ME7B07 RESEARCH METHODS – [15 Credits]

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Semester: 1 AND 2

Module Organisation
The lecture element for this module runs for the first 10 weeks of semester 1 (2 hours per week). Other elements will be assessed during semester 2 and at the time of project submission.

Module Description
This module will provide an introduction to students the key aspects of research in engineering, research methods & designs, data collection and analysis, ethical and legal perspectives, presentation and writing skills.

The module aims to:
- Develop a critical outlook in students regarding published research
- Support students in the development of their research project
- Expose students to the organisation, conduct & implementation of research in universities & institutes
- Enable students to utilise the available research resources and develop a supportive research environment
- Enable students to efficiently use multiple methods of presentation to effectively communicate research

Module Content & Syllabus
- 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
- Sampling analysis
- Data collection
- Research access
- Communication and oral presentation skills
- Citation manager software training
- Report writing and presentation
- Production of a short video (3-5 minutes) that explains project background, existing research activities, purpose of the project research activity, focusing on the research and/or clinical outcomes. A professional video producer will provide instructional lectures on how to embark on this process.

**Learning Outcomes**

On successful completion of this module, students should have developed the skills to:

1. Plan and manage a postgraduate research project
2. Critically appraise existing research tools, methods and publications
3. Identify scope of future research and design a research proposal
4. Summarise and 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 tools for experimental problem solving
8. Communicate design and research concepts visually and orally, to multi-disciplinary teams.
9. Understand the relevance of individual research in society and the potential impact on individuals, groups and society
10. Communicate and explain research topics to diverse audiences, including non-specialists and lay audiences using multimedia tools.
Module Notes
Provided on Blackboard

Teaching Strategies
The module is taught using a combination of lectures, seminars and workshops delivered by academics and industrial experts.

Assessment Modes
Assessment is through written coursework and presentations, often linked to the individual research project being completed by each student. Unless otherwise stated, all work should be submitted via blackboard.

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<thead>
<tr>
<th>Element</th>
<th>%</th>
<th>Due Date</th>
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<tbody>
<tr>
<td>Project proposal</td>
<td>15</td>
<td>Week 7 of Semester 1</td>
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<tr>
<td>Ethics and Business Paper</td>
<td>5</td>
<td>Week 10 of Semester 1</td>
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<tr>
<td>Research Grant Application</td>
<td>20</td>
<td>Week 4 of Semester 2</td>
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<tr>
<td>Video Presentation</td>
<td>10</td>
<td>Week 11 of Semester 2</td>
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<tr>
<td>Oral Presentation</td>
<td>15</td>
<td>Semester 2 (mid May)</td>
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<tr>
<td>Short Paper</td>
<td>10</td>
<td>One week after thesis submission</td>
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<tr>
<td>Conference Participation</td>
<td>15</td>
<td>Semester 2 (when appropriate)</td>
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<tr>
<td>Seminar Participation</td>
<td>10</td>
<td>Students must attend guest seminars during the academic year;</td>
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Recommended Texts
- Academic Press.