Module Code: CEU44A01
Module Name: Civil Engineering Materials
ECTS Weighting: 5 ECTS
Semester taught: Semester 2
Module Coordinator/s: Sara Pavia

Module Learning Outcomes with reference to the Graduate Attributes and how they are developed in discipline:

On successful completion of this module, students should be able to:

LO1. Select quality building material, compatible with existing fabrics and responsible towards the environment.

LO2. Identify, analyse and solve problems relating to the behaviour of building materials in constructions.

LO3. Select the most appropriate materials needed in order to solve a problem or to be employed for a particular use.

LO4. Critically interpret the results of engineering testing and scientific analysis of building materials.

LO5. Differentiate between choices of concrete mix constituents and site process.

LO6. Categorise non-structural cracking and corrosion phenomena in concrete and plan for their minimization or avoidance.

LO7. Develop a regime for investigation of material deterioration.

LO8. Effectively conduct the relevant experiments and analysis needed in order to evaluate the quality and durability of building materials.

LO9. Communicate effectively the results of research and laboratory experimentation.

LO10. Practice high professional standards in relation to the repair and conversation of traditional and historic fabrics.

LO11. Practice high ethical standards concerning the selection of quality materials for building.

Graduate Attributes: levels of attainment
To act responsibly - Enhanced

1 TEP Glossary
Module Content

The module provides the student with essential knowledge on the properties, use, deterioration and repair of some of the most important materials used for building including stone and ceramic brick, insulations Portland cement (PC) concrete, lime and PC mortar, metal and timber.

- **Mortar:**

- **Concrete:**

- **Sustainable materials and construction:**
  Building with earth, hemp-lime concretes, straw bale and other sustainable materials. Thermal and hygric properties. Production and application.

- **Insulation materials:**
  Lime-based renders, cork and hemp materials, aerogels and CSB. Thermal and hygric properties. Production and application.

- **Stone:**

- **Brick:**

- Timber:

- Steel:
  Manufacture. Corrosion and fire protection.

**Teaching and Learning Methods**

Lectures, laboratories and site visits.
The teaching strategy is a mixture of:
- Lectures (27 hours),
- laboratory practical’s and site visits (12 hours),
- research reports.

<table>
<thead>
<tr>
<th>Assessment Details²</th>
<th>Assessment Component</th>
<th>Assessment Description</th>
<th>LO Addressed</th>
<th>% of total</th>
<th>Week due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td>2 hour written exam</td>
<td>LO1-LO7</td>
<td>80%</td>
<td></td>
<td>In April, as published by the exams office</td>
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<tr>
<td>Coursework</td>
<td>Four technical reports</td>
<td>LO8-LO11</td>
<td>20%</td>
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</table>

**Reassessment Requirements**

2 hour 100% written examination

**Contact Hours and Indicative Student Workload²**

<table>
<thead>
<tr>
<th>Contact hours: lectures 27 hours; laboratories and sites 12 hours.</th>
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<tbody>
<tr>
<td>Independent Study (preparation for course and review of materials): 60 hours</td>
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<tr>
<td>Independent Study (preparation for assessment, incl. completion of assessment): 30 hours</td>
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Recommended Reading List

- Download publications on insulation, earth construction, lime-hemp concrete, lime-based materials etc. from: https://www.tcd.ie/research/profiles/?profile=pavias

Module Pre-requisite

1st / 2nd year modules in Chemistry and Materials.

Module Co-requisite

None

Module Website


Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.

No

Module Approval Date

Approved by

Academic Start Year

January 2021

Academic Year of Date

2020-21

COVID-19 contingency statement:

While the intention is to deliver some lectures, tutorials and labs face-to-face, there is uncertainty due to the Covid-19 situation and the entire module delivery may need to change to an online delivery if required by government restrictions. In the case of a possible new lockdown scenario during teaching term:

- All lectures, tutorials and labs will be delivered online using Blackboard. Some of these sessions will be live sessions and your attendance at live sessions is required.
- Assignments and examinations will be conducted and submitted online.