław Kupczyk

laboratory classes (25 hours)

Study groups details

Group number 1

Class instructors:

Dr inż. Radosław Kupczyk

Element of course groups in various terms:

Course group description	First term	Last term
missing group description in English (BudAB-S1-2019-sem8)	2022/2023-L	

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	2	2022/2023-L	