CVEN9000

Civil Engineering Design Practice

Term 2, 2022
Course Overview

Staff Contact Details

Convenors

<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
<th>Availability</th>
<th>Location</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>James McDonald</td>
<td><a href="mailto:jamesmcdonald@unsw.edu.au">jamesmcdonald@unsw.edu.au</a></td>
<td></td>
<td>Water Research Centre (H22) room 102</td>
<td></td>
</tr>
</tbody>
</table>

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

Design practice is a final year course intended to enable students to integrate material learnt in several sub-disciplines of civil or environmental engineering. Working in groups, students undertake a multi-disciplinary real world design project. The objective is to develop the students' self-directed learning, design, teamwork and managerial skills. The projects assigned to the groups focus on urban water systems particularly relating to drinking water supply, stormwater and wastewater management, bioremediation of urban runoff and improvement of recreational water quality.

The philosophy of this course is to promote engagement and understanding of the learning outcomes by challenging students to solve applied and practical real world problems. Therefore, the course is structured with a large proportion of self-directed work supported by close interaction with demonstrators in workshops and assessments intended to promote a deep understanding of the learning outcomes. In addition, lectures are provided in separate streams to expose students to relevant specialist knowledge and also refresh students understanding of core design, communication and project management skills.

Course Aims

The aim of this course is:

- To stimulate the intellectual curiosity of students so that they will be motivated to undertake independent learning as a lifelong skill
- To teach students how to define, analyse and solve problems clearly and logically and in doing so be able to find, evaluate, interpret and collate information
- To develop independent critical thought within students so that when necessary they will be able to challenge current knowledge and thinking
- To encourage proactive behaviour in students and to give them the associated entrepreneurial skills necessary to develop evidenced based and profitable outcomes
- To promote a respect within students for individual human rights and dignity, particularly when it relates to members of the public or other people who will be affected by the projects that they design and execute
- To acquaint students with their social, cultural, legal and environmental responsibilities as professional engineers and to generate within them the ability to make ethical decisions with Integrity
- To nurture the skills required for effective leadership including an ability to manage and deliver projects, an understanding of the social dynamics of group performance and the ability to value diverse backgrounds and opinions and function effectively in multidisciplinary teams
- To assist students with development of good oral and written communication skills and the ability to negotiate and persuade
- To instil in students the principles of sustainable design and development
- To foster effective self-management skills and
- To develop skills for collaborative and multi-disciplinary work

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. | PE1.3, PE2.3
2. Develop ability to incorporate social, political, environmental and economic issues within an engineering based solution to community sensitive projects. | PE1.5, PE1.6, PE3.1, PE3.4
3. Develop the capacity for analytical and critical thinking and its application in creative problem solving. | PE2.1, PE2.2
4. Ability to engage independent and reflective learning. | PE3.3
5. Develop communication, negotiation and advocacy skills. | PE1.5, PE3.2, PE3.5
6. Develop skills for collaborative and multi-disciplinary projects. | PE2.4, PE3.5, PE3.6
7. Leadership and member roles in group related professional engineering project completion. | PE3.5
8. Undertake and execute self-contained applied research report. | PE1.4, PE3.2
9. A respect for ethical practice and social responsibility. | PE3.1, PE3.5

The expected learning outcomes for this course are to gain practical knowledge on how to manage projects, work independently and within a team, the development of communication skills and to apply contemporary sustainable planning theory in a practical situation. This course is designed to address the learning outcomes below and the corresponding Engineers Australia (EA) Stage 1 Competency Standards for Professional Engineers as shown above.

**Teaching Strategies**

The main strategy of this practice course is to give students the opportunity for self-directed learning. It will be necessary for the student project teams to make decisions in difficult circumstances and perhaps with insufficient data. Incidences of poor quality or insufficient data often occur in real life and professional engineers need to develop and refine their critical thinking and strategic problem solving skills to find solutions to real world problems, even in the face of uncertainty. To meet this challenge, students are encouraged to collect as much relevant data as possible and make educated decisions, remembering that the ultimate responsibility for any decision rests with the decision maker (even when incorrect advice may have been received).

Another important teaching strategy of the course is to encourage students to develop communication skills by working in project teams to solve a real world environmental problem. To achieve the learning outcomes of this course, the class will be divided into small groups and assigned different projects.
Assessment

To the extent appropriate at university, assessments will reflect the kinds of deliverables expected at the professional level in such industries as environmental engineering consulting and government public works. The final mark for each student will be determined by a combination of individual and group contributions. Each group will consist of 7-9 members and groups will be responsible for assigning roles and individual tasks within the team.

Each group member will be assessed individually on the above roles and will also be required to submit his/her own assessment of the other individual contributions within the group. On the basis of these peer evaluations the mark for each group member will be adjusted into an individual contribution to determine the final mark. There will be no written examination or quiz in this subject. An outline of the course assessment is set out below. Detail of each assessment including the submission date, marks assigned and the general criteria by which marks are assigned will be found in Moodle and in the table in the assessment overview section of this document. The course coordinator reserves the right to adjust the final scores by scaling if agreed with the Head of School.

There will be NO formal examination. The final marks for the course will be determined based on the scores from each of the 4 assessment tasks. Each group task will include a peer evaluation component that transforms the group mark into a final individual mark.

<table>
<thead>
<tr>
<th>Assessment task</th>
<th>Weight</th>
<th>Due Date</th>
<th>Course Learning Outcomes Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Annotated bibliography</td>
<td>20%</td>
<td>17/06/2022 08:00 PM</td>
<td>1, 4, 8</td>
</tr>
<tr>
<td>2. Project Proposal and risk assessment</td>
<td>15%</td>
<td>29/06/2022 08:00 PM</td>
<td>2, 5, 6</td>
</tr>
<tr>
<td>3. Presentation</td>
<td>20%</td>
<td>13/07/2022 11:00 AM</td>
<td>2, 5, 6</td>
</tr>
<tr>
<td>4. Final Report</td>
<td>45%</td>
<td>05/08/2022 08:00 PM</td>
<td>1, 2, 3, 4, 5, 6, 7, 8, 9</td>
</tr>
</tbody>
</table>

Assessment 1: Annotated bibliography

Assessment length: maximum 10 pages
Submission notes: submit on moodle
Due date: 17/06/2022 08:00 PM
Deadline for absolute fail: 22/06/2022
Marks returned: 24/06/2022

This is an individual assessment. Students are expected to display evidence of in-depth understanding of the topic. Provide evidence of ability to research and synthesise information. Students will be marked on presentation, clarity, organisation and depth of research and demonstration of critical analysis of source content.

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.
Assessment criteria

This is an individual assessment. Students are expected to display evidence of in-depth understanding of the topic. Provide evidence of ability to research and synthesise information. Students will be marked on presentation, clarity, organisation and depth of research and demonstration of critical analysis of source content.

Assessment 2: Project Proposal and risk assessment

Assessment length: maximum 5 pages + HS017 risk assessment form
Submission notes: submit online via Moodle
Due date: 29/06/2022 08:00 PM
Deadline for absolute fail: 6/06/2022
Marks returned: 8/06/2022

This is a group assessment; peer evaluation will be used to determine an individual mark. Students are expected to display an understanding of the key issues of the project. Demonstrate an ability to plan and describe decision making processes and assess risk of field work involved in the project.

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Assessment criteria

This is a group assessment; peer evaluation will be used to determine an individual mark. Students are expected to display an understanding of the key issues of the project.

Demonstrate an ability to plan and describe decision making processes and assess risk of field work involved in the project.

Assessment 3: Presentation

Assessment length: 18 minutes + 5 minutes for questions
Submission notes: Students give presentation via Blackboard in week 7 workshops
Due date: 13/07/2022 11:00 AM
Deadline for absolute fail: students must be present on the due date
Marks returned: 19/07/2022

This is a group assessment; peer evaluation will be used to determine an individual mark. Each student will be marked on both content and presentation technique. Students are expected to display a knowledge of their topic and communicate their findings clearly.

This is not a Turnitin assignment

Assessment criteria

This is a group assessment; peer evaluation will be used to determine an individual mark. Each student will be marked on both content and presentation technique. Students are expected to display a knowledge of their topic and communicate their findings clearly.

Assessment 4: Final Report
**Assessment length:** maximum 100 pages  
**Submission notes:** Submit online via Moodle  
**Due date:** 05/08/2022 08:00 PM  
**Deadline for absolute fail:** 10/08/2022  
**Marks returned:** 13/08/2022

This is a group assessment; peer evaluation will be used to determine an individual mark. Students will be expected to display and communicate in-depth knowledge of their project issues and solutions. Evidence of analytical thinking and problem solving as well as organisation and presentation of the report will be assessed.

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

**Assessment criteria**

This is a group assessment; peer evaluation will be used to determine an individual mark. Students will be expected to display and communicate in-depth knowledge of their project issues and solutions. Evidence of analytical thinking and problem solving as well as organisation and presentation of the report will be assessed.
**Attendance Requirements**

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

**Course Schedule**

[View class timetable]

**Timetable**

<table>
<thead>
<tr>
<th>Date</th>
<th>Type</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>O-Week: 23 May - 27 May</td>
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</tbody>
</table>
| Week 1: 30 May - 3 June | Lecture   | Monday  
  - Course overview  
  - Project description part 1  
  - Assessments |
|                    | Lecture   | Wednesday  
  - Water Sensitive Urban design  
  - Project description part 2 |
|                    | Workshop  | • Review assessment timeline  
  • Meet your project group and discuss how you will organise the project  
  • Plan Assessment 1 tasks |
| Week 2: 6 June - 10 June | Lecture   | Monday  
  **Introduction to water quality in urban systems** |
|                    | Lecture   | Wednesday  
  **Australian Rainfall and Runoff Handbook and Modelling**  
  Maryam Farzadkhoo, Water Research Laboratory |
|                    | Workshop  | • Work on Assessment 1 – Annotated Bibliography |
| Week 3: 13 June - 17 June | Lecture   | Monday  
  **Referencing and Research Skills** |
|                    | Lecture   | Wednesday  
  Guest Lecture: Sydney Water |
<table>
<thead>
<tr>
<th>Workshop</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work on Assessment 2 with your group – Project Proposal</td>
<td>Annotated bibliography: submit on moodle</td>
</tr>
</tbody>
</table>

**Week 4: 20 June - 24 June**

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Monday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Assessment</td>
<td>Varsha Sivagurunathan, Water Research Centre</td>
</tr>
<tr>
<td>Lecture</td>
<td>Wednesday</td>
</tr>
<tr>
<td>Guest Lecture: Sustainability and Water Management in Randwick LGA</td>
<td>Peter Maganov, Randwick Council</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Workshop</th>
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</thead>
<tbody>
<tr>
<td>Finalise Assessment 1 – Project Proposal.</td>
<td>Get feedback on drafts from demonstrator.</td>
</tr>
<tr>
<td>Install freeware GIS software for Wednesday Week 5 lecture.</td>
<td></td>
</tr>
</tbody>
</table>

**Week 5: 27 June - 1 July**

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Monday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guest Lecture: Stopping Pollution Entering Our Waterways</td>
<td>Blake Allingham, Project Engineer, Ocean Protect</td>
</tr>
<tr>
<td>Lecture</td>
<td>Wednesday</td>
</tr>
<tr>
<td>Using GIS in urban design</td>
<td>Caleb Dykman, Water Research Centre</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Workshop</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Work through GIS exercise for your Project area</td>
<td></td>
</tr>
<tr>
<td>Prepare for Assessment 3 - Group Presentation</td>
<td></td>
</tr>
<tr>
<td>Start organising final report structure and content</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Proposal and risk assessment: submit online via Moodle</td>
<td></td>
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</tbody>
</table>

**Week 6: 4 July - 8 July**

| Lecture | NO LECTURES OR WORKSHOPS THIS WEEK |

**Week 7: 11 July - 15 July**

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Monday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation Techniques</td>
<td></td>
</tr>
<tr>
<td>Time Frame</td>
<td>Lecture</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Week 8: 18 July - 22 July</td>
<td>Monday: Report writing - how to maximise your group's mark</td>
</tr>
<tr>
<td>Lecture</td>
<td>Wednesday: Community Engagement in Environmental Engineering</td>
</tr>
<tr>
<td>Week 9: 25 July - 29 July</td>
<td>Monday: Urban Water Management - Current Research</td>
</tr>
<tr>
<td>Lecture</td>
<td>Wednesday: Dr Adele Jones, Water Research Centre</td>
</tr>
</tbody>
</table>
| Workshop        | • Review presentation feedback and plan to incorporate it into the report | • Work on the Final Report: proof read each others work  
• Final Chance to ask questions |                                                                           |
| Week 10: 1 August - 5 August | Lecture: No formal lectures or workshop this week: work on the final report |                                                                          | **FINAL REPORT DUE 8 PM FRIDAY 5 AUGUST**                                   |
| Assessment      |                                                                          |                                                                          | Final Report: Submit online via Moodle                                     |
Resources

Recommended Resources

Additional resources will be found on Moodle

Stormwater Management

Stormwater NSW Library

http://stormwaternsw.asn.au/resources/external-links/

Stormwater Source Control Handbook


CRC for Water Sensitive Cities Comprehensive stormwater management handbook

https://watersensitivecities.org.au/content/stormwater-biofilter-design/

Australian Rainfall and Runoff Guidelines


Organisations for urban waterway improvement

Cooks River Alliance

http://cooksriver.org.au/

Cooks Net

Parramatta River Catchment Group


Life Cycle Assessment

https://nexus.openlca.org/

http://www.openlca.org/

http://www.lcatextbook.com/
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](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](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](https://www.unsw.edu.au/engineering/civil-and-environmental-engineering/student-life)
- Special Consideration: [https://student.unsw.edu.au/special-consideration](https://student.unsw.edu.au/special-consideration)
- General and Program-Specific Questions: The Nucleus: Student Hub

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

James

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

<table>
<thead>
<tr>
<th>Program Intended Learning Outcomes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge and skill base</strong></td>
<td></td>
</tr>
<tr>
<td>PE1.1 Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline</td>
<td>✔</td>
</tr>
<tr>
<td>PE1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline</td>
<td>✔</td>
</tr>
<tr>
<td>PE1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline</td>
<td>✔</td>
</tr>
<tr>
<td>PE1.4 Discernment of knowledge development and research directions within the engineering discipline</td>
<td>✔</td>
</tr>
<tr>
<td>PE1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline</td>
<td>✔</td>
</tr>
<tr>
<td>PE1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline</td>
<td>✔</td>
</tr>
<tr>
<td><strong>Engineering application ability</strong></td>
<td></td>
</tr>
<tr>
<td>PE2.1 Application of established engineering methods to complex engineering problem solving</td>
<td>✔</td>
</tr>
<tr>
<td>PE2.2 Fluent application of engineering techniques, tools and resources</td>
<td>✔</td>
</tr>
<tr>
<td>PE2.3 Application of systematic engineering synthesis and design processes</td>
<td>✔</td>
</tr>
<tr>
<td>PE2.4 Application of systematic approaches to the conduct and management of engineering projects</td>
<td>✔</td>
</tr>
<tr>
<td><strong>Professional and personal attributes</strong></td>
<td></td>
</tr>
<tr>
<td>PE3.1 Ethical conduct and professional accountability</td>
<td>✔</td>
</tr>
<tr>
<td>PE3.2 Effective oral and written communication in professional and lay domains</td>
<td>✔</td>
</tr>
<tr>
<td>PE3.3 Creative, innovative and pro-active demeanour</td>
<td>✔</td>
</tr>
<tr>
<td>PE3.4 Professional use and management of information</td>
<td>✔</td>
</tr>
<tr>
<td>PE3.5 Orderly management of self, and professional conduct</td>
<td>✔</td>
</tr>
<tr>
<td>PE3.6 Effective team membership and team leadership</td>
<td>✔</td>
</tr>
</tbody>
</table>