

CVEN4701

Planning Sustainable Infrastructure

Term 2, 2022



Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Richard Stuetz	r.stuetz@unsw.edu.au			

Lecturers

Name	Email	Availability	Location	Phone
Ruth Fisher	ruth.fisher@unsw.edu.au			
Iain MacGill	i.macgill@unsw.edu.au			
James Hayes	j.e.hayes@unsw.edu.au			
Robert Care	r.care@unsw.edu.au			
Elnaz Irannezhad	e.irannezhad@unsw.edu.au			

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 enables engineers to analyse and design sustainable infrastructure to support the needs of urban and regional economies and populations. It builds on and applies the concepts learned in introductory tools, water, transport and engineering operation courses in Stages 1 to 3 of the program. It provides an urban or regional context to the planning and design of infrastructure in the areas of water and waste management, transport services, energy supply and distribution; and introduces planning methods to enable system thinking to design from macro to asset specific scale so that sustainable outcomes are enabled for urban and regional communities.

The course covers the system design of infrastructure, specifically focusing on:

- Water systems
- Transport systems
- Energy systems
- Material management systems, particularly related to waste and wastewater
- Planning influences on regional and urban infrastructure
- Use of sustainability assessment tools for the selection of infrastructure design.

Course Aims

The course aims to have students gain the following attributes:

- An in-depth engagement with the relevant disciplinary knowledge 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
- A respect for ethical practice and social responsibility
- Skills for effective communication

The objectives of the course include:

- Enable students to design infrastructure systems that include the social and cultural context, as well as having regard to sustainability principles in urban precincts.
- Use information to direct the design of infrastructure so that scarce materials are conserved and not dispersed in un-recoverable forms into the environment.
- Familiarise students with the meaning of sustainability in terms of waste, water and wastewater, transport, energy systems and climate impact.
- Introduce students to the use of planning methods to assess sustainability performance of system options in urban and regional infrastructure.
- Use systems thinking techniques in planning from macro scale to asset specific scale in water and wastewater, waste management, transport and energy systems so that sustainability outcomes are enabled for urban communities.

Course Learning Outcomes

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

Learning Outcome	EA Stage 1 Competencies
1. Carry out independent critical assessment of infrastructure sustainability at varying scales and contexts.	PE1.1, PE1.2, PE1.3, PE1.5
2. Apply sustainability principles to create solutions to enable urban and regional infrastructure provision.	PE1.3, PE1.4, PE1.5, PE1.6, PE2.1, PE2.3
3. Display creativity by creating infrastructure solutions that may not be conventional	PE1.2, PE1.4, PE2.1, PE2.2, PE2.3
4. By the conclusion of this course the student will be able carried out literature reviews, work independently, work in a group and present findings effectively	PE1.4, PE3.1, PE3.2, PE3.4, PE3.6

Teaching Strategies

Initial lecture will provide a historical background to the design brief. Lectures will provide reinforcement of transport, materials, management, water, waste, energy and sustainability topics that builds on previous CVEN courses in year 1, 2 & 3. Formal presentations will be supported by workshops, to examine how this information can be used to design sustainable solutions in an urban and/or regional context. The teaching program will be supported by a combination internal and external guest lectures/ workshops.

Private Study	<ul style="list-style-type: none"> • Review lecture and supporting material • Contribute to group discussions and assessments • Prepare for lectures and workshops • Reflect on group assignments and workshop activities • Independently gather and review relevant supporting information • Keep up with notices and find out marks via Moodle
Lectures	<ul style="list-style-type: none"> • Find out what you must learn • Take notes from guest lectures • See relevant examples and concepts • Hear announcements on course changes
Workshops	<ul style="list-style-type: none"> • Be active in workshops and group activities • Participate in guest lecture / workshop activities • Participate in team building and encourage dialogues within groups • Ask questions
Assessments	<ul style="list-style-type: none"> • Demonstrate your knowledge and skills • Demonstrate higher understanding and problem solving for real world examples • Demonstrate time management skills through group work and distribution of projects tasks • Seek informal discussions via guest lectures, lectures and discussion boards as required

Additional Course Information

This builds on the fundamentals from courses in Years 1, 2, and 3 plus the design of components of

various infrastructure covered in:

- CVEN1701 Environmental Principles
- ENGG1000 Engineering Design and Innovation
- CVEN2402 Transport Engineering and Environmental Sustainability
- DESN2000 Engineering Design and Professional Practice
- CVEN3502 Water and Wastewater Engineering
- CVEN3103 Engineering Operations and Control

Assessment

Students will undertake a variety of individual and group assessment tasks that are associated with course objectives.

Groups with four members will be self-selected using groups on Moodle by end of Week 1.

For group assessment items, only one submission is allowed to be submitted per group (Your first submission is your final submission). All assessment submissions will be through Moodle and/or Turnitin.

Assessment components, the marks assigned to each task, and the dates of submission are set out below and on Moodle. See assessment details on individual and group assignments on Moodle.

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

All group members are required to attend the peer marking of video presentation (Week 9) and project management report interview (Week 11) for satisfactory completion of the assessment task.

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Online Quiz	15%	16/6/2022 6PM	1, 2
2. Presentation	15%	24/7/2022 11:59 PM	2, 3, 4
3. Project Management Report and Professional Development	30%	Part A - Aug 5, 2022; Part B - see Moodle	4
4. Technical report	40%	31/7/2022 11:59 PM	2, 3, 4

Assessment 1: Online Quiz

Start date: 16/6/2022 4PM

Assessment length: 15 Multiple choice questions

Due date: 16/6/2022 6PM

Marks returned: Within 1 week

Technical assessment of sustainability principles, critical thinking, self-reflection and professional attributes.

Assessment criteria

Individual online quiz conducted during class (week 3) (see Moodle for details).

Assessment 2: Presentation

Start date: 30/5/2022

Assessment length: 3 minute group video presentation

Due date: 24/7/2022 11:59 PM
Marks returned: Within 2 weeks

Video presentation on the integration of discipline subject matter with the social, cultural and/or environmental background for the case study.

Assessment criteria

Group assessment video presentation (see Moodle for details)

Additional details

Peer marking of group video presentations will occur on Tuesday 26/7/22 between 4-6pm (week 9).

All group members are required to attend for satisfactory completion of this assessment task.

Assessment 3: Project Management Report and Professional Development

Start date: 30/5/2022

Assessment length: Part A - Report and group interview; Part B - 3 Online modules (see Moodle)

Due date: Part A - Aug 5, 2022; Part B - see Moodle

Marks returned: Within 2 weeks

Part A - Project management report on the management of assessment task by groups (see Moodle for details).

Part B - Self-reflection assessment tasks (see Moodle for details).

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

Assessment criteria

Part A - Group assessment project management report and group interview (during week 11)

Part B - Individual ongoing reflective components (See Moodle for Details).

Additional details

Part A - Group interviews will occur on Tuesday 9/8/22 (week 11).

All group members are required to attend for satisfactory completion of the assessment task.

Assessment 4: Technical report

Start date: 30/5/2022

Assessment length: 10 pages written report plus Appendix

Due date: 31/7/2022 11:59 PM

Marks returned: Within 4 weeks

Technical assessment on either water, waste, transport or energy for case study location.

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

Assessment criteria

Individual assessment (see Moodle for details)

Attendance Requirements

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

Course Schedule

The table of lectures and workshops for each week, indicating the topics and the names of presenter involved, assessment workshops, group consultation workshops, and group and individual assessment activities.

Yellow – Hybrid delivery (and recorded)

Green – Hybrid delivery (and recorded)

Orange – Online delivery (and recorded)

Blue – Consultation workshop

Red – Assessment task

Date	Tuesday (12-14)	Tuesday (16-18)	Thursday (16-18)
	TETB G16	TETB G16	TETB G16
Week 1 (30/5/22)	Course Introduction and site study information (Stuetz)	Sustainability principles (Fisher)	Assessment tasks, expectations, and group formation (Stuetz)
Week 2 (6/6/22)	Communication and teamwork (Care)	Critical thinking and reflection / Report Writing (Hayes)	Sustainability workshop (Fisher)
Week 3 (13/6/22)	Transport (Irannezhad)	Energy (MacGill)	Quiz
Week 4 (20/6/22)	Transport (Irannezhad)	Energy (MacGill)	Energy workshop (MacGill) / Transport workshop (Irannezhad)
Week 5 (27/6/22)	Waste (Fisher)	Water (Stuetz)	Waste workshop (Fisher) / Water workshop (Stuetz)
Week 6 (4/7/22)	Non-teaching		
Week 7 (11/7/22)	Consultation workshop: General (Stuetz)	Consultation workshops: Energy / Transport	Consultation workshops: Waste / Water
Week 8 (18/7/22)	No scheduled class	Consultation workshops: Video presentation (Stuetz)	Consultation workshop: Project management (Stuetz)

Week 9 (25/7/22)	<i>No scheduled class</i>	Presentation watching and peer marking (all students)	Consultation workshops: General (Stuetz)
Week 10 (1/8/22)	<i>No scheduled class</i>	<i>No scheduled class</i>	<i>No scheduled class</i>
Week 11 (8/8/22)	Project Management Interview (all students) All Day	Project Management Interview (all students) All Day	<i>No scheduled class</i>

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 T2 2022 will be held online between 12th - 25th August 2022 inclusive, and supplementary exams between 5th - 9th September 2022 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.

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	✓