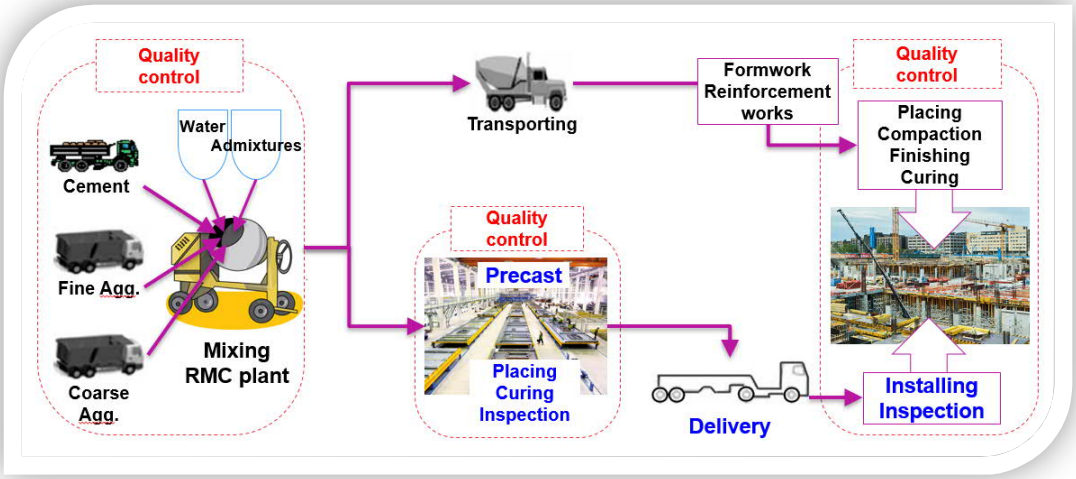

CIV-E2060 Production Technology of Concrete Structures L (5 cr)

Course Syllabus

25.02. -10.04.2019

1. Course information

Status of the Course: Programme Name: Building Technology

Major studies; Construction and Maintenance

Level of the Course: Aalto Eng, Master degree course

Teacher in charge: Prof. Jouni Punkki firstname.surname@aalto.fi

Teaching Period: IV 2019 (Period IV)

Course Homepage: https://mycourses.aalto.fi/course/view.php?id=20511

Registration for Courses: Registration to course using WebOodi - https://oodi.aalto.fi

Language of Instruction: English

2. Learning Outcomes

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

1. Identify the possible production methods of concrete structures
2. Identify the different forming systems, reinforcement systems, placing, curing and finishing of site-cast concrete
3. Illustrate the precast concrete fabrication process
4. Apply the practical concreting technologies under extreme environmental production conditions
5. Assess 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) Excursions - (Concrete element factory and construction site)
4) Final written exam

4.1 Lectures and expert talks

The course includes 8 lectures covering the content of the course. These lectures are divided into 2 parts: i) introductory lecture by the course teachers and ii) 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	Topic	Content (short list)	Time	Lecturer/201
Mon 25.2.2019	Introduction	Course content and outcomes Manufacturing of concrete (types of	12:00 - 14:00	**FA**
Wed 27.2.2019	Production of cast-in situ	Formwork & Reinforcement work (shortly) Placing, compacting (vibration) and curing	10:00 - 12:00	**JP**
Mon 4.3.2019	Production of pre-cast concrete	Pre-cast concrete production process Precast concrete transportation, handling, storage and installation	12:00 - 14:00	**JP**
Wed 6.3.2019	Concrete construction	Concrete construction - Contractor's view	10:00 - 11:00	**Hannu Anttonen, Jatke Uusimaa Oy**
	Formworks	Formwork and formwork systems	11:00 - 12:00	**Ilari Roihuvuo PERI Suomi Ltd Oy**
Mon 11.3.2019	Production	Ready-Mix concrete production	12:00 - 13:00	**Mikko Vasama Rudus OY**
		Production of concrete products: Concrete pipes	13:00 - 14:00	**Mika Tulimaa Rudus Oy**
Wed 13.3.2019	Production	Pre-cast concrete production: Design aspects, delivery models.	10:00 - 11:00	**Juha Rämö Parma Oy**
		Pre-cast concrete production: Production planning, production	11:00 - 12:00	**Mikko Koskinen MK Elementti Oy**
Mon 18.3.2019	Quality control	Factors causing variations in the quality of concrete & Advantages of quality control	12:00 - 13:00	**FA**
		Product standards and Quality control of concrete manufactoring	13:00 - 14:00	**Ari Mantila Rakennus-teollisuus RT**
Wed 20.3.2019	Concreting under extreme	Concreting in hot-weather Cold-weather concreting Under water concreting	10:00 - 12:00	**FA**
Mon 25.3.2019	Excursion - I (Concrete Element Factory)		11:00 - 13:00	
Wed 27.3.2019	Excursion - II (Construction site - ???????)		11:00 - 13:00	
Mon 1.4.2019	Seminar - I		12:00 - 14:00	
Wed 3.4.2019	Seminar - II		10:00 - 12:00	
Wed 10.4.2019	**Exam**			

Students will get points for:

i. Attending lectures, expert talks and excursions
ii. Writing a diary for the expert talks and excursions.

Diary and attending lectures weighted value is 10% of the final grade

4.2 Concrete work plan and concrete production related topics - group assignment and seminar

The main objective of this assignment is to enable students to combine knowledge related to the production technology of structures made primarily of steel reinforced concrete. Groups are asked to

prepare (i) concrete work plan for a real life reinforced concrete structure and (ii) a PowerPoint presentation at the course seminar about a topic related to the concrete production. The presentation is max. 12 slides length and the presentation time is about 15 min.

The concrete work plan and the presentation weighted value is 20% of the final grade.

4.3 Excursions - (Concrete element factory and construction site)

Two excursions are arranged at the end of the course:

1) Excursion - I (Concrete Element Factory) - Mon 25.3.2019
2) Excursion - II (Construction site) - Wed 27.3.2019

The expert talks and excursions (attending and writing a learning diary) weighted value is 10% of the final grade.

4.4 Final exam

The written exam includes 5 questions (14 points each) covering the course outcomes. The questions are (short) essay questions types. The final exam weighted value is 70% of the final grade.

5. Course Workload

Student workload include (i) attending the lectures, expert talks and the course excursions, (ii) writing the concrete work plan and seminar presentation (group work) and (iii) self-study work. The course ETCS/workload is presented in the following table.

Table 2: Course workload

Student activities	Quantity / Meetings	Duration (h)	Task load (h)	Total load (h)	% grade
Group work				24,5	18 %
Concrete work plan (preparing and writing)	4	3	12		
Preparing seminar topic presentation	3	3,5	10,5		
Seminar presentation	1	2	2		
individual work - Expert talks and excursions				15,5	11 %
Attending expert lectures	7	1	7		
Attending excursions	2	2	4		
Writing learning diaries	9	0,5	4,5		
individual work - Self studay and exam				95	70 %
Lectures	4,5	2	9		
Independent reading	1	83	83		
Final examination	1	3	3		
			Total workload (Hours)	135	100 %

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). For passing the course, a minimum of (15) points are required for group and individual work and a minimum of (35) points are required for the exam.

Table 3: 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
   - 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 - Betonitekniikan 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/enregulations/Aalto+University+Code+of+Academic+Integrity+and+Handling+Violations+Thereof (in English)

9. Prerequisites

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