

<b>Module Code</b>	CEU44A61
<b>Module Name</b>	4A6(1) Structures I
<b>ECTS Weighting<sup>1</sup></b>	5 ECTS
<b>Semester taught</b>	Semester 1
<b>Module Coordinator/s</b>	Prof Brian Broderick
<b><a href="#">Module Learning Outcomes</a> with reference to the <a href="#">Graduate Attributes</a> and how they are developed in discipline</b>	<p>On successful completion of this module, students should be able to:</p> <p>LO1. Describe the methods used to provide global stability in multi-storey buildings</p> <p>LO2. Select an appropriate method of ensuring lateral stability for given steel and RC building frames</p> <p>LO3. Choose an appropriate floor beam and column layout for a multi-storey building</p> <p>LO4. Analyse statically indeterminate structures using the moment distribution method</p> <p>LO5. Apply moment redistribution to the design of RC structures</p> <p>LO6. Design RC slabs using design code methods</p> <p>LO7. Calculate the lateral torsional buckling capacity of steel beams using design code methods</p> <p>LO8. Calculate the resistance of steel and RC members under biaxial bending and axial load</p> <p>LO9 Describe the types of failure displayed by bolted and welded steel connections and evaluate the resistance of same</p> <p>LO10 Distinguish between simple, semi-rigid and rigid- beam-to-column connections and associate these with global frame behaviour</p> <p>LO11. Assess the influence of boundary conditions on the effective lengths of columns in multi-storey buildings</p> <p>LO12. Design structural steel columns and slender RC columns in multi-storey buildings</p> <p><b>Graduate Attributes: levels of attainment</b></p> <p>To act responsibly - Enhanced</p> <p>To think independently - Enhanced</p> <p>To develop continuously - Enhanced</p> <p>To communicate effectively Enhanced -</p>

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**Module Content**

Please provide a brief overview of the module of no more than 350 words written so that someone outside of your discipline will understand it.

Students learn to design assemblages of structural elements and whole structures. Much of the subject matter addresses the design of multi-storey buildings, with an emphasis on the interactions of different structural elements – beams, columns, and connections – and on means of providing global stability of buildings. The analysis of statically indeterminate assemblages using the moment distribution method is covered, along with the use of moment redistribution in the design of RC structures. Standard methods of designing more complex structural elements are also covered: RC slabs, laterally unrestrained steel beams and the simple design method for steel columns.

**Teaching and Learning Methods**

Lectures and design studies

<b>Assessment Details<sup>2</sup></b> <b>Please include the following:</b> <ul style="list-style-type: none"> <li>• <b>Assessment Component</b></li> <li>• <b>Assessment description</b></li> <li>• <b>Learning Outcome(s) addressed</b></li> <li>• <b>% of total</b></li> <li>• <b>Assessment due date</b></li> </ul>	Assessment Component	Assessment Description	LO Addressed	% of total	Week due			
	Examination	2 hour written examination		50%				
	Coursework			50%				
<b>Reassessment Requirements</b>	100% written exam							
<b>Contact Hours and Indicative Student Workload<sup>2</sup></b>	<table border="1"> <tr> <td><b>Contact hours: 50</b></td> </tr> <tr> <td><b>Independent Study (preparation for course and review of materials): 20</b></td> </tr> <tr> <td><b>Independent Study (preparation for assessment, incl. completion of assessment): 50</b></td> </tr> </table>					<b>Contact hours: 50</b>	<b>Independent Study (preparation for course and review of materials): 20</b>	<b>Independent Study (preparation for assessment, incl. completion of assessment): 50</b>
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<b>Independent Study (preparation for assessment, incl. completion of assessment): 50</b>								
<b>Recommended Reading List</b>	Reinforced and Prestressed Concrete Design, O'Brien and Dixon, <i>Longman</i> Reinforced and Prestressed Concrete, King and Evans, <i>Van Nostrand Reinhold</i> Reinforced Concrete Structures, Park and Paulay, <i>Wiley</i> Structural Steelwork Design, Dowling, Owens and Knowles, <i>Butterworths</i> Structural Steelwork Design to BS5950, Morris and Plum, <i>Longman</i> Design of Structural Steelwork, McKenzie, <i>Macmillan</i>							
<b>Module Pre-requisite</b>	3A2 or similar introduction to structural design							
<b>Module Co-requisite</b>								
<b>Module Website</b>	<a href="https://www.tcd.ie/Engineering/undergraduate/baiyear4/modules/4A61.pdf">https://www.tcd.ie/Engineering/undergraduate/baiyear4/modules/4A61.pdf</a>							
<b>Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.</b>	No							

<b>Module Approval Date</b>	
<b>Approved by</b>	
<b>Academic Start Year</b>	September 2021
<b>Academic Year of Date</b>	2021-22

**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.