Module Code

(MHH124715)

Research Methodology

2018 - 19

Semester B

Module Team

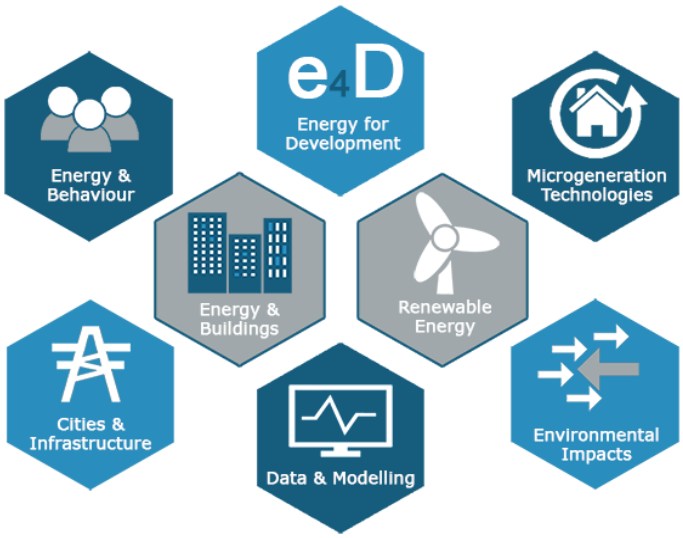
Dr Mansoor
Dr Vijayalakshmi
Mr Ali Al Mahruqi
Mr Ramakrishna

الجامعة الوطنية
National University
Science & Technology للعلوم والتكنولوجيا

College of Engineering

Sultanate of Oman

MODULE HANDBOOK



Source: www.energy.soton.ac.uk

Department of Electrical & Computer Engineering / Mechanical and Industrial Engineering

1. Module Details

Programme Name	Module Code	Module Title	Credits	Level and Semester	Pre-Requisite Knowledge
BEng (Hons) *CAME, MT, POM, E&I ,CO, EPE, TE*	MHH124715	Research Methodology	10	Level 4 Sem B	Programme Admissions Requirement

2. Aims and Objectives

This module provides the necessary knowledge and skills to carry out effective research work that forms the basis underpinning Level 4 Project. The aims of this module are twofold. Firstly, the aim is to introduce students to the research methodology topics. The module focuses on research process, design, data analysis techniques, literature review and consideration of ethical and environmental issues. The second aim of the module is to prepare students identify a project title and carry on with the research leading to completion of a critical analysis and pre-design of the project. By working through the topics, it is hoped that the module will provide with an insight of research methodologies and prepare the students for taking up the 'Technical Project' module following semester. The critical study report, to be submitted as a part of continuous assessment, will provide input to the 'project' to be chosen in the following semester.

The Objectives of this module are:

- To develop skills for conducting a research and subsequently an engineering project work using scientific methods.
- To learn about the various phases involved in conducting a research for engineering projects.
- To develop skills for proper reporting of scientific work with universally accepted frameworks, conventions, citations & referencing and methods.
- To review and critically analyse learned and popular literature on engineering challenges in the area of the project topic and prepare a report for conducting the project work in the subsequent semester.

3. Syllabus

The teaching syllabus will cover the following areas:

- The research process
- Examples of research based projects
- Research Design, Methods and data analysis techniques
- Statistical analysis and use of SPSS
- Sourcing literature
- Literature review writing
- Intellectual property and plagiarism
- Ethical consideration in research projects
- Environmental Issues
- Project proposals
- Project planning and management

4. Learning Outcomes

On completion of this module the student should be able to:

1. Illustrate the aims and objectives of project (AM7)
2. Evaluate the literature relevant to a chosen project topic (AM7)
3. Evaluate a range of data analysis methods, experimental methods, alternative approaches in relation to specific project objectives (AM6)
4. Develop a research proposal and plan for a research project in an appropriate area relevant to the programme of study (AM7,AM8)
5. Examine the ethical and environmental issues involved in undertaking research based project work (AM9)
6. Predict resource issues such as time, materials and equipment (AM9)

The learning outcomes of the module are mapped against College's graduate attribute given in section 10.

5. Learning and Teaching Strategy

Lectures and seminars will be given to introduce the course material. Tutorials will be used to reinforce the module material discussed during lecture sessions. Tutorials also serve as a platform of technical discussions to clarify any queries that arise from directed studies. Directed Studies will be given to help sourcing information, methodologies, and literature relevant to chosen project topic

6. Weekly Teaching Schedule (FT / SPT / PT)

Week No	Date of Commencement of week	Topics to be covered	References	Ebrary	Remarks
1	24- Feb-2019	Introduction to the module and assessment criteria. Introduction and definition of CW requirements for the module assessment.	R1, R3		
2	03- Mar-201	The research process: Engineering Problem identification, requirement specifications, Proposal Writing , Project Aim & Objectives	R1, R2, R3	E1, E2	*Finalization of project topic and topic identification form submission to Project Approval Committee*
3	10 -Mar -2019	Examples of research based projects (Students to start with CW1)	R1, R2, R3	E1, E2	Receiving technical paper from Project Supervisor
4	17 -Mar -2019	Examples of research based projects (Students to start with CW1)	R1, R2, R3	E1, E2	

5	24 -Mar -2019	Research Design, Methods and data analysis techniques, Statistical analysis and use of SPSS	R1, R2	E1, E2	e - learning week
6	31 -Mar -2019	Sourcing literature, Literature review writing - Literature Search, Critical Analysis and Abstract Writing, CCE Harvard referencing *(STUDENTS TO START WITH CW-2)*	R1, R2, R3	E1, E2	Submission of CW1
7	07 -Apr -2019	Tools for Engineering design and analysis, prototyping, testing and delivery	R1, R2, R3	E1, E2	
	14 -Apr -2019	*Mid-term Examinations*			Midterm Exam
8	21 -Apr -2019	Intellectual Property, Avoiding Plagiarism	R1, R2, R3	E1, E2	Consultation with Supervisor on Critical Study Report (CW2);
9	28 -Apr -2019	Ethical and Environmental Issues for consideration.	R1, R2, R3	E1, E2	Consultation with Supervisor on Critical Study Report (CW2);
10	05 -May -2019	Critical Study Report(CW-2); Draft copy submission for comments by the supervisor			Report writing
11	12 -May -2019	Critical Study Report(CW-2); Plagiarism check using Turnitin			Final Check of CW2 with Project Supervisor
12	19 -May -2019	Critical Study Report (CW-2); final review and submission, Preparation of CW-3 presentation.			Submission of CW2 and CW3 preparation
13	26 -May -2019	Presentation Week CW3			CW3 Presentations
14	02 -Jun -2019	Feedback on CW2 and CW3			

R1. Kothari, C.R., 2010. *Research Methodology, Methods and Techniques.* 2nd Edition. India: New Age International Publishers.

R2. Sharp, J.A., Peters, J. & Howard, K., 2006. *The Management of a Student Research Project*. 3rd Edition. England: Gower Publishing Limited.

R3. Ford, R. & Coulston, C., 2008. *Design for Electrical & Computer Engineers: Theory, Concepts, and Practice*. McGraw-Hill.

E1 – Dunne, M., Pryor, J. & Yates, P., 2004. *Becoming a researcher*. McGraw-Hill Education. ebrary [Online] Available from: https://ebookcentral.proquest.com/lib/caledonian-ebooks/detail.action?docID=287792&query=Becoming+a+researcher [Accessed: 07th June 2018].

E2 – Wilkinson, D., 2000. The Researcher's Toolkit: The Complete Guide to Practitioner Research. Taylor and Francis. ebrary [Online] Available from: https://ebookcentral.proquest.com/lib/caledonian-ebooks/detail.action?docID=166019&query=The+Researcher%E2%80%99s+Toolkit%3A+The+Complete+Guide+to+Practitioner+Research [Accessed: 08th June 2018].

7. Assessment Strategy

Coursework-1 25% (Research Methods) – Two tasks (take home assignments) will constitute the coursework.

Coursework-2 50% (Critical Study Report) – Each student must identify a project title at the beginning of the semester and start working on, literature review, critical evaluation, project planning, management and preliminary test / experimental setup. A critical study report on the chosen project must be submitted by the date indicated in the schedule.

Coursework-3 25% (Presentation and defense) – Each student must give a presentation of the project, covering the critical evaluation of literature, project planning, management and preliminary test / experimental setup and findings. The student must also defend his presentation before a panel of experts.

Assessment Procedures

This module is assessed only by Continuous Assessments

Sl. No.	Type of assessment	Description	Marks	Weightage
1	Coursework 1	Research Methods – 2 Tasks	100	25%
2	Coursework 2	Critical Study Report	100	50%
3	Coursework 3	PPT Presentation and Defense	100	25%
Total CW				100%

Pass requirement: A minimum 'Total CW' of 50 marks.

NOTE: It is mandatory to complete all course works to achieve a 'PASS' in the 'Research Methodology' module .It is also necessary to achieve a 'PASS' in the 'Research Methodology' module in order to be eligible for registering on the 'Technical Project' module.

8. Indicative Marking Threshold for Coursework

Indicative Mark	Commentary on Marking Standards
90% and above **Outstanding**	**Outstanding** • Truly outstanding work to be recognized in all aspects- New invention, novel technology, new idea worth applying for patent, evidence of excellent communication skills, clearly communicated report, results critically analyzed , alternate solutions and appropriate suggestions put forward • Exceptionally superior work in both content and presentation • Indicates highest level of achievement + points below
80 - 89% **(EXCELLENT)**	**Excellent** • Exceptionally clear, well-structured and theoretically informed. • Standard of English excellent, • Exceptionally good powers of analysis and interpretation. • Adequate References Solutions to problems • All steps in a meticulously structured manner • Use of relevant units and interpretations, • Use of intelligent and innovative methods + points given below
70-79% **(VERY GOOD)**	**High** • Displaying a thorough understanding of the topic. • Focusing clearly on the question • Demonstrate extensive reading to support analysis • Soundness of judgment • Coherently reasoned statement with empirical evidence. • Suggestions for improvement Solutions to problems • All steps in a structured manner with relevant units of quantities. • Answers to show accurate results (may miss simple steps) • Good interpretations of Solution (may be incomplete)
60-69% **(GOOD)**	**Generally Good** • Solid piece of work which answers the question, • A clear conclusion in a generally focused and well written manner, • Use of citations, quotations and references. • Evidence of wider reading and deep analysis Solutions to problems • Contain necessary /important steps with relevant units. • Accurate results, (may miss some steps which are not very critical to problem solving) • Reasonable level of interpretation of results. • Proper referencing
50-59% **(Satisfactory)**	**Average** • Substantial room for improvement, (e.g. in terms of the standard of written English, the sharpness of focus on the question) • Insufficient analysis of the results • References included, but not adequate Solutions to problems • Steps for solving problem based on theory and principles (may lack some steps towards the final answers) • No substantial interpretation of the final result
<50% **(FAIL)**	**Poor** • Exhibits some potential / degree of standard (falls down in at least one of the categories indicated above) Solutions to problems • Missing important steps for solving the problem • Initial steps correct but mistakes towards final result

9. Learning and Teaching expectations

Expectations from students

- Read the Module Handbook very carefully and follow it as a guide to module requirements.
- Attend the lecture classes regularly and check the CCE Learn regularly to receive information/announcements regarding module delivery
- Develop good rapport with the supervisor and obtain adequate guidance and support from him/her.
- Avoid plagiarism in all CW activities and submissions.
- Complete all submissions/presentations as per the advice of the supervisor within the prescribed time limits.

Expectations from supervisor

- Follow the principles of academic integrity, ethics, courtesy and fairness towards students.
- Assist and guide the students for selecting a suitable topic for their project.
- Arrange regular meetings with the students and guide them properly. Advise/guide the students regarding procurement of materials/equipment's required for the project work, if any.
- Guide and motivate the students to make good project reports and presentations, avoiding plagiarism in any form.

10. CCE Graduate Attributes

Module Title: Research Methodology

Module Code: MHH124715

	Module Learning Outcomes	Assessment Components	GRADUATE ATTRIBUTES				
			Discipline Knowledge and Application	Communication Skills	Learning Research and Enquiry	Creativity, Confidence and Enterprise	Citizenship
1	Illustrate the aims and objectives of project	AM7	X	X	X	X	X
2	Source and critically review literature relevant to a chosen project topic	AM7	X	X	X		
3	Evaluate a range of data analysis methods, experimental methods, alternative approaches in relation to specific project objectives	AM6	X	X	X		
4	Develop a research proposal and plan for a research project in an appropriate area relevant to the programme of study	AM7,AM8	X	X	X	X	
5	Consider the ethical and environmental issues involved in undertaking research based project work	AM9	X	X	X		X
6	Recognize and take an account of resource issues such as time, materials and equipment.	AM9	X	X	X		

Legends for various summative assessment components:

AM1: Unseen examinations or class tests
AM2: Open-book examinations or class tests
AM3: Computer-based assessments
AM4: Laboratory reports
AM5: Essays and design assignments
AM6: Data interpretation exercises
AM7: Case studies and reports
AM8: Oral, poster, audio-visual, or electronic presentations
AM9: Project or dissertation report