School of Electrical Engineering and Telecommunications

Semester 1, 2018
Course Outline

ELEC9772
MEngSc Project Part B

1. Course Staff

Project supervisor:	As nominated by the student for MEngSc Project Part A
MEngsc Project coordinator:	Dr. Aron Michael, Hilmer Building 648 a.michael@unsw.edu.au

Consultations: About the project work, technical inquiries should be directed to the project supervisor whereas general administrative inquiries should be directed to the MEngSc project coordinator. All email enquiries should be made from your student email address with ELEC9772 in the subject line; otherwise they will not be answered.

Keeping Informed: Announcements may be made via email (to your student email address) and/or via online learning and teaching platforms – in this course, we will use Moodle https://moodle.telt.unsw.edu.au/login/index.php. Please note that you will be deemed to have received this information, so you should take careful note of all announcements. The Moodle name of this course is: ELEC9772 (MEngSc Project Part B) S1_2018.

2. Course Summary

Contact Hours

The project consists of regular meetings with the supervisor, typically about 30-45 minutes weekly. In addition, the project usually involves experimental work and thus requires laboratory assistance from the supervisor and/or technical staff.

Context and Aims

The Master of Engineering project is undertaken in the second semester of the final year of the 2-year MEngSc. The course, MEngSc Project A, is the first part of the project. Its purpose is for students to undertake directed laboratory and research work on an approved topic under the guidance of an academic supervisor.

The project provides an opportunity for the student to bring together engineering principles learned over their previous years of study and apply these principles to innovatively solve problems such as the development of a specific design, process and/or the investigation of a hypothesis. The projects must

be complex, open-ended problems that allow room for student creativity, and the acquisition, analysis and interpretation of results. There must be multiple possible solutions or conclusions at the outset and sufficient complexity to require a degree of project planning from the student. The project requires the student to formulate problems in engineering terms, manage an engineering project and find solutions by applying engineering methods. Students also develop skills that enable them to work in a research and development environment.

As a Masters (Postgraduate) level project, it is expected that the outcomes and standard of work undertaken in the ME project is of a more advanced level than that during a final year undergraduate thesis.

Schedule

Period	Activity
Weeks 1-12	▪ Weekly meetings during the semester with supervisor for technical guidance on project work ▪ Laboratory work during the semester subject to arrangement with technical staff
Week 13	▪ 12pm Thursday: deadline for submission of Final Report, submit online via Moodle

Assessment

1. Project report 90% weighting
2. Participation effort 10% weighting

3. Course Details

Credits

This is a 6 UOC course. The expected workload is 10–12 hours per week throughout the 13 week semester.

Relationship to Other Courses

MEngSc Project B constitutes the second part of the two-part project work (parts A and B) and immediately follows MEngSc Project A in the next semester. MEngSc Project A involves a substantive literature search and reviews of the background for the chosen topic, development of a good understanding of the problem that is to be solved, familiarization with the tools or equipment required for the project, some preliminary development work, and formulation of a research plan. This prepares the student for the detailed project work undertaken in this course.

Pre-requisites and Assumed Knowledge

Satisfactory completion of ELEC9771 MEngSc Project Part A.

Following Courses

There are no following courses.

Learning outcomes

The MEngSc project provides a good pathway into working in industry and research and further opportunities for postgraduate students to explore concepts or research ideas already encountered at an advanced level. It serves as an important indicator of how well students are able to bring together

what they have learnt at an undergraduate and postgraduate level as well as from any relevant work experience. It also plays an important role in the final grading of degrees.

At the end of MEngSc Project B, students will be able to:

1. Develop a design or a process or investigate a hypothesis following industry and professional engineering standards.
2. Critically reflect on a specialist body of knowledge related to their project topic and the various facets and practical issues and challenges encountered in their project work.
3. Apply scientific and engineering methods to solve an engineering problem. Demonstrate the solution, e.g show the working of their designed prototype, simulations or experimental setup
4. Analyse data objectively using quantitative and mathematical methods.
5. Demonstrate written communication in professional and lay domains, through a written final report on their research topic detailing the motivation, background, selected research methodology, detailed design, testing, critical analysis and discussion of the results obtained.

This course is designed to provide the above learning outcomes which arise from targeted graduate capabilities listed in ***Appendix A***. The targeted graduate capabilities broadly support the UNSW and Faculty of Engineering graduate capabilities (listed in ***Appendix B***). This course also addresses the Engineers Australia (National Accreditation Body) Stage I competency standard as outlined in ***Appendix C***.

Syllabus

On completion of MEngSc Project A, students will have gained detailed background knowledge of the chosen topic area as a basis for developing their own ideas and program of work in MEngSc Project B. Some tasks in the program were completed in MEngSc Project A but the remaining major tasks are performed in MEngSc Project B including the writing of the final report. The report is required at the end of the semester and the student must attend and exhibit his/her project work at the Open Day in the School.

4. Teaching Strategies

Delivery Mode

- One introduction lecture by the course coordinator – to explain project requirements, procedures, available resources, and assessment scheme.
- Regular weekly meetings between supervisor and student – to discuss and advise on the project work.
- Laboratory access throughout the semester – for students to carry out practical design and development work with occasional assistance from technical staff.

Learning in this course

The project gives you the opportunity to take on a project on your own, to produce a self-contained and rounded piece of work written up for others to assess and use. While the project is yours alone, you will need to obtain advice, information and assistance from others, for example your supervisor, technical officers responsible for laboratories, or computing and workshop staff.

Regular meetings with your supervisor are important, especially during the early stages when it is important to check that what you are doing is indeed what is required. If you want to contact your

supervisor outside a regular meeting time, leave a message arranging a time to meet. Pre-arranged consultations are often more effective, check contact details on the School website.

Having completed ME Project Part A, at this stage you should have a clear idea what you are going to do and what tasks have got to be performed on the way to achieving your goal.

It is a good idea to draw up a developmental schedule and allocate times for each task and important stages or project milestones. The time duration of each task should be carefully checked to ensure if it is realistic and, in particular, allows sufficient time for tasks that are critical for the success of the project. For example, ordering components or equipment construction by the workshop, access to state-of-the art research facilities may have particularly time implications you need to be well aware of. There may be significant lead time with component delivery. Workshop time is always limited and long delays are frequently experienced and therefore it is important to get drawings to the workshop as soon as possible. Access to research facility often requires laboratory inductions and extensive training. Discuss these issues with your supervisor to draw up realistic and time efficient plan.

You are expected to complete your project work at the end of the session, prepare an Open Day demonstration and submit your Project Report. It is wise to keep all these milestones in mind as you work to bring your chosen topic to fruition.

Keep careful notes and write up as you go. The importance of keeping good notes is understood by all of us who have been frustrated by losing an important reference or vital information about an experiment. Careful note taking can also simplify the final Project Report write-up.

Start writing-up as soon as possible - Day 1 is not too early. This is good advice because writing-up often helps to clarify ideas and can suggest some additional investigations to pursue. It is better to make this kind of discovery early rather than later. Furthermore, writing-up is a major task that should not be rushed.

Try to have your draft complete well before submission date and discuss it with your supervisor before producing the final version. Transforming the draft into the final version requires considerable organisation. Allow at least a week for the normal contingencies (e.g. proof reading and the correction of typing errors), and for other problems (e.g. failed equipment). Equipment breakdown is not a valid excuse for late submission.

5. Assessment

Assessment is based on evaluating the student's work through the final report (90%) and participation effort (10%).

The breakdowns for marking the report are as follows: literature review/background (10%); execution of the research project, quality of analysis, discussion of results (50%); conclusions and value added (20%); and document presentation (20%).

The marking of the participation effort is based on student's attendance at lab and meetings throughout the semester, levels of intellectual contribution (e.g. did the student come up with ideas), examination

of relevant documentation (project diary, student's lab book detailing experiment activities or measurement records), etc.

Only the supervisor will assess the participation effort. The assessment of the report and Open Day presentation will be carried out by the thesis supervisor and the assessor whose marks are equally weighed. The assessor is an academic staff assigned by the School. The marking is done independently by each marker, without collusion or knowledge of the other mark.

The final project report is to be submitted by **12pm (noon) Thursday of week 13**. This is done by uploading the report via Moodle as a pdf formatted file. The project report must be individually written even for cases where a group of students work on the same topic. If your supervisor or assessor specifically requests a printed copy of your report, please make one and hand it to them directly (but you still also need to upload your report).

Policy for lateness in report submission

The penalty is detailed below:

- For project report – 5 marks off the *project* for every day late. Penalty applies until the marks for the *course* decrease to 50, and further lateness does not result in failure of the *course*, but might be a failure of the project report (weekends count as days). Any project report not turned in within 6 weeks after the deadline will be finalised at zero (0) marks.
- If there is a delay in submission due to unforeseen reasons (e.g., medical issues), prior permission should be obtained from the project coordinator, with the consent of the supervisor before the due date. This is at the discretion of the project coordinator, but should only be granted in exceptional circumstances beyond the student's control. As per normal, students can also apply through myUNSW for special consideration.

Discrepancy amongst project marks

- For mark difference less than or equal to 10 marks, the unweighted average is used.
- For mark difference of 11-15 marks, the Project Coordinator discusses with the two markers about why they gave their marks and assists the two markers to come to an agreement on a final mark.
- For any mark difference greater than 15 marks, a third assessor is used. An unweighted average of the three marks will be used.
- If the situation arises that one mark is invalid, the Project Coordinator has the discretion to eliminate that mark and average the other two (if they fail within the 10 mark difference)

Relationship of Assessment Methods to Learning Outcomes

	Learning outcomes				
Assessment	**1**	**2**	**3**	**4**	**5**
Final report	✓	✓	✓	✓	✓
Participation effort	✓	✓	✓		

6. Course Resources

Recommended text(s):

Reading materials are specified by the supervisor (related to particular thesis topic).

On-line resources

Moodle

As a part of the teaching component, Moodle will be used to disseminate materials, host forums: https://moodle.telt.unsw.edu.au/login/index.php. All information about this course is available from this link which is regularly updated.

Mailing list

Announcements concerning course information will be given on Moodle and/or via email (which will be sent to your student email address).

7. Additional Information about the project

Project Report Specification

- The report must be submitted as **one single pdf file**.
- Page size must be A4 (210 x 297 mm). Page margins must not be less than: 25mm (left and right edges), 25mm (upper edge), and 20mm (lower edge).
- Project must be prepared using a word processor, e.g Microsoft Office or LaTeX.
- The report must include a **title page** with the following details:

THE UNIVERSITY OF NEW SOUTH WALES

SCHOOL OF ELECTRICAL ENGINEERING AND TELECOMMUNICATIONS

Title of Project

Name of Author

Master of Engineering Science (Electrical Engineering or Telecommunications or Energy Systems or Systems & Control)

Submission Date (month and year)

Supervisor: (followed by name)

- Immediately following the title page is the project **summary page**. This summary sheet is designed to assist in determining the overall input by students into the project work. The guidelines for completing the summary page and the summary form can be downloaded from the course website. Complete this form, sign and date it, scan the form, and insert into the project report as the second page (after the title page).
- Students might like to include a page for acknowledgment. This would be the third page.
- All pages must be numbered. The main body of the project must be numbered consecutively from beginning to end. Other sections must either be included or have their own logical numbering system.
- Graphs, diagrams and photographs should be inserted as close as possible to their first reference in the text. Rotated graphs etc are to be arranged so as to be conveniently read, with the bottom edge to the outside of the page.
- The author of the project is responsible for the preparation of the project before the deadline, proofreading the typescript and having corrections made as necessary.

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If Things Go Wrong

If you start having serious problems, don't ignore them or stop working; the problems won't go away. Talk over your worries with your supervisor to see what you can do to get going again. If you are still not able to resolve the problems, then see the Project Coordinator, the Director of Academic Studies in EE&T or the Student Counseling and Careers Unit. The Learning Centre also offers advice and support on these matters. Often some advice or perhaps reducing the scope of the project can get you working effectively for the rest of the year.

8. Other Matters

Academic Honesty and Plagiarism

Plagiarism is the unacknowledged use of other people's work, including the copying of assignment works and laboratory results from other students. Plagiarism is considered a form of academic misconduct, and the University has very strict rules that include some severe penalties. For UNSW policies, penalties and information to help you avoid plagiarism, see https://student.unsw.edu.au/plagiarism. To find out if you understand plagiarism correctly, try this short quiz: https://student.unsw.edu.au/plagiarism-quiz.

There were several instances of plagiarism in courses with thesis or project report submissions. The most common penalty was **failure** of the course. If you don't understand what plagiarism is, please act now to educate yourself.

Student Responsibilities and Conduct

Students are expected to be familiar with and adhere to all UNSW policies (see https://student.unsw.edu.au/guide), and particular attention is drawn to the following:

Workload

It is expected that you will spend at least **ten to twelve hours per week** studying a 6 UoC course, from Week 1 until the final assessment, including both face-to-face meetings with your supervisor and *independent, self-directed study*. In periods where you need to need to complete assignments or prepare for assessments, the workload may be greater. Over-commitment has been a common source of failure for many students. You should take the required workload into account when planning how to balance study with employment and other activities.

General Conduct and Behaviour

Consideration and respect for the needs of your fellow students and teaching staff is an expectation. Conduct which unduly disrupts or interferes with a class is not acceptable and students may be asked to leave the class.

Work Health and Safety

UNSW policy requires each person to work safely and responsibly, in order to avoid personal injury and to protect the safety of others.

Special Consideration

You must submit all assignments and attend all assessments scheduled for your course. You should seek assistance early if you suffer illness or misadventure which affects your course progress. All applications for special consideration must be **lodged online through myUNSW before the**

assessment event, not to course or school staff. For more detail, consult https://student.unsw.edu.au/special-consideration.

Continual Course Improvement

This course is under constant revision in order to improve the learning outcomes for all students. Please forward any feedback (positive or negative) on the course to the course convener or via the Course and Teaching Evaluation and Improvement Process. You can also provide feedback to ELSOC who will raise your concerns at student focus group meetings.

In our efforts to provide a rich and meaningful learning experience, we have continued to evaluate and modify our delivery and assessment methods. The assessment criteria and marking guidelines have been extensively revised together with clearly-defined policies on handling marking differences and late submission of work. Course administration is now via Moodle where students can obtain course material and submit their work for assessment.

Administrative Matters

On issues and procedures regarding such matters as special needs, equity and diversity, occupational health and safety, enrolment, rights, and general expectations of students, please refer to the School and UNSW policies:

http://www.engineering.unsw.edu.au/electrical-engineering/policies-and-procedures

https://student.unsw.edu.au/guide

Appendices

Appendix A: Targeted Graduate Capabilities

Electrical Engineering and Telecommunications programs are designed to address the following targeted capabilities which were developed by the School in conjunction with the requirements of professional and industry bodies:

- The ability to apply knowledge of basic science and fundamental technologies;
- The skills to communicate effectively, not only with engineers but also with the wider community;
- The capability to undertake challenging analysis and design problems and find optimal solutions;
- Expertise in decomposing a problem into its constituent parts, and in defining the scope of each part;
- A working knowledge of how to locate required information and use information resources to their maximum advantage;
- Proficiency in developing and implementing project plans, investigating alternative solutions, and critically evaluating differing strategies;
- An understanding of the social, cultural and global responsibilities of the professional engineer;
- The ability to work effectively as an individual or in a team;
- An understanding of professional and ethical responsibilities;
- The ability to engage in lifelong independent and reflective learning.

Appendix B: UNSW Graduate Capabilities

The course delivery methods and course content directly or indirectly addresses a number of core UNSW graduate capabilities, as follows:

- Developing scholars who have a deep understanding of their discipline, mostly through self-study with little guidance from staff.
- Developing rigorous analysis, critique, and reflection, and ability to apply knowledge and skills to solving problems encountered in the course of project work.
- Developing capable independent and collaborative enquiry, through self-study and information gathering spanning the duration of the course.
- Developing digital and information literacy and lifelong learning skills through the literature review and selective gathering of background technical information required for the project.
- Developing ethical practitioners who are collaborative and effective team workers, through group activities, seminars.
- Developing independent, self-directed professionals who are enterprising, innovative, creative and responsive to change, through challenging design and project tasks.
- Developing citizens who can apply their discipline in other contexts, are culturally aware and environmentally responsible, through interdisciplinary tasks, seminars and group activities.

Appendix C: Engineers Australia (EA) Professional Engineer Competency Standard

	Program Intended Learning Outcomes	
PE1: Knowledge and Skill Base	PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals	
	PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing	✓
	PE1.3 In-depth understanding of specialist bodies of knowledge	✓
	PE1.4 Discernment of knowledge development and research directions	✓
	PE1.5 Knowledge of engineering design practice	✓
	PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice	
PE2: Engineering Application Ability	PE2.1 Application of established engineering methods to complex problem solving	✓
	PE2.2 Fluent application of engineering techniques, tools and resources	✓
	PE2.3 Application of systematic engineering synthesis and design processes	✓
	PE2.4 Application of systematic approaches to the conduct and management of engineering projects	✓
PE3: Professional and Personal Attributes	PE3.1 Ethical conduct and professional accountability	✓
	PE3.2 Effective oral and written communication (professional and lay domains)	✓
	PE3.3 Creative, innovative and pro-active demeanour	✓
	PE3.4 Professional use and management of information	✓
	PE3.5 Orderly management of self, and professional conduct	✓
	PE3.6 Effective team membership and team leadership	