

CVEN4705

Environmental Sustainability - Methods, Tools, Management

Term 3, 2022



Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Ruth Fisher	ruth.fisher@unsw.edu.au	Please email or Teams chat to arrange a time or through the Moodle forum	Civil Engineering Building (H2) Rm311	+61 2 9385 5073

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

An introduction to sustainable engineering principles and the social, economic and political context in which they have arisen, and in which they are implemented. It introduces methods, techniques and tools used by public and private sector sustainability managers to implement sustainable engineering principles in organisations, regions, projects and processes. Sustainability assessment techniques are introduced that can be applied at a product level (Life Cycle Assessment), at a corporate and regional level (Materials Flow Analysis) and at a regional and national level (Environmental Footprint and Input-Output Analysis). The course will introduce principles of Industrial Ecology (IE) and the preparation of Environmental Impact Statements (EIS), Environmental Management Systems (EMS) and Environmental Reports (ER).

Course Aims

To introduce students to principles of Ecologically Sustainable Development (ESD), Sustainable Engineering and Industrial Ecology and the contexts in which these principles are implemented. To develop students' understanding of the various methods and techniques (analytical tools) of Industrial Ecology used by regional and corporate environmental managers to implement ESD principles in organisations and regions. To expose students to the practice of real-world sustainability projects and initiatives in the region.

Course Learning Outcomes

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

Learning Outcome	EA Stage 1 Competencies
1. State and explain various definitions of sustainability, Ecologically Sustainable Development (ESD) and emerging themes such as Circular Economy (CE), apply these principles to different examples and effectively communicate progress and context	PE1.1, PE1.2, PE1.6
2. Apply sustainability accounting methods such as material flow analysis, environmental lifecycle assessment and footprint accounting methods for various case studies	PE1.6, PE2.2
3. Critically assess environment-related problems and the application of appropriate tools, describing the suitability of different approaches, for different outcomes and at different scales (households, corporations, regions)	PE1.4, PE1.6, PE2.3
4. Critically evaluate sources of information concerning sustainability dimensions, including uncertainty, both individually and collaboratively	PE1.6, PE2.2, PE3.1, PE3.6

Teaching Strategies

The following teaching strategies will be used in this course. Students are encouraged to direct their own learning to get the most out of their participation in this course.

Lectures

- Take notes on skeleton overheads provided to get a full set of reference notes for the course.
- Participate in class discussions and work out example problems in class.
- Ask questions on how the content of lectures applies to assignment questions.
- Hear announcements on course changes

Workshops

- Work actively in small ad hoc groups on problems set in class.
- Be guided by discussion questions and additional reading
- Participate and attempt all tutorial questions
- Ask questions


Private Study

- Review lecture material, reference books, and resources on UNSW Moodle.
- Work in groups on class assignments.
- Reflect on class problems and assignments.
- Download materials from UNSW Moodle and work through additional readings provided.
- Keep up with notices, join the discussion and find out marks via UNSW Moodle.

Assessment

- Answer quiz questions in class.
- Demonstrate your knowledge and skills in tutorials and assignments.
- Demonstrate ability to work effectively in a group by completing the group assignment.
- Demonstrate higher understanding and problem solving on real world problems in hypothetical, but realistic problem settings in tutorials.

Assessment

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Assignment 1 (Group) 	30%	01/11/2022 09:00 AM	2, 3, 4
2. Quiz	40%	Not Applicable	1, 2, 3
3. Assignment 2 (Individual)	30%	25/11/2022 05:00 PM	3, 4

Assessment 1: Assignment 1 (Group) (Group)

Assessment length: 10 pages

Due date: 01/11/2022 09:00 AM

Marks returned: Week 10

This assignment requires the use of LCA to inform decisions in the planning, construction and operation of a house. You will apply your knowledge of LCA and life cycle thinking to calculate the lifecycle impacts for a provided case study. In the report you will also comment on data quality/suitability, alternate methods and use your critical thinking skills to suggest actionable interventions. Students will prepare one group report to be submitted to Turnitin, where feedback will be provided

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

Assessment criteria

The Assignment will be marked according to a Rubric provided on Moodle. Please see the Moodle page for more details on the assessment requirements.

Late submissions will attract a 5% late penalty per day overdue, for a maximum of 5 days.

Assessment 2: Quiz

Submission notes: Quizzes will be conducted in Moodle Quiz during the allocated class times. See Moodle for timings

Marks returned: Immediately following the end of the quiz timeframe, or within a week depending on the question types.

The quizzes will test the students' ability to synthesise specific parts of the course, demonstrate understanding of main principles and implement them in given situations. May include calculations, multiple choice and short answer questions.

This is not a Turnitin assignment

Assessment 3: Assignment 2 (Individual)

Due date: 25/11/2022 05:00 PM

In the second assignment, students need to prepare an individual presentation on a given topic. The marks for this task also include a Peer Assessment component (5%) which will run in Week 10. The final submission is a video submission due in Week 11 (25%).

Additional details

Marking Rubrics and Assignment details and relevant links are provided on Moodle.

Attendance Requirements

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

Course Schedule

[View class timetable](#)

Timetable

Date	Type	Content
O-Week: 5 September - 9 September		
Week 1: 12 September - 16 September	Lecture	Introduction to course; ESD and sustainability concepts
	Workshop	SDG and ESD activities
	Lecture	Impacts + Key areas of concern
Week 2: 19 September - 23 September	Lecture	Carbon Footprints (CF)
	Workshop	Carbon footprint activities
	Lecture	Guest Lecture and discussion, NGER, Climate Active and SBTs
	Assessment	Quiz 1 (6%)
Week 3: 26 September - 30 September	Lecture	Lifecycle assessment principles
	Workshop	LCA principles workshop
	Lecture	OpenLCA software intro + Group Assignment intro
Week 4: 3 October - 7 October	Lecture	LCA detailed
	Workshop	LCA Workshop 2 – using OpenLCA
	Lecture	Data quality indices and uncertainty
	Assessment	Quiz 2 (10%)
Week 5: 10 October - 14 October	Lecture	Footprints (Water + Ecological)
	Workshop	Footprints workshop 1
	Workshop	<i>Guest lecture and discussion – Product footprints</i>
Week 6: 17 October - 21 October		

Week 7: 24 October - 28 October	Lecture	Footprints (Material)
	Workshop	Footprints workshop 2
	Lecture	Circular Economy
	Assessment	Quiz 3 (12%)
Week 8: 31 October - 4 November	Lecture	Material Flow Analysis (MFA)
	Workshop	MFA Activity
	Lecture	Sustainability reporting
	Assessment	Group Assignment due (30%)
	Assessment	Assignment 1 (Group)
Week 9: 7 November - 11 November	Lecture	Multicriteria decision analysis and triple bottom line analysis
	Workshop	MCDA activity
	Lecture	<i>Guest discussion – Rating systems</i>
	Assessment	Quiz 4 (12%)
Week 10: 14 November - 18 November	Workshop	Peer Review Activity (5% - part of Individual Assignment)
Study Week: 21 November - 24 November	Assessment	Individual Assignment due (25%)

Resources

Prescribed Resources

There are no texts set for this subject. Course notes via .pdf files as well as multimedia resources are provided for this course in Moodle

Course Evaluation and Development

Changes have been made to this course due to student feedback on quiz structure and academic integrity. The delivery of the peer review activity in Week 10 has also been made more flexible for those attending online or face to face.

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.

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 Information

Final Examinations:

Final exams in T3 2022 will be held online between 25th November - 8th December 2022 inclusive, and supplementary exams between 9th - 13th January 2023 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](#)
- Book an Academic Advising session: <https://app.acuityscheduling.com/schedule.php?owner=19024765>

Disclaimer

This course outline sets out description of classes at the date the Course Outline is published. The nature of classes may change during the Term after the Course Outline is published. Moodle should be consulted for the up to date class descriptions. If there is any inconsistency in the description of activities between the University timetable and the Course Outline (as updated in Moodle), the description in the Course Outline/Moodle applies.

Image Credit

Mike Gal.

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.

Appendix: Engineers Australia (EA) Professional Engineer Competency Standard

Program Intended Learning Outcomes	
Knowledge and skill base	
PE1.1 Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline	✓
PE1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline	✓
PE1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline	
PE1.4 Discernment of knowledge development and research directions within the engineering discipline	✓
PE1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline	
PE1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline	✓
Engineering application ability	
PE2.1 Application of established engineering methods to complex engineering 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	
Professional and personal attributes	
PE3.1 Ethical conduct and professional accountability	✓
PE3.2 Effective oral and written communication in 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	✓