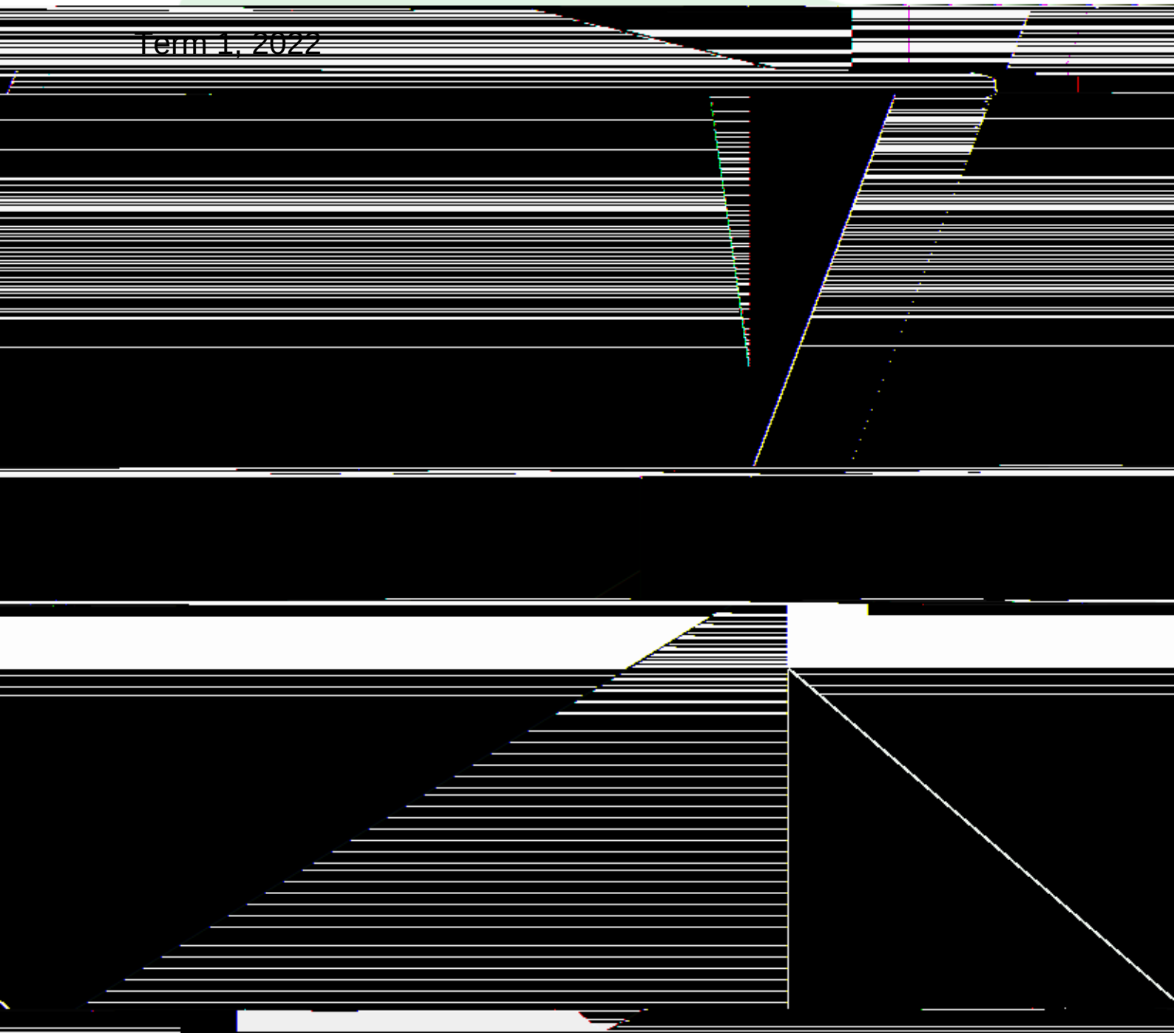
School of Civil and Environmental Engineering

UNSW Engineering

CVEN9892

Sustainability Assessment and Risk Analysis

Term 1, 2022



Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Thomas Wiedmann	t.wiedmann@unsw.edu.au		Room 312, School of Civil & Environmental Engineering (Building H20)	+61 2 9065 2065

Lecturers

Name	Email	Availability	Location	Phone
Ruth Fisher	ruth.fisher@unsw.edu.au		Room 205, School of Civil & Environmental Engineering (Building H20)	

School Contact Information

Engineering Student Support Services – The Nucleus - enrolment, progression checks, clash requests, course issues or program-related queries

Engineering Industrial Training – Industrial training questions

UNSW Study Abroad – study abroad student enquiries (for inbound students)

UNSW Exchange – student exchange enquiries (for inbound students)

UNSW Future Students – potential student enquiries e.g. admissions, fees, programs, credit transfer

Phone

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

(+61 2) 9385 3179 – UNSW Study Abroad and UNSW Exchange (for inbound students)

Course Details

Units of Credit 6

Summary of the Course

The design of water and energy systems has advanced from a cost-benefit basis to the incorporation of quantitative assessments of environmental burdens and the human and environmental risks associated with competing options. This course will equip students with the ability to apply life cycle assessment for quantifying environmental burdens, and an understanding of the factors that define human health and environmental risks. The latter include the presence of chemicals and pathogenic organisms, and the reliability of engineered systems.

Course Aims

This course will introduce students to a series of practical tools for sustainability assessment and risk assessment. Although many of the tools are widely applicable, the focus and practical examples are generally related to the water industry. There are no specific prerequisites for this course, but it assumes some familiarity with water supply technologies and environmental issues, will involve computational activities and is aimed at students with an undergraduate degree in engineering.

The aim of this course is to introduce sustainability assessment tools, in particular LCA, LCC and risk

Learning Outcome	EA Stage 1 Competencies
4. Describe the basic principles of risk assessment and be able to undertake risk assessment calculations and formulate reasonable conclusions based on risk assessment activities.	PE1.1, PE1.2, PE1.3, PE1.4,

Assessment

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

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
4. Final Exam	40%	Final exam period	1, 3, 4

Assessment 1: Quizzes

Assessment length: 15 minutes for each Quiz
Due date: Week 4 and Week 10

Online Quiz 1: Students will be expected to demonstrate a conceptual understanding of the topics taught in the first three weeks of the course.

Online Quiz 2: Students will be expected to demonstrate a conceptual understanding of the topics taught in the Weeks 5-9 of the course.

This is not a Turnitin assignment

Additional details

The two quizzes will be held in Week 4 and Week 10, during workshop times.

Assessment 2: Group Assignment

Start date: Week 2
Assessment length: 8 pages
Due date: 23/03/2022 08:00 PM

This is a group assignment where a LCA of a system or product is undertaken. The aim is to demonstrate an understanding of environmental sustainability and LCA methodology, the capacity for analytical and critical thinking, for creative problem solving and skills for collaborative team work. The assessment criteria refer to the study context, methodology and calculations, assumptions and explanations, results, discussion, recommendations, conclusions, summary and the overall report quality.

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Assessment 3: Individual Assignment

Start date: Week 6
Assessment length: 3000 words maximum (not including tables or references)
Due date: 12/04/2022 08:00 PM

This is an individual assignment where students will apply skills learnt in the course to determine the risk of a particular environmental contaminant. The assessment encourages analytical and critical thinking and creative problem solving using industry guidelines.

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Assessment 4: Final Exam

Assessment length: 2 hours
Due date: Final exam period

The exam is 2-hour open book exam during the normal exam period conducted online. The exam will test the students' ability to synthesise the overall course. All material presented during the session will be examinable in the exam unless otherwise noted. Students must be available at the stipulated exam time no matter the time zone in the country they may be currently residing in.

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Hurdle requirement

A mark of at least 40% in the final examination is required before the class work is included in the final mark. Therefore, a mark of at least 40% in the final examination is required to pass the whole course!

Additional details

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

Course Schedule

View class timetable

Timetable

Date	Type	Content
Week 1: 14 February - 18 February	Lecture	Life Cycle Assessment 1 (LCI, LCIA)
	Workshop	Life cycle inventories, Introduction to openLCA
Week 2: 21 February - 25 February	Lecture	Life Cycle Assessment 2 (LCSA, TBL)
	Workshop	openLCA exercises
Week 3: 28 February - 4 March	Lecture	Sustainable engineering and sustainable resource management
	Workshop	Sustainability Principles and MFA
Week 4: 7 March - 11 March	Lecture	GHG emissions accounting and environmental footprints
	Workshop	Online Quiz 1 (10%), Carbon and water footprints, TBL exercises
Week 5: 14 March - 18 March	Lecture	Environmental chemical risk assessment
	Workshop	Environmental chemical risk assessment
Week 6: 21 March - 25 March	Homework	Week 6 is Flexibility Week, i.e. there is no lecture and no workshop. Use the time to work on assignments.
Week 7: 28 March - 1 April	Lecture	Environmental microbial risk assessment
	Workshop	Environmental microbial risk assessment
Week 8: 4 April - 8 April	Lecture	Risk analysis: Concepts, Frameworks, and Management in engineered systems
	Workshop	Risk analysis, Risk Management
Week 9: 11 April - 15 April	Lecture	Disability Adjusted Life Years (DALYs)
	Workshop	Disability Adjusted Life Years (DALYs)
Week 10: 18 April - 22 April	Lecture	Multicriteria analysis
	Workshop	Online Quiz 2 (10%), Multicriteria analysis

Resources

Recommended Resources

There is no required textbook for this course. However, we strongly recommend the following textbook:

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Submission of Assessment Tasks

Please refer to the Moodle page of the course for further guidance on assessment submission.

UNSW has a standard late submission penalty of:

- 5% per day, for all assessments where a penalty applies, capped at five days (120 hours), after which a student cannot submit an assessment, and no permitted variation.

Academic Honesty and 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.

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Academic Information

Final Examinations:

Final exams in T1 2022 will be held online between 29th April - 12th May inclusive, and supplementary exams between 23rd - 27th May inclusive. You are required to be available on these dates. Please do not to make any personal or travel arrangements during this period.

ACADEMIC ADVICE

- 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
- Key UNSW Dates - eg. Census Date, exam dates, last day to drop a course without academic/financial liability etc.
- 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
- 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

Image Credit

Coxs River, Kanimbla Valley (photo taken by T. Wiedmann)

CRICOS

CRICOS Provider Code: 00098G

Acknowledgement of Country

We acknowledge the Bedegal people who are the traditional custodians of the lands on which UNSW Kensington campus is located.