

Module Code	CEU44E03 (also M5)
Module Name	Research Methods
ECTS Weighting¹	5 ECTS
Semester taught	Semester 1
Module Coordinator/s	Assistant Prof. David O'Connell (david.oconnell@tcd.ie)
Module Learning Outcomes with reference to the Graduate Attributes and how they are developed in discipline	<p>Learning outcomes</p> <p>On successful completion of this module, students will be able to:</p> <ol style="list-style-type: none"> 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 <p>Graduate Attributes: levels of attainment</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.

Assessment Details² Please include the following: <ul style="list-style-type: none"> • Assessment Component • Assessment description • Learning Outcome(s) addressed • % of total • Assessment due date 	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	Week1, Sem 2			
	Literature Review		1-4	45	Week 4, Sem 2			
Reassessment Requirements								
Contact Hours and Indicative Student Workload²	<table border="1"> <tr> <td>Contact hours: 22hrs (2 hrs lecture per week)</td> </tr> <tr> <td>Independent Study (preparation for course and review of materials): 50hrs</td> </tr> <tr> <td>Independent Study (preparation for assessment, incl. completion of assessment): 50 hrs</td> </tr> </table>					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
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Recommended Reading List	<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"> • Peter Bock. 2007. Getting it Right: R&D Methods for Science and Engineering. Academic Press. • Miller & Freund's Probability and Statistics for Engineers 8th Economy Edition by Richard A. Johnson, Irwin Miller and John Freund (2010) • Douglas C. Montgomery, George C. Runger. Applied Statistics and Probability for Engineers, 4th Edition, Wiley; ISBN: 978-0-471-74589-1, June 2006. 							
Module Pre-requisite	None							
Module Co-requisite	None							
Module Website								
Are other Schools/Departments involved in the delivery of	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 2022

Academic Year of Date 2022-23

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.