

Short Title:	Research Project (Part 1: Research Methods) APPROVED
Full Title:	Research Project (Part 1: Research Methods)
Module Code:	MIOT H6023
ECTS credits:	5
NFQ Level:	9
Module Delivered in	2 programme(s)
Module Contributor:	Philip Owende
Module Description:	<p>The Research Project Part 1 (Research Methods) module aims to develop the learners' ability to initiate and conduct research in a structured, professional, and repeatable manner, from the identification of research area/topic, to the development of a comprehensive Project Proposal that is required to plan for and execute a substantive research project as part of the MEng in Internet of Things Technologies programme. The module covers the understanding of the research process, identification of necessary resources to support research, research planning, literature/technology review, ethics, identification of potential impacts of research, and the application of appropriate formats for presentation to and communication of findings to peers, professional communities, and the society at large.</p>
Learning Outcomes:	
<i>On successful completion of this module the learner will be able to</i>	
<ol style="list-style-type: none"> 1. Demonstrate understanding of the basis for scientific research and the structured methodology employed when undertaking a research project; 2. Define the elements and develop a research project from vague descriptions or problem statements and specific research questions that should be addressed, primarily by self-directed inquiry; 3. Search, critically review and appropriately cite literature sources that are relevant to generic research topics, and synthesize appropriate discussion of findings and conclusions, including any limitations of such work; 4. Demonstrate understanding of the roles of ethics in research, and its relevance to experimental design and compliance with Standards of Best Practice. 5. Design and develop a comprehensive Research Proposal that encompasses appropriate method(s), coherent project outline and project plan, that could be applied to successfully execute a research project within a defined timeframe 	

Module Content & Assessment

Indicative Content
Background to Scientific Research Definition of scientific research. Research processes. Roles of researcher/candidate and research supervisor(s). Bench-marking of research.
Sources and Use of Information Primary and secondary sources. Subject areas experts. Surveys. Library databases and Internet resources. Referencing and citation. Plagiarism. Selected tools for reference management; EndNote® and Freeware, e.g., Zotero, BibTex, RefME etc.
Role of Ethics in Research Professional practice and central responsibility of scientists. Ethics as design. Ethical reasoning and ethics. Computer software and digital information. Data protection. Privacy and informed consent; Rights and responsibility in IP. Responsibility for the environment. Responsible research conduct: research misconduct (falsification of data, fabrication of data, handling of human and animal research subjects etc.); authorship and credit in research.
Planning a Research Project Choosing and justifying a research topic. Producing research aims and objectives. Developing research question(s). Research methods. Design and analysis of experiments: strategy of experimentation; statistical techniques in experimentation. Collaborative work. Developing a Research Proposal; logic and structure, methods & methodologies, definition of milestones and project deliverables, and identification of potential impact(s).
Literature and Technology Review Types of publication. Literature search and strategy; keywords. Delimitation and scoping of research domain. Critical review of literature. Writing a literature review as an iterative process.
Using and Analysing Research Data Computer aided analyses. Designing for and using statistics; software for statistical analyses. Management of experimental data. Ensuring validity and reliability of quantitative data.
Research dissemination Writing scientific papers; understanding the format. Writing and presenting conference papers. Research summaries and abstracts. Poster Presentation. Writing journal papers. Publishing online. Planning and writing a thesis/dissertation; structure and layout. Managing critiques and reviews. Citations and Impact.

Indicative Assessment Breakdown	%
Course Work Assessment %	100.00%

Course Work Assessment %				
<i>Assessment Type</i>	<i>Assessment Description</i>	<i>Outcome addressed</i>	<i>% of total</i>	<i>Assessment Date</i>
Written Report	Project Outline Document	1,2	25.00	Week 3
Written Report	Project Proposal	1,2,3,4,5	75.00	Week 12

No Final Exam Assessment %

Indicative Reassessment Requirement
Coursework Only <i>This module is reassessed solely on the basis of re-submitted coursework. There is no repeat written examination.</i>

ITB reserves the right to alter the nature and timings of assessment

Indicative Module Workload & Resources

Resources
<i>Recommended Book Resources</i>
<p>John W. Creswell. 2014, <i>Research design</i>, 4th Ed., Thousand Oaks; Sage Publications London [ISBN: 9781452226095]</p> <p>Joshua Schimel. 2011, <i>Writing science</i>, 1st Ed., Oxford [Oxfordshire]; Oxford University Press [ISBN: 9780199760244]</p> <p>Catherine, Dr. Dawson 2010, <i>Introduction to Research Methods</i>, 4th Ed., How to Books Glasgow [ISBN: 9781845283674]</p> <p>Day R & B Gastel 2006, <i>How to write and publish a scientific paper</i>, 6th Ed., Greenwood Press. Westport, CT [ISBN: 0313330271]</p>
<i>Recommended Article/Paper Resources</i>
<p>Poeschl M, S Ward & P Owende 2012, <i>Environmental impacts of biogas deployment, Part 1: Life Cycle Inventory for evaluation of production process emissions to air</i>, Journal of Cleaner Production, 24, 168</p> <p>Brennan L and PMO Owende 2010, <i>Biofuels from Microalgae - A Review of Technologies for Production, Processing and Extractions of Biofuels and Co-products.</i>, Renewable & Sustainable Energy Reviews, 14(1), 557</p>
<i>This module does not have any other resources</i>

Module Delivered in

Programme Code	Programme	Semester	Delivery
BN_EMIOT_M	Master of Engineering in Internet of Things Technologies [BN535M 30 credits taught with a 60 credit research project]	1	Mandatory
BN_EMIOT_R	Master of Engineering in Internet of Things Technologies [BN535R 60 credits taught with a 30 credit research project]	1	Mandatory