School of Civil and Environmental Engineering

Summer Term, 2022

CVEN4951/4952/4953 RESEARCH THESIS A/B/C

COURSE DETAILS

Units of Credit	4 + 4 + 4
Contact hours	as agreed with supervisor
Course Coordinator	**Summer Term:** Dr Ulrike Dackermann email: u.dackermann@unsw.edu.au office: Building H20, Room CE610

INFORMATION ABOUT THE COURSE

This course is in three parts. Research Thesis A is undertaken in the first term of enrolment. Research Thesis A is a prerequisite for Research Thesis B, which in turn is a prerequisite for Research Thesis C.

By default, students must ordinarily take Research Thesis A, B and C in three consecutive terms.

With School permission, students may request to take Research Thesis A in one term then Research B + C concurrently in the following term. This option is strictly limited only to students who can demonstrate the ability to progress. Further details are provided in the ASSESSMENT section below.

Students may enrol in up to and including 20 UoC while undertaking the Research Thesis without being considered as overloading. Students who enrol in 22 UoC or more while undertaking the Thesis are considered to be overloading and will require permission to do so.

By default, students cannot undertake Industrial Training while enrolled in Research Thesis B unless exceptional circumstances are demonstrated by the student and accepted by the School.

Prerequisite:

Only students who have completed 126 units of credit, and have also achieved the required weighted average mark as determined by the School (WAM > 70%) will be permitted to enrol in Research Thesis. In addition, all courses to the end of Year 3 in the discipline of the thesis topic need to be completed.

Find more information about the structure of the Research Thesis here:
https://www.unsw.edu.au/engineering/study/academic-information/undergraduate-thesis.

HANDBOOK DESCRIPTION

The online handbook description is available at myUNSW:

https://www.handbook.unsw.edu.au/undergraduate/courses/2022/CVEN4951
https://www.handbook.unsw.edu.au/undergraduate/courses/2022/CVEN4952
https://www.handbook.unsw.edu.au/undergraduate/courses/2022/CVEN4953

PROCEDURE FOR SELECTION AND CONFIRMATION OF A RESEARCH THESIS TOPIC

Your priority is to find a supervisor and agree on a topic BEFORE ENROLLING in Research Thesis A.

Browse the internet link below ('Search Projects') to find available topics and contact potential supervisors.

http://intranet.civeng.unsw.edu.au/info-about/student-intranet/honours#master

Note: It is unlikely that this list is fully up-to-date and comprehensive. It is essential that during the Term priorto enrolment in Research Thesis A that individual students approach School teaching & research staff in area(s) of potential interest, to explore the range of possible thesis topics that may be available.

ORGANISE ENROLMENT:

- Discuss your selection with potential topic supervisors.
- Once you have a Supervisor and topic, you will need to download, complete and sign (both you and your Supervisor) a Research Thesis Form → enrol yourself on myUNSW → then upload the signed form to the Student Intranet here: https://intranet.civeng.unsw.edu.au/info-about/student-intranet/submit-thesis-application-form
- Please note that you will only be able to complete course enrolment for CVEN4951. The School will complete your class registration once you've submitted your topic nomination form to the Student Intranet.

PLEASE BE AWARE THAT IF YOU CANNOT FIND A SUPERVISOR BY THE START OF TERM OF RESEARCH THESIS A, THEN YOU WILL NOT BE ALLOWED TO ENROL/CONTINUE IN THE COURSE AND IT WILL BE AUTOMATICALLY DROPPED FROM YOUR ENROLMENTS. IF YOU HAVE CONTACTED THE COURSE COORDINATOR TO ASSIST YOU FINDING A SUPERVISOR, THEN YOU WILL REMAIN ENROLLED IN THE COURSE. AS AN ALTERNATIVE, YOU MAY ENROL IN THE PARALLEL THESIS A COURSE CVEN4050 (THESIS A) FOR WHICH AN INDIVIDUAL SUPERVISOR IS NOT REQUIRED.

OBJECTIVES

The Research Thesis Project is an individual project in which each student works under the guidance of a nominated member of the academic staff (supervisor). A co-supervisor may also be nominated depending on the set up of the project (e.g. an employer could be a co-supervisor in an external thesis project). The work may involve laboratory experiments, field or industry-based investigations, design applications or theoreticalresearch.

The Research Thesis aims to provide students with the opportunity to:

- Undertake and execute an academic research project.
- Produce a self-contained research thesis, which may be understood and used by others with technical background knowledge in the same discipline area as the thesis topic, and may potentially be suitable for publication.
- Present their research in a 5-minute video presentation.

WHAT IS A RESEARCH THESIS?

That depends quite a bit on your field of study. However, all theses have at least two things in common:

- They are based on students' original research.
- They take the form of a written report, which presents the findings of thatresearch.

WHY WRITE A RESEARCH THESIS?

- ***Satisfy your intellectual curiosity***
  This is the most compelling reason to write a research thesis. You have studied courses during your degree that perhaps really piqued your interest. Now is your chance to follow your passions, explore further, and contribute some original ideas and research in your field.

- ***Develop transferable research skills***
  Whether you choose to pursue further research (e.g. complete a PhD) or not, the process of developing and crafting a feasible research project will polish skills that will serve you well in almost any future job. After all, most jobs require some form of problem solving and oral and written communication. Writing a research thesis requires that you:
  - ask smart questions
  - acquire the investigative instincts needed to find answers
  - navigate libraries, laboratories, archives, databases, and other research venues
  - develop the flexibility to redirect your research if your initial plan flops
  - master the art of time management
  - sharpen your argumentation skills
  - organize a lengthy piece of writing
  - polish your oral communication skills by presenting and defending your research to academic staff and students
- ***Work closely with academic staff***
  At large research universities like UNSW, you have likely taken classes where you barely got to know your lecturer. Writing a thesis offers the opportunity to work one-on-one with an academic supervisor. Such relationships can enrich your intellectual development and later serve as invaluable references for employment.

- ***Open windows into future professions***
  A research thesis will give you a taste of what it's like to do research in your field. It also might help you decide whether to pursue that field in your future career.

TEACHING STRATEGIES

The Research Thesis is an individual project in which each student works under the guidance of a nominated member of the School's academic staff (supervisor). One or more co-supervisors (including from outside the School) may also be nominated depending on the set up of the project. The research may involve laboratory experiments, field- or industry-based investigations, design applications or theoretical research.

PRIVATE STUDY

- **As a rough guide only, an average student would be expected to spend approximately 35 hours per week on work related to this course during the summer term**.
- More guidance is needed initially from the supervisor when the topic is being defined to establish the objectives and methodology of the thesis.

SUPERVISION

- There are no specific hours assigned to this course, except for the scheduled workshops (see below).
- Meetings between the supervisor(s) and the student may take place periodically or by private arrangement.
- Should supervisors be on study leave or unavailable for a considerable period of the term, alternative arrangements need to be established and made known to both the student and course coordinator.

CONSULTATION

- The course coordinator will be available by email to liaise with enrolled students as needed.

EXPECTED LEARNING OUTCOMES

This course is designed to address the learning outcomes below and the corresponding Engineers Australia Stage 1 Competency Standards for Professional Engineers as shown. The full list of Stage1 Competency Standards may be found in Appendix A.

After successfully completing this course, you should be able to:

Learning Outcomes		EA Stage 1 Competencies
1.	*Develop a design or a process or investigate a hypothesis following industry and professional engineering standards.*	PE2.1, PE2.2, PE2.3, PE2.4
2.	*Critically reflect on a specialist body of knowledge related to their thesis topic.*	PE1.3
3.	*Apply scientific and engineering methods to solve an engineering problem.*	PE2.1
4.	*Analyse data objectively using quantitative and mathematical methods.*	PE1.2, PE2.1, PE2.2
5.	*Demonstrate oral and written communication in professional and lay domains.*	PE3.2

IT IS ESSENTIAL THAT YOU REGULARLY CHECK YOUR OFFICAL UNSW EMAIL FOR UPDATES, REMINDERS, ETC.

ASSESSMENT – KEY DATES FOR YOUR DIARY

Research Thesis A: Covers the planning/preparing and completion of the initial work on the project, including undertaking a comprehensive literature review related to their specific area of research.

Research Thesis B: Continue to progress the research and commence the writing of methodology and results chapters of the thesis.

Research Thesis C: Thesis C complete any outstanding lab/field/modelling research and analyses; complete and submit the keystone deliverable Research Thesis; and present findings in a 5-minute video presentation.

The following course assessments relate to the student's research planning (A), conducting the research project and writing the thesis document (A, B & C), and disseminating the results in different forms (A, B & C).

In the event of an unsatisfactory assessment in Research Thesis A or Thesis B, a student must submit a show cause. A plan of future action to improve student performance must be prepared and agreed upon by both the supervisor and course coordinator before progress to Research Thesis B or Research Thesis C is allowed. Failure to receive the progress assessment by the due date will result in the student results being withheld and/or failure.

RESEARCH THESIS A (CVEN 4951) SUBMISSIONS

ITEM	WHEN	DETAILS
Component A1	Week 3	*Should include: Statement of the Problem and draft Literature Review.*
Component A2	Week 5	*Should include: More detailed, revised and improved Introduction (Statement of the Problem); and an enhanced Literature Review, incorporating Supervisor feedback.* ***NOTE:** If students are seeking to apply for permission to enrol concurrently in Research Thesis B + C in the following term, then the additional requirements are that the A2 submission must also include a Thesis Outline (Chapters and indicative sub-headings) plus a 1 – 2-page description of Research Methodology, sufficient to indicate clear understanding of the nature and extent of the work required.*

Submissions A1 & A2 must be provided to the supervisor by 4.00pm Friday of the submission week.

RESEARCH THESIS B (CVEN 4952) SUBMISSIONS

ITEM	WHEN	DETAILS
Component B1*	Week 3	***for students enrolled in Research Thesis B+C concurrently.*** *Progress Report – this will take the form of an improved and extended A2 submission, including a detailed Thesis Outline (chapter and sub-headings), Research Methodology and preliminary Results and Analyses.*
Component B1*	Week 5	***for students enrolled in Research Thesis B only.*** *Progress Report – this will take the form of an improved and extended A2 submission, including a detailed Thesis Outline (chapter and sub-headings), Research Methodology and preliminary Results and Analyses.*

Submission B1 must be provided to the supervisor by 4.00pm on Friday of the submission week.

RESEARCH THESIS C (CVEN 4953) SUBMISSIONS

ITEM	WHEN	DETAILS
Research Abstract	Week 3	*Further details of the requirements for the Research Abstract will be advised by the Course Coordinator during the term via Moodle.*
Video Presentation	Week 4	*Further details of the requirements for the Video Presentation will be advised by the Course Coordinator during the term via Moodle*
Thesis Submission	Week 5	*The Research Thesis is to be submitted electronically as a single pdf by 4.00pm on Friday of the submission week via the School's web portal at: http://intranet.civeng.unsw.edu.au/research-thesis-upload-page* *Further document requirements and upload instructions are available at this site. Supervisors may also request that they be provide a hard copy for their records.*

SUMMARY OF ALL RESEARCH THESIS MARKED ASSESSMENTS			
		Due Date	**Mark**
Research Thesis A:			
1.	Component A1	Week 3	**satisfactory/unsatisfactory**
2.	Component A2	Week 5	**10 % of Final Mark**
Research Thesis B:			
1.	Component B1	Week 5 (B+C: Week 3)	**5 % of Final Mark**
Research Thesis C:			
1.	Research Abstract	Week 3	**5 % of Final Mark**
2.	Video Presentation	Week 4	**10 % of Final Mark**
3.	Thesis Submission	Week 5	**70 % of Final Mark (incl. 10 % Supervisor)**

PROCEDURE FOR SEEKING APPROVAL TO ENROL IN RESEARCH THESIS B + C CONCURRENTLY

With Supervisor and School approval, students who demonstrate accelerated progress during Research Thesis A may enrol in a 4+8 UoC structure, where Research Thesis B and C are both taken in the same term after Research Thesis A.

Students should submit their request to undertake Research Thesis B+C (concurrent) at the same time they submit their extended Component A2 submission (see the ASSESSMENTS section above for the additional content to be include).

It is strongly recommended that you discuss with your supervisor, prior to submitting your formal request for approval. Once your application for concurrent B+C is received, your supervisor will be asked to approve or decline this request.

Students who do not demonstrate enough progress during Research Thesis A may be instructed to change enrolment and complete Research Thesis C in a third term after Research Thesis B.

FAIL/LATE PENALTIES AND PROCEDURES

Fail in Research Thesis A – must re-enrol in Research Thesis A again (or enrol in CVEN4050)

Fail in Research Thesis B – must re-enrol in Research Thesis B again (or enrol in CVEN4050)

Fail in Research Thesis C – Students have three options.

1) re-enrol for Research Thesis A, B & C again, new project and supervisor
2) re-enrol for Research Thesis C again, same project - needs consent of an appropriate supervisor & student
3) student does further work, re-submits thesis after a maximum of 6 weeks. Course mark capped at 50%. If still not satisfactory, then needs to re-enrol. (This option is only available if the original mark was ≥40, OR if the student is in their last term before graduation, regardless of the original mark).

Fail in Research Thesis B & C (when taken simultaneously) – Students must re-enrol in Research Thesis B again, and cannot concurrently enrol in Research Thesis C. They can then take Research Thesis C when Research Thesis B has been satisfactorily completed.

Late Procedure – In all cases, applications for late submission (special consideration) can be applied for BEFORE the due date. This is at the discretion of the Thesis Coordinator, but will only be granted in exceptional circumstances. As per normal, students apply through myUNSW for special consideration.

Further information on what constitutes special consideration, and how to apply for it, can be found at this website: https://student.unsw.edu.au/special-consideration

Late Penalties (when special consideration hasn't been submitted and accepted)

- For all assignments other than the thesis – zero (0) marks are awarded after the due date and time.
- For the thesis – 5 marks are taken off the grade for the *research thesis* every day it is late.
- Any thesis not submitted within 13 days after the deadline will be finalised at zero (0) marks.

RELEVANT RESOURCES

Topic material as direct by the supervisor.

Honours Thesis Writing for Engineering Students:
https://student.unsw.edu.au/honours-thesis-writing-engineering-and-science-students

Online iWrite thesis writing tutorial:
http://iwrite.sydney.edu.au/tutorials/start/starthere.htm

UNSW Learning and Career Hub:
https://student.unsw.edu.au/individual-consultations-academic-support

References on writing style and technical communication skill:

- Lindsay, D "A Guide to Scientific Writing" 2nd ed. Longman, 1995
- Eisenberg, A "Effective Technical Communication" 2nd ed. McGraw-Hill, 1992.
- Evans, D. "How to write a better thesis or report" Melbourne University Press, 1995.
- Winkle, A and Hart, B "Report writing Style Guide for engineering students" 3rd ed. Faculty of Engineering, Flexible Learning Centre, University of South Australia, 1996.

HEALTH & SAFETY

UNSW is committed to the health and safety of all people who work, study, visit UNSW campuses. Health and safety are intrinsic to the way UNSW does business and UNSWs overall aim is "Harm to Zero", with the expectation that no person shall come to any harm while working, studying or visiting UNSW.

UNSW will comply with the NSW Work Health and Safety Act 2011 and the Work Health and Safety Regulation 2011.

Details about UNSW Health and Safety commitment are available online:
https://safety.unsw.edu.au/unsw-health-and-safety-policy-statement

and comprehensive information about UNSW's Health and Safety can be found on:
http://safety.unsw.edu.au/

Student requirements, training and responsibilities

As a student undertaking a research thesis you are often undertaking experimental works in laboratories, attending data collection in the field or participating in community consultations. Independent of your thesis topic, the expectation is that you adhere to the UNSW Health & Safety policies.

Every student must complete online safety training at the beginning of Research Thesis Project A by the end of Week 2.

All students have to complete the following online training:

- On-Line Work Health & Safety Awareness
- On-Line Ergonomics

Students working in the laboratory also have to complete:

- On-Line Laboratory Safety Awareness
- On-Line Green Lab Environment Compliance

There are additional courses for students who work with radiation or gene technology or in a PC2 Laboratory.

It is the responsibility of the student to self-enrol into these courses via this webpage:
http://safety.unsw.edu.au/Training/student-training

In addition to the online courses, every student must complete a local induction (RIPA Folder) with the laboratory manager of the laboratory they are working in. Anyone working in WRL laboratories can organise their local induction

with their supervisor.

In meetings with their supervisor, students will be informed about their project specific Risk Assessments, Risk Management Forms and Safe Work Procedures. It is the responsibility of the student to engage in this discussion with their supervisor and to follow Health & Safety requirements and expectations.

DATES TO NOTE

Refer to MyUNSW for Important Dates available at:

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

PLAGIARISM

Beware! An assignment that includes plagiarised material will receive a 0% Fail, and students who plagiarise may fail the course. Students who plagiarise are also liable to disciplinary action, including exclusion from enrolment.

Plagiarism is the use of another person's work or ideas as if they were your own. When it is necessary or desirable to use other people's material you should adequately acknowledge whose words or ideas they are and where you found them (giving the complete reference details, including page number(s)). The Learning Centre provides further information on what constitutes Plagiarism at:

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

ACADEMIC ADVICE

Useful information and resources:

- Key Staff to Contact for Academic Advice (log in with your zID and password): https://intranet.civeng.unsw.edu.au/key-staff-to-contact-during-your-studies-at-unsw
- CVEN Student Intranet (log in with your zID and password): https://intranet.civeng.unsw.edu.au/student-intranet
- Student Life at CVEN, including Student Societies: https://www.unsw.edu.au/engineering/civil-and-environmental-engineering/student-life
- Special Consideration: https://student.unsw.edu.au/special-consideration
- General and Program-Specific Questions: The Nucleus: Student Hub

RESEARCH THESIS A (CVEN 4951) COURSE PROGRAM			
Week	Milestones	Suggested Activities	Assessment/Workshops
1	Confirm Thesis Topic and Enrolment Arrange regular supervision meetings withSupervisor(s)	**Attend Live Orientation Workshop** Work on Statement of the Problem and Literature Review, and consult with supervisor(s)	**Live Orientation Workshop + Q&A** (see Moodle for details)
2	Complete mandatory student health and safety training	**View Literature Review & Problem Statement Workshop** Work on Statement of the Problem and Literature Review, and consult with supervisor(s)	**Literature Review & Problem Statement Workshop** Recorded session (see Moodle for details)
3	**Submit Component A1** – Statement of the Problem and draft Literature Review	Work on Statement of the Problem and Literature Review, and consult with supervisor Consult Investigation and Methodology with supervisor. **Submit Component A1 to Supervisor(s)**	**Component A1 Due – submit to your supervisor(s) by 4pm on Friday**
4	Receive review of Component A1 fromsupervisor(s)	Revise Statement of the Problem and Literature Review. Consult on your proposed Research Methodology with supervisor(s).	
5	**Submit Component A2** – more detailed, revised and improved Introduction (Statement of Problem) & Literature Review.	Expand on Literature Review and prepare draft project skeleton. Agree on your proposed Research Methodology with supervisor(s). **Submit Component A2 to Supervisor(s)**	**Component A2 Due – submit to your supervisor(s) by 4pm on Friday**

If students are seeking to apply for permission to enrol concurrently in Research Thesis B + C in the following Term, then the additional requirement is that the A2 submission must also include a Thesis Outline (Chapters and indicative sub-headings) plus a description of the Research Methodology.

RESEARCH THESIS B (CVEN 4952) COURSE PROGRAM			
Week	Milestones	Suggested Activities	Assessment/Workshops
1	Review and discussion of Component A2 feedback from supervisor(s)	Undertake thesis research with Supervisor(s) guidance. Work on Progress Report.	***Thesis Writing Workshop*** Recorded session (see Moodle for details)
2		Undertake thesis research with Supervisor(s) guidance. Work on Progress Report.	
3	***Research Thesis B+C students only:** **Submit Component B1** - detailed Thesis Outline (chapter and sub-headings), Research Methodology and (Preliminary) Results and Analyses.	Undertake thesis research with Supervisor(s) guidance. Work on Progress Report. ***Research Thesis B+C students only:** **Submit Component B1** to Supervisor(s)	****Research Thesis B+C students only:*** ***Component B1 Due –submit to your supervisor by 4.00 pm on Friday.***
4	***Research Thesis B+C students only:** Receive review of Component B1 from supervisor(s)	Undertake thesis research with Supervisor(s) guidance. Work on Progress Report. Revise thesis.	
5	**Submit Component B1** - detailed Thesis Outline (chapter and sub-headings), Research Methodology and (Preliminary) Results and Analyses.	Undertake thesis research with Supervisor(s) guidance. Work on Progress Report. Revise thesis. **Submit Component B1** to Supervisor(s)	***Component B1 Due –submit to your supervisor by 4.00 pm on Friday.***

RESEARCH THESIS C (CVEN 4953) COURSE PROGRAM			
Week	Milestones	Suggested Activities	Assessment/Workshops
1	Complete remaining research work	Complete remaining thesis research with Supervisor(s) guidance. Work on thesis with Supervisor(s) guidance.	
2	Complete analysis of results	Complete remaining thesis research with Supervisor(s) guidance. Work on thesis with Supervisor(s) guidance. Prepare draft of Research Abstract.	
3	**Submit Research Abstract**	Complete remaining thesis research with Supervisor(s) guidance. Work on thesis with Supervisor(s) guidance. **Submit Research Abstract**	***Research Abstract Due – submit by 4.00 pm on Friday. Course coordinator to advise on submission requirements.***
4	Receive supervisor feedback on video presentation	Work on thesis with Supervisor(s) guidance. Prepare 5-minute video presentation with Supervisor(s) guidance.	***Video Presentations Due – Course Coordinator to provide further details.***
5	Receive supervisor feedback on thesis **Submit Research Thesis**	Work on thesis with Supervisor(s) guidance.	***Research Thesis Due – Submit on-line by 4.00 pm onFriday.***

Appendix A: Engineers Australia (EA) Competencies

Stage 1 Competencies for Professional Engineers

	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