

CVEN9000

Civil Engineering Design Practice

Term 1, 2023



Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Babak Shahbodagh	b.shahbodagh@unsw.edu.au		Room 541, Hilmer Building (E10)	

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 involves undertaking and completing a series of design tasks in either civil or environmental engineering, depending on whether students are undertaking the civil or environmental stream.

Civil Engineering Stream (T1, 2023):

This project-based integrating course involves formulating designs for and solutions to real-world civil engineering problems in the areas of geotechnical, structural, and pavement engineering. The problems will be drawn from industry and will be multi-disciplinary, involving the application of material learnt throughout the undergraduate program. The course will involve group project work and the preparation of working drawings and project reports similar to those required in the industry. The objective is to further develop the students' research, teamwork, managerial, and self-directed learning skills. This year, the course involves the detailed design of various structural components of a container port in Australia, including the realignment of the port access road, the design of the floor for the terminal, and the design of the machinery foundations, according to Australian Standards.

Course Aims

This course aims to provide students with the opportunity to undertake practical civil engineering projects and to develop final detailed designs, including the preparation of working drawings and project reports similar to those required in practice. It aims to build on the skills developed in the students' previous civil engineering practice classes. These skills include:

- 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,
- Skills for collaborative and multi-disciplinary work,
- Skills for effective communication, &
- Research Skills.

Course Learning Outcomes

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

Learning Outcome	EA Stage 1 Competencies
1. Gain in-depth knowledge of relevant discipline and its interdisciplinary context.	PE1.1, PE1.2, PE1.5, PE2.1, PE2.3
2. Grasp conceptual design ideas in Civil Engineering.	PE1.1, PE1.5, PE2.3
3. Provide students with an experience more typical of what graduate engineers may encounter.	PE2.1, PE2.2, PE2.4
4. Develop the capacity for analytical and critical thinking and its application in creative problem solving.	PE1.1, PE1.2, PE2.3, PE3.3

Learning Outcome	EA Stage 1 Competencies
5. Develop skills for collaborative and multi-disciplinary projects.	PE3.1, PE3.2, PE3.6
6. Ability to engage independent and reflective learning	PE1.2, PE1.4, PE3.3, PE3.5
7. Undertake and execute self-contained applied research report.	PE1.4, PE3.2
8. A respect for ethical practice and social responsibility.	PE3.1, PE3.5

Teaching Strategies

The main aim of the course is to give you the opportunity for self-directed learning. You need to make decisions on your design data and methodology. The course involves multidisciplinary projects in the area of civil engineering with a range of design tasks. A four-hour period is allocated per week to the course. Two hours is common to all students for lectures and two hours for workshops. During the two hours workshop, students will work on the project under the guidance of the demonstrators. The teaching strategies that will be used include:

Lectures

- Attend the lectures to keep yourself updated on the teaching materials
- Discuss your queries with the lecturer
- Hear announcements on course changes

Workshops

- Self-directed learning and solving the problems
- Meet with group members and develop strategies
- Be guided by demonstrators
- Work on design problems
- Ask questions

Private Study

- Review lecture materials, textbooks, and standards
- Understand the design process
- Conduct research on the topic
- Join Moodle discussions of problems
- Study relevant sources and references

Assessments

- Demonstrate your knowledge and skills
- Demonstrate higher understanding and problem solving
- Demonstrate understanding of concept design and provide complete design solutions

Assessment

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

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. First Report - Subgrade Evaluation	10%	06/03/2023 05:00 PM	1, 3, 4, 5, 8
2. Second Report - Design Traffic & Empirical Design of Flexible Pavement	20%	27/03/2023 05:00 PM	1, 2, 3, 5, 8
3. Third Report - Final Port Design	45%	28/04/2023 05:00 PM	1, 2, 3, 4, 5, 6, 7, 8
4. Fourth Report - Design of Machine Foundation	25%	28/04/2023 05:00 PM	1, 2, 3, 4, 6, 8

Assessment 1: First Report - Subgrade Evaluation

Due date: 06/03/2023 05:00 PM

This is a group assessment.

The aim is to evaluate the subgrade strength. You are required to discuss the soil test results and give reasons for the adoption of the design CBR/modulus.

Assessment 2: Second Report - Design Traffic & Empirical Design of Flexible Pavement

Due date: 27/03/2023 05:00 PM

Design traffic & Empirical design of granular pavement with thin asphalt surfacing.

Assessment 3: Third Report - Final Port Design

Due date: 28/04/2023 05:00 PM

Design Flexible Pavement using Mechanistic Approach &
Design Industrial Floor

Assessment 4: Fourth Report - Design of Machine Foundation

Due date: 28/04/2023 05:00 PM

Design a pile group for an industrial machine.

Attendance Requirements

For courses with Workshops and/or Labs, attendance for those classes is a necessary part of the course. You must **attend at least 80% of the workshop/lab** in which you are enrolled for the duration of the session.

Course Schedule

[View class timetable](#)

Timetable

Date	Type	Content
O-Week: 6 February - 10 February		
Week 1: 13 February - 17 February	Lecture	Lecture & workshop: Introduction & Subgrade Evaluation
Week 2: 20 February - 24 February	Lecture	Lecture & workshop: Design Traffic
Week 3: 27 February - 3 March	Lecture	Lecture & workshop: Design flexible pavement
Week 4: 6 March - 10 March	Lecture	Lecture & workshop: Design flexible pavement (Cont'd) - Introduction to Software Circly
	Assessment	First Report - Subgrade Evaluation
Week 5: 13 March - 17 March	Lecture	Lecture & workshop: Design industrial floor for the port
Week 6: 20 March - 24 March		Flexibility Week - No Lecture/Workshop
Week 7: 27 March - 31 March	Lecture	Lecture & workshop: Design industrial floor for the port (Cont'd)
	Assessment	Second Report - Design Traffic & Empirical Design of Flexible Pavement
Week 8: 3 April - 7 April	-- Select --	Public Holiday - No Lecture/Workshop
Week 9: 10 April - 14 April	Lecture	Lecture & workshop: Design machine foundations (Piles & Pile Groups)
Week 10: 17 April - 21 April	Lecture	Lecture & workshop: Design machine foundations (Piles & Pile Groups) (Cont'd)

Resources

Prescribed Resources

Moodle:

Materials including class and demonstration links, lecture notes, project description, field and laboratory test data, and traffic data will be provided through Moodle.

References:

- Austroads: Guide to Pavement Technology Part 2: Pavement Structural Design
- Guide to Industrial Floors and Pavements - Design, Construction and Specification, Cement Concrete and Aggregates Australia
- Principles of soil dynamics. Das BM, Ramana GV, Cengage Learning; 2016.

Recommended Resources

- Pavement analysis and design, Huang, Y.H., 2004.
- Bowles, J.E. Foundation Analysis and Design, McGraw-Hill

Course Evaluation and Development

The course is reviewed annually through the myExperience survey. All responses are considered and we make changes to the course annually in response. We are also always happy to get feedback during the course for immediate consideration.

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 2023 will be held on campus between the 28th of April and the 11th of May, and Supplementary Exams between the 22nd of May and the 26th of May. You are required to be available on these dates. Please do not 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://unswengacademicadvising.as.me/schedule.php>

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.

Image Credit

<https://pixabay.com/photos/port-ships-cranes-load-containers-675539/>

<https://pixabay.com/service/license/>

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	✓