

# CIV-E1010 Building Materials Technology

## Course Syllabus

04.09. – 19.10.2023

### 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., Office – R249

Teaching Period: Autumn 2023 (Period I)

Registration for Courses: Registration to course using SISU - <https://sisu.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. Bituminous materials and their applications
4. Aggregates for concrete and bituminous mixtures
5. Masonry construction
6. Cementitious materials, concrete, and reinforcement steel
7. Common thermal insulating materials in buildings
8. Sustainable use of building materials

## 4. Teaching and learning methods

The course includes the following learning methods and activities:

- Lectures
- Weekly exercises
- Laboratory demonstrations of the common building materials tests
- Written exam at the end of the course

### 4.1 Lectures 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.

1	Monday	04.09.2023	10:15–12:00	Introduction to building materials
2	Tuesday	05.09.2023	10:15–12:00	Fundamental properties of building materials
3	Monday	11.09.2023	10:15–12:00	Aggregates for concrete and asphalt
4	Tuesday	12.09.2023	10:15–12:00	Asphalt as a building material
5	Monday	18.09.2023	10:15–12:00	Wood as a building material
6	Tuesday	19.09.2023	10:15–12:00	Common masonry materials
7	Monday	25.09.2023	10:15–12:00	Concrete as a building material
8	Tuesday	26.09.2023	10:15–12:00	Steel as a reinforcing material
9	Monday	02.10.2023	10:15–12:00	Common insulation materials used in buildings
10	Tuesday	03.10.2023	10:15–12:00	Sustainability of building materials

### 4.2 Weekly exercises

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 25% of the course grade.

1	Thursday	07.09.2023	8:30 - 10:00	Fundamental properties of building materials
2	Thursday	14.09.2023	8:30 - 10:00	Aggregates and asphalt
3	Thursday	21.09.2023	8:30 - 10:00	Wood and masonry
4	Thursday	28.09.2023	8:30 - 10:00	Concrete and steel reinforcement
5	Thursday	05.10.2023	8:30 - 10:00	Insulation materials and sustainability

### 4.3 Laboratory demonstrations

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 will take the lead in operating the equipment. The course assistants will always be available in the laboratory to introduce the test, describe the operation of the equipment and discuss the expected results.

Each student attends only one laboratory session based on the group she/he selects. Students write laboratory report and submit it on myCourses (report template with instructions will be given in myCourses). The weighted value of the attendance and laboratory report is 5% of the course grade.

	Day / date / time			Session
1	Monday	09.10.2023	10:15–12:00	Laboratory demonstration – I (groups 1 – 4)
2	Tuesday	10.10.2023	10:15–12:00	Laboratory demonstration – II (groups 5 – 8)
3	Thursday	12.10.2023	8:30 - 10:00	Laboratory demonstration – III (groups 9 – 12)

Each laboratory session includes the following tests:

- 1) Aggregates - Gradation test
- 2) Compressive strength test (Concrete, and Aerated concrete blocks)
- 3) Tensile strength test (Steel and Wood)
- 4) Los Angeles abrasion test, Nordic Ball mill test and water absorption test for bricks

#### 4.4 Final exam

The written exam includes 5 questions covering the course outcomes. The final exam is evaluated (grade: 0...5) and its weighted value is 70% of the course grade.

### 5. Course Workload

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

	Student activities	Quantity	Duration (Hour)	Workload (Hour)	Total workload (Hour)	Portion of final grade (%)
Student progress and learning	Lectures	10	1,75	17,5	94,5	70 %
	Self-study: Independent work			74		
	Final examination	1	3	3		
Weekly exercises	Weekly exercises - "attending" sessions	5	1,75	8,75	33,75	25 %
	Solving and submitting the weekly exercises' solution	5	5	25		
Laboratory demonstrations	Laboratory demonstrations - "attending"	1	2	2	7	5 %
	Writing the laboratory report	1	5	5		
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 the course is: 5 (highest); 4; 3; 2; 1 (lowest passing grade); 0 (failed). The course outcome assessment include:

- a) Individual work:
  - Weekly exercises and laboratory report. [Weighted value 30% of the grade]
- b) Written exam:
  - Written exam [Weighted value 70% of the grade.]

To pass the course, students should collect at least 50 points from the (written exam + individual work) or (50 points) from only the written exam.

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

## 7. Study Materials

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

- [in English] Michael S. Mamlouk, John P. Zaniewski. Materials for civil and construction engineers. Available at: <https://primo.aalto.fi/>
- [in Finnish] Siikanen, Unto. (2009) Rakennusaineoppi. Julkaistu: 2009. Available at: <https://primo.aalto.fi/>
- Course lecture notes and handout - include slides from lectures, explanatory notes, and exercises.

## 8. Prerequisites

-

## 9. Further Information

-