Module Code | CE7S05
---|---
Module Name | S5: Advanced Concrete Technology
ECTS Weighting | 5 ECTS
Semester taught | Semester 1
Module Coordinator/s | Associate Prof. Roger P. West (rwest@tcd.ie)
Lecturer(s): Prof. Ravindra Dhir, Prof. Sara Pavia, Prof. Roger P. West

**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. Identify suitable cementitious materials for use in practice.
LO2. Demonstrate a deep understanding of the principal fresh and hardened properties of concrete.
LO3. Understand the mechanisms and prevention of durability problems in concrete.
Demonstrate an awareness of the application of statistics in relation to concrete.

**Graduate Attributes: levels of attainment**
To act responsibly - Enhanced
To think independently - Enhanced
To develop continuously - Enhanced
To communicate effectively - Enhanced

Module Content
To introduce advanced concepts in understanding concrete technology, particularly behaviour, production and use in practice. The aim is to prepare the student for early career design and construction practice, material specification and practical problems in the use of concrete in all its forms. It builds on, but does not require as a prerequisite, the 4A1 elective in Civil Engineering Materials, but focuses on concrete, as the most commonly used construction material in Ireland.

1. *The constitution, specification and hydration of Portland Cement*
   Chemical composition, cement properties, international standards, hydration, setting and hardening.
2. *Pozzolans*
   Types, reactivity, mechanical and durability characteristics
3. *Properties of concrete*
Workability and rheology, strength, impact, maturity, creep, shrinkage and thermal properties, porosity, permeability, and diffusion

4. New Concrete processes and products
Admixtures, high strength concrete, self-compacting concrete, fibres, shotcrete, insulated concrete formwork, rolled reinforcement.

5. Applied Statistics
Variability, regression, curve fitting, significance testing, Student t-test.

Teaching and Learning Methods

Teaching strategies
- Core content via lectures online
- Background reading

Assessment Details
Please include the following:
- Assessment Component
- Assessment description
- Learning Outcome(s) addressed
- % of total
- Assessment due date

<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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</thead>
<tbody>
<tr>
<td>Term assignment including presentation</td>
<td></td>
<td>10%</td>
<td>3, 7 and 9</td>
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<tr>
<td>Examination</td>
<td></td>
<td>90%</td>
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Reassessment Requirements
100% examination

Contact Hours and Indicative Student Workload

<table>
<thead>
<tr>
<th>Contact hours: 40</th>
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Independent Study (preparation for course and review of materials): 4 x 12

Independent Study (preparation for assessment, incl. completion of assessment): 3x 4
<table>
<thead>
<tr>
<th><strong>Recommended Reading List</strong></th>
<th>None</th>
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<tbody>
<tr>
<td><strong>Module Pre-requisite</strong></td>
<td>None</td>
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<tr>
<td><strong>Module Co-requisite</strong></td>
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<tr>
<td><strong>Module Website</strong></td>
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<tr>
<td>Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.</td>
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<td><strong>Module Approval Date</strong></td>
<td>2010</td>
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<td><strong>Approved by</strong></td>
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<tr>
<td><strong>Academic Start Year</strong></td>
<td>1st September 2020</td>
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<tr>
<td><strong>Academic Year of Date</strong></td>
<td>2020/2021</td>
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