

CIV-E1010 Building Materials Technology (5 cr)

Course Syllabus

07.09.2020 - 25.10.2020

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: Fahim Al-Neshawy, D.Sc. (firstname.surname@aalto.fi), Office – R249
Teaching Period: Autumn 2020 (Period I)
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 gain:

- Knowledge:
 - Students gain a comparative knowledge on the basic properties of the most common building materials composition, properties and applications in buildings and structures
- Skills:
 - Students apply the gained knowledge to perform testing and performance evaluation for common building materials
- General competence:
 - Students understand how manufacturing processes affect the properties and the characteristics of building material
 - Students gains knowledge about the sustainability of building materials

3. Course content

This course offers an introduction to the common building materials, properties and their applications. The course is divided into the following topics:

1. Fundamental properties of building materials
2. Wood and structural timber
3. Aggregates for concrete and bituminous mixtures
4. Masonry bricks construction
5. Cementitious materials, concrete and reinforcement steel
6. Bituminous materials and their applications
7. Sustainable use of building materials

4. Teaching and learning methods

The course includes the following learning methods and activities:

- Lectures and weekly exercises
- Laboratory demonstrations of the common building materials tests (subject to change because of COVID-19)
- Written exam at the end of the course

4.1 Lectures and weekly exercises schedule (subject to change)

The course includes 10 lectures covering the contents of the course as shown in the table below. Lecture notes and presentation slides will be added on myCourses as the course proceeds.

The course includes weekly exercises (5 exercises). Weekly exercises include computational type questions. The exercise answers are submitted to MyCourses eLearning system "weekly". The weighted value of the weekly exercises is 20 points (4 points / exercise).

	Date	Lecture and exercise topic
Mon	07.09.2020	The fundamentals of building materials
Tue	08.09.2020	Basic properties of building materials
Thu	10.09.2020	Exercise 01 - Fundamentals
Mon	14.09.2020	Behaviour of common building materials
Tue	15.09.2020	Burnt-clay brick masonry
Thu	17.09.2020	Exercise 02 - Fundamentals and bricks
Mon	21.09.2020	Wood as a building material
Tue	22.09.2020	Aggregates for concrete and asphalt
Thu	24.09.2020	Exercise 03 - Wood and Aggregates
Mon	28.09.2020	Cement and concrete
Tue	29.09.2020	Reinforcement steel for concrete
Thu	01.10.2020	Exercise 04 - Concrete and Reinforcement
Mon	05.10.2020	Sustainability and building materials
Tue	06.10.2020	Bituminous materials
Thu	08.10.2020	Exercise 05 - Sustainability and Bituminous materials
Mon	12.10.2020	Laboratory tests (demonstration)
Tue	13.10.2020	Laboratory tests (demonstration)
Thu	15.10.2020	Laboratory tests (demonstration)
Thu	22.10.2020	Course Exam

4.2 Laboratory demonstrations (subject to change because of COVID-19)

Testing of Materials Laboratory "Testing Hall" is intended to give an experimental understanding and verification of the topics covered in the building materials course. Because of the nature of the laboratory experiments and the number of students attending the course, the experimental work is conducted as a class activity with students observing the tests. The laboratory staff and course assistants will take the lead in operating the equipment. An instructor will always be available in the laboratory to introduce the test, describe

the operation of the equipment and discuss the expected results. Students will be expected to laboratory report and submit it on myCourses (report template with instructions will be given) The weighted value of the laboratory report is 5 points.

4.3 Final exam

The written exam includes 5 topics (15 points each) covering the course outcomes. The questions include (short) essay questions and computational question. The final exam is evaluated (grade: 0..5) and its weighted value is 75% of the final grade.

5. Course Workload

The course ETCS and the estimated workload are presented in the following table.

Student activities	Quantity	Duration (Hour)	Total workload (Hour)
Lectures	10	2	20
Weekly exercises - "attending" sessions	5	2	10
Solving and submitting the weekly exercises' solution	5	3	15
Laboratory tests - "attending"	4	2	8
Laboratory tests - written reports	1	4	4
Self-study: Independent work			75
Final examination	1	3	3
Total workload (Hours)			135
ECTS Credit of the course (workload / 27)			5

6. Assessment methods and grading scale - evaluation criteria and methods

The grading scale for course is: 5 (highest); 4; 3; 2; 1 (lowest passing grade); 0 (failed). The course outcome assessment include:

- a) Individual work:
 - Weekly exercises. [Weighted value 20 pints (5 ex. * 4p)].
 - Laboratory tests [Weighted value 5 points].
- b) Written exam:
 - Written exam [Weighted value 75 points].

Activity	Total points	Grading	
Final grade	100	0	< 50
		1	50 ... < 60
		2	60 ... < 70
		3	70 ... < 80
		4	80 ... < 90
		5	90 ... 100

For passing the course, a minimum of (12.5) points are required for the course work and a minimum of (37.5) points are required for the exam.

7. Study Materials

Recommended readings (selected chapters based on the course contents) from the following books:

- [in English] Michael S. Mamlouk, John P. Zaniewski. (2013). Materials for civil and construction engineers. Available at: <https://www.dawsonera.com/abstract/9781292038469>
- M. Clara Gonçalves and Fernanda Margarido, (2015). "Materials for Construction and Civil Engineering - Science, Processing, and Design"
<https://link.springer.com/book/10.1007%2F978-3-319-08236-3#toc>
- [in Finnish] Siikanen, Unto.(2009) Rakennusaineoppi. Julkaistu: 2009. Available at: <https://aalto.finna.fi/>
- Course lecture notes and handout - include slides from lectures, explanatory notes, and exercise problems.

8. Prerequisites

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9. Further Information

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