School of Civil and Environmental Engineering

Term 3, 2021

CVEN4701 PLANNING SUSTAINABLE INFRASTRUCTURE

COURSE DETAILS

Units of Credit	**6**	
Contact hours	6 hours per week	
Lecture	Tuesday, 10:00 – 12:00	Online
Workshop	Tuesday, 13:00 – 15:00	Online
	Thursday, 10:00 – 12:00	Online

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 Dr Baran Yildiz email: baran.yildiz@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
- 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

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	• 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	• Find out what you must learn • Take notes from guest lectures • See relevant examples and concepts • Hear announcements on course changes
Workshops	• 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	• 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.	*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 regional infrastructure provision*	PE1.3, PE1.4, PE1.5, PE1.6, PE2.1, PE2.2
3.	*Display creativity by creating infrastructure solutions that may not be conventional*	PE1.2, PE1.4, PE1.5, 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*

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 consultation workshops, and group and individual assessment activities.

Term 3 2021

Date	Tuesday (10-12)	Tuesday (13-15)	Thursday (10-12)
	Lecture (Online)	**Lecture / Workshop (Online)**	**Workshop (online)**
13/09/2021 (Week 1)	Course Introduction and site study information (Stuetz)	Sustainability principles (Fisher)	Assessment tasks, expectations, and group formation (Stuetz)
20/09/2021 (Week 2)	Critical thinking and reflection / Report Writing (Hayes)	Communication and teamwork (Care)	Sustainability workshop (Fisher)
27/09/2021 (Week 3)	Energy (Yildiz)	Energy (Yildiz)	Quiz
04/10/2021 (Week 4)	Transport (Chakraborty)	Transport (Chakraborty)	Energy workshop (Yildiz) / Transport workshop (Chakraborty)
11/10/2021 (Week 5)	Waste (Fisher)	Water (Stuetz)	Waste workshop (Fisher) / Water workshop (Stuetz)
18/10/2021 (Week 6)	***Non-teaching***		
25/10/2021 (Week 7)	Consultation workshop: General (Stuetz)	Consultation workshops: Energy / Transport	Consultation workshops: Waste / Water
01/11/2021 (Week 8)	Consultation workshops: Video presentation (Stuetz)	*No scheduled class*	Consultation workshops: Project management (Stuetz)
08/11/2021 (Week 9)	Presentation watching and peer marking (all students)	Presentation watching and peer marking (all students)	Consultation workshops: General (Stuetz)
15/11/2021 (Week 10)	*No scheduled class*	*No scheduled class*	*No scheduled class*
22/11/2021 (Week 11)	Project Management Interview (all students) All Day	Project Management Interview (all students) All Day	No scheduled class

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. See assessment details on individual and group 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)	13/09/21	30/09/21 at 10am (Week 3)	Within 1 week
2.	Technical report	10 pages plus Appendix	40%	CLO 2, 3, 4	Individual assessment (see Moodle for details)	13/09/21	14/11/21 at 11:59 PM (Week 10)	Within 4 weeks
3.	Professional Skills Part A: Project Management Report	Report and group interview	15%	CLO 4	Group assessment project management report and interview	13/09/21	19/11/21 at 11:59 PM Group interviews will occur on 23/11/21 (Week 11)**	Within 3 weeks
	Part B: Professional Development	3 Online modules	15%	CLO 4	Individual ongoing reflective components (See Moodle for Details)	13/09/21	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)	13/09/21	07/11/21 at 11:59 PM (Week 9) Peer marking will occur on 09/11/21 (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://intranet.civeng.unsw.edu.au/key-staff-to-contact-during-your-studies-at-unsw

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