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| **Module Code** | CE7S01 |
| **Module Name** | Geotechnical Engineering |
| **ECTS Weighting**[1] | 5 ECTS |
| **Semester taught** | Semester 1 |
| **Module Coordinator/s** | Module Coordinator: Prof. Brendan O'Kelly, (bokelly@tcd.ie)<br>Module delivery also by Professor David Igoe (igoed@tcd.ie) |
| **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 understand and apply:<br>LO1. Basic geotechnical principles and processes<br>LO2. Embankment design and construction on soft ground<br>LO3. Ground improvement techniques<br>LO4. Laboratory and field strength testing<br>LO5. Ground investigation and monitoring<br>LO6. Piled foundations<br>LO7. Retaining walls<br><br>**Graduate Attributes: levels of attainment**<br>To act responsibly - Enhanced<br>To think independently - Enhanced<br>To develop continuously - Enhanced<br>To communicate effectively - Enhanced |
| **Module Content** | This module will cover a selection of geotechnical engineering topics, in depth, including construction processes and the advancements and latest research developments in specific topic areas:<br><br>• Embankments on soft ground: design, construction and monitoring.<br>• Ground improvement options for various problematic ground conditions.<br>• Pile foundation design and practice – applying Eurocodes.<br>• Advanced retaining wall design.<br>• Laboratory shear strength testing — standard and advanced testing methods<br>• Geotechnical properties of peat, with focus on strength measurement, interpretation and recommended use in design practice.<br>• Consistency limits determinations and recent developments in this area. |

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| | The aim is to provide an understanding of the geotechnical concepts and processes and the application of geotechnical principles and practical guidelines in geotechnical engineering practice. |
| **Teaching and Learning Methods** | 27 lectures, and the coursework elements described in the Assessment section. 19 lectures are delivered by Dr. O'Kelly and 8 lectures are delivered by Dr. Igoe. |

**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 |
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| L01–L07 | Written examination | | 85% | |
| | Coursework, two exercises from Dr. Igoe | | 15% | |
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| **Reassessment Requirements** | 100% Reassessment Examination |

**Contact Hours and Indicative Student Workload**[2]

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| **Contact hours:** |
| **Independent Study (preparation for course and review of materials):** |
| **Independent Study (preparation for assessment, incl. completion of assessment):** |

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| **Recommended Reading List** | Craig's Soil Mechanics, 2020, Ninth Edition. Jonathan Knappett and R.F. Craig. CRC Press. |

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| **Module Pre-requisite** | Students must have successfully completed an undergraduate module(s) in Soil Mechanics and (or) Geotechnical Engineering. |
| **Module Co-requisite** | |
| **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** | |
| **Academic Year of Date** | 2022–2023 |