<table>
<thead>
<tr>
<th><strong>Module Code</strong></th>
<th>CE7M05 (also CEU44E03/5E2)</th>
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</thead>
<tbody>
<tr>
<td><strong>Module Name</strong></td>
<td>Research Methods</td>
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<tr>
<td><strong>ECTS Weighting</strong></td>
<td>5 ECTS</td>
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<tr>
<td><strong>Semester taught</strong></td>
<td>Semester 1</td>
</tr>
<tr>
<td><strong>Module Coordinator/s</strong></td>
<td>Assistant Prof. David O’Connell (<a href="mailto:david.oconnell@tcd.ie">david.oconnell@tcd.ie</a>)</td>
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**Module Learning Outcomes with reference to the Graduate Attributes and how they are developed in discipline**

Learning outcomes
On successful completion of this module, students will be able to:
1. Plan and manage a postgraduate research project
2. Critically appraise of existing research tools, methods and publications
3. Identify scope of future research and design a research proposal
4. Summarise, communicate (in written and oral form) research within and outside their own field
5. Recognise issues of plagiarism, confidentiality, data protection and other ethical issues
6. Design engineering experiments and analyse and interpret quantitative information collected
7. Identify and apply appropriate statistical software tool for experimental problem solving

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

This course covers research philosophies in engineering, research in academia, research scopes & problems, research process and design. Also covered are characteristics of good research and choice of research topic. Components of research proposal preparation, literature review, research strategies, research ethics, research access sources and processes are covered.

The module covers and explores data collection and analysis, sample analysis, software application, report writing and presentation.

### Teaching and Learning Methods

Lectures & seminars given by lecturers, other academics and research experts.

Group/Individual learning of statistical software

*(Lecture notes and presentation will all be available online in Blackboard)*
<table>
<thead>
<tr>
<th>Assessment Details</th>
<th>Assessment Component</th>
<th>Assessment Description</th>
<th>LO Addressed</th>
<th>% of total</th>
<th>Week due</th>
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<tbody>
<tr>
<td>Please include the</td>
<td>Ethics Approval</td>
<td></td>
<td>1,2,5</td>
<td>15</td>
<td>Week 1,</td>
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<tr>
<td>following:</td>
<td>Report</td>
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<td>Sem 2</td>
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<td></td>
<td>Experimental Design</td>
<td></td>
<td>1,6,7</td>
<td>40</td>
<td>Week 1,</td>
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<td>Sem 2</td>
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<tr>
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<td>Literature Review</td>
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<td>1-4</td>
<td>45</td>
<td>Week 4,</td>
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<td>Sem 2</td>
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**Assessment Component**

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

**Contact Hours and Indicative Student Workload**

- **Contact hours:** 22hrs (2 hrs lecture per week)
- **Independent Study (preparation for course and review of materials):** 50hrs
- **Independent Study (preparation for assessment, incl. completion of assessment):** 50 hrs

**Recommended Reading List**


**Module Pre-requisite**

- None

**Module Co-requisite**

- None

**Module Website**

- Are other Schools/Departments
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.