<table>
<thead>
<tr>
<th><strong>Module Code</strong></th>
<th>CEU44A01</th>
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</thead>
<tbody>
<tr>
<td><strong>Module Name</strong></td>
<td>Civil Engineering Materials</td>
</tr>
<tr>
<td><strong>ECTS Weighting</strong>¹</td>
<td>5 ECTS</td>
</tr>
<tr>
<td><strong>Semester taught</strong></td>
<td>Semester 2</td>
</tr>
<tr>
<td><strong>Module Coordinator/s</strong></td>
<td>Sara Pavia</td>
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</tbody>
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**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 durability and environmental impact 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 materials problems and deterioration.
- **LO8.** Effectively determine the relevant experiments and analysis needed to evaluate the quality and durability of building materials.
- **LO9.** Interpret and communicate effectively the results of research and laboratory experimentation.
- **LO10.** Practice high professional standards in relation to sustainable materials and the repair and conservation of traditional and historic fabrics.
- **LO11.** Practice high ethical standards concerning the selection of quality and sustainable materials for building.
Graduate Attributes: levels of attainment
To act responsibly – LO 11, 8, 3,1.
To think independently – LO 7, 6, 5,2, 1.
To develop continuously – LO 10, 4, 1.
To communicate effectively – LO 9, 3,1.

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.

- 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.
- 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.

Assessment Details

Please include the following:
- Assessment component
- Assessment description
- Learning outcome(s) addressed

<table>
<thead>
<tr>
<th>Assessment Component</th>
<th>Assessment Description</th>
<th>LO Addressed</th>
<th>% of total</th>
<th>Week due</th>
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<tbody>
<tr>
<td>Examination</td>
<td>2 hour written exam</td>
<td>LO1-LO7</td>
<td>80%</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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Reassessment Requirements

2 hour 100% written examination

Contact Hours and Indicative Student Workload

Contact hours: lectures 27 hours; laboratories and sites 12 hours.

Independent Study (preparation for course and review of materials): 60 hours

Independent Study (preparation for assessment, incl. completion of assessment): 30 hours

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](https://www.tcd.ie/research/profiles/?profile=pavias)
<table>
<thead>
<tr>
<th><strong>Module Pre-requisite</strong></th>
<th>1st / 2nd year modules in Chemistry and Materials.</th>
</tr>
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<tbody>
<tr>
<td><strong>Module Co-requisite</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Are other Schools/Departments involved in the delivery of this module?</strong></td>
<td>No</td>
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<td><strong>Module Approval Date</strong></td>
<td><strong>Approved by</strong></td>
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<td></td>
<td><strong>Academic Start Year</strong></td>
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<tr>
<td></td>
<td>September 2022</td>
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<td><strong>Academic Year of Date</strong></td>
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<td>2022-23</td>
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