



Australia's
Global
University

School of Civil and Environmental Engineering

Term 2, 2021

CVEN4701 PLANNING SUSTAINABLE INFRASTRUCTURE

COURSE DETAILS

| | | |
|--|--|--|
| Units of Credit | 6 | |
| Contact hours | 6 hours per week | |
| Lecture | Tuesday, 9:00 – 11:00 | Online (weeks 1-5, 6, 7, 9, 10) |
| Workshop | Tuesday, 11:00 – 13:00 Thursday, 14:00 – 16:00 | Online (weeks 1-5); Tyree G16 (weeks 7-9) Tyree G16 (weeks 1-9) |
| Course Coordinator and Lecturer | Prof Richard Stuetz email: r.stuetz@unsw.edu.au | |
| Lecturer | Dr Ruth Fisher email: ruth.fisher@unsw.edu.au Dr Shantanu Chakraborty email: s.chakraborty@unsw.edu.au Associate Professor Iain MacGill email: i.macgill@unsw.edu.au Dr James Hayes email: j.e.hayes@unsw.edu.au Dr Robert Care email: r.care@unsw.edu.au | |

INFORMATION ABOUT THE COURSE

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
- CVEN2402 Transport engineering and environmental sustainability
- DESN2000 Engineering Design and Professional Practice
- CVEN3701 Environmental frameworks, law and economics
- CVEN3502 Water and wastewater engineering
- CVEN3103 Engineering operations and control

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.

HANDBOOK DESCRIPTION

See link to virtual handbook:

<https://www.handbook.unsw.edu.au/undergraduate/courses/2021/CVEN4701/>

OBJECTIVES

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.

The course aims to have the 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

TEACHING STRATEGIES

Initial lecture will provide a historical background to the development of the urban case study area, the redevelopment of the Long Bay Correctional Complex, Matraville, NSW.

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 context. The teaching program will be supported by live and recorded 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 |

EXPECTED LEARNING OUTCOMES

The course is designed to enable the student to critically and independently assessing information on planning sustainable infrastructure and related these to historical-social-cultural-economic context of urban / regional / remotes communities. To provide the student with practical tools for solving urban / regional / remotes infrastructure problems and provide multi-disciplinary solutions.

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

| Learning Outcome | | EA Stage 1 Competencies |
|------------------|---|--|
| 1. | <i>Carry out independent critical assessment of infrastructure sustainability at varying scales and contexts</i> | PE1.1, PE1.2, PE1.3, PE1.5 |
| 2. | <i>Apply sustainability principles to create solutions to enable regional infrastructure provision</i> | PE1.3, PE1.4, PE1.5, PE1.6, PE2.1, PE2.2 |
| 3. | <i>Display creativity by creating infrastructure solutions that may not be conventional</i> | PE1.2, PE1.4, PE1.5, PE2.1, PE2.2, PE2.3 |
| 4. | <i>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</i> | PE1.4, PE3.1, PE3.2, PE3.4, PE3.6 |

For each hour of contact it is expected that you will put in at least 1.5 hours of private study.

This course is designed to address the learning outcomes above and the corresponding Engineers Australia Stage 1 Competency Standards for Professional Engineers as shown. The full list of Stage 1 Competency Standards may be found in Appendix A.

COURSE PROGRAM

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

Term 2 2021

| Date | Tuesday (9-11am) | Tuesday (11-1pm) | Thursday (2-4pm) |
|-------------------------|--|---|--|
| | Lecture (Online) | Workshop (Online or Tyree G16) | Workshop (Tyree G16) |
| 31/05/2021 (Week 1) | Course Introduction and site study information (Stuetz) | Sustainability principles (Fisher) - Online | Assessment tasks, expectations and group formation (Stuetz) |
| 07/06/2021 (Week 2) | Critical thinking and reflection / Report Writing (Hayes) - Online | Communication and teamwork (Care) - Online | Sustainability workshop (Fisher) |
| 14/06/2021 (Week 3) | Energy (MacGill) | Energy - Online (MacGill) | Online quiz |
| 21/06/2021 (Week 4) | Transport (Chakraborty) | Transport - Online (Chakraborty) | Energy workshop (MacGill) / Transport workshop (Chakraborty) |
| 28/06/2021 (Week 5) | Waste (Fisher) | Water - Online (Stuetz) | Waste workshop (Fisher) / Water workshop (Stuetz) |
| 05/07/2021 (Week 6) | Non-teaching | | |
| 12/07/2021 (Week 7) | Consultation workshop: General (Stuetz) - Online | Consultation workshops: Energy / Transport | Consultation workshops: Waste / Water |
| 19/07/2021 (Week 8) | <i>No scheduled class</i> | Consultation workshops: Video presentation (Stuetz) | Consultation workshops: Project management (Stuetz) |
| 26/07/2021 (Week 9) | Presentation watching and peer marking (all students) | Presentation watching and peer marking (all students) | Consultation workshops: General (Stuetz) |
| 02/08/2021 (Week 10) | <i>No scheduled class</i> | <i>No scheduled class</i> | <i>No scheduled class</i> |
| 09/08/21 (Week 11) | Project Management Interview (All Day) - Online | Project Management Interview (All Day) - Online | No scheduled class |

ASSESSMENT

Students will undertake a variety of individual and group assessment components 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. See assessment details on assignments.

ASSESSMENT OVERVIEW

| | Topic | Length | Weighting | Learning outcomes assessed | Assessment Criteria | Issue date | Due date and submission requirements* | Marks returned |
|----|---|----------------------------|-----------|----------------------------|--|------------|--|----------------|
| 1. | Online Quiz | 15 MCQ's | 15% | CLO 1, 2 | Individual online quiz conducted during class (see Moodle for details) | 31/05/21 | 17/6/21 at 2 pm (Week 3) | Within 1 week |
| 2. | Technical report | 10 pages plus Appendix | 40% | CLO 2, 3, 4 | Individual assessment (see Moodle for details) | 31/05/21 | 01/08/21 at 11:59 pm (Week 10) | Within 3 weeks |
| 3. | Professional Skills Part A: Project Management Report | Report and group interview | 15% | CLO 4 | Group assessment project management report and interview | 31/05/21 | 06/08/21 at 11:59 pm Group interviews will occur during week 11** | Within 3 weeks |
| | Part B: Professional Development | 3 Online modules | 15% | CLO 4 | Individual ongoing reflective components (See Moodle for Details) | 31/05/21 | Throughout term (See Moodle for dates) | Within 2 weeks |
| 4. | Presentation | 3 minute group video | 15% | CLO 2, 3, 4 | Group assessment Video presentation (see Moodle for details) | 31/05/21 | 25/07/21 at 11:59 pm (Week 9) Peer marking (Week 9)** | Within 2 weeks |

* Penalties for late submissions will be penalised at the rate of 10% per day after the due date and time have expired.

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

RELEVANT RESOURCES

- Sarte, S. Bry; Sustainable Infrastructure. The guide to green engineering and design. John Wiley 2010 (ISBN: 978-0-470-45361-2) (Online version available at the UNSW library)
- Additional materials provided on Moodle.

DATES TO NOTE

Refer to MyUNSW for Important Dates available at:

<https://student.unsw.edu.au/dates>

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 ADVICE

For information about:

- Notes on assessments and plagiarism;
- Special Considerations: student.unsw.edu.au/special-consideration;
- General and Program-specific questions: [The Nucleus: Student Hub](#)
- Year Managers and Grievance Officer of Teaching and Learning Committee, and
- CEVSOC/SURVSOC/CEPCA

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>

Appendix A: Engineers Australia (EA) Competencies

Stage 1 Competencies for Professional Engineers

| | Program Intended Learning Outcomes |
|--|---|
| PE1: Knowledge and Skill Base | PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals |
| | PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing |
| | PE1.3 In-depth understanding of specialist bodies of knowledge |
| | PE1.4 Discernment of knowledge development and research directions |
| | PE1.5 Knowledge of engineering design practice |
| | PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice |
| PE2: Engineering Application Ability | PE2.1 Application of established engineering methods to complex 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 |
| PE3: Professional and Personal Attributes | PE3.1 Ethical conduct and professional accountability |
| | PE3.2 Effective oral and written communication (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 |