



School of Civil and Environmental Engineering  
Term 1, 2020

## CVEN4051 Thesis B

### COURSE DETAILS

<b>Units of Credit</b>	<b>6</b>	
<b>Contact hours</b>	4 hours per week	
<b>Class</b>	Tue, 4:00 – 6:00 pm	ChemicalSc M17 (K-F10-M17)
	Thurs, 1:00 – 3:00 pm	Mathews Theatre B (K-D23-203)
<b>Course</b>	Professor Michael J Manefield	
<b>Coordinator and</b>	email: <a href="mailto:manefield@unsw.edu.au">manefield@unsw.edu.au</a>	
<b>Lecturer</b>	office: Hilmer, Level 5, room 517 (enter via SEB E8)	

### INFORMATION ABOUT THE COURSE

This course is the second of two parts and is undertaken after CVEN4050 Thesis A, usually in the preceding semester. The Thesis involves formulating the designs for and solution to open-ended civil and/or environmental engineering problems. The problems will be drawn from industry and will be multi-disciplinary involving application of material learnt throughout the undergraduate program and will require creative thought. The course will include the preparation of relevant professional documents.

### HANDBOOK DESCRIPTION

See link to handbook: <https://www.handbook.unsw.edu.au/undergraduate/courses/2020/cven4051/>

### OBJECTIVES

To familiarise the student with a framework for carrying out contaminated site remediation.  
To enable engineering students to carry out knowledgeable assessment of reports and data presented to them by specialists across disciplines (microbiology, chemistry, environmental engineering, chemical engineering, civil engineering).  
To provide students with sufficient knowledge to make complex choices between remediation options.

List of programme attributes:

- An in-depth engagement with the relevant disciplinary knowledge in its inter-disciplinary context
- Capacity for analytical and critical thinking and for creative problem solving

- Ability to engage independent and reflective learning
- Information literacy
- Skills for collaborative and multi-disciplinary work
- A respect for ethical practice and social responsibility
- Skills for effective communication

#### TEACHING STRATEGIES

<b>Private Study</b>	<ul style="list-style-type: none"> <li>• Review lecture material and documentation</li> <li>• Do set problems and assignments</li> <li>• Join Moodle discussions of problems</li> <li>• Reflect on class problems and assignments</li> <li>• Download materials from Moodle</li> <li>• Keep up with notices and find out marks via Moodle</li> </ul>
<b>Lectures</b>	<ul style="list-style-type: none"> <li>• Find out what you must learn</li> <li>• Hear announcements on course changes</li> </ul>
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Demonstrate your knowledge and skills</li> <li>• Demonstrate higher understanding and problem solving</li> </ul>

#### 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 Stage 1 Competency Standards may be found in Appendix A.*

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

Learning Outcome		EA Stage 1 Competencies
1.	Demonstrate technical understanding of physical, chemical and biological phenomena	PE1.1
2.	Demonstrate contextual understanding of complex problems	PE1.5 (bc)
3.	Analyse technical complexities to deliver an informed position statement	PE1.1, 1.2
4.	Evaluate health risks present based on environmental regulator guidelines	PE1.6 (ab), PE3.1 (ac)
5.	Formulate strategies and recommendations.	PE1.3
6.	Effectively self-manage and demonstrate commitment to the Team	PE3.5 (ade), 3.6 (abcd)
7.	Deliver professional briefing	PE3.2 (a)
8.	Effectively communicates intended message in the form of an executive summary	PE3.2 (b)

<b>COURSE PROGRAM</b>
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**Term 1 2020**

<b>Date</b>	<b>Topic</b>	<b>Lecturers</b>
17/02/2020 (Week 1)	Course Introduction	Mike Manefield
24/02/2020 (Week 2)	Private/group study	
02/03/2020 (Week 3)	Private/group study	
09/03/2020 (Week 4)	Private/group study	
16/03/2020 (Week 5)	Private/group study	
23/03/2020 (Week 6)	Private/group study	
30/03/2020 (Week 7)	Private/group study	
06/04/2020 (Week 8)	Private/group study	
13/04/2020 (Week 9)	Project presentations	Students
20/04/2020 (Week 10)	Project presentations	Students

<b>ASSESSMENT</b>
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Overall rationale for assessment components and their association with course objectives.

<b>Assignment Outcomes</b>	<b>Performance Indicators</b>			<b>Mapping to Engineers Australia competencies</b>
	<b>Developing</b>	<b>Meets expectations</b>	<b>Beyond expectations</b>	
Demonstrate contextual understanding of the problem	Identifies some issues present in terms of the engineering principles, social, cultural, environmental, commercial, legal or political contexts.	Explains the issues present in terms of the engineering principles, social, cultural, environmental, commercial, legal or political contexts.	Analyses the interplay between issues relating to engineering principles, social, cultural, environmental, commercial, legal or political contexts.	<b>1.5</b> Knowledge of engineering design practice and contextual factors impacting the engineering discipline. (b, c)
Analyse technical complexities to deliver an informed position statement	Explores analytical processes to investigate results and inform the stated position.	Applies appropriate analytical tools to investigate, analyse and interpret results of calculations to inform prediction and support the stated position.	Demonstrates excellence in analytical application for the systematic investigation, analysis and interpretation results to inform prediction and	<b>1.1</b> Comprehensive, theory-based understanding <b>1.2.</b> Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the

			support the stated position.	engineering discipline
Evaluate health risks present based on the EPA guidelines	Appropriately interprets EPA guidelines to assess potential health risk in relation to contamination present.	Appropriately interprets EPA guidelines to assess potential health risk in relation to contamination present.	Appropriately interprets EPA guidelines to assess potential health risk in relation to contamination present.	<b>1.6</b> Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (a, b) <b>3.1</b> Ethical conduct and professional accountability (a, c)
Formulate strategies and recommendations	Explores technical knowledge in relation to environmental contaminant engineering.	Proficiently applies technical knowledge and skills in the field of environmental contaminant engineering to formulate strategies and recommendations.	Expertly applies advanced technical knowledge and skills in the field of environmental contaminant engineering to formulate strategies and recommendations.	<b>1.3</b> In depth understanding of specialist bodies of knowledge within the engineering discipline.
Effectively self-manage and demonstrate commitment to the Team	Completes self-review of time management, team processes and group performance evaluation.	Explains and reflects on decision making, time management, team processes, group dynamics, diverse perspectives, individual and team performance.	Demonstrates sound judgement and decision making as evidenced through critical evaluation and reflection of time management, team processes, group dynamics, diverse perspectives, individual and team performance.	<b>3.5</b> Orderly management of self, and professional conduct (a, d, e). <b>3.6</b> Effective team membership and team leadership (a, b, c, d).
Delivers professional briefing	Coveys information in presentation of technical information; Communication skills are developing.	Uses appropriate body language and vocal control to express information effectively and succinctly, using textual and graphical media to present the issues and	Demonstrates clarity, fluency and confidence when explaining complex material to diverse audiences using various communication devices for succinct and compelling	<b>3.2</b> Effective oral communication in professional and lay domains (a).

		position to technical and non-technical audiences.	delivery of the issues and position.	
Effectively communicates intended message in the form of an executive summary	Submits an executive summary, communicating some of the concerns.	Prepares executive summary, communicating clearly and succinctly and presenting an objective viewpoint.	Prepares high quality, error-free executive summary, communicating clearly and succinctly and presenting informed, objective viewpoint.	3.2 Effective written communication in professional and lay domains (b).

Details of each assessment component, the marks assigned to it, the criteria by which marks will be assigned, and the dates of submission are set out below.

The final grade for this course will normally be based on the sum of the scores from each of the assessment tasks. Students who perform poorly in the quiz are recommended to discuss progress with the lecturer during the term. Note: The lecturer reserves the right to adjust the final scores by scaling if agreed by the Head of School.

<b>PENALTIES</b>
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Late submissions will be penalised at the rate of 10% per day after the due time and date have expired.

<b>ASSESSMENT OVERVIEW</b>
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<b>Item</b>	<b>Length</b>	<b>Weighting</b>	<b>Learning outcomes assessed</b>	<b>Assessment Criteria</b> (this needs to explicitly describe what students are expected to demonstrate in the task)	<b>Due date and submission requirements</b>	<b>Deadline for absolute fail</b>	<b>Marks returned</b>
Presentation	15 min	30%	1, 2, 4-7	Group presentation and Q&A to assess ability to give professional briefing on remediation options assessment for the Botany Industrial Park.	14/04 4-6 pm 16/04 1-3 pm 21/04 4-6 pm 23/04 1-3 pm	N/A	One week after due date
Report	20-30 pages	60%	1, 2, 4-8	Requires students to produce a professional quality remediation options assessment for the Botany Industrial Park	24/04 5 pm	5 days after deadline	Three weeks after due date
Assignment	1 page	10%	6	One-page self-review of individual and team performance.	24/04 5 pm	5 days after deadline	Three weeks after due date

## RELEVANT RESOURCES

- Your course coordinator and fellow students. Talk to your coordinator. Talk to your peers. These are valuable sources of information.
- Lecture series by government and industry experts. Refer to slides and recordings available on the CVEN4051 Moodle page.
- National Environment Protection (Assessment of Site Contamination) Measure 1999 – available online (<https://www.legislation.gov.au/Details/F2013C00288>)
- Guideline on performing remediation options assessment ([https://www.crccare.com/files/dmfile/GuidelineonconductingROA\\_Rev2.pdf](https://www.crccare.com/files/dmfile/GuidelineonconductingROA_Rev2.pdf)).
- Guideline on performing cost-benefit and sustainability analysis of remediation options ([https://www.crccare.com/files/dmfile/GuidelineonperformingCBandSAofremediationoptions\\_Rev0.pdf](https://www.crccare.com/files/dmfile/GuidelineonperformingCBandSAofremediationoptions_Rev0.pdf)).
- Conceptual Site Model Orica Botany. ([https://www.orica.com/Locations/Asia-Pacific/Australia/Botany/Botany-Transformation-Projects/Groundwater-Cleanup#.XQL9\\_y17Gi4](https://www.orica.com/Locations/Asia-Pacific/Australia/Botany/Botany-Transformation-Projects/Groundwater-Cleanup#.XQL9_y17Gi4))
- Additional materials provided on Moodle.

## 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

(Formerly known as Common School Information)

For information about:

- Notes on assessments and plagiarism,
- School policy on Supplementary exams,
- Special Considerations: [student.unsw.edu.au/special-consideration](https://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://www.engineering.unsw.edu.au/civil-engineering/student-resources/policies-procedures-and-forms/academic-advice>



**Appendix A: Engineers Australia (EA) Competencies**  
*Stage 1 Competencies for Professional Engineers*

	<b>Program Intended Learning Outcomes</b>
<b>PE1: Knowledge and Skill Base</b>	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
<b>PE2: Engineering Application Ability</b>	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
<b>PE3: Professional and Personal Attributes</b>	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