UNSW Course Outline

CVEN1701 Climate Change and Environmental Sustainability - 2024

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General Course Information

Course Code : CVEN1701
Year : 2024
Term : Term 3
Teaching Period : T3
Is a multi-term course? : No
Faculty : Faculty of Engineering
Academic Unit : School of Civil and Environmental Engineering
Delivery Mode : In Person
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Undergraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

Climate change is the biggest challenge of our era and engineers play an important role in mitigating and adapting to climate impacts. You will explore the causes and impacts of climate change, the key challenges and opportunities associated with sustainable development, as well

as a range of techniques to quantify environmental impacts of corporations and economies. Conceptual frameworks such as Sustainable Development Goals, circular economies and planetary boundaries are introduced. You will work with sustainability assessment methods and tools in detail, including carbon and environmental footprint accounting, material flow analysis and life cycle assessment.

Course Aims

The course aims to provide students with the fundamental science behind global environmental change, reinforce their understanding of climate change mitigation and adaptation and core sustainability principles, as well as build their capabilities in critical thinking and reasoning.

In particular, the course will improve students' ability to evaluate the sustainability of systems, interpret practical examples of sustainable engineering and circular economies, analyse data, communicate the findings and meaning of their results, and work in small teams.

The development of practical and professional skills in sustainability assessment methods and tools complements the strengthening of fundamental knowledge in environmental sustainability through practice-relevant experience.

This knowledge will then be applied in courses in years 2 to 4 in a range of areas related to sustainability and environmental engineering, including chemical engineering, transport engineering, environmental law and economics, waste, water and wastewater engineering, as well as planning for sustainable infrastructure.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Investigate and discuss the implications of climate change on human and natural systems.
CLO2 : Evaluate and analyse simple environment-related systems by adopting environmental footprints, life cycle assessment and material flow analysis.
CLO3 : Assess environment related problems and apply appropriate quantitative methods.
CLO4 : Demonstrate how information from the application of these methods and tools can be applied in solution development and make recommendations towards more sustainable decision making processes.

Course Learning Outcomes	Assessment Item
CLO1 : Investigate and discuss the implications of climate change on human and natural systems.	• Quizzes • Assignment 1
CLO2 : Evaluate and analyse simple environment-related systems by adopting environmental footprints, life cycle assessment and material flow analysis.	• Assignment 2
CLO3 : Assess environment related problems and apply appropriate quantitative methods.	• Quizzes • Assignment 2
CLO4 : Demonstrate how information from the application of these methods and tools can be applied in solution development and make recommendations towards more sustainable decision making processes.	• Assignment 1 • Quizzes • Assignment 2

Learning and Teaching Technologies

Moodle - Learning Management System | Microsoft Teams | Echo 360

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Quizzes Assessment Format: Individual	50%	Due Date: Weeks 3, 5, 8, 9, 10
Assignment 1 Assessment Format: Individual	20%	Due Date: Week 7
Assignment 2 Assessment Format: Group	30%	Due Date: Week 11

Assessment Details

Quizzes

Assessment Overview

Students will be expected to demonstrate an understanding of the qualitative and quantitative concepts presented in the course. Quizzes will test the students' ability to synthesise and interpret content presented during previous weeks of the term. There will be five Moodle quizzes (partly with open questions), each worth 10% of the total course mark.

Course Learning Outcomes

- CLO1 : Investigate and discuss the implications of climate change on human and natural systems.
- CLO3 : Assess environment related problems and apply appropriate quantitative methods.
- CLO4 : Demonstrate how information from the application of these methods and tools can be applied in solution development and make recommendations towards more sustainable decision making processes.

Assignment submission Turnitin type

Not Applicable

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.
For more information on Generative AI and permitted use please see here.

Assignment 1

Assessment Overview

This assignment is related to the implications of climate change on human and natural systems and will take the form of an individual essay. Students will be expected to demonstrate an understanding of this topic.

Course Learning Outcomes

- CLO1 : Investigate and discuss the implications of climate change on human and natural systems.
- CLO4 : Demonstrate how information from the application of these methods and tools can be applied in solution development and make recommendations towards more sustainable decision making processes.

Assessment Length

as specified by lecturer

Assignment submission Turnitin type

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

Generative AI Permission Level

Simple Editing Assistance

In completing this assessment, you are permitted to use standard editing and referencing functions in the software you use to complete your assessment. These functions are described below. You must not use any functions that generate or paraphrase passages of text or other media, whether based on your own work or not.
If your Convenor has concerns that your submission contains passages of AI-generated text or media, you may be asked to account for your work. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.
For more information on Generative AI and permitted use please see here.

Assignment 2

Assessment Overview

This is a group assignment where environmental footprints of households are calculated, compared, altered and discussed and suggestions for changes presented. The aim is to demonstrate an understanding of environmental sustainability and footprinting 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.

Course Learning Outcomes

- CLO2 : Evaluate and analyse simple environment-related systems by adopting environmental footprints, life cycle assessment and material flow analysis.
- CLO3 : Assess environment related problems and apply appropriate quantitative methods.
- CLO4 : Demonstrate how information from the application of these methods and tools can be applied in solution development and make recommendations towards more sustainable decision making processes.

Assessment Length

as specified by lecturer

Assignment submission Turnitin type

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

Generative AI Permission Level

Simple Editing Assistance

In completing this assessment, you are permitted to use standard editing and referencing functions in the software you use to complete your assessment. These functions are described below. You must not use any functions that generate or paraphrase passages of text or other media, whether based on your own work or not.
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General Assessment Information

There will be no final examination in this course. Instead, there will be five quizzes, worth 50% of the total course mark, one individual assignment (20%) and one group assignment (30%).

If you are unwell or have other extenuating circumstances which prevent you from completing an assessment, you **always have to apply for Special Consideration** through official University channels (before the deadline, if possible): https://student.unsw.edu.au/special-consideration. Otherwise the fit-to-submit rule applies, i.e. by sitting or submitting an assessment on the scheduled assessment date, the student is declaring that they are fit to do so and cannot later apply for Special Consideration.

Marking criteria: All assignments will be marked on the basis of whether the student demonstrates an understanding of the material. Where numerical errors can be identified as simple slips, penalties will not be as large as when errors appear to be a result of a conceptual misunderstanding, or the source of the error is difficult to determine from the working. The group assignment will be additionally assessed with respect to the depth of the analysis, the breadth of its consideration of the question at hand and the clarity of the way in which the answer is

presented. The use of tables and diagrams is encouraged. Make sure you do not exceed the imposed page limits.

Penalties for late submissions of all assignments apply. Late work will be penalised at the rate of 5% per day after the due time and date have expired.

Grading Basis

Standard

Requirements to pass course

The total of all assessments needs to be at least 50 marks (50%) to pass the course.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 9 September - 15 September	Topic	Climate Change I: The Physical Science Basis
Week 2 : 16 September - 22 September	Topic	Climate Change II: Impacts, Adaptation and Vulnerability
Week 3 : 23 September - 29 September	Topic	Climate Change III: Mitigation of Climate Change
	Assessment	Quiz 1
Week 4 : 30 September - 6 October	Topic	Environmental Sustainability I: Sustainability Principles, Sustainable Engineering, Industrial Ecology / Circular Economy
Week 5 : 7 October - 13 October	Topic	Environmental Sustainability II: System Dynamics modelling, Limits to Growth
	Assessment	Quiz 2
Week 6 : 14 October - 20 October	Activity	Flexibility week for all courses, no teaching. Work on Assignment.
Week 7 : 21 October - 27 October	Topic	Sustainability Assessment Methods I: Carbon Accounting and Environmental Footprints
	Assessment	Assignment 1 due
Week 8 : 28 October - 3 November	Topic	Sustainability Assessment Methods II: Material Flow Analysis, Life Cycle Assessment 1
	Assessment	Quiz 3
Week 9 : 4 November - 10 November	Topic	Sustainability Assessment Methods III: Life Cycle Assessment 2, Multi-Criteria Decision Analysis
	Assessment	Quiz 4
Week 10 : 11 November - 17 November	Topic	Examples of sustainability in industry practice. Guest lectures.
	Assessment	Quiz 5
Week 11 : 18 November - 24 November	Assessment	Assignment 2 due

Attendance Requirements

Undergraduate students must attend at least 80% of the workshops in which they are enrolled for the duration of the session.

Course Resources

Prescribed Resources

UNSW Moodle

All material required for this course will be provided on UNSW Moodle. It is compulsory for all students to access this resource: https://moodle.telt.unsw.edu.au/login/index.php

Recommended Resources

Textbook and Readings

There is not compulsory textbook for this course. However, we **strongly recommend** the following two:

- Peters, G. and Svanström, M. 2019. ***Environmental Sustainability for Engineers and Applied Scientists***. Cambridge University Press, Cambridge. https://doi.org/10.1017/9781316711408 [available through UNSW Library at https://www.library.unsw.edu.au and through UNSW Bookshop at https://www.bookshop.unsw.edu.au/details.cgi?ITEMNO=9781316617731 and https://unswbookshop.vitalsource.com/products/-v9781316731284].
- Diesendorf, M. and Taylor, R. (2023) ***The Path to a Sustainable Civilisation: Technological, Socioeconomic and Political Change***. 2023. Springer Nature Singapore, Singapore. https://doi.org/10.1007/978-981-99-0663-5 and https://sustainablecivilisation.com [available through UNSW Library at https://www.library.unsw.edu.au and through UNSW Bookshop at https://www.bookshop.unsw.edu.au/details.cgi?ITEMNO=9789819906628].

Readings will be posted on Moodle, unless a URL is provided in the syllabus. Students are required to be familiar with the required reading materials prior the class.

Useful literature

- Hoekstra, A. Y. and T. O. Wiedmann. 2014. Humanity's unsustainable environmental footprint. Science 344(6188): 1114-1117. http://dx.doi.org/10.1126/science.1248365
- Brunner, Paul H and Helmut Rechberger. 2017. *Handbook of Material Flow Analysis For Environmental, Resource, and Waste Engineers* (Taylor and Francis, CRC Press, Second edition).
  [available through UNSW Library at https://www.library.unsw.edu.au].

Useful databases for academic journals (accessible via UNSW Library)

- http://www.sciencedirect.com
- http://www.scopus.com
- http://scholar.google.com

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Thomas W iedmann		Room 106, Civil and Environmental Engineering Building H20	+61 2 9065 2065	agree via email	No	Yes

Other Useful Information

Academic Information

I. Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to, or within 3 working days of, submitting an assessment or sitting an exam.

Please note that UNSW has a Fit to Sit rule, which means that if you sit an exam, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's Special Consideration page.

II. Administrative matters and links

All students are expected to read and be familiar with UNSW guidelines and polices. In particular, students should be familiar with the following:

- Attendance
- UNSW Email Address
- Special Consideration
- Exams
- Approved Calculators
- Academic Honesty and Plagiarism
- Equitable Learning Services

III. Equity and diversity

Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at

the commencement of, their course, or with the Equity Officer (Disability) in the Equitable Learning Services. Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.

IV. Professional Outcomes and Program Design

Students are able to review the relevant professional outcomes and program designs for their streams by going to the following link: https://www.unsw.edu.au/engineering/student-life/student-resources/program-design.

Note: This course outline sets out the 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 or your primary learning management system (LMS) 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/Moodle/LMS, the description in the Course Outline/Moodle/LMS applies.

Academic Honesty and Plagarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.*

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism, visit: student.unsw.edu.au/plagiarism. The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also

be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis or contract cheating) even suspension from the university. The Student Misconduct Procedures are available here:

www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Submission of Assessment Tasks

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of five percent (5%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day. This is for all assessments where a penalty applies.

Work submitted after five days (120 hours) will not be accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These will be clearly indicated in the course outline, and such assessments will receive a mark of zero if not completed by the specified date. Examples include:

- Weekly online tests or laboratory work worth a small proportion of the subject mark;
- Exams, peer feedback and team evaluation surveys;
- Online quizzes where answers are released to students on completion;
- Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date; and,
- Pass/Fail assessment tasks.

Faculty-specific 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)

School Contact Information

For assistance with enrolment, class registration, progression checks and other administrative matters, please see the Nucleus: Student Hub. They are located inside the Library – first right as you enter the main library entrance. You can also contact them via http://unsw.to/webforms or reserve a place in the face-to-face queue using the UniVerse app.

For course administration matters, please contact the Course Coordinator.

Questions about the this course should normally be asked during the scheduled class so that everyone can benefit from the answer and discussion.