

Module Code	CEU44E03 (also 5E2/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)
<u>Module Learning Outcomes</u> with reference to the <u>Graduate Attributes</u> 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

Research Philosophies in Engineering, Research in Academia, Research scopes & problems, Research process and design, Characteristics of good research and choice of research topic.

Components of research proposal, Literature review, Research strategies, Research ethics, Research access.

Data collection, Data analysis, Sampling analysis, Software training, 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)

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

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

Creswell, J. W. Research design: Qualitative, quantitative and mixed methods approach. 3rd Ed. Thousand Oaks, CA: Sage., 2009.

- 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 this module? If yes, please provide details.

Module Approval Date

Approved by

Academic Start Year September 2021

Academic Year of Date 2021-22