Course Outline

Introduction

The School of Computer Science and Engineering (CSE) administers final year thesis reports in single, combined, and concurrent degree programs for the BE (Computer Engineering), BE (Software Engineering), BE (Bioinformatics), BSc (Computer Science Honours).

Program	Thesis Part A	Thesis Part B	Thesis Part C
Software Engineering	COMP4951	COMP4952	COMP4953
Computer Engineering	COMP4951	COMP4952	COMP4953
Bioinformatics	COMP4951	COMP4952	COMP4953
Biomedical Engineering (Dual award BE)	BIOM4951	BIOM4952	BIOM4953
Computer Science Honours	COMP4961	COMP4962	COMP4963

Contacts and Course Web Sites

The first point of contact for all thesis enquiries:

- *Jing Hsu - Thesis course administrator (jing.hsu@unsw.edu.au (mailto:jing.hsu@unsw.edu.au))*
- *John Shepherd - Thesis coordinator (jas@cse.unsw.edu.au (mailto:jas@cse.unsw.edu.au))*

The thesis administration related enquiries should be sent to *jing.hsu@unsw.edu.au* (mailto:jing.hsu@unsw.edu.au) (cc'ing *jas@cse.unsw.edu.au (mailto:jas@cse.unsw.edu.au))* . We will help you through all policy related matters, including thesis extensions, late penalties, result submission, and reassessment coordination.

As a general rule, all templates and reference materials regarding the thesis will be made available through UNSW Moodle Web sites created for thesis students. You can also utilize the forum to communicate with your fellow thesis students and the Thesis Coordinator.

The Thesis Coordinator can help you with generic academic guidance and any other thesis-related matters that you need some advice/discussion independently of your supervisor. However, your supervisor is the main person to talk to in all matters relating to conducting your thesis.

Course Aims and Learning Outcomes

Course Aims

The thesis provides an opportunity for you to bring together engineering principles learned over the previous years of study, and apply these principles to innovatively solve problems such as the development of a specific design and/or the investigation of a hypothesis. Thesis projects are complex, open-ended problems that allow room for your creativity, and the acquisition, analysis, and interpretation of results. Typically, the project you work with will have multiple possible solutions or conclusions and sufficient complexity to require a degree of project planning. The thesis requires you to formulate problems in engineering terms, manage an engineering project and find solutions by applying engineering methods. You will also develop an ability to work in a research and development environment.

Course Learning Outcomes

At the conclusion of this course, students should be able to:

1. Carry out a project following industry and professional engineering standards and methods. (7, 8, 9, 10)
2. Critically reflect on a specialist body of knowledge related to a topic. (2, 3)
3. Apply scientific and engineering methods to solve an engineering problem. (7)
4. Analyse data objectively using quantitative and mathematical methods. (2, 7, 8)
5. Demonstrate oral and written communication in professional and lay domains. (12)
6. Ability to complete complex tasks through effective planning and communication (13, 14, 15)

*Note: cross reference the numbers in brackets to the BE (Hons) Program Learning Outcomes in Appendix A.

Course Overview

Pre-requisites

- for BE students, you must have completed at least 75% of Stage 3 (ie. approximately 132 units of credit must be completed before enrolling in Thesis Part A).
- for CS students, you must be enrolled in the first semester of Computer Science Honours

Structure

Undergraduate theses are unusual (compared to other courses) in that they consist of a single piece of work spread over three courses: Part A, Part B and Part C. The three parts have quite different outcomes and assessment, which are described in detail below, but which can be summarised as:

- Thesis A
  - aims: understand the problem, develop a plan, start working on solution
  - assessment items: presentation in week 8, initial report in week 11
- Thesis B
  - aims: complete part of the solution, evaluate it, and demonstrate your partial solution
  - assessment items: demonstration in week 11
- Thesis C
  - aims: complete the solution, evaluate it, write up the whole project
  - assessment items: project demonstration in week 8, final report in week 11

Students with excellent academic records and who perform exceptionally in Thesis A may be permitted to do Thesis B and C together in a single term. However, for students who do both Thesis B and Thesis C in one term there are different deadlines for Thesis B deliverables:

  - assessment items: preliminary demonstration in week 4

Tasks

Through the thesis, you will put into practice the knowledge and skills that you've learned in your study up to this point. You do this by investigating a research topic, developing a significant software/hardware system, or some combination of these. All topics will require you to carry out the same basic set of six tasks:

1. **Define the problem:** with the topic description as starting point, you need to describe in more detail what the problems are or what the product is. You also need to motivate the work and say why it is important that it should be done.
2. **Survey the literature:** you need to determine what the key developments in the area are, and in particular, how they relate to your topic. Describe, compare and analyse the `competition.
3. **Present your options:** describe and compare the alternative methods that could be applied to solve the problems that you have identified, or the (alternative) steps involved in making the product. Highlight the advantages and disadvantages of each of the methods.
4. **Plan your attack:** decide on the method(s) that are most appropriate, and justify your decision(s). Plan how you will do the work, and check with your supervisor that your plan is realistic. Note that you will be using this plan in Thesis Part B.
5. **Solve the problem:** carry out your plan and either develop a solution to the research problem, or build the system.
6. **Evaluate your solution:** justify why your solution is a good solution. For a theory problem, this may already be clear from the solution (proof) itself. For other kinds of research problems, you might do some complexity analysis or build a simulation. For software development, you need to carry out a testing plan which analyses relevant aspects of the system such as correctness, performance, usability, etc.

Deliverables and Assessment

An overview of the assessment items is described below. Refer to the course Web site for full marking criteria details of each assessment item.

For the exact due dates/times, refer to ***the Due Dates/Submission pages*** on the site.

Thesis A:

- **Thesis Seminar Presentation** (during Week 8) (25%): Make a 30-minute presentation about your Thesis A topic and the plan
- **Thesis A Written Report** (Wednesday Week 11) (75%)

A mark out of 100 will be returned by your supervisor and the assessor. Your thesis A mark is the average of your supervisor’s mark and assessor’s mark. It will contribute 20% towards your final thesis mark. In your UNSW academic transcript, Thesis A is graded as Enrolment Continuing/Discontinuing. You must pass both the written report and the seminar to receive an Enrolment Continuing(EC) grade in Thesis A.

Thesis B:

- **Thesis Seminar Presentation** (during Week 11) (100%): Make a 30-minute presentation about your preliminary outcome and the plan for the rest of the thesis

A mark out of 100 will be returned by your supervisor and the assessor. Your thesis B mark is the average of your supervisor’s mark and assessor’s mark. It will contribute 5% towards your final thesis mark. In your UNSW academic transcript, Thesis B is graded as Enrolment Continuing/Discontinuing.

Thesis C:

- **Thesis Demonstration/Presentation** (During Week 8) (10%): Make a 30-minute presentation about the final outcome of your thesis. This could be a demonstration of your system built or a presentation of your theoretical work.
- **Final Thesis Report** (Week 11) (90%): The final Thesis Report is often called simply "The Thesis".
- **Thesis Summary/Abstract** (Wednesday Week 11): Along with the report, you are required to submit a 150-word summary of your thesis. This summary is going to be published in the CSE Thesis Digital Archive.

A mark out of 100 will be returned by your supervisor and the assessor. Your thesis C mark is the average of your supervisor's mark and assessor's mark. It will contribute 70% towards your final thesis mark.

Participation:

- Participation is a component of Thesis C but assessed by the supervisor only.
- The supervisor gives the participation marks based on student participation (contact frequency with the supervisor, efforts made, etc) during the entire thesis process.

A mark out of 100 will be returned by your supervisor.

Final Mark

The final thesis mark is computed as follows:

Thesis A:

ThesisASeminar = mark out of 100

ThesisAReport = mark out of 100

ThesisASeminar = (ThesisASeminarMarkSupervisor + ThesisASeminarMarkAssessor)/2

ThesisAReport = (ThesisAReportMarkSupervisor +ThesisAReportMarkAssessor)/2

ThesisAMark = 0.75*ThesisAReport + 0.25*ThesisASeminar

ThesisAGrade = EC, if ThesisAMark >= 50; NF, otherwise

Thesis B:

ThesisBMark = mark out of 100

ThesisBMark = (ThesisBMarkSupervisor + ThesisBMarkAssessor) / 2

ThesisBGrade = EC, if ThesisBMark >= 50; NF, otherwise

Thesis C:

ThesisCDemo = mark out of 100

ThesisCReport = mark out of 100

ThesisCDemo = (ThesisCDemoMarkSupervisor + ThesisCDemoMarkAssessor)/2

ThesisCReport = (ThesisCReportMarkSupervisor + ThesisCReportMarkAssessor)/2

ThesisCMark = 0.1*ThesisCDemo + 0.9*ThesisCReport

Participation:

ParticipationMark = mark out of 100

Final Mark:

FinalMark = 0.2*ThesisAMark + 0.05*ThesisBMark + 0.7*ThesisCMark + 0.05*ParticipationMark

FinalGrade = HD|DN|CR|PS|FL, determined by FinalMark

For example:

Thesis A:

ThesisASeminar= 80

ThesisAReport= 88

ThesisAMark = 0.25*80 + 0.75*88 = 86

Thesis B:

ThesisBMark = 82

Thesis C:

ThesisCDemo= 90

ThesisCReport= 80

ThesisCMark = 0.1*90+ 0.9*80 = 81

Participation:

ParticipationMark = 80

Final Mark

FinalMark = 0.2*86 + 0.05*82 + 0.7*81 + 0.05*80 = 82 (not including late penalty)

Thesis Showcase

After the Thesis C demonstrations, the Thesis Coordinator will invite students to demonstrate their work at an evening showcase event attended by academic staff, other students and industry representatives. The showcase is scheduled on Thursday evening of Week 12. The showcase students must provide a poster which summaries their thesis work by Wednesday Week 12.

Late Penalties, Extensions, and Special Consideration

Thesis A

Any student who doesn't attend their Thesis A seminar or submits their report by the due date will receive an Absent Fail grade and will be required to re-enroll the following semester. *Special Consideration can be sought in the usual manner, by submitting an application within the required time to Student Central (see below for more details on Special Consideration)* .

Thesis B

Any student who does not submit their Thesis B report by the due date will receive an Absent Fail grade and will be required to re-enroll the following semester. *Special Consideration can be sought in the usual manner, by submitting an application within the required time to Student Central (see below for more details on Special Consideration)* .

Application for an Extension

If you are going to submit your thesis late then you should notify the Thesis Administration (office.thesis@cse.unsw.edu.au) and submit a written request. *Submit a special consideration (extension request) via UNSW Student Central.* You should include the thesis extension form (found in the Course Resources section) - and any relevant documentation such as a medical certificate.

Note that if you submit late then you will ***automatically incur a late penalty*** unless you have specifically applied for and been granted an exemption from the late penalty in advance (see below).

Late Penalty

The penalty for submitting late will be applied as follows:

- For all other assessment items besides Thesis C report - zero (0) awarded
- For Thesis C report (aka the thesis) - 5 marks off the Thesis C mark (ThesisCMark) for every day late (weekends count as days). The penalty applies only if the Thesis C mark is greater than 50. The penalty applies until the Thesis C mark decreases to 50. Further lateness does not result in failure of the course.

1. Example 1, if the Thesis C mark is 77, but the Thesis C report was turned in 5 days late, the final Thesis C mark will be 52 (77-5*5).
2. Example 2, if the Thesis C mark is 77, but the Thesis C report was turned in 6 days late, the final Thesis C mark will be 50.

Application for an Exemption to a Late Penalty

An exemption from the late penalty is only granted in extenuating circumstances, e.g. prolonged sickness or major equipment or supply delays. These circumstances must be documented, and the documentation must clearly show how the work was affected.

if you require an extension because of major equipment or supply delays, or an illness or family circumstances (for example), you should apply for an exemption from the late penalty in the following way:

1. Fill in the thesis extension request form (found in the Course Resources section)

2. Apply for Special Consideration via Student Central.

3. Submit a copy of the extension request form and any other relevant supporting documentation to Student Central

4. Make sure your supervisor is fully informed of your circumstances.

5. You will receive a confirmation email, copied to your supervisor and assessor, outlining the new deadline and penalty conditions.

In all cases, the School will get back to you with a decision via an email to your CSE account.

UNSW Special Consideration Policy (https://student.unsw.edu.au/special-consideration)

Reassessment Procedure

The Thesis Part C mark may be queried by a student. Before doing so, the student should be aware of the following:

Thesis Part C reports are marked by the supervisor and assessor independently. The final mark is determined by an average of these two marks, less any penalties. The supervisor and assessor do not apply any (or exempt) mark penalties for lateness. Late penalties are applied by Thesis Administration after consultation with the Thesis Coordinator after the submission of the marks to the Student Office.

Supervisors and assessors can modify their mark after submission via an email to Thesis Administration (office.thesis@cse.unsw.edu.au) but must justify the change to the Thesis Coordinator once final results have been released to students. The student's CSE weighted average or eligibility for honours are not sufficient grounds to justify a marked change or a request for revision of the final mark.

An application for review must be made not later than 15 working days from the date of official results notification to students. After a review of the mark, the mark may be either increased or *decreased* .

Thesis Report Review

If a student feels that an error has been made in marking the thesis report, then the following action should be carried out:

1. The student should email the Thesis Administration (office.thesis@cse.unsw.edu.au) and explain the error. If the error is clear Thesis Administration will make arrangements for the mark to be corrected, otherwise students will be directed to step 2.

2. The student should see both the supervisor and assessor, together or separately, and request both to review their assessment of the report.

3. If the academics deem the request reasonable, both should review their assessment independently, and forward a report to Thesis Administration (office.thesis@cse.unsw.edu.au).

4. Thesis Administration will inform the student of the Thesis Report Review outcome after discussion with the Thesis Coordinator.

Thesis Coordinator Review

If the student is not content with the result of the Thesis Report Review, then the student should initiate a Thesis Coordinator Review.

1. The student should contact the Thesis Administration (office.thesis@cse.unsw.edu.au) again, and submit via email the reasons why they feel the result of the Thesis Report Review was unacceptable.

2. Thesis Administration will contact the Thesis Coordinator, who will review the case determine whether the conclusion of the Thesis Report Review should stand, or an independent examiner should be asked to assess the report. The independent examiner may choose to interview the supervisor and assessor before assessing the report itself.

3. If the student is still not content, then the student is able to submit a complaint to the CSE Grievance Officer.

Students should be aware that they are always able to submit a formal application for review via Student Central. However, a fee is charged for such reviews, and the scope of the review is far more restrictive than a school-oriented review. It is thus advisable to follow the school's internal review procedures.

UNSW policy on Review of Results (https://student.unsw.edu.au/results)

Some Advice on Research

Here is some simple advice that will help you get on well with your supervisor and work effectively:

Meet with your supervisor regularly. Note that your supervisor is not there to tell you what to do, but to advise you. In general, you should take the initiative to organise meetings, and you should drive the work. Manage your time. You are responsible for monitoring your own progress and ensuring that you remain on track to meet deadlines. However, your supervisor should be able to tell you whether you are being too optimistic, or whether you need to do more.

Write-up as you go. Do not under-estimate how much time it will take to write up the work. Writing-up as you go is not only more time-efficient, it also forces you to formulate your ideas more clearly and completely, and this will substantially increase the overall quality of your work. As well, your final mark will depend largely on the quality of the work and the quality of the presentation in the thesis.

Focus on the project. Understanding the context of your work is important in placing and motivating the research. However, having a concrete, narrow focus when you are working towards a goal and understanding thoroughly the deeper issues involved is better than working too broadly or tackling too wide a problem. Your supervisor should help you to keep your work suitably focused.

Many students are too ambitious in Thesis Part A and Part B and find they run out of time with a thesis that is nowhere near finished. Make sure that the project is feasible (do this early in consultation with your supervisor), write-up whenever you can, and keep an eye on the plan.

Expectations and Responsibilities of Students Plagiarism and Academic Integrity

Plagiarism may be defined as "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 work, or knowingly permitting it to be copied. This includes 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 acknowledgment 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.
- Submitting an assessment item that has already been submitted for academic credit elsewhere may also be considered plagiarism.
- The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does not amount to plagiarism.

Students are reminded of their Rights and Responsibilities in respect of plagiarism, as set out in the University Undergraduate and Postgraduate Handbooks, and are encouraged to seek advice from academic staff whenever necessary to ensure they avoid plagiarism in all its forms.

The Learning Centre website is the central University online resource for staff and student information on plagiarism and academic honesty.

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, including those incorrect referencing practices, paraphrasing, summarising, essay writing, time management, and appropriate use of a range of materials such as text, images, formulae, and concepts.

Individual assistance is available on request from The Learning Centre.

Academic Integrity and Plagiarism (https://student.unsw.edu.au/plagiarism)

UNSW Ethics Committee and Ethics Approval

Does your thesis involve other people doing something for you?

If so, it may require ethics approval.

The basic principle is that if you want people to provide you with something, even if just 5 min of their time to answer questions, then you should (i) treat them with suitable dignity and (ii) ensure any possibility that they may be badly affected is absolutely minimised. When research at UNSW involves people, then it comes under the oversight of the UNSW Ethics Committee which must give approval before it proceeds.

You will need to get approval if your project involves any of the following (more than one may apply):

a survey, even if done online, an interview, focus group, or other such qualitative method, data-mining, when individual identities might be revealed, behavioural observation, e.g. people using something, choices people make, online activities recording or photography of people, even if in public spaces experiments on human reactions (or other abilities) human performance, e.g. running, falling, playing music, testing a device, tasting or smelling, e.g. foods, and, of course, drug trials, body tissues and other medical activities.

Also, projects involving animals will need ethics approval. Visit the Human Research Ethics Web site to find out what you need to do.

Human Research Ethics Web Site (https://research.unsw.edu.au/human-research-ethics-home)

Occupational Health and Safety Policies and Expectations

The role of the Occupational, Health Safety and Environment team is to provide a professional service to the UNSW, its staff, and students on all matters relating to occupational health, safety, and environment, particularly in the area of legislative compliance.

UNSW Health and Safety (https://safety.unsw.edu.au/)

Equity and Diversity

All tertiary education institutions have a responsibility to provide the opportunity for students with disabilities to access and participate equitably in tertiary education in order to achieve their individual capabilities. UNSW Australia also has obligations under the following anti-discrimination legislation:

New South Wales Anti-Discrimination Act 1977 Disability Discrimination Act (1992).

UNSW is committed to the goals of equal opportunity and affirmative action in education and employment. It aims to provide a study and work environment for staff and students that fosters fairness, equity and respect for social and cultural diversity and that is free from unlawful discrimination, harassment, and vilification.

More information on Equity and Diversity (https://www.gs.unsw.edu.au/policy/equitystatement.html)

Appendix A

BE (Hons) Program Learning Outcomes

1. Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.
2. Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.
3. In-depth understanding of specialist bodies of knowledge within the engineering discipline.
4. Discernment of knowledge development and research directions within the engineering discipline.
5. Knowledge of engineering design practice and contextual factors impacting the engineering discipline.
6. Understanding of the scope, principles, norms, accountabilities, and bounds of sustainable engineering practice in the specific discipline.
7. Application of established engineering methods to complex engineering problem-solving.
8. Fluent application of engineering techniques, tools, and resources.
9. Application of systematic engineering synthesis and design processes.
10. Application of systematic approaches to the conduct and management of engineering projects.
11. Ethical conduct and professional accountability.
12. Effective oral and written communication in professional and lay domains.
13. Creative, innovative and pro-active demeanour.
14. Professional use and management of information.
15. Orderly management of self, and professional conduct.
16. Effective team membership and team leadership.

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