

# CONCRETE STRUCTURES II

Subject code: **06.4-WI-AUP-KB2**

Subject type: Obligatory

Language of instruction: English

Responsible for the subject: Jacek Korentz Ph.D. Eng.

Providing education: Anna Kucharczyk M.Sc.  
Paweł Błażejowski M.Sc.

Type of class	Number of classes per semester	Number of classes per week	Semester	Type of credit	ECTS points
<b>Full time studies</b>					2
Lecture	15	1	5	credit with a grade	
Class	30	2		credit with a grade	

## SUBJECT OBJECTIVE:

1. The objective in terms of knowledge is to familiarize the student with the construction material, which is concrete, with the principles of interaction between concrete and reinforcing steel during the transfer of loads, rules of behaviour of reinforced concrete sections and concrete structures.
2. The objective in terms of skills is to teach the student to design basic elements of t concrete structures (beams, plates, columns and foundations)
3. The objective in terms of personal and social competence is to prepare the student to present in the group and defend in the student's individual design solution in the field of concrete structures.

## INITIAL REQUIREMENTS:

Formal: A credit for courses in the following subjects: materials science, structural mechanics, general construction.

Informal: Basic general knowledge, technical understanding, spatial imagination.

## SUBJECT SCOPE:

Lecture programme:

Characteristics of reinforced concrete structures, interaction between concrete and reinforcing steel.

Mechanical properties of concrete and reinforcing steel.

Ultimate limit states: bending cross-sections, eccentrically extruded cross-sections, shear zone.

Serviceability limit states: stress reduction, checking scratches, checking deflections.

Principles of designing reinforced concrete elements: beams, half-masts, pillars, foundations.

Principles of shaping reinforcement in reinforced concrete elements.

Construction of reinforced concrete structures: longwall structures, rod and frame constructions.

Compressed structures - discussion.

Project programme

Design of construction elements of a reinforced concrete ceiling in a building of a particular purpose: monolithic slab, pole, base, foundation base.

### EDUCATIONAL METHODS:

- Lecture - conventional lecture,  
 Project - individual work on a project based on the teacher's explanations.

### EDUCATION RESULTS:

Results after completion of the course	Symbol	Verification methods	Type of class
<b>Knowledge</b>			
The student has knowledge of the properties of concrete and steel, The student can check load capacity and dimension reinforced concrete cross-sections and knows the principles of designing basic structural elements The student has a structured, theoretically founded general knowledge covering key issues in the field of concrete structures	K1_W01 K1_W03	Test	Lecture
<b>Abilities</b>			
The student can communicate using various techniques in a professional environment and in other environments The student can use analytical methods to formulate and solve engineering tasks. The student can assess the usefulness of routine methods and tools for solving a simple engineering task of a practical construction design	K1_U02, K1_U09 K1_U15	Systematic inspection of the progress of the project	Project
<b>Social skills</b>			
The student understands the importance and needs of lifelong learning and can organize the learning process for other people The student can cooperate and act in a group, assuming different roles in it. The student is able to properly define the priorities for the implementation of his own tasks or other tasks.	K1_K01 K1_K03 K1_K04	Random attendance inspection. Systematic inspection of the progress of the project	Lecture Project

### REQUIREMENTS TO OBTAIN A CREDIT:

Lectures:

The student attends lectures.

Project:

The student works individually on project tasks.

Basis for the grade:

The final grade is the average grade for the test and, lectures and projects.

### STUDENT WORK:

Interaction with the teacher:	
Time according to the timetable	45 h
Time for consultations	5 h
Exam and tests during the semester	0 h
Student work without a teacher:	
Preparation for classes during the semester	2
Field studies (including analyses, architectural studies, urban planning)	0
Preparation for tests, tasks, revisions, etc.	8
Preparation of the final report, project, presentation, discussion, test, etc.	0
ECTS for the subject according to the timetable	2 ECTS.

### **BASIC LITERATURE:**

1. PN-EN 1992-1-1:2008, Eurokod 2: Projektowanie konstrukcji z betonu. Część 1-1: Reguły ogólne i reguły dla budynków. 2008
2. PN-B-03264: 2002, Konstrukcje betonowe, żelbetowe i sprężone. Obliczenia statyczne i projektowanie.2002.
3. PN-88/B-01041, Rysunek konstrukcyjny budowlany. Konstrukcje betonowe, żelbetowe i sprężone.
4. Łapko A, Jansen B.C, Podstawy projektowania i algorytmy obliczeń konstrukcji żelbetowych, Arkady, Warsaw,2005,.
5. Grabiec K., Bogucka J., Grabiec T., Obliczenie przekrojów w elementach betonowych i żelbetowych (wg. PN-B-03264:1999). Arkady. Warsaw 2004.
6. Starosolski W., Konstrukcje żelbetowe według Eurokodu 2 i norm związanych, T.1-4. Wydawnictwo Naukowe PWN. Warsaw 2012.

### **NOTES:**

None

### **SYLLABUS PREPARED BY:**

Jacek Korentz D.Sc. Eng.