

CEIC4000

Environment and Sustainability

Term 2, 2023



Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Graeme Bushell	g.bushell@unsw.edu.au	During office hours on Teams	Hilmer room 219	9385 5921

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.

If circumstances outside your control impact on submitting assessments, Special Consideration may be granted, usually in the form of an extension or a supplementary assessment. Applications for Special Consideration must be submitted [online](#).

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.

Course Details

Units of Credit 6

Summary of the Course

We hear every day about the destruction of forests, plastic in the oceans and carbon dioxide in the atmosphere. We hear that we all need to change, because our current lifestyles are unsustainable: eat less meat, drive less car, recycle our plastic and compost our food waste. But is it enough? How much change do we need, to have a sustainable world? What should engineers do to help us achieve it, and why?

In this course we will grapple with these big questions. You'll be able to take an in-depth look at a sustainability issue that you're passionate about: its causes, consequences and implications. You'll also hear about lots of other issues that you'd never even heard of before and will develop the critical skills to challenge sloppy sustainability thinking wherever you find it. You'll also start to develop an understanding of the way our society, economy and environment interact, to make sense out of chaotic and rapidly changing world; and develop your ability to use ethical thinking to decide how you ought to behave in it.

Course Aims

This course is about about the sustainability of various human activities (most of which are directly or indirectly related to engineering) across a range of potentially limiting environmental circumstances. It aims to raise awareness of these issues and the use of sustainability tools to assess their status, or our performance in attempting to mitigate their impact and change our behaviour.

Consideration of these matters raises fundamental ethical questions, and hence the opportunity is taken to examine what ethical practice as a professional engineer means.

Course Learning Outcomes

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

Learning Outcome	EA Stage 1 Competencies
1. Be aware of the causes and societal implications of a range of sustainability issues, with the ability to discuss at least one issue in detail	PE1.5
2. Assess the impact of environmental issues on economic, social and environmental sustainability	PE1.3, PE1.6, PE1.5, PE2.1, PE3.4
3. Advocate an ethical role for the professional engineer in the sustainability context	PE3.1, PE3.2, PE3.3
4. Develop and communicate a logical argument	PE3.2, PE3.4
5. Critically assess the arguments of others	PE3.2, PE3.5

Teaching Strategies

The course is designed around the delivery of a major assignment, which asks students to investigate a sustainability issue of their choice, in some depth, and to evaluate the role that the engineering profession ought to play. As we go through the term there are lectures, readings, and activities to develop the concepts and ideas that need to be applied in the assignment - with multiple ways to engage. Regular and detailed feedback, at both personal and class levels (through peer evaluation) ensures that unfamiliar concepts are understood and properly applied. Classes are offered in either fully online, or in blended mode (online lecture discussions with face-to-face tutorials).

Assessment

The indicated word limits will be strictly applied, and are as measured by Turnitin, **NOT** as determined by your word processor or any other means. If you submit something over the word limit it will be returned to you for editing and resubmission. This may result in you incurring a late penalty.

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Participation	15%	O-Week, Week 1, Week 2, Week 3, Week 7, Week 8, Stuvac	1, 5
2. Assignment Draft	15%	Week 3, Week 6, Week 8	2, 3, 4
3. Peer evaluations	20%	Week 4, Week 5, Week 9, Week 10	1, 5
4. Assignment	50%	11/08/2023 09:00 PM	1, 2, 3, 4

Assessment 1: Participation

Due date: O-Week, Week 1, Week 2, Week 3, Week 7, Week 8, Stuvac

Participation during term is assessed for tutorial activities as described in the schedule. This is important as active participation allows students to communicate, form arguments, and learn from a diversity of perspectives. Participation means you attempt all the aspects of the activity, such that meaningful feedback can be provided.

This is not a Turnitin assignment

Assessment criteria

Were you present and engaged with what was going on?

Additional details

Which activities in which participation is expected, varies week by week although it is typically related to tutorial class. This should be clear in the course schedule wherever "participate" is mentioned.

Assessment 2: Assignment Draft

Assessment length: 1000 words maximum, each part

Due date: Week 3, Week 6, Week 8

Marks returned: within 2 weeks of submission

Early written work primarily for feedback so that students may improve the quality of their submissions. This assignment will be subjected to similarity checking and students can see the similarity reports. The maximum length is 1000 words maximum per part, including the bibliography.

This assignment is submitted through Turnitin and students can see Turnitin similarity reports.

Assessment criteria

The assessment rubric is provided with the assignment brief.

Additional details

Word limit is *as determined by Turnitin*, and includes the bibliography.

You may, **optionally**, also submit your drafts through the Evaluation workshop tool in moodle. If you do this, your work will be peer reviewed and possibly discussed during tutorial. This will help the rest of the class through the discussion of general principles that may apply to their own work, and will help you through more detailed, and earlier, feedback than you would otherwise receive.

Assessment 3: Peer evaluations

Due date: Week 4, Week 5, Week 9, Week 10

Assignment drafts and participation activities are peer evaluated according to the course schedule. Evaluation marks are awarded to you based on how closely your evaluation of the given work matches the tutor's assessment of the same work. Your evaluation work provides feedback points to the person you are assessing.

This is not a Turnitin assignment

Assessment criteria

Marks are awarded based on how close your assessment of peers' work is, in relation to the truest assessment (using the algorithm built in to the moodle workshop tool).

Additional details

Selected student draft assignments will be discussed in tutorial in weeks 4 and 9, presentations delivered in tutorial in weeks 5 and 10. Evaluations are due by the end of the same week using the moodle workshop tool.

Note that while delivering a presentation is optional and attracts extra participation marks, evaluating drafts and presentations should be considered as a required component of assessment.

Assessment 4: Assignment

Assessment length: 3000 words maximum

Due date: 11/08/2023 09:00 PM

Deadline for absolute fail: End of exam period

Marks returned: After release of results

This integrative and summative assignment will provide students with an opportunity to demonstrate their understanding of the topics covered in the course and apply knowledge to areas of their interest. This assignment is subjected to similarity checking and students can see similarity reports. Maximum length is 3000 words.

This assignment is submitted through Turnitin and students can see Turnitin similarity reports.

Assessment criteria

Assessment criteria are given with the assignment brief.

Additional details

Word limit is as determined by Turnitin, and includes the bibliography. Students not meeting minimum requirements on the basis of the written submission may be eligible to demonstrate the course learning outcomes in interview.

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: 22 May - 26 May	Online Activity	Read the course outline. Complete "Introductory quiz" to release course content (100% mark required, unlimited attempts allowed) Complete "Your Views" survey for 15% of PARTICIPATION marks
	Assessment	Participation
Week 1: 29 May - 2 June	Lecture	Lecture (in Teams, recorded). The UN sustainable development goals. What does sustainability mean, what is a sustainability issue. How it is different to sustainable development. A stocks and flows framework. Environmental, economic and social sustainability. The tragedy of the commons. Course and assessment briefing.
	Tutorial	Sustainability and sustainable development discussion. Assignment topic selection. 15% of PARTICIPATION marks.
	Assessment	Participation
Week 2: 5 June - 9 June	Lecture	Lecture (in Teams, recorded). Sustainability metrics and indicators. What they are and how they work. Simple metrics assess direct contribution to the change. Footprints include indirect contributions. Safe limits and the idea of absolute assessment. The Daly rules. Planetary boundaries and biogeochemical cycles.
	Tutorial	Sustainability assessment. 15% of PARTICIPATION marks.
	Assessment	Participation
Week 3: 12 June - 16 June	Lecture	Lecture (in Teams, pre-recorded due to public holiday). Basic ideas in ethics and what's meant

		by ethical reasoning. Hume's guillotine. A seminar from Joshua Greene.
	Tutorial	Ethics discussion 1. 15% of PARTICIPATION marks.
	Assessment	Participation
	Assessment	Assignment Draft
Week 4: 19 June - 23 June	Lecture	Lecture (in Teams, recorded). Review of metrics, absolute and relative. Dynamics are critical to understanding sustainability. Resource depletion dynamics. Population dynamics modelling. Ecological overshoot.
	Tutorial	Evaluate draft submissions with peers during tutorial. Enter your assessments in moodle for 25% of EVALUATION marks.
	Online Activity	Next week's tutorial has the opportunity for a limited number of students to present their approach for part 2 of the assignment draft, during the tutorial. REGISTER to do this using the sign-up tool in moodle if you're interested.
	Assessment	Peer evaluations
Week 5: 26 June - 30 June	Lecture	Lecture (in Teams, recorded). Life Cycle Assessment (LCA)
	Tutorial	Present your ideas for part 2 of the assignment for 30% of PARTICIPATION marks (pre-registration required). Evaluate your peers' presentations in moodle for 25% of EVALUATION marks.
	Assessment	Peer evaluations
Week 6: 3 July - 7 July	Reading	Flex week - no formal classes. Use this week for reading and to develop your assignment.
	Assessment	Assignment Draft
Week 7: 10 July - 14 July	Lecture	Lecture (in Teams, recorded). Expert guest Stephen Cohen – Ethical frameworks, elements of moral reasoning, and professional ethics.
	Tutorial	Ethics discussion 2. 15% of PARTICIPATION marks.
	Assessment	Participation
Week 8: 17 July - 21	Lecture	Lecture (in Teams, recorded). Understanding

July		societal collapse – population dynamics, structural demographics theory, and historical examples.
	Tutorial	Ethics discussion 3. 15% of PARTICIPATION marks.
	Assessment	Participation
	Assessment	Assignment Draft
Week 9: 24 July - 28 July	Lecture	Lecture (in Teams, recorded). The Limits to Growth
	Tutorial	Evaluate draft submissions with peers during tutorial. Enter your assessments in moodle for 25% of EVALUATION marks.
	Online Activity	Next week's tutorial has the opportunity for a limited number of students to present a precis of their assignment draft, during the tutorial. REGISTER to do this using the sign-up tool in moodle if you're interested.
	Assessment	Peer evaluations
Week 10: 31 July - 4 August	Lecture	Lecture (in Teams). TBC - expert guests Professionals Australia (recorded) – succeeding with an engineering career in an uncertain world. Zoom link to be provided. Film screening with live chat (not recorded) - Surviving Progress (this is also available to rent or buy on YouTube - if you can't attend the class).
	Tutorial	Present a precis of your assignment for 30% of PARTICIPATION marks (pre-registration required). Evaluate your peers' presentations in moodle for 25% of EVALUATION marks.
	Online Activity	Complete an online survey for 15% of PARTICIPATION marks.
	Assessment	Peer evaluations
Stuvac: 7 August - 11 August	Assessment	Participation
	Assessment	Assignment

Resources

Prescribed Resources

Videos, recorded lectures, required and suggested readings, tutorial sessions and recordings, plus links to other online resources will be provided on the course moodle page
<https://moodle.telt.unsw.edu.au/course/view.php?id=75940>

Course Evaluation and Development

Feedback on course design and implementation is encouraged, at any time but particularly through the myExperience survey at the end of term. There were several minor issues identified in the previous implementation that have now been tidied up: the assignment has been split into three non-overlapping documents - the brief, a template, and advice.

The assessment criteria for the assignment have been adjusted term in light of developments with generative AI and advice on this topic included in the assignment advice document.

Submission of Assessment Tasks

In the School of Chemical Engineering, all written work will be submitted for assessment via Moodle unless otherwise specified. Attaching cover sheets to uploaded work is not required unless specifically requested for an individual assessment task; when you submit work through Moodle for assessment you are agreeing to uphold the Student Code.

Some assessments will require you to complete the work online and it may be difficult for the course coordinator to intervene in the system after the due date. You should ensure that you are familiar with assessment systems well before the due date. If you do this, you will have time to get assistance before the assessment closes.

All submissions are expected to be neat and clearly set out. Your results are the pinnacle of all your hard work and should be treated with respect. Presenting results clearly gives the marker the best chance of understanding your method; even if the numerical results are incorrect. Please make it easy for the markers who are looking at your work to see your achievement and give you due credit.

Marking guidelines for assignment submissions will be provided at the same time as assignment details to assist with meeting assessable requirements. Submissions will be marked according to the marking guidelines provided.

Late penalties

Unless otherwise specified, submissions received after the due date and time will be penalised at a rate of 5% per day or part thereof (including weekends) and will not be accepted more than 5 days late. For some activities including Exams, Quizzes, Peer Feedback, and Team Evaluation surveys, extensions and late submissions are not possible.

Special consideration

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 submitting an assessment or sitting an exam.

UNSW has a [Fit to Sit / Submit rule](#), which means that if you attempt an exam or submit a piece of assessment, 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](#).

Please note that for **all** special consideration requests (including COVID-19-related requests), students will need documentary evidence to support absences from any classes or assessments.

Academic Honesty and Plagiarism

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility and courage (International Center for Academic Integrity, 'The Fundamental Values of Academic Integrity', T. Fishman (ed), Clemson University, 2013). At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.

Further information about academic integrity and plagiarism can be located at:

- The [Current Students site](#)
- The [ELISE training site](#)

The Conduct and Integrity Unit provides further resources to assist you to understand your conduct obligations as a student: <https://student.unsw.edu.au/conduct>.

To help describe what we are looking for, here are some things that we consider to be quite acceptable (even desirable!) actions for many assessments, and some that we consider to be unacceptable in most circumstances. Please check with the instructions for your assessments and your course coordinator if you're unsure. As a rule of thumb, if you don't think you could look the lecturer in the eye and say "this is my own work", then it's not acceptable.

Acceptable actions	Unacceptable actions
<ul style="list-style-type: none"> ✓ reading/searching through material we have given you, including lecture slides, course notes, sample problems, workshop problem solutions ✓ reading/searching lecture transcripts ✓ reading/searching resources that we have pointed you to as part of this course, including textbooks, journal articles, websites ✓ reading/searching through your own notes for this course ✓ all of the above, for any previous courses ✓ using spell checkers, grammar checkers etc to improve the quality of your writing ✓ studying course material with other students 	<ul style="list-style-type: none"> ✗ asking for help with an assessment from other students, friends, family ✗ asking for help on Q&A or homework help websites ✗ searching for answers to the specific assessment questions online or in shared documents ✗ copying material from any source into your answers ✗ using generative AI tools to complete or substantially complete an assessment for you ✗ paying someone else to do the assessment for you

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism. Further information about referencing styles can be located at <https://student.unsw.edu.au/referencing>.

For assessments in the School of Chemical Engineering, we recommend the use of referencing software such as [Mendeley](#) or [EndNote](#) for managing references and citations. Unless required otherwise specified (i.e. in the assignment instructions) students in the School of Chemical Engineering should use either the APA 7th edition, or the American Chemical Society (ACS) referencing style as canonical author-date and numbered styles respectively.

Artificial intelligence tools such as ChatGPT, CodePilot, and built-in tools within Word are modern tools that are useful in some circumstances. In your degree at UNSW, we're teaching you skills that are needed for your professional life, which will include how to use AI tools responsibly plus lots of things that AI tools cannot do for you. AI tools already are (or will soon be) part of professional practice for all of us. However, if we were only teaching you things that AI could do, your degree would be worthless, and you wouldn't have a job in 5 years.

Whether the use of AI tools in an assessment is appropriate will depend on the goals of that assessment. As ever, you should discuss this with your lecturers – there will certainly be assessments where the use of AI tools is encouraged, as well as others where it would interfere with your learning and place you at a disadvantage later. Our goal is to help you learn how to ethically and professionally use the tools available to you. To learn more about the use of AI, [see this discussion we have written](#) where we analyse the strengths and weaknesses of generative AI tools and discuss when it is professionally and ethically appropriate to use them.

While AI may provide useful tools to help with some assessments, UNSW's policy is quite clear that taking the output of generative AI and submitting it as your own work will never be appropriate, just as paying someone else to complete an assessment for you is serious misconduct.

Academic Information

To help you plan your degree, assistance is available from academic advisors in [The Nucleus](#) and also in the [School of Chemical Engineering](#).

Additional support for students

- [Current Student Gateway](#) for information about key dates, access to services, and lots more information
- [Engineering Student Life - Current Student Resources](#) for information about everything from getting to campus to our first year guide
- [Student Support and Success](#) for our UNSW team dedicated to helping with university life, visas, wellbeing, and academic performance
- [Academic Skills](#) to brush up on some study skills, time management skills, get one-on-one support in developing good learning habits, or join workshops on skills development
- [Student Wellbeing, Health and Safety](#) for information on the UNSW health services, mental health support, and lots of other useful wellbeing resources
- [Equitable Learning Services](#) for assistance with long term conditions that impact on your studies
- [IT Service Centre](#) for everything to do with computing, including installing UNSW licensed software, access to computing systems, on-campus WIFI and off-campus VPNs

Course workload

Course workload is calculated using the Units-Of-Credit (UOC). The normal workload expectation for one UOC is approximately 25 hours per term. This includes class contact hours, private study, other learning activities, preparation and time spent on all assessable work.

Most coursework courses at UNSW are 6 UOC and involve an estimated 150 hours to complete, for both regular and intensive terms. Each course includes a prescribed number of hours per week (h/w) of scheduled face-to-face and/or online contact. Any additional time beyond the prescribed contact hours should be spent in making sure that you understand the lecture material, completing the set assignments, further reading, and revising for any examinations. Most 6 UoC courses will involve approximately 10-12 hours per week of work on your part. If you're not sure what to do in these hours of independent study, the resources on the [UNSW Academic Skills](#) pages offer some suggestions including: making summaries of lectures, read/summarise sections from the textbook, attempt workshop problems, reattempting workshop problems with some hints from the solutions, looking for additional problems in the textbook.

Full-time enrolment at university means that it is a *full-time* occupation for you and so you would typically need to devote 35 hours per week to your studies to succeed. Full-time enrolment at university is definitely incompatible with full-time employment. Part-time/casual employment can certainly fit into your study schedule but you will have to carefully balance your study obligations with that work and decide how much time for leisure, family, and sleep you want left after fulfilling your commitments to study and work. Everyone only gets 168 hours per week; overloading yourself with both study commitments and work commitments leads to poor outcomes and dissatisfaction with both, overtiredness, mental health issues, and general poor quality of life.

On-campus class attendance

In 2023, most classes at UNSW are running in a face-to-face mode only. Attendance is expected as is

participation in the classes. As an evidence-driven engineer or scientist, you'll be interested to know that education research has shown students learn more effectively when they come to class, and less effectively from lecture catch-up recordings. If you have to miss a class due to illness, for example, we expect you to catch up in your time, and within the coming couple of days.

For most courses that are running in an "in person" mode:

- Lectures are normally recorded to provide an opportunity to review material after the lecture; lecture recordings are not a substitute for attending and engaging with the live class.
- Workshops/tutorials are not normally recorded as the activities that are run within those sessions normally cannot be captured by a recording. These activities may also include assessable activities in some or all weeks of the term.
- Laboratories are not recorded and require in-person attendance. Missing laboratory sessions may require you to do a make-up session later in the term; if you miss too many laboratory sessions, it may be necessary to seek a Permitted Withdrawal from the course and reattempt it next year, or end up with an Unsatisfactory Fail for the course.
- Assessments will often require in-person attendance in a timetabled class or a scheduled examination.

This course outline will have further details in the Course Schedule and Assessment sections.

Class numbers are capped in each class to ensure appropriate facilities are available, to maintain student:staff ratios, and to help maintain adequate ventilation in the spaces. Only students enrolled in each specific classes will be allowed in the room. Class rosters will be attached to corresponding rooms and circulated among lab demonstrators and tutors. No over-enrolment is allowed in face-to-face classes.

In certain classroom and laboratory situations where physical distancing cannot be maintained or the staff running the session believe that it will not be maintained, face masks will be designated by the course coordinator as **mandatory PPE** for students and staff. Students are required to bring and use their own face mask. Mask can be purchased from IGA Supermarket (Map B8, Lower Campus), campus pharmacy (Map F14, Middle Campus), the post office (Map F22, Upper Campus) and a vending machine in the foyer of the Biological Sciences Building (Map E26, Upper Campus).

Your health and the health of those in your class is critically important. You must stay at home if you have COVID-19 or have been advised to self-isolate by [NSW health](#) or government authorities.

Asking Questions

Asking questions is an important part of learning. Learning to ask good questions and building the confidence to do so in front of others is an important professional skill that you need to develop. The best place to ask questions is during the scheduled classes for this course, with the obvious exception being questions that are private in nature such as special consideration or equitable learning plans. Between classes, you might also think of questions — some of those you might save up for the next class (write them down!), and some of them you might ask in a Q&A channel on Teams or a Q&A forum on Moodle. Please understand that staff won't be able to answer questions on Teams/Moodle immediately but will endeavour to do so during their regular working hours (i.e. probably not at midnight!) and when they are next working on this particular course (i.e. it might be a day or two). Please respect that staff are juggling multiple work responsibilities (teaching more than one course, supervising research students, doing experiments, writing grants, ...) and also need to have balance between work and the rest of their life.

Note: 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

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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	