

ELEC4120

Undergraduate Thesis - Part A



UNSW

THE UNIVERSITY OF NEW SOUTH WALES

School of Electrical Engineering
and Telecommunications

Equivalent courses: TELE4120, PHTN4120

COURSE OUTLINE - Session 2, 2008

1. Course Staff

Thesis supervisor: To be nominated by the student (together with thesis topic)
Thesis coordinator: Dr. Toan Phung, room EE107, toan.phung@unsw.edu.au
Project management lecturers: Dr. Iain MacGill, room EE124B, i.macgill@unsw.edu.au

2. Course Details

Credits: This is a 6 UOC course. It is important to note that in the WAM (Weighted Average Mark) calculation for awarding Honours degree, this course is considered to be a 4.5 UOC, level 4 course. The expected workload is 10-12 hours per week throughout the 12 week session.

Contact hours: The thesis component of the course consists of regular meetings with the supervisor, typically about 30 minutes weekly. The thesis often involves experimental work and thus requires laboratory assistance from the supervisor and/or technical staff.

The project management component of the course consists of a two hour lecture and two hour tutorial per week.

Lectures will be held in the Ritchie Theatre, Tuesday 9-11am. The provisional syllabus of these weekly lectures is outlined below. It is highly recommended that you attend all lectures. The Lecturer will use Powerpoint slides that will NOT be available to students. Note that UNSW policy is that you are expected to be regular and punctual in attendance at all classes in the course – both lectures and tutorials. See <https://my.unsw.edu.au/student/atoz/AttendanceAbsence.html> for details.

The program of weekly 2 hour tutorials has a number of innovative elements which we hope will enhance the learning experience by creating a close link between the lecture material, and the planning and management of your thesis project.

Consultations: About the thesis work, technical inquiries should be directed to the thesis supervisor whereas general administrative inquiries should be directed to the thesis coordinator.

About the project management, inquiries regarding course administration and the lecture program should preferably be made at the end of lectures. Otherwise, an email is the preferred method of contact, including if students wish to arrange a consultation: i.macgill@unsw.edu.au. Tutorials will be led by academic staff of the School. All questions on the tutorials and tutorial assignments should be directed to these staff at the weekly tutorials.

3. Course Information

Aims: This course is undertaken in the second last session of the BE degree program. Its purpose is twofold:

1. for students to undertake directed laboratory and research work on an approved topic under the guidance of an academic supervisor, and
2. for students to develop a fundamental understanding and associated skills in project management.

This course constitutes the first of the two-part thesis work (parts A and B). Thesis A involves a detailed literature review of the chosen topic, and preparation of a research management plan. This prepares the student for the detailed project work undertaken in Thesis B in the following session.

A list of thesis topics offered by the school is published each year and can be viewed on the EE&T thesis/project database web site. Students are to make their own selection. Usually, the topic chosen is influenced by the students' future career directions. Note that some topics offered on the list are of a general nature, requiring the topic to be defined in discussion with the supervisor. Many topics can be modified to cater for specific student interests. There is provision for topics not on the published list to be suggested by students or industry. However, it is necessary to find a member of staff who is prepared to act as a supervisor (or co-supervisor) of such a topic.

The thesis is a good introduction to work in industry and research, and is an important indicator of how well students are able to utilise what they have learnt throughout their course. It also plays an important role in the final grading of degrees.

Concurrent to the thesis work is the project management component taught in this course. The objective is to provide students with fundamental insights and tools for project management in the provision of professional services. Lectures will cover the projectised organisation, planning processes, project execution and ongoing project management. Other topics include negotiation, organizational strategy development, human resources and effective communications.

The project management component, though designed specifically for students in the School of Electrical Engineering and Telecommunications, has wide application to project management in the provision of professional services. As such, it will provide you with fundamental insights and tools which can be applied throughout your career as an engineer, and perhaps beyond.

Overall, at the end of the course students should:

- Have developed detailed background knowledge of the chosen topic area as a basis for developing their own ideas and program of work in Thesis B.
- Understand the general infrastructure requirements of engineering projects including laboratory, workshop, computing facilities, information systems and OHS requirements.
- Gained an appreciation of the role of thesis supervisors play in quality assurance.
- Understand the key underlying themes and processes of project management for professional service providers
- Be able to demonstrate key techniques and skills required in planning and executing engineering projects
- Appreciate other key management areas including negotiation, people management and organizational communications.
- Have developed an appreciation and understanding of project management systems and associated formal processes of planning, managing, controlling, change management, quality assurance and risk mitigation.

Prerequisite: ELEC3117 and 120 units of credit.

Following course: ELEC4121 Thesis B. This is a 6 UOC course but in the WAM calculation for awarding Honours degree, this course is considered to be a 13.5 UOC, level 4 course.

Equivalent courses: TELE4120, PHTN4120.

Old courses: This course replaces previous courses ELEC4910 (Individual Thesis Part A) and ELEC4914 (Group Thesis Part A), and incorporates project management materials from the previous ELEC4010 course.

4. Learning outcomes

After the successful completion of the course, the student will be able to:

- prepare a detailed project management plan for research projects including time, scope and budgeting.
- execute this research plan with appropriate management, control, change management, and risk mitigation processes.
- effectively manage the contribution of their thesis supervisors to their work through a regular review process.
- deliver a professional seminar presentation on their chosen research topic outlining the motivation, background and selected research methodology that will be used in Thesis B.
- successfully proceed on to the design and synthesis tasks of thesis B for their chosen research topic.

Graduate attributes are the skills, qualities, understandings and attitudes a university agrees its students will develop during their program of study. Some faculties including Engineering have contextualised agreed UNSW-wide Graduate Attributes according to their disciplines and professional areas. The course delivery methods and course content address a number of core UNSW *graduate attributes*; these include:

- The skills involved in scholarly enquiry, in particular, the appreciation of and ability to indulge in research.
- An in-depth engagement with the relevant disciplinary knowledge in its inter-disciplinary context
- Development of analytical and critical thinking.
- Ability to engage in independent learning.
- Information literacy - skills to appropriately locate, evaluate and use relevant information
- Development of effective communication skills
- The skills required for collaborative and multidisciplinary work
- An appreciation of and responsiveness to change

Please refer to <http://www.ltu.unsw.edu.au/content/userDocs/GradAttrEng.pdf> for more information about graduate attributes.

5. Teaching strategies

- One introduction lecture by the course coordinator – to explain thesis requirements, procedures, available resources, and assessment scheme.
- Regular meetings between supervisor and student – to discuss and advise on the thesis work.
- Laboratory sessions throughout the session – to assist students in the experimental work.

For the project management component of the course:

- Lectures – to provide fundamental knowledge relevant to project management
- Tutorials – to develop skills in project management
- Assignments – to give practice in applying these skills and to assess your progress
- Project report and seminar – to apply these skills in a coherent and effective manner through management of your thesis project
- Examination – the final test of competency

6. Assessment details

There are two components of the assessment in this course:

(1). Thesis:	Thesis seminar:	35% overall weight
	Written report:	15% overall weight
(2). Project management:	Tutorial assignments:	10% overall weight
	Thesis Project Management	
	- seminar	5% overall weight
	- report	10% overall weight
	Final examination:	25% overall weight

The *thesis component* will contribute 50% of your final mark for this course and it comprises an oral presentation together with a written report. The assessment will be carried out by the thesis supervisor and the thesis assessor whose marks are equally weighed. Other requirements are given in Section 9.

For the *project management component*, the tutorial tasks will contribute 25% of your final mark. These tasks include a number of assignments and also a seminar and project report by each student on the planning and management of their thesis project. All tutorial work is undertaken individually, even for those students undertaking a group thesis. Note that tutorial marks awarded to you by your tutor are provisional – the course coordinator reserves the right to adjust average marks across the tutorial classes if they decide that this is required to balance the different marking approaches taken by the tutors. The two-hour exam at the end of session will contribute another 25%.

Note that satisfactory performance is required in both the *thesis component* and the *project management component* in order to pass the course. The latter in turn requires satisfactory performance in each of the three components – the tutorial, project management seminar/report, and exam assessment.

Assessment task due dates are given in the course schedule. Students who passed the thesis component but failed the project management component may be allowed to proceed with Thesis B.

7. Course Schedule

Note that this schedule is provisional at this stage and may be updated during the session. You should attend lectures and regularly check the course website for possible updates.

Provisional Schedule, this version dated 16 July 2008

WEEK	LECTURE	TUTORIAL	
0	No lecture , however, the course coordinators will be available for discussion during the scheduled lecture	No tutorials	
1	Welcome and course introduction – Iain MacGill Thesis logistics – Toan Phung	No tutorials	
2	Go/no-go analysis Project Management & Roles	Thesis discussion PM processes Project registration	
3	Tasks analysis	– Go/no analysis [out] Assignment 1	
4	Scoping	– Tasks [in] Assignment 1 [out] Assignment 2	
5	Budgeting	– Scoping [in] Assignment 2 [out] Assignment 3	
6	Guest lecture 1	- Budgeting – Discussion of seminar program and project reports [in] Assignment 3 [out] Assignment 4	
7	Guest lecture 2	In class exercise [in] Assignment 4	
8	Guest lecture 3	Project Management Seminars	
9	Guest lecture 4	Project Management Seminars [in] Project Management Report by COB Friday	
10	Thesis seminars – no lecture or tutorials – oral presentation for thesis project in week 10, associated report due in week 9		
11	Case study	No tutorials	
12	Course Review	No tutorials	

8. Resources for Students

Regular updates and course materials will be added to the ELEC4120 website - found at <http://subjects.ee.unsw.edu.au/elec4120/>. You should check this website frequently.

Lecture slides are closely linked and complement material available in a comprehensive Manual and Process Guide developed specifically for the course. This guide is freely available for all students. Furthermore, additional materials including case studies, guest lecture summaries and special topics will be handed out at the beginning of some lectures.

A number of useful resources including electronic versions of key process forms, and a simple yet powerful EXCEL spreadsheet which can be used for planning and managing medium sized projects, will be made available on the course website at <http://subjects.ee.unsw.edu.au/elec4120/>

Recommended text(s):

- UNSW Learning Centre, Thesis Writing Guide.

Further Text(s) and Reference(s):

- To be specified by supervisor (related to particular thesis topic)

9. Additional Information about the thesis

How to nominate a thesis topic

The EE&T thesis database lists all the current thesis topics that can be taken by students. It can be found on the following web site:

<http://scoff.ee.unsw.edu.au/document/thesis/thesisTopicSelection.htm>

Once you have chosen a topic you like, and you have spoken to the supervisor of that topic and he/she has agreed that you are able to do the topic, you can then come to the school office and pick up a “*Topic Nomination Form*” which then needs to be signed by you and your supervisor.

Resources

The thesis gives you the opportunity to take on a project on your own, to produce a self contained and rounded piece of work and write it 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.

Before carrying out any research it is important to be aware of what work has been done by other researchers before you. A Library Handbook is available on request from the School Office, or you can ask the Library staff for assistance with the available resources and how to access them.

The Internet has become a major source of information for research activities. Students should make as much use of this valuable resource as possible.

What to do

While most of your actual thesis work will be carried out in the second Session (ten hours/week), four hours/week have been timetabled for the thesis in the first Session. It is important that you take

full advantage of this time (remember you are expected to supplement the nominal hours with an equal amount of your own time).

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 at the School office or at your supervisor's office arranging a time to meet. (Pre-arranged consultations are often more effective). You can also contact your supervisor by telephone or email, either at the University or (with permission) at home. Their email address can be found on the school website <http://www.eet.unsw.edu.au>.

Defining a topic is difficult, but it is probably your most important task. Once you have a clear idea of what is required, you can then analyse the alternative courses of action available for achieving your goal. However, if you have the wrong problem then no amount of brilliant analysis or design will achieve the required objective.

Once you have defined your problem, review what has been achieved before, and list what alternative courses of action or methods of solution are available. Analyse the alternatives and decide which of them is the most appropriate for the task in hand. 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 development 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 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 if equipment is constructed, get the drawings to the workshop as soon as possible. Workshop time is always limited and long delays are frequently experienced. Discuss what you want with the Workshop Foreman with the aim of simplifying your design or modifying existing items.

Thesis seminar

During week 10, you are required to give a Seminar presentation describing your work on the topic. A written report about 3000 words to accompany is also required and this must be submitted beforehand (end of week 9). Plan your presentation to last about 20 minutes plus 10 minutes for questions and introducing the speaker. By this stage you will be knowledgeable in your topic, but you should present the material so that it can be understood by the fourth year students attending your seminar. Go at a steady pace and practice the right emphasis and timing by speaking into a tape recorder or even at the bedroom wall. Practice will give you confidence and remove some of the nervousness.

The thesis seminar might have the following outline:

- Thesis/group thesis definition
- Literature review
- Description of preliminary work
- Outline and timetable schedule for work in Thesis B in the following Session.

Technical skills are very important, but just as important is the ability to talk about your work in an informative and convincing way. The seminar provides the opportunity both to inform and to demonstrate your communication skills. Your talk should be addressed both to your examiners who will need to know details about your progress with the topic, and to students and staff members having a more general interest in the project.

Student seminars will take place at the times given in the Timetable at locations to be advised. The duration of each seminar will be 30 minutes including time for questions, for group thesis seminar, 45 minutes. The student giving the seminar must provide a one page typed "Summary Sheet" that introduces the topic area to those present. You are also required to be the chairperson for the seminar that follows yours even if it takes place on the following day. (See "Advice to Chairperson" document on the course web site). This is an important function and students must ensure that they perform this task.

If you are planning to do a "Microsoft PowerPoint" presentation, you need to bring your own laptop. However, you also need to make sure that the seminar room you are allocated in has the digital projector's facility.

In addition to giving a seminar, you are required to attend and assess seminars given by at least six other students. "Seminar Assessment Sheets" will be issued to each student and these must be completed and returned to the School Office by the supervisor or assessor attending the seminar at the end of each seminar. These sheets will be used as part of the assessment for Thesis Part A. You are also required to keep a record of the seminars attended on a "Seminar Attendance Form". All forms will be available in the seminar rooms.

The Seminar Assessment Sheet shows the areas of the presentation considered important.

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 thesis 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.

10. 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 serious offence by the University and severe penalties may apply.

All submitted reports and assignments must have an attached cover-sheet that declares that the work detailed in the report/assignment is entirely that of the named student(s) only. The form is available from the EE&T School web site.

Some guidance on plagiarism is provided here. For more information about plagiarism, please refer to <http://www.lc.unsw.edu.au/plagiarism>.

What is Plagiarism?

Plagiarism is the presentation of the thoughts or work of another as one's own.* Examples include:

- direct duplication of the thoughts or work of another, including by copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person's assignment without appropriate acknowledgement;
- paraphrasing another person's work with very minor changes keeping the meaning, form and/or progression of ideas of the original;

- piecing together sections of the work of others into a new whole;
- presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and
- claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.†

For the purposes of this policy, submitting an assessment item that has already been submitted for academic credit elsewhere may be considered plagiarism.

Knowingly permitting your work to be copied by another student may also be considered to be plagiarism.

Note that an assessment item produced in oral, not written, form, or involving live presentation, may similarly contain plagiarised material.

The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does *not* amount to plagiarism.

The Learning Centre website is main repository for resources for staff and students on plagiarism and academic honesty. These resources can be located via:

www.lc.unsw.edu.au/plagiarism

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
- appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.

Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

* Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle

† Adapted with kind permission from the University of Melbourne.

Continual Course Improvement

Students are advised that the course is under constant revision in order to improve the learning outcomes of its 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.

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 policies, see <http://scoff.ee.unsw.edu.au/>