



ENEC14014 *Structural and Geotechnical Design*

Term 3 - 2017

Profile information current as at 25/04/2024 04:55 am

All details in this unit profile for ENEC14014 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

In this unit you will analyse, design and prepare documentation for major civil engineering projects involving a broad range of investigation and design activities. You will establish project requirements and determine design loads and conditions, analyse structures and design components using Australian Standards and/or relevant guidance. You will use commercial computer software to analyse and design the structures with various design actions; conduct site investigations, test and characterise geotechnical materials, design foundations and earth retaining structures, and make assessments of geotechnical stability. In this unit you are expected to document the process of modelling, testing and analysis and communicate, work and learn, both individually and in teams in a professional manner. If you are enrolled in distance mode, you will be required to attend a residential school during the term.

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: (ENEC12012 Stress Analysis or ENEC13010 Solid Mechanics) AND ENEC12008 Geotechnical Engineering AND (ENEC13015 Steel & Timber Design or ENEC13011 Steel Structures) AND (ENEC13016 Concrete Technology & Design or ENEC14013 Concrete Structures)

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 3 - 2017

- Melbourne
- Mixed Mode
- Perth

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).

Residential Schools

This unit has a Compulsory Residential School for distance mode students and the details are:

Click here to see your [Residential School Timetable](#).

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. **Portfolio**

Weighting: 40%

2. **Portfolio**

Weighting: 30%

3. **Portfolio**

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 Moodle

Feedback

The unit was structured well and the content covered in a way to ensure easy learning.

Recommendation

The good practice will continue for next delivery as well.

Feedback from Moodle

Feedback

It is better to have more detailed assessment feedback within 2 weeks to help the learning

Recommendation

Next year the unit coordinator will ensure more constructive feedback will be given within two weeks, as per policy.

Feedback from Moodle

Feedback

More detail for Viva component will help us to prepare better for the assessment.

Recommendation

More detail about viva and its marking will be provided next year.

Unit Learning Outcomes

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

1. Calculate various types of loads acting on a structural system and provide a rationale for applied load combinations
2. Analyse and design complex structural components using appropriate Australian Standards
3. Describe and demonstrate site investigation and geotechnical testing techniques used to characterise sites and geotechnical materials
4. Analyse, assess and design foundations and earth retaining structures and assess stability of slopes
5. Analyse and/or design structural and geotechnical components using appropriate software
6. Demonstrate a professional level of communication and team work

The Learning Outcomes for this unit are linked with **Engineers Australia's Stage 1 Competency Standard**.

Alignment of Learning Outcomes, Assessment and Graduate Attributes



Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes					
	1	2	3	4	5	6
1 - Portfolio - 40%	•	•	•	•	•	•
2 - Portfolio - 30%			•	•	•	•

Assessment Tasks	Learning Outcomes					
	1	2	3	4	5	6
3 - Portfolio - 30%	•	•			•	•

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
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						

Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes									
	1	2	3	4	5	6	7	8	9	10
1 - Portfolio - 40%	•	•	•	•	•	•	•	•		
2 - Portfolio - 30%	•	•	•	•		•	•	•		
3 - Portfolio - 30%	•	•	•	•		•	•	•		

Textbooks

ENEC14014

Prescribed

Reinforced and Prestressed Concrete

2nd Edition (2013)

Authors: Yew-Chaye Loo, Sanaul H. Chowdhury

Cambridge University Press

Melbourne , VIC , Australia

ISBN: 9781107637863

Binding: Hardcover

ENEC14014

Prescribed

Soil Mechanics and Foundations

3rd Edition (2010)

Authors: Muni Budhu

John Wiley & Sons

USA

ISBN: 978-0-470-55684-9

Binding: Hardcover

ENEC14014

Supplementary

Design of Prestressed Concrete to AS3600-2009

2nd Edition (2015)

Authors: Gilbert, R. I., Mickleborough, N. C., Ranzi, G.

CRC Press

Boca Raton , FL , USA

ISBN: 978-1-4665-7269-0

Binding: Hardcover

ENEC14014

Supplementary

Foundation Design: Principles and Practices

3rd Edition (2015)

Authors: Coduto, D. P., Kitch, W. A., Yeung, M. R.

Pearson

USA

ISBN: 9780133411898

Binding: Hardcover

Additional Textbook Information

Prescribed textbook for Geotechnical Design (Soil Mechanics and Foundations) is the same textbook you used for the prerequisites unit ENEC12008.

In addition to the text book, students **must have access to Australian Standards** and **SA HB 108-2013 Timber Design Handbook** (available through university library website) also required for the unit. Full list of required standards are available on the unit website.

List of recommended reading books/papers may be available from the unit website, as necessary.

[View textbooks at the CQUniversity Bookshop](#)

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Finite Element Software for Structural Analysis: SPACE GASS

Referencing Style

All submissions for this unit must use the referencing style: [Harvard \(author-date\)](#)
For further information, see the Assessment Tasks.

Teaching Contacts

Sarkar Noor E Khuda Unit Coordinator
s.noorekhuda@cqu.edu.au

Schedule

Week 1 - 06 Nov 2017

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Introduction to ENEC14014, Unit Overview, Masonry Lecture 2: Consolidation Tutorial 1: Structural Engineering Tutorial 2: Geotechnical Engineering	Structural Design: Masonry, Material Properties, Design of Control Joints (AS3700-2011) Geotechnical Design: Consolidation	

Week 2 - 13 Nov 2017

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Requirements for Masonry Design Lecture 2: Shear Strength of Soil Tutorial 1: Structural Engineering Tutorial 2: Geotechnical Engineering	Structural Design: Lateral and Gravitational Load Distribution of Masonry Buildings (AS3700-2011) Geotechnical Design: Shear Strength of Soil	

Week 3 - 20 Nov 2017

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Structural Design of Unreinforced Masonry I Lecture 2: Bearing Capacity of Shallow Foundation I Tutorial 1: Structural Engineering Tutorial 2: Geotechnical Engineering	Structural Design: Design for In-plane Shear and Compression (AS3700-2011) Geotechnical Design: Bearing Capacity of Shallow Foundations	

Week 4 - 27 Nov 2017

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Structural Design of Unreinforced Masonry II Lecture 2: Bearing Capacity of Shallow Foundation II Tutorial 1: Structural Engineering Tutorial 2: Geotechnical Engineering	Structural Design: Design for Out-of-plane bending (AS3700-2011) Geotechnical Design: Bearing Capacity of Shallow Foundations	

Vacation Week - 04 Dec 2017

Module/Topic	Chapter	Events and Submissions/Topic
Mid-term break		

Week 5 - 11 Dec 2017

Module/Topic	Chapter	Events and Submissions/Topic
--------------	---------	------------------------------

Lecture 1: Reinforced Concrete Design using Strut-and-tie model
Lecture 2: Bearing Capacity of Deep Foundation I
Tutorial 1: Structural Engineering
Tutorial 2: Geotechnical Engineering

Structural Design: Reinforced Concrete Design
Geotechnical Design: Pile Foundations

Team Portfolio Due: Week 5 Friday (15 Dec 2017) 5:00 am AEST

Week 6 - 18 Dec 2017

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Prestressed Concrete Design I Lecture 2: Bearing Capacity of Deep Foundation II Tutorial 1: Structural Engineering Tutorial 2: Geotechnical Engineering	Structural Design: Introduction to Prestressed Concrete Design; Prestress Force and Tendon Profile Geotechnical Design: Pile Foundations	

Week 7 - 01 Jan 2018

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Prestressed Concrete Design II Lecture 2: Retaining Wall I Tutorial 1: Structural Engineering Tutorial 2: Geotechnical Engineering	Structural Design: Losses; Ultimate Design Checks Geotechnical Design: Retaining wall	

WEEK 8 - 08 Jan 2018

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Prestressed Concrete Design III Lecture 2: Retaining Wall II Tutorial 1: Structural Engineering Tutorial 2: Geotechnical Engineering	Structural Design: Ultimate Design Checks Geotechnical Design: Retaining wall	

Week 9 - 15 Jan 2018

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Application of FEA in Structural Engineering Lecture 2: Slope Stability Tutorial 1: Structural Engineering Tutorial 2: Geotechnical Engineering	Structural Design: Use of FEA Software in Structural Engineering Analysis and Design Geotechnical Design: Slope Stability Tutorial 1: Structural Engineering Tutorial 2: Geotechnical Engineering	Residential School [15 Jan - 17 Jan]

Week 10 - 22 Jan 2018

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Tutorials (as required) Lecture 2: Site Investigation Tutorial 1: Structural Engineering Tutorial 2: Geotechnical Engineering	Tutorials Site Investigation Tutorial 1: Structural Engineering Tutorial 2: Geotechnical Engineering	

Week 11 - 29 Jan 2018

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Tutorials (as required) Lecture 2: Tutorials (as required)	Tutorials	

Week 12 - 05 Feb 2018

Module/Topic	Chapter	Events and Submissions/Topic
No lectures in this week - Both Individual Project Portfolios are due this week [Wednesday]		Individual Portfolio 1 (Structural Design) Due: Week 12 Wednesday (7 Feb 2018) 5:00 pm AEST Individual Portfolio 2 (Geotechnical Design) Due: Week 12 Wednesday (7 Feb 2018) 5:00 pm AEST

Term Specific Information

Please read **ENEC14014: General Information** available in the unit website.

Practical Classes for on-campus students will be scheduled after week 5. Detail of the laboratory timetable will be available in Week 3. Distance students will complete all practicals during the residential school.

Due to multi-campus delivery of the unit, **workshop** timetable will be available from unit website separately.

Assessment Tasks

1 Team Portfolio

Assessment Type

Portfolio

Task Description

Objective:

The aim of this assessment is to allow the students to demonstrate their understanding of various concepts, theories and processes developed in both Structural and Geotechnical Engineering topics covered in the program. This may include, but is not limited to structural analysis, calculation of design actions, concrete design, steel design, masonry design, prestressed concrete design, consolidation, slope stability, site investigation, earth retaining wall and foundation design. Formal assessment is by submission of a portfolio which contains evidence of all the individual work that the student has performed throughout the term. A portfolio is used to allow individuals to choose evidence that demonstrates to the satisfaction of course assessors how the learning outcomes have been met and to what level.

A **Portfolio Brief** detailing the requirements for Portfolio, including required pieces of work, will be available on the course Website in Week 1. Students must read and follow the guidance and timeline to complete the project successfully.

This assessment is based on team project and **single portfolio** must be submitted by each team.

Assessment Due Date

Week 5 Friday (15 Dec 2017) 5:00 am AEST

Return Date to Students

Please see the project brief

Weighting

40%

Minimum mark or grade

50% of the total marks for the assignment are required to pass this course

Assessment Criteria

Grades for the assessment will be determined based on the evidence and substantiation of attainment of the Learning Outcomes.

After submission of the portfolio, a short interview (viva) may be scheduled for each student. Students must be prepared to answer any questions raised by the facilitator/lecturer. The questions will be based on their individual achievement/work and the work the team has produced. The interview may also be used as an assessment tool and unsatisfactory performance during interview may affect the grade.

Omission of any of the required items as specified in the **Portfolio Brief** will automatically result in a Fail grade. Students will receive feedback after two weeks of the interview.

Individual Student's Grade:

Initially team submission will be assessed and a grade will be given for each team. Then individual grade will be determined based on their contribution **and** performance during the viva. Each student's contribution will be determined by peer assessment. It may be possible individual grade may be higher than team marks, but capped at maximum

marks for the assessment.

Example: Individual contributions of 3 students in Team A are given below. This Team A received 36 marks (out of 40) for their portfolio.

M1 - 30%; M2 - 33%; M3 - 37% (Total 100%)

Based on the contribution, Individual marks are given as follow.

$M1 = 36 \times (30/33.3) = 32.4$ (out of 40)

$M2 = 36 \times (33/33.3) = 35.6$ (out of 40)

$M3 = 36 \times (37/33.3) = 40.0$ (out of 40)

If the performance in the viva is not at the satisfactory level, the above individual marks will be multiplied by 0.5 and given as final marks for this assessment item.

Referencing Style

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

Submission

Online Group

Submission Instructions

It is not expected that students will type up workbook/calculations. Students should scan hand calculations for online submission.

Learning Outcomes Assessed

- Calculate various types of loads acting on a structural system and provide a rationale for applied load combinations
- Analyse and design complex structural components using appropriate Australian Standards
- Describe and demonstrate site investigation and geotechnical testing techniques used to characterise sites and geotechnical materials
- Analyse, assess and design foundations and earth retaining structures and assess stability of slopes
- Analyse and/or design structural and geotechnical components using appropriate software
- Demonstrate a professional level of communication and team work

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Team Work
- Information Technology Competence
- Cross Cultural Competence
- Ethical practice

2 Individual Portfolio 1 (Structural Design)

Assessment Type

Portfolio

Task Description

Objective:

The aim of this assessment is to allow the students to demonstrate their understanding of various concepts, theories and processes developed in Structural Engineering topics covered in the program. This may include, but is not limited to structural analysis, calculation of design actions, concrete design, steel design, masonry design and prestressed concrete design.

Formal assessment is by submission of a portfolio which contains evidence of all the individual work that the student has performed throughout the term. A portfolio is used to allow individuals to choose evidence that demonstrates to the satisfaction of course assessors how the learning outcomes have been met and to what level.

A **Portfolio Brief** detailing the requirements for Portfolio, including required pieces of work, will be available on the course Website in Week 6. Students must read and follow the guidance and timeline to complete the project successfully.

Assessment Due Date

Week 12 Wednesday (7 Feb 2018) 5:00 pm AEST

Return Date to Students

2 weeks after the interview

Weighting

30%

Minimum mark or grade

50% of the total marks for the assignment are required to pass this course

Assessment Criteria

Grades for the assessment will be determined based on the evidence and substantiation of attainment of the Learning Outcomes.

After submission of the portfolio, a short interview (viva) will be scheduled for each student. Students must be prepared to answer any questions raised by the facilitator/lecturer. The questions will be based on their individual achievement/work and the work they produced. The interview may also be used as an assessment tool and unsatisfactory performance during interview may affect the grade*.

Omission of any of the required items as specified in the **Portfolio Brief** will automatically result in a Fail grade.

** If the performance in the viva is not at the satisfactory level, the marks obtained from the submission will be multiplied by 0.5 and awarded as final marks for this assessment.*

Referencing Style

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

Submission

Online

Submission Instructions

One Report for team

Learning Outcomes Assessed

- Describe and demonstrate site investigation and geotechnical testing techniques used to characterise sites and geotechnical materials
- Analyse, assess and design foundations and earth retaining structures and assess stability of slopes
- Analyse and/or design structural and geotechnical components using appropriate software
- Demonstrate a professional level of communication and team work

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Cross Cultural Competence
- Ethical practice

3 Individual Portfolio 2 (Geotechnical Design)

Assessment Type

Portfolio

Task Description**Objective:**

The aim of this assessment is to allow the students to demonstrate their understanding of various concepts, theories and processes developed in Geotechnical Engineering topics covered in the program. This may include, but is not limited to consolidation, slope stability, site investigation, earth retaining wall and foundation design.

Formal assessment is by submission of a portfolio which contains evidence of all the individual work that the student has performed throughout the term. A portfolio is used to allow individuals to choose evidence that demonstrates to the satisfaction of course assessors how the learning outcomes have been met and to what level.

A **Portfolio Brief** detailing the requirements for Portfolio, including required pieces of work, will be available on the course Website in Week 6. Students must read and follow the guidance and timeline to complete the project successfully.

Assessment Due Date

Week 12 Wednesday (7 Feb 2018) 5:00 pm AEST

Return Date to Students

After the final grade released

Weighting

30%

Minimum mark or grade

50% of the total marks for the assignment are required to pass this course

Assessment Criteria

Grades for the assessment will be determined based on the evidence and substantiation of attainment of the Learning Outcomes.

After submission of the portfolio, a short interview (viva) will be scheduled for each student. Students must be prepared to answer any questions raised by the facilitator/lecturer. The questions will be based on their individual achievement/work and the work they produced. The interview may also be used as an assessment tool and unsatisfactory performance during interview may affect the grade*.

Omission of any of the required items as specified in the **Portfolio Brief** will automatically result in a Fail grade.

** If the performance in the viva is not at the satisfactory level, the marks obtained from the submission will be multiplied by 0.5 and awarded as final marks for this assessment.*

Referencing Style

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

Submission

Online

Learning Outcomes Assessed

- Calculate various types of loads acting on a structural system and provide a rationale for applied load combinations
- Analyse and design complex structural components using appropriate Australian Standards
- Analyse and/or design structural and geotechnical components using appropriate software
- Demonstrate a professional level of communication and team work

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Cross Cultural Competence
- Ethical practice

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