ENEC14017 *Water Resources Engineering*
Term 2 - 2024

Profile information current as at 12/07/2025 11:34 am

General Information

Overview
In this unit, you will be introduced to the principles of hydraulics and hydrology and how to apply solutions to solve water engineering problems. This unit introduces the principles to solve water resources engineering problems on catchment hydrology and urban floodwater management. You will study governing concepts of probability, risk, and uncertainty applied to hydrology and hydraulics. You will also study rainfall patterns, river and reservoir routing, rapid and gradually varying flow in open channels, flood and stormwater control, and the design of hydraulic structures. To complete these tasks, you must use appropriate technical language, communicate professionally, and work in teams and individually.

Details
Career Level: *Undergraduate*
Unit Level: *Level 4*
Credit Points: *12*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.25*

Pre-requisites or Co-requisites
Prerequisite: ENEC12010 Hydraulics & Hydrology
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 - 2024

- Bundaberg
- Cairns
- Gladstone
- Mackay
- 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 Undergraduate 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. **Written Assessment**
Weighting: 35%
2. **Written Assessment**
Weighting: 35%
3. **Online Test**
Weighting: 30%

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 Student Unit and Teaching Evaluation & Self-reflection

Feedback

Some students perceived the workload as heavy.

Recommendation

Unit content evaluation should be carried out to assess the workload.

Feedback from Student Unit and Teaching Evaluation

Feedback

Some students found the useful feedback was limited.

Recommendation

A group feedback session to discuss overall feedback should be conducted after marking the assessment. It should allow for a more comprehensive understanding of the feedback provided and promote collective learning and improvement.

Unit Learning Outcomes

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

1. Apply skills in hydraulics and hydrology to water engineering design
2. Conduct a hydrology assessment of a catchment
3. Design urban stormwater management systems
4. Prepare team reports for water engineering projects.

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:

Introductory 1.4 Discernment of knowledge development and research directions within the engineering discipline. (LO: 1N 2N 3N)

Intermediate 2.3 Application of systematic engineering synthesis and design processes. (LO: 1I 2I 3I) 2.4 Application of systematic approaches to the conduct and management of engineering projects. (LO: 1I 2I 3I) 3.3 Creative, innovative, and proactive demeanor. (LO: 4I)

Advanced 1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline. (LO: 1A 2A 3I) 1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences underpin the engineering discipline. (LO: 1A 2A 3I) 1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline. (LO: 1A 2A 3I) 1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline. (LO: 1A 2A 3I) 1.6 Understanding of the scope, principles, norms, accountabilities, and bounds of sustainable engineering practice in the specific discipline. (LO: 1A 2A 3I) 2.1 Application of established engineering methods to complex engineering problem-solving. (LO: 1A 2A 3I) 2.2 Fluent application of engineering techniques, tools, and resources. (LO: 1A 2A 3I) 3.2 Effective oral and written communication in professional and lay domains. (LO: 4A) 3.4 Professional use and management of information. (LO: 4A) 3.6 Effective team membership and team leadership. (LO: 4A)

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 Undergraduate Course Moodle site for further information on Engineers Australia's Stage 1 Competency Standard for Professional Engineers and course-level mapping informationhttps://moodle.cqu.edu.au/course/view.php?id=1511

Alignment of Learning Outcomes, Assessment and Graduate Attributes

— N/A Level | ◦ Introductory Level | • Intermediate Level | • Graduate Level | ◦ Professional Level | ◦ Advanced Level

Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes			
	1	2	3	4
1 - Written Assessment - 35%	•	•		•
2 - Written Assessment - 35%			•	•
3 - Online Test - 30%	•	•	•	

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes			
	1	2	3	4
1 - Communication				•
2 - Problem Solving	•	•	•	
3 - Critical Thinking		•	•	
4 - Information Literacy	•	•	•	
5 - Team Work			•	•
6 - Information Technology Competence	•	•	•	
7 - Cross Cultural Competence				
8 - Ethical practice				
9 - Social Innovation				
10 - Aboriginal and Torres Strait Islander Cultures				

Textbooks and Resources

Textbooks

ENEC14017

Prescribed

Water-Resources Engineering
Third Edition (2013)
Authors: David A. Chin
Pearson Education Limited
Harlow , Essex CM202 2JE , UK
ISBN: ISBN-13: 978-0-273-78591-0
Binding: Paperback

View textbooks at the CQUniversity Bookshop

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- TUFLOW Software
- MUSIC software
- HECRAS software
- RORB software
- FLIKE software
- Access to a computer with administrator rights where different software can be installed (needs Windows operating system)

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

Schedule

Week 1 - 08 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic
Probability, risk, and uncertainty in water resources engineering		

Week 2 - 15 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic
Probability models and estimation of flood at gauged stations		

Week 3 - 22 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic

Intensity Frequency Duration (IFD) for design Rainfall depths		

Week 4 - 29 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic
Rainfall temporal patterns		

Week 5 - 05 Aug 2024

Module/Topic	Chapter	Events and Submissions/Topic
Rainfall to runoff for design runoff		**Scoping and Preliminary Investigation** Due: Week 5 Friday (9 Aug 2024) 11:45 pm AEST

Vacation Week - 12 Aug 2024

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 19 Aug 2024

Module/Topic	Chapter	Events and Submissions/Topic
Runoff routing and design of detention basins		

Week 7 - 26 Aug 2024

Module/Topic	Chapter	Events and Submissions/Topic
Flood hydraulics and rating curves		

Week 8 - 02 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Urban drainage I- Longitudinal drainage		

Week 9 - 09 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Urban drainage II - Cross drainage		

Week 10 - 16 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Water-Sensitive Urban Design I		

Week 11 - 23 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Water Sensitive Urban Design II		

Week 12 - 30 Sep 2024

Module/Topic	Chapter	Events and Submissions/Topic
Review		**Final design and Analysis** Due: Week 12 Friday (4 Oct 2024) 11:45 pm AEST **Online Test** Due: Week 12 Monday (30 Sept 2024) 11:45 pm AEST

Review/Exam Week - 07 Oct 2024

Module/Topic	Chapter	Events and Submissions/Topic

Exam Week - 14 Oct 2024

Module/Topic	Chapter	Events and Submissions/Topic

Assessment Tasks

1 Scoping and Preliminary Investigation

Assessment Type
Written Assessment

Task Description
You will work on two projects from Week 1 to Week 12. You need to work on both projects simultaneously. Each project has two parts: Part A and Part B. Part A is to be submitted in Week 5, and Part B is to be submitted in Week 12. Part B is a continuation of Part A, so the feedback given for Part A should be addressed in the Part B submission.
Project 1:
You will create a Stormwater Drainage Strategy report for a specific site, to be submitted with a development application to the local council. In this project will evaluate changes in water quality and quantity before and after development and identify measures to mitigate any adverse impacts post-development.
Part A: Hydrologic Analysis as per ARR2019
Part B: Propose a Stormwater Treatment System

Project 2:
A future housing development is proposed in the coastal floodplain. Prepare a flood model for a 1% AEP event that includes this proposed development area. Appropriate attributes have already been included in the provided file to ensure the proposed development area will be flood-free if you use this file in the provided TUFLOW model.
Part A: Hydrologic Analysis as per ARR2019
Part B: Flood Model of the area
Note: This is a team assignment but be prepared to submit individual reports if the team fails to function effectively. Maintain a good record of your weekly contributions and inform the lecturer immediately if issues arise within the team.

Assessment Due Date
Week 5 Friday (9 Aug 2024) 11:45 pm AEST

Part A of Project 1 and Project 2 as two separate reports

Return Date to Students

14 days after submission

Weighting
35%

Minimum mark or grade
50 %

Assessment Criteria
The assessment will be marked based on the followings:
1) Clarity and organization of the report
2) Compliance with the project scope and local guidelines as specified
3) Technical accuracy of the work
4) Completeness of the work covering all aspects of the work as specified in the scope.

Referencing Style

- Harvard (author-date)

Submission
Online Group

Learning Outcomes Assessed

- Apply skills in hydraulics and hydrology to water engineering design
- Conduct a hydrology assessment of a catchment
- Prepare team reports for water engineering projects.

2 Final design and Analysis

Assessment Type
Written Assessment

Task Description
You will work on two projects from Week 1 to Week 12. You need to work on both projects simultaneously. Each project has two parts: Part A and Part B. Part A is to be submitted in Week 5, and Part B is to be submitted in Week 12. Part B is a continuation of Part A, so the feedback given for Part A should be addressed in the Part B submission.
Project 1:
You will create a Stormwater Drainage Strategy report for a specific site, to be submitted with a development application to the local council. In this project will evaluate changes in water quality and quantity before and after development and identify measures to mitigate any adverse impacts post-development.
Part A: Hydrologic Analysis as per ARR2019
Part B: Propose a Stormwater Treatment System

Project 2:
A future housing development is proposed in the coastal floodplain. Prepare a flood model for a 1% AEP event that includes this proposed development area. Appropriate attributes have already been included in the provided file to ensure the proposed development area will be flood-free if you use this file in the provided TUFLOW model.
Part A: Hydrologic Analysis as per ARR2019
Part B: Flood Model of the area
Note: This is a team assignment but be prepared to submit individual reports if the team fails to function effectively. Maintain a good record of your weekly contributions and inform the lecturer immediately if issues arise within the team.

Assessment Due Date
Week 12 Friday (4 Oct 2024) 11:45 pm AEST

Part B of Project 1 and Project 2 as two separate reports

Return Date to Students

14 days after submission

Weighting
35%

Minimum mark or grade
50

Assessment Criteria
The assessment will be marked based on the followings:
1) Clarity and organization of the report
2) Compliance with the project scope and local guidelines as specified
3) Technical accuracy of the work
4) Completeness of the work covering all aspects of the work as specified in the scope.

Referencing Style

- Harvard (author-date)

Submission
Online Group

Learning Outcomes Assessed

- Design urban stormwater management systems
- Prepare team reports for water engineering projects.

3 Online Test

Assessment Type
Online Test

Task Description
The test comprises content covered in the term. Some of the questions will be of numerical types which would require short calculations and some will be multiple choice types.

Assessment Due Date
Week 12 Monday (30 Sept 2024) 11:45 pm AEST

Return Date to Students

After the certification of grades.

Weighting
30%

Minimum mark or grade
50

Assessment Criteria
The answers will be marked as either correct or incorrect only.

Referencing Style

- Harvard (author-date)

Submission
Online

Learning Outcomes Assessed

- Apply skills in hydraulics and hydrology to water engineering design
- Conduct a hydrology assessment of a catchment
- Design urban stormwater management systems

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