



School of Civil and Environmental Engineering

Term 1, 2022

CVEN9743

# CONSTRUCTION ENGINEERING PRACTICES

## COURSE DETAILS

<b>Units of Credit</b>	6 UoC	
<b>Contact hours</b>	4 hours per week	
<b>Class</b>	Monday, 18:00 – 20:00	Rex Vowels Theatre and online
<b>Workshop</b>	Monday, 20:00 – 21:00	Rex Vowels theatre and on-line
<b>Class Tests</b>	Saturdays, 10:00 – 12:00 in Weeks 4, 7, & 10	On-line

### Course Coordinator and Lecturer

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## INFORMATION ABOUT THE COURSE

This course is designed to develop/ extend your knowledge and understanding about civil engineering and its place in developing infrastructure projects. Successful delivery of project infrastructure is dependent upon strong leadership of a multi-disciplinary team, innovative construction methodologies, and effective communication between the project group in dealing with the project's internal and external stakeholders. In this course the primary focus is upon the innovative construction methodologies used in infrastructure delivery and how construction methodologies are influenced by the physical, political, social and economic constraints associated with a project. This will be presented using a combination of project reviews, analysis of particular construction methods, and investigation of the development in construction equipment and current industry practices. There are no specific prerequisites for this course but it assumes that students commencing to this course have either an undergraduate degree in engineering or allied experience in civil construction operations, mining or tunnelling. All communications shall be made using the course Moodle.

## HANDBOOK DESCRIPTION

Construction is centred on infrastructure including tunnels, shafts, cofferdams, caissons, piles, scaffolding, formwork, steel structures, concrete structures, bridges, roads, railways, dams, harbours, and pipelines. The course looks at how such infrastructure is brought into being in the most efficient way given the many physical, political, social and economic constraints present.

<https://www.handbook.unsw.edu.au/postgraduate/courses/2022/CVEN9743/>

## OBJECTIVES

The objectives of the course are to:

- Provide a detailed outline on specific construction methods and techniques employed in the delivery of infrastructure projects;
- Identifying key factors that will impact upon construction process selection;
- Investigate state-of-the-art practices and techniques presently being employed in industry;
- Addressing the physical, political, social and economic constraints issues in developing construction solutions to infrastructure projects; and,
- Selection of construction methods that produce infrastructure that is are environmentally sustainable and ethically and sociably responsible.

In addition the course aims to foster:

- Capacity for analytical thinking and for creative problem solving;
- Ability to engage independent and reflective learning;
- Develop the skills for collaborative and multi-disciplinary work by working effectively in small teams;
- Information literacy; and,
- Skills for effective communication.

These objectives and course aims will be achieved using:

- Lectures and assigned readings;
- Workshops; and,
- The course Assessment Tasks

List of programme 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

This course will be presented as a series of lectures, each accompanied by additional reading material. Following each lecture, a workshop will be conducted for you to practice implementation of key knowledge acquired from the lecture.

**In Term 1, 2022 the CVEN9743 course will be delivered in three x (3 week) sessions. These sessions will be assessed progressively throughout the term in Weeks 4, 7, & 10.**

Specific teaching and learning strategies include:

<b>Private Study</b>	<ul style="list-style-type: none"><li>• Download materials from UNSW Moodle</li><li>• Review lecture material and additional reading</li><li>• Complete all assignments</li><li>• Do the set class problems</li><li>• Join Moodle discussions of problems</li><li>• Reflect on class problems and assignments</li><li>• Keep up with notices and find out marks via Moodle</li></ul>
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<b>Lectures</b>	<ul style="list-style-type: none"> <li>• Find out what you must learn</li> <li>• Summarise essential course material from lectures and associated reading</li> <li>• Follow worked examples</li> <li>• Hear announcements on course changes</li> </ul>
<b>Workshops</b>	<ul style="list-style-type: none"> <li>• Be guided by Lecturer/ Demonstrator(s)</li> <li>• Practice solving set problems</li> <li>• Ask questions during or at the end of a Workshop session</li> </ul>
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Enhance your knowledge by undertaking necessary research to complete given tasks</li> <li>• Demonstrate your knowledge and skills</li> <li>• Demonstrate higher understanding and problem solving</li> <li>• Do not copy sections from textbooks or websites, always use appropriate references for sourced material</li> <li>• In preparing an assessment element pay particular attention to the instructional advice provided by the lecturer to maximise your mark</li> <li>• Preparing for scheduled the in-class tests scheduled in the Term</li> </ul>

**All course reading materials, course communications, student questions, Assignment and Report submissions, Assignment and Report grades (including feedback) will be made using the course Moodle.**

#### EXPECTED LEARNING OUTCOMES

**This course is designed to address the learning outcomes below 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.**

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

Learning Outcome		EA Stage 1 Competencies
1.	Develop an understanding of some of the construction methods and techniques used in developing civil infrastructure projects	PE1.1, PE1.3, PE2.3, PE2.4
2.	Through independent research, (which is student-centred and self-directed learning), a student should be able to identify the construction practices required of an infrastructure project and be able to acquire the knowledge to enable them be able to contribute within a multi-disciplinary infrastructure team	PE1.1, PE1.2, PE1.4, PE2.3, PE2.4
3.	Communicate developed solutions concisely, by presenting their work as a written submission or verbally	PE3.2, PE3.3, PE3.4, PE3.5, PE3.6
4.	Complete such work if assigned to a multi-disciplinary team	PE2.2, PE2.3, PE2.4, PE3.1, PE3.2, PE3.3, PE3.4, PE3.5, PE3.6

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

#### COURSE PROGRAM

All Lectures and Workshops will ordinarily be presented by Mr Robert Holdom and students will be advised of changes to this expectancy.

The weekly Lecture and Workshop will be an integrated evening program. The weekly allocated time (1800 – 2100h) will be recorded as a 'Lecture' and made available on the course Moodle should you want to review

any content. The Week 1 Lecture uploading may take several days for it to be made available on the Moodle, but beyond that the weekly lecture recordings are normally expected to be available on the course Moodle within 24 hours.

This course will be delivered in three x (3 week) sessions and students will be progressively assessed by three separate Class Tests. Class Test 1 will assess the material instructed in weeks 1, 2 & 3. Class Test 2 will assess the material instructed in weeks 4, 5, & 7. Class Test 3 will assess the material instructed in weeks 8, 9, & 10.

**Note: There is no Final Examination being held in the formal examination session for this course.**

**Term 1 2022**

Date	Topic and Lecture Content	Demonstration Content
14/02/2022 (Week 1)	Introduction to civil infrastructure Differentiation of project types	Weekly Workshop on topic
21/02/2022 (Week 2)	Road infrastructure Road construction techniques	Weekly Workshop on topic
28/02/2022 (Week 3)	Bridges Outline of types and some construction methods	Weekly Workshop on topic <b>Nominate Group Ass Topic</b>
07/03/2022 (Week 4)	Caisson construction Coffer dam construction	Weekly Workshop on topic <b>On-line Class Test 1 on Saturday</b>
14/03/2022 (Week 5)	Water supply infrastructure (catchments & dams)	Weekly Workshop on topic
21/03/2022 (Week 6)	<b>Flexibility Week. No Class.</b>	<b>Group Assignment due</b>
28/03/2022 (Week 7)	Water supply infrastructure (pipeline & treatment plant) Pipeline construction	Weekly Workshop on topic <b>On-line Class Test 2 on Saturday</b>
04/04/2022 (Week 8)	Rail Infrastructure Heavy and light rail alternatives	Weekly Workshop on topic
11/04/2022 (Week 9)	Coordinated transport infrastructure Course Review	Weekly Workshop on topic <b>Individual Assignment due</b>
18/04/2022 (Week 10)	<b>Easter Monday Public Holiday. No Class.</b> Pre-recorded lecture: Cities as a series of flows	<b>On-line Class Test 3 on Saturday</b>

<b>ASSESSMENT</b>
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- Individual Assignment  
Each student is required to investigate an aspect of Construction Productivity associated with heavy engineering construction. You must include comparison with work that has been done in Australia. The way you present your findings will feature as a significant part of the assessment of this task. The successful completion of this Assignment will provide you with the ability to be able to investigate the methods and processes that can be used in future construction work that you will be associated with as your engineering professional career evolves.
- Group Report  
You are required to work in groups of three students and to produce a Group Report from one of the

nominated topics. After reading the assessment requirement, each group will nominate their topic preferences for approval. Student groups will be advised of their approved topic and can then commence preparing their submission from that notification. In preparing this work, students will have the opportunity to learn about why different forms of construction methods, processes and construction solutions were taken and the impacts that those decisions have had in the construction delivery of these pieces of significant infrastructure and its impact on community at large. The basis of this work is to provide each learner the opportunity to work with others, to offer an exchange of ideas among the group and contribute in preparing a group report.

### 3. Class Tests

Student performance in this course will be entirely assessed within the schedule up until the end of Term 1. There will be no Final Examination in the formal examination period that follows the Term 1 lecture period.

The course has been structured along three themes:

- a. Project types, road and bridge construction
- b. Diversion of rivers, water supply infrastructure, and pipeline construction
- c. Rail infrastructure, coordinated transport and understanding cities as 'flows'

These three themes will be taught and examined by way of three separate Class Tests that covers each 3-week session:

Class Test 1 will examine the content of lecture and workshop material covered in weeks 1, 2, & 3.

Class Test 2 will examine the content of lecture and workshop material covered in weeks 4, 5 & 7.

Class Test 3 will examine the content of lecture and workshop material covered in weeks 8, 9, & 10.

Class Test 1 will be held on Saturday 12<sup>th</sup> March 2022.

Class Test 2 will be held on Saturday 2<sup>nd</sup> April 2022.

Class Test 3 will be held on Saturday 23<sup>rd</sup> April 2022.

All Class Tests will be conducted as an 'open-book' examination and will be of 75 minutes nominal duration.

Learning and assessing in this manner will require students to summarise their work on a weekly basis, complete the workshop material and tasks and seek out the assistance they need by way of discussing it with other peers, asking questions on the Moodle discussion board or seeing the lecturer at opportune breaks in the lecture and workshop sessions or outside of those times.

*All assignments are to be submitted by uploading onto the Moodle. All submissions shall be subject to a 'Turnitin' submission tool review. No emailed assignment submissions will be accepted.*

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

**Whilst not applicable to CVEN9743, students are to note the following:**

**Supplementary Examinations for Term 1 2022 will be held on Monday 23<sup>rd</sup> May – Friday 27<sup>th</sup> May (inclusive) should you be required to sit one. You are required to be available during these dates. Please do not to make any personal or travel arrangements during this period.**

#### **PENALTIES**

*Late submissions will receive a 5% deduction penalty per day. Late submissions up to 5 days (120 hours) late will be marked and will receive the appropriate penalty deductions. After 5 days (120 hours) a student cannot submit an assessment.*

## ASSESSMENT OVERVIEW

Item	Length	Weighting	Learning outcomes assessed	Assessment Criteria <i>(this needs to explicitly describe what students are expected to demonstrate in the task)</i>	Due date and submission requirements	Deadline for absolute fail	Marks returned
<b>1. Individual Assignment</b>							
Individual Assignment	3000 words	30%	1	Each student is required to prepare an individual submission in Report form in accordance with the guidelines provided within the assignment outline. Marks will be allocated on content, format of the submitted document, its readability and referencing	Before 5pm on 14th April 2022	Before 5pm on 19th April 2022	Within 2 weeks
<b>2. Class Tests</b>							
Class Test 1	75 mins	15%	3	Content covered Weeks 1, 2, & 3 Students will be required to provide answers by way of any of the following forms: calculations, written answers or select an answer to a question from multiple-choice options	Saturday 12 <sup>th</sup> March 2022 Online 10:00 – 12:00pm	Not sitting event	Within 2 weeks
Class Test 2	75 mins	15%	3	Content covered Weeks 4, 5, & 7 Students will be required to provide answers by way of any of the following forms: calculations, written answers or select an answer to a question from multiple-choice options	Saturday 2 <sup>nd</sup> April 2022 On-line 10:00 – 12:00pm	Not sitting event	Within 2 weeks
Class Test 3	75 mins	15%	3	Content covered Weeks 8, 9, & 10 Students will be required to provide answers by way of any of the following forms: calculations, written answers or select an answer to a question from multiple-choice options	Saturday 23 <sup>rd</sup> April 2022 On-line 10:00 – 12:00pm	Not sitting event	Within 2 weeks
<b>3. Group Assignment</b>							

a. Topic Approval		2%	2	Students to form a group of three and nominate their topics and have it approved	Before 5pm on 3 <sup>rd</sup> March 2022	Not meeting deadline	Within 1 week
b. Final Submission	4500 words	23%	2	A Group Report is to be submitted	Before 5pm on 27 <sup>th</sup> March 2022	Before 5pm on 1 <sup>st</sup> April 2022	Within 2 weeks

## RELEVANT RESOURCES

There are no set textbooks for this course. The lecturer will provide you with prescribed readings for each lecture topic.

- You are required within this course to undertake your own literature research. This should be discussed with the UNSW library staff as to how you can undertake independent research and find your resources
- Additional materials provided on Moodle.
- Recommended Internet sites.

## 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

- 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 - <https://www.student.unsw.edu.au/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 [Home \(unsw.edu.au\)](https://www.unsw.edu.au)
- Refer to Academic Advising: <https://app.acuityscheduling.com/schedule.php?owner=19024765>

## Appendix A: Engineers Australia (EA) Competencies

### Stage 1 Competencies for Professional Engineers

	<b>Program Intended Learning Outcomes</b>
<b>PE1: Knowledge and Skill Base</b>	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
<b>PE2: Engineering Application Ability</b>	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
<b>PE3: Professional and Personal Attributes</b>	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