

Module specification

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Module Code	ENG7A3
Module Title	Research Methods & Postgraduate Studies
Level	Level 7
Credit value	20
Faculty	FACE
HECoS Code	100184
Cost Code	GAME
Pre-requisite module	N/A

Programmes in which module to be offered

Programme title	Core/Optional/Standalone
MSc Engineering (Advanced Manufacturing)	Core
MSc Engineering (Sustainable Energy)	Core
MSc Engineering (Electrical)	Core

Breakdown of module hours

Learning and teaching hours	24 hrs
Placement tutor support hours	0 hrs
Supervised learning hours e.g. practical classes, workshops	0 hrs
Project supervision hours	0 hrs
Active learning and teaching hours total	24 hrs
Placement hours	0 hrs
Guided independent study hours	176 hrs
Module duration (Total hours)	200 hrs

Module aims

This module advances students' expertise through critical engagement with contemporary theories, frameworks, and research within the discipline. Learning activities promote intellectual autonomy, analytical depth, and the synthesis of complex information. The emphasis is on developing strategic thinking and professional insight to address modern industry or research challenges.

This module aims to equip postgraduate engineering students with the research knowledge, critical skills, and methodological confidence required to evaluate technical literature, apply the scientific method, and design a rigorous research proposal that underpins successful MSc-level research and future professional or doctoral study.

Module Learning Outcomes

At the end of this module, students will be able to:

1	Critically evaluate and synthesise technical literature using qualitative and quantitative research methods to address complex engineering problems (AHEP-4 M4).
2	Produce a structured, student-led research review paper that critically analyses contemporary research and establishes a coherent foundation for an MSc research project.
3	Select the scientific method to justify appropriate research approaches, including methodological design, data strategies, and ethical considerations within an engineering research context.
4	Construct a well-justified research proposal that integrates literature evaluation, research objectives, methodology, and ethical approval processes suitable for postgraduate engineering research.

Assessment

Indicative Assessment Tasks:

This section outlines the type of assessment task the student will be expected to complete as part of the module. More details will be made available in the relevant academic year module handbook.

Assessment 1:

Students will prepare a student-led research review paper. The paper will focus on an early-stage literature review aligned to the student's intended MSc research project, assessing their ability to select, critically evaluate, and synthesise technical sources to address complex research problems

Assessment 2:

Students will develop a research proposal for their intended MSc research project. The proposal will demonstrate the student's ability to define research aims, justify methodological choices, address ethical considerations, and align their work with current engineering research practice, following guidance and templates provided in the assessment brief.

Assessment number	Learning Outcomes to be met	Type of assessment	Duration/Word Count	Weighting (%)	Alternative assessment, if applicable
1	1-2	Written Assignment	2000	50%	N/A
2	3-4	Written Assignment	2000	50%	N/A

Derogations

Credits shall be awarded by an Assessment Board for those modules in which a mark of at least 50% has been achieved, with a minimum mark of 40% in each element of assessment.

Learning and Teaching Strategies

Learning and teaching at this level are research-informed and strategically designed to develop advanced conceptual and analytical skills. Students engage in seminars, debates, and workshops that promote critical thinking and originality. The blended delivery framework supports independent exploration and scholarly reflection, with tutorials providing tailored academic guidance for professional or research application.

Welsh Elements

This module will be delivered through the medium of English; however, students have the option to submit their assessments in the medium of Welsh. While this module is not currently offered fully through Welsh, Welsh language support and guidance are available, and some learning materials or tutorial discussions may incorporate Welsh elements where appropriate. To further promote bilingual learning, all students have the opportunity to take the 20-credit *Welsh for STEM* short course, designed to develop confidence and subject-specific language skills in both English and Welsh.

Indicative Syllabus Outline

- Engineering research foundations: Principles of postgraduate research in engineering, including the role of research in innovation, industry impact, and academic advancement.
- Qualitative and quantitative research methods: Comparative analysis of qualitative, quantitative, and mixed methods approaches and their application to complex engineering problems.
- The scientific method and research design: Hypothesis formulation, research questions, experimental design, and validation strategies within engineering research.
- Literature search and critical evaluation: Advanced techniques for sourcing, selecting, and critically evaluating technical literature in line with AHEP-4 requirements.
- Research ethics and governance: Ethical approval processes, research integrity, data protection, and responsible conduct of engineering research.
- Academic writing and dissemination: Structuring research papers and proposals, IEEE formatting, citation standards, and scholarly communication.
- Developing a research proposal: Translating literature insights into clear research aims, objectives, methodologies, and impact statements.
- Preparation for MSc research projects: Managing research timelines, supervision expectations, and transition into independent postgraduate research.

Indicative Bibliography

Please note the essential reads and other indicative reading are subject to annual review and update.

Essential Reads:

J. W. Creswell and J. D. Creswell, Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 6th ed. Thousand Oaks, CA, USA: SAGE, 2023.

Other indicative reading:

M. Alley, The Craft of Scientific Writing, 4th ed. New York, NY, USA: Springer, 2018.

C. Booth, W. C. Colomb, J. M. Williams, and G. G. Colomb, The Craft of Research, 4th ed. Chicago, IL, USA: University of Chicago Press, 2016.

Elsevier, "Research Skills for Engineers," Elsevier Researcher Academy, 2023. [Online]

Administrative Information

For office use only	
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