

CVEN9898

Fundamentals of Sustainable Infrastructure

Term 1, 2022



Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Ruth Fisher	ruth.fisher@unsw.edu.au	Please email to arrange a time or through the Moodle forum	H20 Rm 205	(02) 9385 5073

Lecturers

Name	Email	Availability	Location	Phone
Shantanu Chakraborty	Cven.teaching@unsw.edu.au	Please contact through Moodle forum	external	
Baran Yildiz	baran.yildiz@unsw.edu.au	Please contact through Moodle forum		
Richard Stuetz	r.stuetz@unsw.edu.au	Please contact through Moodle forum		

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 course provides a theoretical background to the sustainability aspects of water and waste management, transport services, energy supply and distribution. The theory will then be applied to the analysis and design of sustainable infrastructure case studies, involving economic, resource and population constraints.

It provides a regional planning context to the planning and design of infrastructure and provides a series of case studies to illustrate the principles of sustainable infrastructure design.

Course Aims

The course aims to have students gain the following attributes:

- A respect for ethical practice and social responsibility
- Skills for effective communication
- An in-depth engagement with the relevant civil and environmental engineering knowledge related to infrastructure design 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

Course Learning Outcomes

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

Learning Outcome	EA Stage 1 Competencies
1. Outline the fundamental concepts underpinning the provision of Sustainable Infrastructure solutions	PE1.1, PE1.3, PE1.5, PE1.6
2. Analyse infrastructure provision requirements and issues at different scales (building, precinct, city, region)	PE2.1, PE2.2, PE2.4, PE1.5, PE1.6
3. Generate solution options and evaluate their feasibility in terms of function and sustainability outcomes	PE2.2, PE2.4, PE3.2, PE3.4

Teaching Strategies

Please refer to the information in Moodle

Additional Course Information

The course will be run in hybrid mode. All lectures and workshops will be available to students to attend online through Blackboard collaborate. **Some** lectures and workshops will be offered as hybrid (both

online and face to face in Rm 701, H20).

Lectures and online lessons will provide the foundational concepts of transport, water, waste and energy and sustainability that underpin the delivery of Sustainable Infrastructure solutions. Lectures will be supported by workshops, which will examine how this information can be used to analyse sustainable solutions for urban communities. Information relating to key infrastructure systems will also be available on Openlearning to support students learning and build on what was delivered in the lectures and workshops.

All announcements, assessments, grades etc will be available on Moodle which is the main page for the course. It is envisaged that for each hour of contact that you will put in at least 1.5 hrs of private study.

It is expected that students:

Private Study	<ul style="list-style-type: none">• Review lecture material and supporting references material on OpenLearning• Contribute to group discussions and assessments• Prepare for workshops• Keep up with notices and find out marks via Moodle
Lectures	<ul style="list-style-type: none">• Prepare for the lectures and workshops before attending• Hear announcements on course changes
Workshops	<ul style="list-style-type: none">• Be active in workshops and group activities• Participate in OpenLearning discussion topics if participating asynchronously• Ask questions on assessment tasks
Assessments	<ul style="list-style-type: none">• Demonstrate your knowledge and skills in assignments• Demonstrate higher understanding and problem solving in assignments• Demonstrate time management skills through group work and distribution of project tasks• Seek informal discussions via lecturers and guest lecturers

Assessment

Late submissions will be penalised at the rate of 5% per day after the due time and date have expired.

All assessment details and rubrics can be found in Moodle. The final grade for this course will be based on the sum of the scores from each of the assessment tasks. There is **no final exam** for this course.

Note: The lecturer reserves the right to adjust the final scores by scaling if agreed by the Head of School.

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Background Report	30%	01/04/2022 05:00 PM	1, 2
2. Quizzes	20%	See Moodle for Schedule	1
3. Final Report	50%	22/04/2022 05:00 PM	2, 3

Assessment 1: Background Report

Assessment length: 10 - 15 pages

Submission notes: Through Turnitin, one per group

Due date: 01/04/2022 05:00 PM

Marks returned: 2 weeks after submission deadline

Group report detailing the site context, exemplars, targets and responsibilities for the case study problem.

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

Assessment criteria

The marking rubric for this assignment is provided on Moodle.

Assessment 2: Quizzes

Submission notes: Quizzes will be completed online through Moodle

Due date: See Moodle for Schedule

Marks returned: After the quiz timeframe has ended

Set of four (4) online quizzes testing students comprehension of the studied infrastructure systems.

This is not a Turnitin assignment

Assessment criteria

The four online quizzes on Transport, Energy, Water and Waste will test the students' ability to synthesise specific parts of the course, demonstrate understanding of main principles and implement them in given situations. They may include calculations.

Additional details

They will be held the week following the components delivery, open book, available to be taken in a 24 hr period. See Moodle for specific details.

Assessment 3: Final Report

Submission notes: Each report will be completed individually and submitted through the Turnitin link provided on Moodle

Due date: 22/04/2022 05:00 PM

These will cover the background knowledge provided to the students on Sustainable Infrastructure in relation to each discipline (Water/Wastewater, Waste, Transport and Energy)

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

Assessment criteria

The marking rubric for this assignment is provided on Moodle.

Additional details

See Moodle for Report requirements for each theme (Transport, Energy, Water and Waste). Expected length is 10 pages. See Moodle for details.

Attendance Requirements

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

Course Schedule

All sessions will be run online, however please check on Moodle to see which lectures and workshops **also** offer a face-to-face option.

[View class timetable](#)

Timetable

Date	Type	Content
Week 1: 14 February - 18 February	Lecture	Tuesday, 15th February 11am -1pm Online or in H20-701 Introduction to course, Case study overview, Sustainability (Fisher)
	Workshop	Thursday, 17th February 4pm -6pm Online or in H20-701 Infrastructure Rating Systems & Workshop (Fisher)
Week 2: 21 February - 25 February	Lecture	Tuesday, 22nd February 11am -1pm Online ONLY Transport (Chakraborty)
	Workshop	Thursday, 24th February 4pm -6pm Online ONLY Transport (Chakraborty)
Week 3: 28 February - 4 March	Lecture	Tuesday, 1st March 11am -1pm Online ONLY Energy (Yildiz)
	Workshop	Thursday, 3rd March 4pm - 6pm Online ONLY Energy (Yildiz)

	Assessment	Transport Quiz Due
Week 4: 7 March - 11 March	Lecture	Tuesday, 8th March 11am - 1pm Online or in H20-701 Water (Stuetz)
	Workshop	Thursday, 10th March 4pm - 6pm Online or in H20-701 Water (Stuetz)
	Assessment	Energy Quiz Due
Week 5: 14 March - 18 March	Lecture	Tuesday, 15th March 11am - 1pm Online or in H20-701 Waste (Fisher)
	Workshop	Thursday, 17th March 4pm - 6pm Online or in H20-701 Waste (Fisher)
	Assessment	Water Quiz Due
Week 6: 21 March - 25 March		Flexibility Week
Week 7: 28 March - 1 April	Lecture	Tuesday, 29th March 11am - 1pm Online or in H20-701 Resilience and Systems (Fisher)
	Workshop	Thursday, 31st March 4pm - 6pm Online or in H20-701 Casestudy (Fisher)
	Assessment	Background Report due - 1st April, 5pm
	Assessment	Waste Quiz Due
Week 8: 4 April - 8 April	Project	Feedback and Discussion sessions Tuesday, 5th April 11am-1pm: Energy (online) + Waste (hybrid)

		Thursday, 7th April 4pm-6pm: Waste (hybrid) + Transport (online)
Week 9: 11 April - 15 April	Project	Feedback and Discussion Sessions Tuesday, 12th April 11am - 1pm: Water (hybrid) + Energy (online) Thursday, 14th April 4pm - 6pm: Water (hybrid) + Transport (online)
Week 10: 18 April - 22 April	Lecture	Tuesday, 19th April 11am - 1pm Online or in H20-701 Feedback on Background report + time for Questions (Fisher)
	Assessment	Final Report Due - 22nd April 5pm

Resources

Prescribed Resources

- Additional materials provided on OpenLearning.
- Textbook (online version available at the UNSW library):
 - [Sarté, S. B. \(2010\). Sustainable infrastructure : the guide to green engineering and design. Hoboken, N.J.: Wiley.](#)

Course Evaluation and Development

This course has been optimised to cater for students online, around the world, as well as face to face. We have refined how we deliver information over different platforms and always welcome comments on useability and student feedback.

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 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

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	