

<b>Module Code</b>	CE7M05 (also CEU44E03)
<b>Module Name</b>	Research Methods
<b>ECTS Weighting<sup>1</sup></b>	5 ECTS
<b>Semester taught</b>	Semester 1 & 2
<b>Module Coordinator/s</b>	Assistant Prof. Mohammad Reza Ghaani (mohammad.ghaani@tcd.ie)
<b><u>Module Learning Outcomes</u> with reference to the <u>Graduate Attributes</u> and how they are developed in discipline</b>	<p>Learning outcomes</p> <p>On successful completion of this module, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Plan and manage a postgraduate research project</li> <li>2. Critically appraise of existing research tools, methods and publications</li> <li>3. Identify scope of future research and design a research proposal</li> <li>4. Summarise, communicate (in written and oral form) research within and outside their own field</li> <li>5. Recognise issues of plagiarism, confidentiality, data protection and other ethical issues</li> <li>6. Design engineering experiments and analyse and interpret quantitative information collected</li> <li>7. Identify and apply appropriate statistical software tool for experimental problem solving</li> </ol> <p><b>Graduate Attributes: levels of attainment</b></p> <p>To act responsibly - Attained</p> <p>To think independently - Attained</p> <p>To develop continuously - Attained</p> <p>To communicate effectively - Enhanced</p>

**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, potentially other academics and research experts if deemed appropriate and possible.

Group/Individual learning of statistical software.

<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			
	Ethics Approval Report		1,2,5	15	Week1, Sem 2			
	Experimental Design		1,6,7	40	Week3, Sem 2			
	Literature Review		1-4	45	Week 4, Sem 2			
<b>Reassessment Requirements</b>	Coursework Assignment 100%							
<b>Contact Hours and Indicative Student Workload<sup>2</sup></b>	<table border="1"> <tr> <td><b>Contact hours:</b> 22hrs (2 hrs lecture per week)</td> </tr> <tr> <td><b>Independent Study (preparation for course and review of materials):</b> 50hrs</td> </tr> <tr> <td><b>Independent Study (preparation for assessment, incl. completion of assessment):</b> 50 hrs</td> </tr> </table>					<b>Contact hours:</b> 22hrs (2 hrs lecture per week)	<b>Independent Study (preparation for course and review of materials):</b> 50hrs	<b>Independent Study (preparation for assessment, incl. completion of assessment):</b> 50 hrs
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<b>Recommended Reading List</b>	<p>Creswell, J. W. Research design: Qualitative, quantitative and mixed methods approach. 3rd Ed. Thousand Oaks, CA: Sage., 2009.</p> <ul style="list-style-type: none"> <li>• Peter Bock. 2007. Getting it Right: R&amp;D Methods for Science and Engineering. Academic Press.</li> <li>• Miller &amp; Freund's Probability and Statistics for Engineers 8th Economy Edition by Richard A. Johnson, Irwin Miller and John Freund (2010)</li> <li>• Douglas C. Montgomery, George C. Runger. Applied Statistics and Probability for Engineers, 4th Edition, Wiley; ISBN: 978-0-471-74589-1, June 2006.</li> </ul>							
<b>Module Pre-requisite</b>	None							
<b>Module Co-requisite</b>	None							
<b>Module Website</b>	<a href="http://www.trinitycollege.ie/Year-Four-Engineering">Year Four - Engineering   Trinity College Dublin (tcd.ie)</a>							
<b>Are other Schools/Departments involved in the delivery of</b>	No – this module is exclusively offered to the Department of Civil, Structural and Environmental Engineering.							

**this module? If yes, please provide details.**

**Module Approval Date**

**Approved by** HOD

**Academic Start Year** September 2024

**Academic Year of Date** 2024-25