School of Civil and Environmental Engineering

Term3, 2021

CVEN4032/4033

HIGHER HONOURS THESIS

COURSE DETAILS

Units of Credit 12 + 12

Contact hours as agreed with supervisor

Course Coordinator Dr. Kristen Splinter
email:k.splinter@unsw.edu.au
Kensington office: CE 313 *note that during COVID I am not working on campus
Main office is at Water Research Laboratory (Manly Vale Campus)
Phone: 80719845 (Water Research Laboratory)

INFORMATION ABOUT THE COURSE

This course is in two parts. CVEN4032 covers Part A in the first Term of enrolment, which is a prerequisite for CVEN4033 Part B which is to be undertaken in the second Term of enrolment.

NOTE: Part A and Part B cannot normally be undertaken in two consecutive Terms due to the workload required. Please consult with the Course Coordinator if you wish to discuss.

The purpose of the Higher Honours Research Thesis courses CVEN4032 and CVEN4033 are to engage the participation of top-performing students with current and leading-edge research activities across the School. Together, the courses promote higher level independence in learning to prepare students for their professional and/or research careers; with a particular emphasis on the development of research, writing and presentation skills that would assist their participation in further (postgraduate) research and for a career in industry.

Prerequisite:
A university WAM (as assessed by the School at the completion of all stage 3 courses) of a minimum of 80 is required for entry into the course. In addition, all courses to the end of Year 3 in the discipline of the thesis topic need to be completed.

This course is differentiated from the 4+4+4 units of credit Honours Research Thesis courses by the substantial additional requirements of:

CVEN4032

- extended review of literature and project report
- 'in progress' research presentation
- An additional level of rigor to the assessment procedure (refer below)

CVEN4033

- an extended research thesis (approx. 30,000 equivalence)
- Completion of a submission ready research paper to an international journal standard.
- Professional presentation within the school seminar program to full School audience.

The unique learning outcomes from these courses are in promotion of higher level independence in learning, above that of Honours Research Thesis A & B, by preparing students for a potential career in academic research and/or higher independent research skills used in industry. The advanced skill set to be developed emphasises the development of research, writing and presentation skills.

HANDBOOK DESCRIPTION

The thesis may describe directed laboratory, investigatory, design, field or research work on an approved subject and will be completed under the guidance and supervision of a member of the School's academic staff.

Online Handbook description is available at MyUNSW:

www.handbook.unsw.edu.au/undergraduate/courses/2021/CVEN4032.html
www.handbook.unsw.edu.au/undergraduate/courses/2021/CVEN4033.html

*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 Higher Honours A.

- Browse online the selection of available topics and identify potential supervisors

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

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

- Discuss your selection with potential topic supervisors
- Once you have a Supervisor and topic, you will need to download, complete and sign (Noting that this must first be signed by you, your Supervisor and the Head of School) Higher Honours Thesis Form → enrol yourself on myUNSW → then upload the signed form to the Student Intranet here: http://intranet.civeng.unsw.edu.au/info-about/student-intranet/submit-thesis-application-form
- You will only be able to complete course enrolment for CVEN4032. The School will complete your class registration once you've submitted your topic nomination form to the Student Intranet

PLEASE NOTE THAT, IF YOU CANNOT FIND A HIGHER HONOURS THESIS SUPERVISOR BY THE START OF TERM 1, THEN YOU WILL NOT BE ALLOWED TO ENROL/CONTINUE IN THE COURSE AND IT WILL BE AUTOMATICALLY DROPPED FROM YOUR ENROLMENTS. AS THE ALTERNATIVES, YOU MAY ENROL IN CVEN4951 (AN INDIVIDUAL SUPERVISOR IS ALSO REQUIRED) OR CVEN4050 FOR WHICH AN INDIVIDUAL SUPERVISOR IS NOT REQUIRED

OBJECTIVES

The purpose of the Higher Honours courses CVEN4032 'Part A' and CVEN4033 'Part B' are to engage the participation of top-performing students with current and leading-edge research activities across the School. Together, the courses promotes higher level independence in learning to prepare students for their professional and/or research careers; with a particular emphasis on the development of research, writing and presentation skills that would assist their participation in further (postgraduate) research and for a career in industry.

The Higher Honours Thesis is an individual research project in which each student works under the guidance of a nominated member of the School's academic staff (supervisor). The Higher Honours course requires students to submit both an extended research thesis (as a guide, approximately 30,000 word equivalence) plus a journal-ready manuscript ready for submission. A co-supervisor (either from within, or external to 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.

WHAT IS A RESEARCH THESIS?

That depends quite a bit on your field of study. However, all honours 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 that research.

WHY WRITE AN HONOURS 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's 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 an honours 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 postgraduate degree and employment.

- ***Open windows into future professions***
  An honours 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 Higher Honours 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). A co-supervisor (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 investigation.

PRIVATE STUDY

- As a rough guide only, an average student would be expected to spend approximately 20+ hours per week on work related to this course.
- 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 session, alternative arrangements need to be established and made known to both the student and course coordinator.

CONSULTATION

- The course coordinator will be available by prior appointment to liaise with enrolled students as needed

EXPECTED LEARNING OUTCOMES

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

1. Develop a design or a process or investigate a hypothesis following industry and professional engineering standards. (7, 8, 9, 10)
2. Critically reflect on a specialist body of knowledge related to their thesis topic. (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)

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.*

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

HIGHER HONOURS A SUBMISSIONS

- Participation in a series of **lunchtime Workshops in WEEK 1** (Orientation to Honours Research Thesis) **and WEEK 2** (Literature Reviews) **– CHECK MOODLE FOR DATES & TIMES**

- **Component A1 submission** should include**:** Statement of the Problem and Literature review.
- **Component A2 submission** should include: More detailed, revised and improved Introduction (Statement of the problem), Literature review, Thesis Outline, Study Methodology, Study Results to-date and outline of Project Time-Line for thesis completion and preparation of submission-ready journal manuscript.
- **Component A3 research progress presentation** will be scheduled to coincide with presentations by completing CVEN4953 Thesis C students.

1. **Component A1 is due: WEEK 7**
2. **Component A2 is due: WEEK 10**
3. **Component A3 will take place in WEEK 10**

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

The assessment of A1 & A2 is more rigorous that for the 4 units of credit CVEN4951 Honours Research Thesis A course, requiring an extended review and report, research presentation, and assessment by the independent examiner in addition to supervisor.

In the event of an unsatisfactory assessment in any of components A1, A2 or A3, 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 CVEN4033 is allowed. Failure to receive the progress assessment by the due date will result in the student results being withheld and/or failure.

At the completion of CVEN4032, the School reserves the right to require the student to complete their Honours Research Thesis by enrolment in CVEN4952 then CVEN4953, rather than continuation to Higher Honours Thesis CVEN4033.

HIGHER HONOURS B SUBMISSIONS

- Participation in a **lunchtime Workshop in WEEK 2** (Thesis Writing)
  – CHECK MOODLE FOR DATE & TIME

- **B1 Seminar Abstract**
- **B2 Research Thesis** (as a guide, approximately 30,000 word equivalents)
- **B3 Completion of a submission-ready journal paper manuscript** in the format of a suitable international peer-reviewed journal
- **B4 Professional presentation** (20 - 30 minute research presentation (+ additional time for questions) to staff and peers)

1. **Component B1 is due: WEEK 7**
2. **Components B2 & B3 are due: WEEK 11**
3. **Component B4 will be scheduled in WEEK 9 or 10 (Further details provided during term)**

Again, the assessment is more rigorous that for the 6 units of CVEN4953 “Honours Research Thesis B” course requiring additional higher level research works comprising of thesis, submission-ready journal paper and a higher

level presentation to a wide School audience. Students will be actively engaged with one of the School's research groups.

SUMMARY OF ALL HIGHER HONOURS THESIS MARKED ASSESSMENTS

Higher Honours Thesis A:

1.	Component A1	Week 7	**Satisfactory/Unsatisfactory**
2.	Component A2	Week 10	**10 % of Final Mark**
3.	Component A3	Week 10	**5% of Final Mark**

Higher Honours Thesis B:

1.	Seminar Abstract	Week 7	**5 % of Final Mark**
2.	Research Seminar	Week 9-10	**10 % of Final Mark**
3.	Thesis Submission	Week 11	**70 % of Final Mark (incl. 10 % Supervisor)**
4.	Submission-ready journal manuscript	Week 11	**Satisfactory/Unsatisfactory**

Further details of the requirements for the Seminar Abstract and the format & scheduling of Seminars will be advised by the Course Coordinator during the term.

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

The submission-ready journal paper manuscript is to be submitted to the Supervisor by 4.00pm on Friday of the submission week.

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

- For all other assignments beside thesis – zero (0) mark is awarded
- For thesis – 5 marks off the *thesis* 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 thesis (weekends count as days).
- Any thesis not turned in within 6 weeks after the deadline will be finalised at zero (0) marks.

RELEVANT RESOURCES

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

- Topic material as direct by the supervisor.
- Materials provided by course coordinator.

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.

DATES TO NOTE

Refer to MyUNSW for Important Dates available at: https://student.unsw.edu.au/dates

PLAGIARISM Beware! An assessment 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

For information about:

- Notes on assessments and plagiarism,
- School policy on Supplementary exams,
- Special Considerations: student.unsw.edu.au/special-consideration
- Solutions to Problems,
- Year Managers and Grievance Officer of Teaching and Learning Committee, and
- CEVSOC.

Refer to Academic Advice on the School website available at:

https://intranet.civeng.unsw.edu.au/key-staff-to-contact-during-your-studies-at-unsw

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