School of Civil and Environmental Engineering

Term 3, 2021

CVEN4051 Thesis B

COURSE DETAILS

Units of Credit	**6**	
Contact hours	2 hours per week	
Class	Tuesday, 16:00 – 18:00	online
Course Coordinator/ Lecturer	Professor Michael J Manefield email: manefield@unsw.edu.au	

INFORMATION ABOUT THE COURSE

This Thesis B course uses contaminated site remediation as a vehicle to deliver thesis project learning objectives. Environmental pollution is a major threat to human and environmental health globally. Civil engineering projects often have to resolve site contamination before proceeding with construction. Remediation of contaminated sites is a multidisciplinary endeavour requiring engagement of civil, environmental and chemical engineers, surveyors and scientists (biologists, chemists and environmental scientists). Thesis B will focus on contaminated site characterisation and development of conceptual site models. Subsequently, Thesis A will focus on remediation options assessment and remediation action plans in the following term. Both courses will require application of material learnt throughout the undergraduate program, independent creative thought and reviewing of literature.

HANDBOOK DESCRIPTION

See link to virtual handbook*:*
https://www.handbook.unsw.edu.au/undergraduate/courses/2021/cven4050

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

Private Study	• Review lecture material and documentation • Do set problems and assignments • Reflect on class problems and assignments • Download materials from Moodle • Keep up with notices and find out marks via Moodle
Lectures	• Find out what you must learn • Hear announcements on course changes
Assessments	• Demonstrate your knowledge and skills • Demonstrate higher understanding and problem solving

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 and presentation	*PE3.2 (b)*

It is expected that you will dedicate approximately 8 hours to this subject per week.

COURSE PROGRAM

Term 3 2021

Date	Activity	Speaker
13/09/2021 (Week 1)	Course Introduction	Mike Manefield
20/09/2021 (Week 2)	Field site characterisation and monitoring	Dave Reynolds
27/09/2021 (Week 3)	Conceptual Site Models (CSM) **Assignment 1 submission (20%)**	Andrei Woinarski
04/10/2021 (Week 4)	Case study 1	Mike Manefield
11/10/2021 (Week 5)	Physical and chemical remediation options	John Hunt
18/10/2021 (Week 6)	Flexibility week	
25/10/2021 (Week 7)	Biological remediation options **Assignment 2 submission (20%)**	Mike Manefield
01/11/2021 (Week 8)	Legislation and regulation	Donna Phelan
08/11/2021 (Week 9)	Case study 2 **Thesis submission (50%)**	Jason Clay
15/11/2021 (Week 10)	No lecture **Presentation submission (10%)**	

ASSESSMENT

Overall rationale for assessment components and their association with course objectives.

Assignment Outcomes	**Performance Indicators**			**Mapping to Engineers Australia competencies**
	Developing	**Meets expectations**	**Beyond expectations**	
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.	**1.5** 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 support the stated position.	**1.1** Comprehensive, theory-based understanding **1.2**. Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the 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.	**1.6** Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (a, b) **3.1** 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.	**1.3** 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.	**3.5** Orderly management of self, and professional conduct (a, d, e). **3.6** 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 position to technical and non-technical audiences.	Demonstrates clarity, fluency and confidence when explaining complex material to diverse audiences using various communication devices for succinct and compelling delivery of the issues and position.	**3.2** Effective oral communication in professional and lay domains (a).
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.

PENALTIES

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

ASSESSMENT OVERVIEW

Item	**Length**	**Weighting**	**Learning outcomes assessed**	**Assessment Criteria** (this needs to explicitly describe what students are expected to demonstrate in the task)	**Due date and submission requirements**	**Deadline for absolute fail**	**Marks returned**
Assignment 1	5 pages	20%	2, 3	A short essay on the impact of site contamination on civil engineering projects using contemporary examples.	1/10 17:00	7 days after deadline	One week after due date
Assignment 2	1 page	20%	1, 2, 3, 5	Requires students to produce a one-page review of the online learning platform TEMPO for contaminated site characterisation.	25/10 17:00	7 days after deadline	One week after due date
Presentation	5 min	10%	1-8	A short presentation on site characterisation recommendations, assessing professional presentation delivery.	19/11 17:00	7 days after deadline	One week after due date
Thesis	10 pages	50%	1-8	Produce a professional report including a position statement on liability in a mock site scenario, a conceptual site model, recommendations for additional site characterisation and recommendations for remediation.	12/11 17:00	7 days after deadline	Two 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. You will hear from professionals about various aspects of site remediation. Slides and recordings available on Moodle.
- 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).
- Guideline on performing cost-benefit and sustainability analysis of remediation options (https://www.crccare.com/files/dmfile/GuidelineonpeformingCBandSAofremediationoptions_Rev0.pdf).
- Conceptual Site Model Orica Botany. (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

For information about:

- Notes on assessments and plagiarism;
- Special Considerations: student.unsw.edu.au/special-consideration;
- General and Program-specific questions: The Nucleus: Student Hub
- Year Managers and Grievance Officer of Teaching and Learning Committee, and
- CEVSOC/SURVSOC/CEPCA

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