MODULE SPECIFICATION PROFORMA

Module Code:	ENG740

Module Title:	Engineering Research Methods and Postgraduate Studies

Level:	7	**Credit Value:**	20

Cost Centre(s):	GSAC	JACS3 **code**:	J500

School:	Applied Science, Computing & Engineering	**Module Leader:**	Dr Shafiul Monir

Scheduled learning and teaching hours	40 hrs
Guided independent study	160 hrs
Placement	0 hrs
Module duration (total hours)	200 hrs

Programme(s) in which to be offered (not including exit awards)	Core	Option
MSc Engineering (Aeronautical) MSc Engineering (Mechanical Manufacture) MSc Engineering (Automotive) MSc Engineering (Composite Materials) MSc Engineering (Renewable & Sustainable Energy) MSc Engineering (Electrical & Electronic) MSc Engineering (Mechatronics) MSc Unmanned Aircraft System Technology	✓	☐

Pre-requisites
N/A

Office use only
Initial approval: 19/06/2018 Version no:3
With effect from: 01/09/2018
Date and details of revision: Version no:

Module Aims
• To enable students to critically analyse major sources of knowledge and hierarchies relating to research. • To develop further the students' knowledge of research design, data collection and analysis. • To prepare students to undertake research at postgraduate level. • To provide students with a critical awareness of the components of project management and its application in a variety of contexts. • To enable students to master writing skills for research proposal and dissertation.

Intended Learning Outcomes

Key skills for employability

KS1	Written, oral and media communication skills
KS2	Leadership, team working and networking skills
KS3	Opportunity, creativity and problem solving skills
KS4	Information technology skills and digital literacy
KS5	Information management skills
KS6	Research skills
KS7	Intercultural and sustainability skills
KS8	Career management skills
KS9	Learning to learn (managing personal and professional development, self-management)
KS10	Numeracy

At the end of this module, students will be able to		Key Skills	
1	Critically analyse inductive and deductive approaches in research	KS1	KS3
		KS6	
2	Discuss advanced research problem	KS1	KS2
		KS6	KS8
		KS10	
3	Interpret and analyse the concepts of reliability and validity	KS1	KS2
		KS5	KS6
4	Identify the salient features of qualitative and quantitative data analysis	KS1	KS3
		KS5	KS6
		KS9	KS10
5	Demonstrate a critical awareness of the overall process of planning and management of an independent research project, and the ability to communicate these through writing and speaking	KS1	KS3
		KS4	KS5
		KS6	KS8
6	Demonstrate an in depth understanding of intellectual property requirements (correct referencing of sources, respect for copyright, etc.)	KS1	KS5
		KS6	KS8
		KS9	KS10

Transferable skills and other attributes

1. Communication
2. ICT Technologies
3. Time management and organisation
4. Interpersonal skills
5. Problem solving
6. Information handling including numeracy

Derogations

Credits shall be awarded by an assessment board for those Level 7 modules in which an overall mark of at least 50% has been achieved with a minimum mark of 40% in each assessment element.

Assessment:

Indicative Assessment Tasks:

Assessment One: An individually prepared critique demonstrating either a qualitative or quantitative research framework or methodology, and relating to a current theme or topic of generic pertinence to the engineering profession. Assessment one is a written assignment and represents 50% of the overall mark.

Assessment Two: An individual report and presentation relating to a proposed research strategy. This assessment represents 50% of the overall mark.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)	Duration (if exam)	Word count (or equivalent if appropriate)
1	1, 3, 4	Report	50	N/A	2500
2	2, 5, 6	Research Proposal	50	N/A	2500

Learning and Teaching Strategies:

A series of workshop style lectures with student-led seminars and small group activities. Directed learning using library and internet resources will be facilitated using Moodle.

Syllabus outline:

- Major sources of knowledge, exploration of the positive, negative outcomes.
- Quantitative and qualitative approaches in the research process; validity and reliability in quantitative and qualitative research.
- Methods of sampling, research design including the experimental approach.
- Surveys, correlation studies, systematic reviews.
- Data analysis in quantitative and qualitative research.
- Research methods, project planning and management, including preparation of a project proposal.

Indicative Bibliography:

Essential reading

Thiel, D.V. (2014) Research Methods for Engineers. Cambridge: Cambridge University Press.

Other indicative reading

Leedy, P.D. and Ormrod, J.E. (2013) Practical Research Planning and Design. 10th Edn. New Jersey: Pearson, Merill Prentice Hall.

Kerzner, H. (2013) Project Management: A Systems Approach to Planning, Scheduling, and Controlling. 11th Edn. John Wiley & Sons.

George, M. (2004) The LEAN Six Sigma Pocket Toolbook. McGraw-Hill.

Dean, A. M. and Voss, D. T. (1999) Design and Analysis of Experiments. New York: Springer-Verlag.

Clive, L. D. (1994) Engineering Design: A Synthesis of Reviews. Cambridge University Press.

Robson, C. (2000) Real World Research. 2ndEdn.Oxford: Blackwell.

Liker, J.K. (2003) The Toyota Way. McGraw-Hill

Plus various others to be signposted on Moodle.