



# ENEC20005 *Advanced Water Engineering*

## Term 2 - 2022

Profile information current as at 05/10/2023 08:58 am

All details in this unit profile for ENEC20005 have been officially approved by CQUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

## General Information

### Overview

Advanced Water Engineering will introduce you to different components of the hydrologic cycle that are essential for designing complex water infrastructures. In this unit, you will discuss concepts of probability and uncertainty governing water resources projects. You will estimate design rainfall and losses, and peak flows and volumes for engineering design. You will also be introduced to the design of pipe networks for water supply and collection of wastewater and stormwater. You will also learn how to apply the concept of Water Sensitive Urban Design (WSUD). In completing these tasks, you must use appropriate technical language in written communication and work in teams to solve problems.

### Details

Career Level: *Postgraduate*

Unit Level: *Level 9*

Credit Points: *12*

Student Contribution Band: *8*

Fraction of Full-Time Student Load: *0.25*

### Pre-requisites or Co-requisites

There are no requisites for this unit.

Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the [Assessment Policy and Procedure \(Higher Education Coursework\)](#).

### Offerings For Term 2 - 2022

- Melbourne
- Online
- Rockhampton

### Attendance Requirements

All on-campus students are expected to attend scheduled classes - in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

### Website

[This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.](#)

## Class and Assessment Overview

### Recommended Student Time Commitment

Each 12-credit Postgraduate unit at CQUniversity requires an overall time commitment of an average of 25 hours of study per week, making a total of 300 hours for the unit.

### Class Timetable

#### [Regional Campuses](#)

Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

#### [Metropolitan Campuses](#)

Adelaide, Brisbane, Melbourne, Perth, Sydney

### Assessment Overview

#### 1. **Project (applied)**

Weighting: 30%

#### 2. **Project (applied)**

Weighting: 30%

#### 3. **In-class Test(s)**

Weighting: 40%

### Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the [University's Grades and Results Policy](#) for more details of interim results and final grades.

## CQUniversity Policies

**All University policies are available on the [CQUniversity Policy site](#).**

You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the [CQUniversity Policy site](#).

## Previous Student Feedback

### Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

#### Feedback from Self-reflection

**Feedback**

Provide extra support and check the teamwork regularly.

**Recommendation**

Team meetings will be conducted in alternate weeks to make sure the teams are progressing well with the project.

## Unit Learning Outcomes

**On successful completion of this unit, you will be able to:**

1. Formulate, plan, manage and complete projects individually or in teams considering stakeholder requirements and principles of sustainable development and communicate the outcomes professionally
2. Design different components of urban water distribution, wastewater collection and stormwater collection systems
3. Analyse a range of WSUD assets for a given urban setting
4. Assess the hydrology of a catchment and estimate design floods.

The Learning Outcomes for this unit are linked with the Engineers Australia Stage 1 Competency Standards for Professional Engineers in the areas of 1. Knowledge and Skill Base, 2. Engineering Application Ability and 3. Professional and Personal Attributes at the following levels:

**Intermediate**

- 2.1 Application of established engineering methods to complex engineering problem solving. (LO: 1I )
- 3.1 Ethical conduct and professional accountability. (LO: 1I )
- 3.2 Effective oral and written communication in professional and lay domains. (LO: 1I )
- 3.3 Creative, innovative and pro-active demeanour. (LO: 1I )
- 3.4 Professional use and management of information. (LO: 1I )

**Advanced**

- 1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline. (LO: 4A )
- 1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline. (LO: 4A )
- 1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline. (LO: 2A 3A 5A )
- 1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (LO: 4A )
- 2.2 Fluent application of engineering techniques, tools and resources. (LO: 2A 3A 5A )
- 2.3 Application of systematic engineering synthesis and design processes. (LO: 2A 3A 5A )
- 2.4 Application of systematic approaches to the conduct and management of engineering projects. (LO: 1A 2A 3A 5A )
- 3.6 Effective team membership and team leadership. (LO: 1A 6A )

*Note: LO refers to the Learning Outcome number(s) which link to the competency and the levels: N - Introductory, I - Intermediate and A - Advanced.*

Refer to the Engineering Postgraduate Units Moodle site for further information on the Engineers Australia's Stage 1 Competency Standard for Professional Engineers and course level mapping information

<https://moodle.cqu.edu.au/course/view.php?id=11382>

## Alignment of Learning Outcomes, Assessment and Graduate Attributes



### Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes			
	1	2	3	4
1 - Project (applied) - 30%	•	•	•	
2 - Project (applied) - 30%	•			•
3 - In-class Test(s) - 40%		•	•	•

### Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes			
	1	2	3	4
1 - Knowledge		◦	◦	◦
2 - Communication	◦	◦	◦	◦
3 - Cognitive, technical and creative skills	◦	◦	◦	
4 - Research	◦	◦	◦	◦
5 - Self-management	◦			
6 - Ethical and Professional Responsibility	◦	◦	◦	
7 - Leadership	◦			
8 - Aboriginal and Torres Strait Islander Cultures				

## Textbooks and Resources

### Textbooks

ENEC20005

#### Prescribed

#### Water Resources Engineering

Edition: THIRD

Authors: David A. Chin

Pearson

Binding: eBook

[View textbooks at the CQUniversity Bookshop](#)

### IT Resources

**You will need access to the following IT resources:**

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- EPANET Software
- Personal Computer
- QGIS and TUFLOW Software

## Referencing Style

All submissions for this unit must use the referencing style: [Harvard \(author-date\)](#)

For further information, see the Assessment Tasks.

## Teaching Contacts

**Raj Sharma** Unit Coordinator

[r.sharma@cqu.edu.au](mailto:r.sharma@cqu.edu.au)

## Schedule

### Week 1 - 11 Jul 2022

Module/Topic	Chapter	Events and Submissions/Topic
Fundamentals of flow in closed conduits	Chapter 2	

### Week 2 - 18 Jul 2022

Module/Topic	Chapter	Events and Submissions/Topic
Design of water distribution system I	Chapter 3	

### Week 3 - 25 Jul 2022

Module/Topic	Chapter	Events and Submissions/Topic
Design of water distribution system II	Chapter 3	

### Week 4 - 01 Aug 2022

Module/Topic	Chapter	Events and Submissions/Topic
Design of wastewater collection system I	Chapter 6	

### Week 5 - 08 Aug 2022

Module/Topic	Chapter	Events and Submissions/Topic
Design of wastewater collection system II	Chapter 6	<b>Project 1</b> Due: Week 5 Friday (12 Aug 2022) 11:00 pm AEST
<b>Vacation Week - 15 Aug 2022</b>		
Module/Topic	Chapter	Events and Submissions/Topic
<b>Week 6 - 22 Aug 2022</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Probability and statistics in water resources engineering	Chapter 8	
<b>Week 7 - 29 Aug 2022</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Fundamentals of surface water hydrology I	Chapter 9	
<b>Week 8 - 05 Sep 2022</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Fundamentals of surface water hydrology II	Chapter 10	
<b>Week 9 - 12 Sep 2022</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Design of storm water collection system I	Chapter 11	
<b>Week 10 - 19 Sep 2022</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Design of storm water collection system II	Chapter 11	
<b>Week 11 - 26 Sep 2022</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Introduction to storm water management system	Chapter 12	
<b>Week 12 - 03 Oct 2022</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Revision Week		<b>Project 2</b> Due: Week 12 Friday (7 Oct 2022) 11:00 pm AEST
<b>Review/Exam Week - 10 Oct 2022</b>		
Module/Topic	Chapter	Events and Submissions/Topic
<b>Exam Week - 17 Oct 2022</b>		
Module/Topic	Chapter	Events and Submissions/Topic

## Assessment Tasks

### 1 Project 1

#### Assessment Type

Project (applied)

#### Task Description

This assessment task is designed to allow students to demonstrate their understanding of the topics covered during the first five weeks. You will work to design and analyse water distribution and wastewater collection systems. Some

information related to the project area is provided and you need to collect other relevant information from suppliers, councils and market surveys as appropriate. This project is by design open-ended, and you are to make several assumptions. Additional information on the project and assessment criteria is available on the unit website.

**Assessment Due Date**

Week 5 Friday (12 Aug 2022) 11:00 pm AEST

**Return Date to Students**

After 14 days of submission.

**Weighting**

30%

**Minimum mark or grade**

50%

**Assessment Criteria**

The assignment will be assessed based on

1. Valid and Verified assumptions: All values and statements should be properly referenced and supported.
2. Explanation of the work: All design steps should be explained in full detail. This covers the presentation of appropriate diagrams, statement of the principles and formulas in the correct order, presentation of all necessary steps in the analysis in the correct order and clear presentation of workings with links to the desired results.
3. Accuracy in calculations and correct results.
4. Appropriate and professional level of Communication: The report should show step by step process of the design and should be reported in a professional way.

**Referencing Style**

- [Harvard \(author-date\)](#)

**Submission**

Online

**Learning Outcomes Assessed**

- Formulate, plan, manage and complete projects individually or in teams considering stakeholder requirements and principles of sustainable development and communicate the outcomes professionally
- Design different components of urban water distribution, wastewater collection and stormwater collection systems
- Analyse a range of WSUD assets for a given urban setting

## 2 Project 2

**Assessment Type**

Project (applied)

**Task Description**

This assessment task is designed to allow students to demonstrate their understanding of the topics covered during weeks 6-11. You will work to analyse floods and/or stormwater design using industry-standard software. Some of the input data relevant to the chosen location of the project will be sourced from ARR2016, QUDM and other sources. This project is by design open-ended, and you are to make several assumptions. Your individual marks from the report depend on your contribution to the project. Details of the project will be provided on the unit website.

**Assessment Due Date**

Week 12 Friday (7 Oct 2022) 11:00 pm AEST

**Return Date to Students**

Two weeks after submission.

**Weighting**

30%

**Minimum mark or grade**

50%

**Assessment Criteria**

The assignment will be assessed based on

1. Valid and Verified assumptions: All values and statements should be properly referenced and supported.

2. Explanation of the work: All design steps should be explained in full detail. This covers the presentation of appropriate diagrams, statement of the principles and formulas in the correct order, presentation of all necessary steps in the analysis in the correct order and clear presentation of workings with links to the desired results.
3. Accuracy in calculations and correct results.
4. Appropriate and professional level of Communication. The report should show step by step process of the design and should be reported in a professional way.

### **Referencing Style**

- [Harvard \(author-date\)](#)

### **Submission**

Online

### **Learning Outcomes Assessed**

- Formulate, plan, manage and complete projects individually or in teams considering stakeholder requirements and principles of sustainable development and communicate the outcomes professionally
- Assess the hydrology of a catchment and estimate design floods.

## **3 Class Test**

### **Assessment Type**

In-class Test(s)

### **Task Description**

The time-restricted exam-style class test will be conducted online. The class test covers all learning outcomes and all learning resources of the unit. The format of the test will be published in week 11.

### **Assessment Due Date**

Test timetable will be published/advised in Week 11.

### **Return Date to Students**

After the certification of the grades.

### **Weighting**

40%

### **Minimum mark or grade**

50%

### **Assessment Criteria**

The following assessment criteria will be used for assessing the test:

- The correctness of the answers;
- The correct process was followed; and
- Accuracy of the calculations.

### **Referencing Style**

- [Harvard \(author-date\)](#)

### **Submission**

Online

### **Learning Outcomes Assessed**

- Design different components of urban water distribution, wastewater collection and stormwater collection systems
- Analyse a range of WSUD assets for a given urban setting
- Assess the hydrology of a catchment and estimate design floods.



## Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the [Student Academic Integrity Policy and Procedure](#). This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

### What is a breach of academic integrity?

A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

### Why is academic integrity important?

A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

### Where can I get assistance?

For academic advice and guidance, the [Academic Learning Centre \(ALC\)](#) can support you in becoming confident in completing assessments with integrity and of high standard.

### What can you do to act with integrity?



#### Be Honest

If your assessment task is done by someone else, it would be dishonest of you to claim it as your own



#### Seek Help

If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)



#### Produce Original Work

Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem