Module Code	CE7S03
Module Name	Wind and Earthquake Engineering
ECTS Weighting[1]	5 ECTS
Semester taught	Semester 1
Module Coordinator/s	Module Coordinator: Prof. John Hickey (john.hickey@tcd.ie) Lecturer(s): Asst Prof. Breiffni Fitzgerald
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. Describe the origin of seismic loads and their effect on building structures; LO2. Calculate the response of a SDOF system to earthquake ground motion; LO3. Calculate response spectra from earthquake ground motion records; LO4. Draw design spectra for linear and non-linear structures; LO5. Describe the main forms for earthquake resistant structures; LO6. Describe the principles and motivation of capacity design procedures and dissipative structural behaviour LO7. Apply the provisions of Eurocode 8 in structural design; LO8. Design structures for wind load; **Graduate Attributes: levels of attainment** To act responsibly - Attained To think independently - Enhanced To develop continuously - Enhanced To communicate effectively - Enhanced
Module Content	This module is suitable for students with a good undergraduate knowledge of structural engineering. It is intended as an introduction to the analysis and design of buildings under seismic and wind loading conditions. The following topics are covered in the module: 1. Engineering seismology and earthquake ground motion. 2. Earthquake response of SDOF systems: response and design spectra, linear and non-linear response. 3. Generalised co-ordinates. Earthquake response of MDOF systems: natural modes and frequencies of vibration, mode superposition.

4. Relevant provisions of Eurocode 8.
5. Wind response of structures.

Teaching and Learning Methods

Students will attend lectures and complete classroom-based tutorials. They will also independently complete larger pieces of coursework, including hand and computer based calculations and a design exercise using the principles and methods introduced in class.
Students are also required to attend a number of specified lectures in structural dynamics given as part of the S9 'Advanced Theory of Structures' module.
Independent background reading and acquisition of web-based materials will also be required.
Student questionnaires will be employed to develop the course content and coursework activities.

Assessment Details[2]
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
Summative	Examination [3 hours]		60%	
Summative	Coursework		40%	
Formative	Classroom assessment of independent learning and reading			

Reassessment Requirements

Examination 100%

Contact Hours and Indicative Student Workload[2]

Contact hours: 30

	Independent Study (preparation for course and review of materials): 25 **Independent Study (preparation for assessment, incl. completion of assessment): 45**
Recommended Reading List	Any textbook on structural dynamics. '*Dynamics of Strucutres'* by Clough and Penzien is recommended. *'Seismic Desing of Buildings to Eurocode 8*' by Elghazouli Web resources to be identified in class.
Module Pre-requisite	
Module Co-requisite	Students must attend specified lectures in S9 – Advanced Theory of Structures
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	1st September 2024
Academic Year of Date	Academic Year 2024/2025