

<b>Module Code</b>	CE7S05
<b>Module Name</b>	S5: Advanced Concrete Technology
<b>ECTS Weighting<sup>1</sup></b>	5 ECTS
<b>Semester taught</b>	Semester 1
<b>Module Coordinator/s</b>	Associate Prof. Roger P. West ( <a href="mailto:rwest@tcd.ie">rwest@tcd.ie</a> ) Lecturer(s): Prof. Ravindra Dhir, Prof. Sara Pavia, Prof. Roger P. West
<b><u>Module Learning Outcomes</u> with reference to the <u>Graduate Attributes</u> and how they are developed in discipline</b>	<p>On successful completion of this module, students should be able to:</p> <p>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.  LO4. Utilise concrete technology solutions in practice on site.  Demonstrate an awareness of the application of statistics in relation to concrete.</p> <p><b>Graduate Attributes: levels of attainment</b>  To act responsibly - Enhanced  To think independently - Enhanced  To develop continuously - Enhanced  To communicate effectively - Enhanced</p>
<b>Module Content</b>	<p>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.</p> <ol style="list-style-type: none"> <li>1. <i>The constitution, specification and hydration of Portland Cement</i> Chemical composition, cement properties, international standards, hydration, setting and hardening.</li> <li>2. <i>Pozzolans</i> Types, reactivity, mechanical and durability characteristics</li> <li>3. <i>Properties of concrete</i></li> </ol>

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<sup>2</sup>**

Please include the following:

- **Assessment Component**
- **Assessment description**
- **Learning Outcome(s) addressed**
- **% of total**
- **Assessment due date**

Assessment Component	Assessment Description	LO Addressed	% of total	Week due
	Term assignment including presentation		10%	3, 7 and 9
	Examination		90%	

**Reassessment Requirements**

100% examination

**Contact Hours and Indicative Student Workload<sup>2</sup>**

<b>Contact hours: 40</b>
<b>Independent Study (preparation for course and review of materials): 4 x 12</b>
<b>Independent Study (preparation for assessment, incl. completion of assessment): 3x 4</b>

<b>Recommended Reading List</b>	None
<b>Module Pre-requisite</b>	None
<b>Module Co-requisite</b>	
<b>Module Website</b>	
<b>Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.</b>	
<b>Module Approval Date</b>	2010
<b>Approved by</b>	
<b>Academic Start Year</b>	1 <sup>st</sup> September 2020
<b>Academic Year of Date</b>	2020/2021