Course Name: CONCRETE STRUCTURES OF INFRASTRUCTURE FACILITIES

Course Code	*Status*	*Semester*	*No. of ECTS credits*	*Hours Fund*
	Compulsory	*III*	*5*	*2P+1V+1L*

Study program: Master study, Civil Engineering - Structures, duration 4 semesters and 120 ECTS credits.

Objectives of the course: Acquiring knowledge about the principles of design and construction of concrete structures of infrastructure facilities, transfer of actions, basics of structural analysis and construction, strengthening and repair of damaged structures and case studies of application of concrete structures in infrastructure facilities.

Learning Outcomes:: After passing this exam, the student will be able to:

- describe the basic elements and systems of reinforced concrete structures of infrastructure facilities;
- analyze and calculate the effects of typical actions on the reinforced concrete structures of infrastructure facilities;
- compare and select optimal systems of reinforced concrete structures for design, construction and rehabilitation;
- propose and design concrete solutions for reinforced concrete structures of infrastructure facilities.

Name of teacher: Mladen Ulićević, PhD, Stru.Eng., Professor of Concrete and Masonry structures

Name of associate: Nikola Baša, PhD, Stru.Eng.

Method of teaching and mastering the course content: Lectures, exercises, consultations, site visits

Course content:

1st week of classes	Water tanks. Function, hygiene conditions, structural characteristics, rectangular bases.
2nd week of classes	Water tanks. Circular bases, loads and stress states, design and construction methods.
3rd week of classes	Water towers. Role and shaping. Layout solutions. Loads. Design and construction methods.
4th week of classes	Squat silos. Purpose and layout solution. Loads, calculation and construction methods.
5th week of classes	Grain silos. Purpose and layout solution. Loads, calculation and construction methods.
6th week of classes	Reinforced concrete shells. Definitions and scope. Types, design and construction.
7th week of classes	Suspended roof structures. Properties and application. Design and construction methods.
8th week of classes	1st Colloquium
9th week of classes	Cooling towers. Properties and application. Design and construction methods.
10th week of classes	Industrial chimneys. Properties and application. Design and construction methods.
11th week of classes	Telecommunication towers. Properties and application. Design and construction methods.
12th week of classes	Visit to the construction site of an infrastructure facility.
13th week of classes	Review of students individual works and assistance in project development.
14th week of classes	Final acceptance and evaluation of the project. The student defends the individual conceptual design of the facility structure. Presentation of work in MS PowerPoint.
15th week of classes	2nd Colloquium

Student obligations during classes: Attendance at lectures and exercises, project producing, taking the colloquia.

STUDENTS WORKLOAD

Weekly	**During the semester**
5 credits x 40/30 = 6.67 hours **Structure:** **2 hours of lectures** **2 hours of exercises** **2.67 hours of individual work including consultations**	**Classes and final exam**: (6.67 hours) x 16 = **106.67 hours** **Necessary preparations before the beginning of the semester** (administration, enrollment, certification): 2 x (6.67 hours) = **13.33 hours** **Total course workload: 5x30 = 150 hours** **Additional work** for exam preparation in the remedial exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total workload for the course 150 hours) **Workload structure**: 106.67 hours (Classes)+13.33 hours (Preparation)+30 hours (Additional work)

Literature:

Basic literature

1. Sahnovski, K.V.: ARMIRANOBETONSKE KONSTRUKCIJE, Građevinska knjiga, Beograd, 1962.
2. Radosavljević, Ž., Bajić, D.: ARMIRANI BETON, knjiga 3, Građevinska knjiga, 1988.
3. Jerotijević, M.: SILOSI, Izgradnja 5/81 - separat, Beograd, 1981.
4. Fuke, P., Buši, A.: REZERVOARI ZA VODU, Građevinska knjiga, Beograd, 1972.

Extended literature

1. Baikov, N.V.: ŽELEZOBETONII KONSTRUKCII, Stroizdat, Moskva, 1981.
2. Leonhart, F.: PREDNAPREGNUTI BETON U PRAKSI, Građevinska knjiga, Beograd, 1968.
3. Ulicki, I.I. i dr.: ARMIRANOBETONSKE KONSTRUKCIJE, Građevinska knjiga, Beograd, 1977.

Technical Codes and Standards

1. Eurocode 0 - EN 1990 – Bases of Structural Design
2. Eurocode 1 - EN 1991 - Action on Structures
3. Eurocode 2 - EN 1992 – Design of Concrete Structures
4. Eurocode 8 - EN 1998 - Design of structures for earthquake resistance

Forms of knowledge assessment and grading:

Student work on lectures and exercises is evaluated according to quality, knowledge and commitment. Each colloquium is scored from 0 to 100 points (%). The colloquium was passed with a minimum of 51 points (%). A student can take the final exam provided that he / she has a positively evaluated and defended project (conceptual design) and that he / she has received at least 20% of the total number of points in the colloquia. The entire course content is taken at the final exam. The student who passed the colloquia should confirm that knowledge at the final exam. The overall grade is formed as a weighted success from the colloquium and the final exam. A passing grade is obtained if 51 weighted points are collected. If the project (conceptual design) is graded higher than the total grade, the student finally gets one grade higher.

Special indications for the course: *For foreign students, aditional literature in English language can be provided.*

Name of the teacher who prepared the data: *Mladen Ulićević, mladenu@ucg.ac.me*

Note: Additional information about the course can be obtained from the course teacher, associate, head of the study program and vice dean for teaching.