EE.ba 5th Semester Project

Student Briefing Session

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Outline

1. Overview

2. Research Skills Development

3. Assessment

4. Undertaking your Project

5. Laboratories / Resources / Budget

6. Groups / Projects

Overview: what is the Project?

- Experience in solving real-world problems

- Opportunity to apply the knowledge gained as an undergraduate student

- Project management, teamwork, communication, research skills, technical skills
  = practice as a professional engineer

- Supervised but not *micro-managed*

- **Independence and initiative**

- A complete project from requirements execution to closeout

- Presentation of what you can achieve and how you go about it

Important People and Roles

Person	Role
You	Work consistently through the year to contribute to the management and technical undertaking of the project.
Your Team	Projects are conducted in teams. How you work together is a critical aspect of the course.
Supervisor & Advisors	Supervisor: provide direction and support; ensure the project plan meets customer's needs and course requirements; monitor progress; and provide guidance and advice but not necessarily detailed instruction; determine grades for the assessment components; provide feedback to students. Advisors: provide direction, support and detailed instruction; support the supervisor with assessment and feedback
Assessment Panels	Assess Preliminary research proposal and exhibition

Project Timetable / Assessment

24 October 2025 → Group Proposal (first draft) & first seminar (group presentations)

November, December till
the last week in January → Progress reports (updating group proposal document and compiling individual reports)

the last week in January 2026 → Final individual presentations

28 February 2026 → Final project report (individual reports) & workbooks

Research Skills Development

- Do not underestimate the breadth and depth of *published research*

- What does this mean for your project?

  - Development of research skills is an important aspect of your project.

  - Discovering relevant publications and using them appropriately are part of research.

  - What if it has been done before?

- **Literature review**

Workbooks / github

- **Each student must maintain a project workbook (e-workbook is possible / also github / wiki).**

  a daily diary of progress

  notes from all meetings, problems encountered, decisions made, design ideas and sketches, references to data sources, calculations, equipment settings, experimental results etc.

- Supervisor may ask students to submit their workbooks / github / wiki so they can be considered in assessment (**performance mark**).

Project Assessment Rubric (*max 60*)

Research process	Facet	5	4	3	2	1
		Fails to satisfy the minimum requirements	*Satisfies the minimum requirements*	Demonstrates a high level of understanding and presentation and a degree of originality and insight	A very high standard of work which demonstrates originality and insight	Outstanding or exceptional work in terms of understanding, interpretation and presentation
Students embark on inquiry and so determine a need for knowledge / understanding	Objectives stated	Unclear or inappropriate	Clear but lacks focus	Clear and focussed	Clear, focussed and innovative	Clear, focussed, innovative, open inquiry
	Context of project	Minimally described	Satisfactorily described	Well described	Informative, well-researched	Comprehensive, extensively researched
	Score (of 5)	0 . 1 . 2 · . ·········3 ············· . ·············· 4 ············· . ·······5				
Students find/generate needed information / data / ideas using appropriate approach / method	Technical challenges	Vaguely specified	Clearly identified	Clearly identified and explained	Clearly identified, explained in context	Clearly identified, explained in context and justified
	Literature review	Minimal use of or inappropriate sources	Several appropriate sources	Many appropriate sources	Numerous appropriate sources	Numerous appropriate and wide range of sources
	Score (of 5)	0 . ·1 . 2 · . ·········3 ············ . ·············· 4 ············ . ·······5				

Undertaking your project: what we hope for

1. The way in which you undertake the project; e.g. consistent effort, professional conduct, initiative and creativity, teamwork, persistence in the face of difficulties, a methodical approach…

2. Successful outcomes; e.g. hardware and software that is complete, tested and works reliably.

3. Clear, concise, and complete documentation so that other groups can continue from where you left off.

What supervisor expect from students

- Workload: provided

- Consistent effort over duration of project.

- Regular, punctual attendance at project meetings.

- Timely submission of assessed items.

- Conduct as befitting a professional engineer.

Groups / Projects

Topic: **Detecting and diagnosing rotor broken bar in a three-phase induction motor**

The objective is to test various methods for detecting and diagnosing rotor broken bar faults in three-phase induction motors.

Main resources:

condition monitoring notes.pdf

Broken Rotor Bar Fault Diagnosis Techniques Based on Motor Current Signature Analysis for Induction Motor—A Review
https://www.mdpi.com/1996-1073/15/22/8569

Advance paper (Prony method):
Estimation of frequency components in stator current for the detection of broken rotor bars in induction machines
https://www.sciencedirect.com/science/article/pii/S0263224110000631

Groups / Projects

Subproject 1 (up to 4 students) resources:

 condition monitoring project & data.zip

Subproject 2 (up to 4 students) resources:

Start by using the example from the MATLAB Predictive Maintenance Toolbox:
Broken Rotor Fault Detection in AC Induction Motors Using Vibration and Electrical Signals
https://www.mathworks.com/help/predmaint/ug/broken-rotor-fault-detection-in-ac-induction-motors-using-vibration-and-electrical-signals.htm
and laboratory data provided at the IEEE data set page:
https://ieee-dataport.org/open-access/experimental-database-detecting-and-diagnosing-rotor-broken-bar-three-phase-induction

1st Milestone / Project Proposal & Seminar

24 October → Project Proposal & Seminar → Group presentation

The purpose of the project proposal & proposal seminar is to demonstrate that the group understands
the aims, motivations and requirements for the project,

that they have   a plan, can articulate the research aspects of the project, and have
considered the project's viability.

The focus of the seminar is on planning.

1st Milestone / Project Proposal & Seminar

A group should clearly state the aims and the motivation for the project.

A group should present a plan that addresses:

      what tasks will be done,

      what the milestones and deliverables will be,

      when the work will be done,

      who will do the various tasks, and

      how the work will be undertaken.

Budget and risk management plans are required as well.

      How these aspects impact on the project's viability?

1ˢᵗ Milestone / Project Proposal & Seminar

The proposal & seminar should include plans pertaining to the research aspects of the project.

What research questions or knowledge gaps the project will address?

What new knowledge will the group discover as part of the project, or what new knowledge will they need to complete the project?

Note that the knowledge need only be new to the group.

It would be appropriate to present preliminary considerations of how this new knowledge will be obtained (present the strategies to be used for a literature survey, experimentation …).

1st Milestone / Project Proposal & Seminar

Seminars should be aimed at the technical level of the student audience. As the audience may be unfamiliar with the topic, clear explanation should be given to the overall background, nature, scope and aims of the project.

Even distribution of load, logical order of presentation and cohesion are part of the assessment criteria. Careful preparation (and **rehearsal**) will be necessary to ensure that this is successfully achieved in the time allocated.

The seminars will be presented in a group with each group member presenting an approximately equal section of the talk. The first speaker should introduce themselves and the other group members. It is preferable that each group member speaks on only one occasion.

1st Milestone / Project Proposal & Seminar

Seminar presentations are 20 minutes long with an additional 10 minutes for questions.

Note that proposal seminars are 30 minutes long irrespective of the number of students in the group.

Groups need not use all the time available provided they express the essential elements of their proposal.

Large groups should take extra care with their preparation to ensure that each member speaks but that the presentation does not run over time.

Moodle: proposal, presentation examples and assessment rubrics will be provided

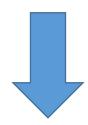# 1st Milestone / Project Proposal & Seminar

Example project documents:

Ehsan Norouzzadeh, " Dynamic Modelling of Large Permanent Magnet Synchronous Generator (PMSG) for Wind Farms"

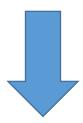**Note: the example is for a single student; you need to add "*who* will do the various tasks?"**

Moodle:

1. proposal example.pdf
2. proposal presentation.pdf
3. assessment rubric for proposal.pdf

1ˢᵗ Milestone / Project Proposal & Seminar

Assessment Rubric:

Research Process	Facet	F	P	C
		Fails to satisfy the minimum requirements	*Satisfies the minimum requirements*	*Demonstrates high level of understanding presentation a degree of origi and insight*
Students embark on inquiry *and so determine a need for knowledge / understanding*	Objectives stated	Unclear or inappropriate	Clear but lacks focus	Clear and focu
	Context of project	Minimally described	Satisfactorily described	Well described
	score (of 5)	0 ·.· 1··.··2 ·. ------------3------------ , --		

1st Milestone / Project Proposal & Seminar

Assessment Rubric:

Students find/generate needed information / data / ideas using appropriate approach / method	Technical challenges	Vaguely specified	Clearly identified	Clearly identified and explained
	References and citations	Minimal use of or inappropriate sources	Several appropriate sources	Many appropriate sources
	score (of 10)	0 ·1 2· 3 ·4 5------------6------------7---		

1ˢᵗ Milestone / Project Proposal & Seminar

Assessment Rubric:

Students critically evaluate information / data / ideas, their approach and results, and react appropriately	Research Planning	Research question identified	Research question and approach specified	Research questi and approach specified with s justification
	Valid technical reasoning	Some presented	Many presented	Strong evidence
	Feasibility of proposed approach	Flawed or infeasible	Feasible, with some changes	Feasible, with minor changes
	score (of 20)	0 ·2 4· 6·8 10 ----------12 --------14--		

1st Milestone / Project Proposal & Seminar

Assessment Rubric:

Students perform necessary processes to meet stated project objectives	Proposed project plan	Presented but is superficial	Presented in some detail	Presented in moderate det
	score (of 5)	0 · .· 1··.··2 · . ------------3------------- . --		
Students communicate project objectives, achievements and the process	Seminar presentation	Unengaging, laboured, disjointed	Mildly engaging, need improvements for the future	Generally eng minor improvement the future
	Visual and spoken elements	Inappropriate or ineffective	Appropriate but not well-integrated, or ineffective	Well-integrat and effective
	Seminar time management	Poor; grossly over-/under-time	Adequate; moderate degree of over-/under-time	Satisfactory; schedule, son hurry or dela
	score (of 20)	0 ·2 4· 6·8 10 -----------12 -------- 14·		

1st Milestone / Project Proposal & Seminar

Tips and suggested details:

- **Aims**: *what* will the project group do? Clearly and concisely express the project's intentions and desired outcomes.
- **Motivation**: *why* is the project being undertaken? Who wants the project? Who will use it or the knowledge it generates? Who stands to benefit from the project's outcomes?
- **Significance**: *why* is the project important? How does it benefit the world?
- **Technical Background**: *what* theory or knowledge does a reader need to understand and to be able to read the proposal report?
- **Related Work:** *what* previous work has been done by other researchers & industry? How does the project fit in the scheme of previous work? For example, does it aim to validate other results, evaluate alternatives, extend or improve previous designs, or deliver something new?

1ˢᵗ Milestone / Project Proposal & Seminar

Tips and suggested details:

- **Deliverables**: *what* are the project's final and interim deliverables and milestones?
- **Knowledge Gaps**: *what* new knowledge will the project generate, or what new knowledge will the project group need to complete the project?
- **Technical Challenges:** *what* technical challenges will the group need to overcome? Why do these issues present a challenge?
- **Requirements/Constraints:** *what* do the stakeholders in the project require? Are there any constraints that need special consideration?
- **Method**: *how* will the project group undertake the necessary work? How will it address the knowledge gaps?

1st Milestone / Project Proposal & Seminar

Tips and suggested details:

- **Planning and Feasibility**:
  - **Work breakdown:** *what* are the key tasks in the project? Do these depend on one another?
  - **Timeline**: *when* will the tasks be done? When will the deliverables and milestones be due?
  - **Task allocation**: *who* will do the different tasks? How will the workload be spread amongst the group members?
  - **Management Strategy**: *how* will the group be managed?
  - **Budget**: *how much* will the project cost? Are there enough funds? What equipment and resources are required?
  - **Risk Analysis**: *what if* things do not go to plan? What may go wrong? In this section focus on risks which are specific to your project.

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Background literature study

- Should provide evidence that the group has begun a study of background literature. This study will continue throughout the project as new questions arise and new sources are found.

- Evidence of this literature study may appear in many different parts of the proposal and later in the reports. For example, reference to published work should be used to justify the project's motivation, identify its significance, support the technical background, review the related work, demonstrate the knowledge gaps, …

- **Project groups should consider the quality of the sources they cite.** A web page may be a useful starting point for further investigation, but it has not necessarily undergone any kind of checking or review. It is expected that groups will include some higher quality sources such as books or peer-reviewed journal publications among their sources.

1ˢᵗ Milestone / Project Proposal & Seminar

Proposal format:

The proposal should:

- include a title page and list of references;
- use a 12 pt font and 1.5 line spacing;
- be submitted in electronic form in pdf format;
- use IEEE style citations as defined in
  http://www.ieee.org/documents/ieeecitationref.pdf; and
- be concisely written to cover required topics as outlined above.

As a guideline only, proposals are typically from 6 to 12 pages long, not including the title page, references and appendices.

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RISK MANAGEMENT

There are two types of risk you should consider at the outset of your project:

1. **Occupational Health and Safety (OH&S) Risks**: risks of hazards causing injury, illness or property damage.

2. **Project (or Technical) Risks**: risks of hazards affecting the successful completion of the project.

Details in Risk Management UoA.pdf / Moodle

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Presentation tips (available at Moodle):

- How to avoid the pitfalls of bad slides   /   Making Good Talk Slides.pdf

- Engineering Project Proposal Presentations   /   Engineering Proposal Presentation.pdf