



CIV-E2060 Production Technology of Concrete Structures D (5 cr)

Course Syllabus

28.2.2022-17.4.2022

1. Course information

Status of the Course: Programme Name: Building Technology
Major studies; Construction and Maintenance

Level of the Course: Aalto Eng, master's degree course

Teacher in charge: Prof. Jouni Punkki
Staff Scientist: Fahim Al-Neshawy

Teaching Period: IV 2022 (Period IV)

Organization: Department of Civil Engineering

Grading: 1 – 5

Language: English

2. Learning Outcomes

Upon successful completion of the course, students will be able to:

- 1) Understand the manufacturing process of the in-situ and precast concrete structures
- 2) Plan the various stages of the in-situ process (different forming systems, reinforcement systems, batching, mixing, placing, curing and finishing of site-cast concrete)
- 3) Understand the common precast concrete fabrication process (manufacturing of elements, transporting and installing of elements)
- 4) Apply the practical concreting technologies under extreme environmental production conditions
- 5) Perform the quality control of concrete production

3. Course Content

The course covers the following topics:

- On site concrete production
- Precast concrete manufacturing
- Special concretes and concreting under extreme environmental condition
- Quality control of concrete

4. Teaching methods

The course includes the following teaching methods and activities:

- 1) Lectures and expert talks
- 2) Concrete work plan and concrete production related topics - group assignment and seminar
- 3) Final written exam

4.1 Lectures and expert talks

The course includes lectures covering the content of the course. These lectures are divided into 2 parts:

- 1) introductory lecture by the course teachers and
- 2) concrete industry – expert talks. Expert talks are presented by experts in the field of concrete structures production to introduce new technologies and advancements of the concrete industry.

The lecture schedule is presented in Table 1. The schedule listed in the table is preliminary and may change during the term based on the experts' timetable.

Table 1: Course lectures – schedule

Date	Time	Lecture topic	Lecture hall	
Mon	28.02.2022	12:00 - 14:00	Introduction to concrete production technology	U6 KONECRANES - U149
Wed	02.03.2022	10:00 - 12:00	Special types of concrete	U3 - U141
Mon	07.03.2022	12:00 - 13:00 13:00 - 14:00	Concreting site practices (RMC, pumping, compaction, curing etc.) <ul style="list-style-type: none"> • Guest lecturer (Ready-Mix Concrete plant) - Rudus Oy 	U6 KONECRANES - U149
Wed	09.03.2022	10:00 - 11:00 11:00 - 12:00	Related site practices - formworks and reinforcement) <ul style="list-style-type: none"> • Guest lecturer (BRE formworks) - BRE Group 	U3 - U141
Mon	14.03.2022	12:00 - 13:00 13:00 - 14:00	Concreting plan <ul style="list-style-type: none"> • Guest lecture: Special aspects of infra structures - Vaylävirasto 	U6 KONECRANES - U149
Wed	16.03.2022	10:00 - 11:00 11:00 - 12:00	Precast concrete production <ul style="list-style-type: none"> • Guest lecturer (Pre-casting) - Consolis 	U3 - U141
Mon	21.03.2022	12:00 - 13:00 13:00 - 14:00	<ul style="list-style-type: none"> • Guest lecturer (Hollow-core slab production) - Consolis • Guest lecturer (Concrete pipes and manhole) - Rudus Oy 	U6 KONECRANES - U149
Wed	23.03.2022	10:00 - 11:00 11:00 - 12:00	Hot and cold weather concreting <ul style="list-style-type: none"> • Shorcreting (Oy Rockplan Ltd) 	U3 - U141
Mon	28.03.2022	12:00 - 14:00	<ul style="list-style-type: none"> • Construction of special concrete structures - Slipform structures and Underwater concrete casting - Fimpec Oy 	U6 KONECRANES - U149
Wed	30.03.2022	10:00 - 11:00 11:00 - 12:00	Quality control of concrete production (key factors involved QC) <ul style="list-style-type: none"> • Guest lecturer (Practice QC and requirements) - The Confederation of Finnish Construction Industries RT (CFCI) 	U3 - U141
Mon	04.04.2022	12:00 - 14:00	Seminar I	U6 KONECRANES - U149
Wed	06.04.2022	10:00 - 12:00	Seminar II	U3 - U141
Wed	13.04.2022	13:00 – 16:00	Course examination	

Writing a (2 to 3 pages) diaries for each expert talk (guest lecture) is weighted 5% of the final grade.

4.2 Group assignments

The main objective of the assignment is to enable students to combine knowledge related to the production technology of structures made primarily of reinforced concrete. Groups are asked to prepare (i) concrete work plan for a reinforced concrete structure and (ii) a presentation at the course seminar about the assignment. The presentation is max. 10 slides length, and the presentation time is about 15 min included feedback/oral examination. The concrete work plan and the presentation weighted value is 35% of the final grade.

4.3 Final exam

The written exam includes 5 questions covering the course outcomes. The questions are (short) essay question types. The final exam weighted value is 60% of the final grade.

5. Course Workload

The estimated student workload (5 cr = 135h) includes:

- 1) attending the lectures and assignment sessions: 36h
- 2) expert talks learning dairies: 10h
- 3) group assignment, concrete work plan and seminar presentation (group work): 40h
- 4) self-study for the exam: 50h

6. Assessment methods and grading scale

The total points of the course are 100 and the grading scale for course is: 5; 4; 3; 2; 1 (lowest); 0 (failed).

Table 2: Course grading

Total points	Grade
<50	0
50 ... <60	1
60 ... <70	2
70 ... <80	3
80 ... <90	4
90 ... 100	5

7. Study Materials

Recommended readings for the course:

- 1) M L Gambhir, (2013). Concrete Technology: Theory and Practice, 5e.
Aalto University Library: <https://www.aalto.fi/en/harald-herlin-learning-centre>
 - On site concrete production
 - Chapter 11 – Production of concrete
 - Precast concrete manufacturing
 - Handout to be prepared
 - Concreting under extreme environmental condition
 - Chapter 12. Concrete under extreme environmental condition
 - Quality control of concrete
 - Chapter 09 – Quality control of concrete
- 2) BY 201 - Betoniteknikan oppikirja 2018 (in Finnish)
- 3) Course handouts

8. Prerequisites

- 1) CIV-E1010 Building Materials Technology 5 op
- 2) CIV-E2020 Concrete Technology L, 5 op