



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

### Course Syllabus

01.03.2021 – 14.04.2021

#### 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 2021 (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 industry
- 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 and assignment sessions – schedule*

Mon	01.03.2021	12:00 – 14:00	+ Introduction to concrete production technology
Wed	03.03.2021	10:00 – 12:00	+ Special types of concrete
Thu	04.03.2021	10:00 – 12:00	Group works - Topic distribution (tehtävänänto)
Mon	08.03.2021	12:00 – 13:00	+ Concreting site practices (RMC, pumping, compaction, curing etc.)
		13:00 – 14:00	+ Guest lecturer (Ready-Mix Concrete plant)
Wed	10.03.2021	10:00 – 11:00	+ Related site practices - formworks and reinforcement)
		11:00 – 12:00	+ Guest lecturer (BRE formworks)
Thu	11.03.2021	10:00 – 12:00	Group works – Questions and guidance
Mon	15.03.2021	12:00 – 14:00	+ Cold and hot weather concreting
Wed	17.03.2021	10:00 – 12:00	+ Concreting plan + Infrastructure concretes and concreting work - Special requirements
Thu	18.03.2021	10:00 – 12:00	Group works – Questions and guidance (tehtävän välitarkastus)
Mon	22.03.2021	12:00 – 13:00	+ Precast concrete elements (from casting to installation)
		13:00 – 14:00	+ Guest lecturer (Design aspects, delivery models)
Wed	24.03.2021	10:00 – 11:00	+ Guest lecturer (Concrete elements: Concrete pipes and manhole)
		11:00 – 12:00	+ Guest lecturer (Concrete elements: Hollow-core slabs)
Thu	25.03.2021	10:00 - 12:00	Group works – Questions and guidance
Mon	29.03.2021	12:00 – 13:00	+ Special concrete structures (Slip forming, shotcrete, under water etc)
		13:00 – 14:00	+ Guest lecturer - Special concrete structures
Wed	31.03.2021	10:00 – 11:00	+ Quality control of concrete production (key factors involved QC)
		11:00 – 12:00	+ Guest lecturer (Practice QC and requirements) - The Confederation of Finnish Construction Industries RT (CFCI)
Thu	01.04.2021	10:00 – 12:00	Group works – Questions and guidance
Mon	05.04.2021	12:00 – 14:00	Seminar presentation I - Oral examination (Feedback)
Wed	07.04.2021	10:00 – 12:00	Seminar presentation II - Oral examination (Feedback)
Thu	08.04.2021	10:00 – 12:00	Course summary and questions
Wed	14.04.2021	13:00 – 16:00	Course examination

Writing a (1 to 2 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 questions 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: 8h
- 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 (highest); 4; 3; 2; 1 (lowest passing grade); 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://aalto.finna.fi/Record/alli.726148>
  - o On site concrete production
    - Chapter 11 – Production of concrete
    - o Precast concrete manufacturing
      - Handout to be prepared
  - o Concreting under extreme environmental condition
    - Chapter 12. Concrete under extreme environmental condition
  - o Quality control of concrete
    - Chapter 09 – Quality control of concrete
- 2) BY 201 - Betoniteknikan oppikirja 2018 (in Finnish) <https://aalto.finna.fi/Record/alli.792791>
- 3) Course handouts

## 8. Ethical Rules

- Aalto University Code of Academic Integrity and Handling Violations Thereof:  
<https://into.aalto.fi/display/ensaannot/Aalto+University+Code+of+Academic+Integrity+and+Handling+Violations+Thereof> (in English)

## 9. Prerequisites

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