DEPARTMENT OF ELECTRICAL ENGINEERING

GUIDE FOR STAFF ON SUPERVISING UNDERGRADUATE PROJECTS

Why do we have them?
They are required under the accreditation requirements. In any case, they have always been seen as an essential part of any engineering degree.

What do they seek to achieve?
As the capstone project, they seek to demonstrate the student’s potential as a practicing engineer. In broad terms, that means their ability to:

- **Research** – define the ‘state of the art’ in a given problem area
- **Communicate** – the work of the project effectively
- **Intellectualise** – reason through issues encountered in solving the problem in a systematic way
- **Exercise self-discipline** – define and keep to a project plan
- **Undertake professional practice** – within the limits of an academic environment

Some implications of the desired learning outcomes
The project has to be new to the student but not engineering. They need to demonstrate they can learn and understand a new area plus gain new skills.

It is their project for them to demonstrate their ability; it is not an exercise to develop something for an academic.

The result does not have to be novel; it has to demonstrate a competent ability to practice engineering.

Planning is critical in engineering and the primary element of professional practice. Students are advised to plan the project top-down and then see what can be done in the time allocated. That engineering decision making should be reported in the thesis. If a student cannot devise a reasonable plan and stick to it then they are not meeting the desired outcomes. Hence the only basis for considering a deferred result is unexpected illness. To give them in other circumstances is to reward sloth and effectively penalises the better students.

A similar situation applies to supplementaries. This is continuous work, hence a supplementary is not applicable under any circumstance.

The nature of project units
We allow three forms of project:

- An industry project – usually resulting from vacation employment
- A student-nominated project – but an academic has to agree to supervise
- A project nominated by an academic.
Industry supervisors are required to send us a letter verifying their qualifications to supervise. That is, they must be a practicing engineer or scientist. Unless they ask for it, confidentiality of the thesis will not be given. If they want confidentiality, then the **maximum** time is three semesters.

Projects are a **supervised** activity. The role of the supervisor is **solely** to:

- Give students a timeslot for meetings
- Offer advice and help develop skills
- Ensure the student is working to a plan
- Review the draft thesis to ensure it meets **technical** requirements.

**Conduct of the project**

Project units are administratively the same as any other unit. There is a unit coordinator responsible for seeing the unit learning outcomes are met and so **only** they can sign off results. Academic mentors are, in effect, laboratory supervisors. Always check with the Projects Coordinator before taking **any** action. **You cannot offer a student a deferred or agree to late submission of a thesis or any similar action.**

The project is over two semesters and is nominally two separate units:

**Engineering Project 401**

In this unit they need to do most of their experimental work.  
Assessment is pass/fail.

**Engineering Project 402**

In this unit students write their thesis and prepare an oral presentation  
Assessment is by a grade.

The EP402 grade is used for **both** units in the calculation of honours.

Can students do both project units simultaneously? **Extremely** difficult and not to be recommended. There are few circumstances where it is warranted. What about missing a semester? Again, ill-advised. Why don’t we make the project a single unit over the year? We could, but that would create some difficulties for international students. **NOTE; ideally the project would be taken in the last** year.

**How often should students meet with you?**

This is something to establish in consultation with the student. However, the **minimum** should be once per fortnight.

**Do students need a logbook?**

Yes. For accreditation it is increasingly important that students keep a log book. They should log in this ideas, experimental data, etc. They should also log meetings. The student should note the outcomes of that meeting and you should check that and sign the book to verify you agree those were the points discussed.
Three initial problems
Students need to read up on the background to their project. They should do this in the semester prior to their enrolment in EP401. They are showing a distinct reluctance to do so and that is causing significant problems. It means many have done very little by the end of the semester. Now in the past, the mid year break meant they could catch up if they worked hard. However, that break has now been reduced by three weeks. The result is a number of students who will not be completing their experimental work until well into the next semester. Those students will probably fail because they cannot create a proper thesis.
What if a student decides to change projects but has passed EP401. A major problem! They cannot re-enrol as they have already passed it. Hence they have to work in their own time and catch up. This presents some significant problems for international students.

What happens of a student fails EP401? Clearly they do it again, but as a general rule we would ask them to seek another project and start afresh. That may mean a different supervisor.

Conditions on enrolment in the project units
For Engineering Project 401, students must submit a project registration form by the end of week 1. The project coordinator has to know who is doing a project and with whom. They must also submit a patents form acknowledging the university owns the intellectual property they produce. The reason for this is that the project is supervised and uses university resources. Hence they do not need this if it is an industry project.

To enrol in Engineering Project 402, they must have passed EP401.

Assessment materials
A very important point. Assessment in EP401 is pass/fail. It is pass if the student is making satisfactory progress at the end of week 12. It is up to supervisors and students to decide what that means at the beginning of the semester. That is the only assessment involved. However, students are also expected to meet regularly with their supervisor. If they do not, this is grounds for failing them.

For EP402 students must first submit a draft 10 working days before the due submission date. The due date is the Friday of the last teaching week. If they do not, you can fail them. They must also:

* Submit a Thesis via the Assignments Office
  A bound copy – to be examined by the supervisor and then placed in the Department’s library
  An unbound copy – for the co-examiner
  Additional cover sheets – to go in the annual report on projects
  A copyright declaration – so we can legally put it on our servers.
  A CD or DVD of the entire thesis – what goes on our servers.
* **Give an oral presentation**
  In effect, a summary of the project, what was accomplished and the major problems encountered.

**NOTE;** You *cannot* insist a student gives you a personal copy of their thesis. You can ask but that is all. You cannot keep the second copy, but if the student does not collect it.... You can make a copy of the electronic thesis.

**The role of the co-supervisor**
It is basically to verify the comments of the supervisor on the assessment sheet are reasonable. An obvious problem is that supervisors can often reward hard work, but the assessment is on the *outcomes* of the project, not the effort put in to achieve them. The co-supervisor can only see those, hence their moderation role. If the co-supervisor does not agree with the assessment, then they should sit together and resolve the differences, then both sign the assessment sheet.

**Assessment**
The basic assessment for EP 402 is:

- Oral presentation 15%
- Thesis 85%

The thesis mark is made up of these components:

- The five areas listed earlier
- Regular meeting with the supervisor and submission of a draft.
- Whether the supervisor sees that it could be published.
- The ranking the supervisor gives.

There is a problem with the last of these. Each year, 20-30% of students are rated by their supervisors as the sort of graduate we see once every 5 years!

**Writing the thesis**
Instructions given to the students are as follow:

* It is a **justification** to show that the student does have the potential to be an engineer. It is not a tutorial or a report or a book.

* It should have chapters that address the following:
  - Why there is a problem that needs to be solved.
  - The current state of the art
  - A statement of the requirements seen for solving that problem
  - The detailed solution
  - Verification of that solution
  - A critique of the approach followed and advice for those who might continue developing this project.
Common mistakes in writing a thesis
* Formatting. They do not understand or follow the correct numbering system for sections, figures, etc. Chapters not on a new page.

* Missing sections or diagrams, poor diagrams, etc. Missing documentation sheets.

* Spelling mistakes, grammar. This is unacceptable in an era when word processors have grammar and spell checkers built-in.

* Incorrect tense and use of "I" or "we".

* They do not know who is the HOD or their course. They do not sign the letter to the HOD.

They are allowed to have three errors in their thesis. After that they have to re-submit and gain a penalty from 1-5 marks depending on the number of errors.

Support for the project
It has its own web site within the Department’s web site. Located within that are all forms plus the “Guide to Projects”. This is a detailed outline of exactly what needs to be done at every stage of the project and includes a checklist at the rear for the thesis. It is also in the correct format. Few students read it.

The draft thesis and you
Your role is to comment on technical aspects of the thesis. It is NOT to correct the English or rewrite the sections. By all means advise the student of such deficiencies but that is the extent of it. To stress again, it is their thesis and their effort.

Acknowledgements
Many students are not aware of the role of this part of the thesis. This should only mention the following:

Their supervisor
Any technical support person who aided them in getting results
Anyone who loaned them equipment, software, etc
If appropriate, their sponsor if they hold a scholarship

That is, anyone who directly contributed to improving the outcomes of this thesis. Further, it is an acknowledgment, not a thank you page so they do NOT thank:

God
Their parents
Their girlfriend/boyfriend
Friends who offered ‘moral support’.