



ENEC13017 *Advanced Structural Analysis*

Term 2 - 2017

Profile information current as at 02/05/2024 05:31 am

All details in this unit profile for ENEC13017 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 determinacy and stability and the implications this has for structural analysis. You will also determine reactions, internal forces and displacements of structures, and analyse truss and beams with moving loads. You will be introduced to fundamentals of finite element method and use commercially available software to analyse structures.

Details

Career Level: *Undergraduate*

Unit Level: *Level 3*

Credit Points: 6

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.125

Pre-requisites or Co-requisites

Prerequisites: ENEG11006 Engineering Statics AND ENEC12012 Stress Analysis

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 - 2017

- Bundaberg
- Distance
- Gladstone
- Mackay
- 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 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 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: 20%

2. **Written Assessment**

Weighting: 20%

3. **Written Assessment**

Weighting: 20%

4. **Examination**

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](#).

Unit Learning Outcomes

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

1. Analyse structures to assess the degree of indeterminacy and structural stability
2. Determine reactions, internal forces and displacements in statically determinate and indeterminate structures
3. Analyse trusses and beams with moving loads and develop influence lines
4. Solve a variety of truss and simple beam problems using the stiffness method
5. Explain the fundamentals of the finite element method and use computer software packages to solve structural engineering problems
6. Demonstrate a professional level of communication

The learning outcomes are linked to Engineers Australia Stage 1 Competencies and also discipline capabilities. You can find the mapping for this on the [Engineering Undergraduate Course website](#).

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 - Written Assessment - 20%	•	•	•	•		•
2 - Written Assessment - 20%	•				•	•
3 - Written Assessment - 20%	•	•	•	•		•
4 - Examination - 40%	•	•	•	•	•	•

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						•

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
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 - Written Assessment - 20%	•	•	•	•		•				
2 - Written Assessment - 20%	•	•	•	•		•				
3 - Written Assessment - 20%	•	•	•	•		•				
4 - Examination - 40%	•	•	•	•						

Textbooks and Resources

Textbooks

ENEC13017

Prescribed

Structural Analysis

9th Edition in SI Units (2016)

Authors: Russell C. Hibbeler

Pearson Higher Ed USA

USA

ISBN: 9781292089461

Binding: Hardcover

[View textbooks at the CQUniversity Bookshop](#)

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Microstran
- SpaceGass

Referencing Style

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

For further information, see the Assessment Tasks.

Teaching Contacts

Faris Albermani Unit Coordinator
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Schedule

Week 1 - 10 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Principle of Virtual Work	Refer to Lectures Supplement	

Week 2 - 17 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Statically Indeterminate Structures (SIS)	Refer to Lectures Supplement	

Week 3 - 24 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Consistent Deformations	Refer to Lectures Supplement	

Week 4 - 31 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Force/Flexibility approach for structural analysis of SIS	Refer to Lectures Supplement	

Week 5 - 07 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
Structural modelling and analysis using commercial software	Refer to Lectures Supplement	Assessment Item 1: Assignment Due: Week 5 Monday (7 Aug 2017) 1:00 pm AEST

Vacation Week - 14 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
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Week 6 - 21 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
Displacement/Stiffness approach for structural analysis	Refer to Lectures Supplement	

Week 7 - 28 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Direct Stiffness Method	Refer to Lectures Supplement	Assessment Item 2: Structural Modelling Due: Week 7 Monday (28 Aug 2017) 1:00 pm AEST

Week 8 - 04 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
Direct Stiffness Method, beam structures	Refer to Lectures Supplement	

Week 9 - 11 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
Direct Stiffness Method, truss structures	Refer to Lectures Supplement	

Week 10 - 18 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
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Direct Stiffness Method, frame structures Refer to Lectures Supplement

Week 11 - 25 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
Moment Distribution approach	Refer to Lectures Supplement	

Week 12 - 02 Oct 2017

Module/Topic	Chapter	Events and Submissions/Topic
Moment Distribution for beam structures	Refer to Lectures Supplement	Assessment Item 3: Assignment Due: Week 12 Monday (2 Oct 2017) 1:00 pm AEST

Review/Exam Week - 09 Oct 2017

Module/Topic	Chapter	Events and Submissions/Topic
Revision		

Exam Week - 16 Oct 2017

Module/Topic	Chapter	Events and Submissions/Topic
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Assessment Tasks

1 Assessment Item 1: Assignment

Assessment Type

Written Assessment

Task Description

The assignment can be downloaded from the moodle site. This assignment covers virtual work and consistent deformation approaches for solving statically indeterminate structures. You will need to start working on this assignment from week 2 of the term.

Assessment Due Date

Week 5 Monday (7 Aug 2017) 1:00 pm AEST

Return Date to Students

Two weeks after the due date

Weighting

20%

Assessment Criteria

Your submission must be neatly presented and easy to follow. Present your results and working on clearly annotated diagrams. Include all the necessary calculations and assumptions made in your solution. Use consistent units.

Referencing Style

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

Submission

Online

Learning Outcomes Assessed

- Analyse structures to assess the degree of indeterminacy and structural stability
- Determine reactions, internal forces and displacements in statically determinate and indeterminate structures
- Analyse trusses and beams with moving loads and develop influence lines
- Solve a variety of truss and simple beam problems using the stiffness method
- Demonstrate a professional level of communication

Graduate Attributes

- Communication
- Problem Solving

- Critical Thinking
- Information Literacy
- Information Technology Competence

2 Assessment Item 2: Structural Modelling

Assessment Type

Written Assessment

Task Description

The assignment can be downloaded from the moodle site. This assignment covers structural modelling and analysis using commercial software. You will need to start working on this assignment from week 4 of the term.

Assessment Due Date

Week 7 Monday (28 Aug 2017) 1:00 pm AEST

Return Date to Students

Two weeks after the due date

Weighting

20%

Assessment Criteria

Clearly define your structural model, units, dimensions, type of elements, support and loading conditions. Specify which commercial software is used for the analysis. Make use of clearly annotated diagrams to show your structural model and results.

Referencing Style

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

Submission

Online

Learning Outcomes Assessed

- Analyse structures to assess the degree of indeterminacy and structural stability
- Explain the fundamentals of the finite element method and use computer software packages to solve structural engineering problems
- Demonstrate a professional level of communication

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence

3 Assessment Item 3: Assignment

Assessment Type

Written Assessment

Task Description

The assignment can be downloaded from the moodle site. This assignment covers the stiffness method of structural analysis. You will need to start working on this assignment from week 7 of the term.

Assessment Due Date

Week 12 Monday (2 Oct 2017) 1:00 pm AEST

Return Date to Students

One week after the due date

Weighting

20%

Assessment Criteria

Your submission must be neatly presented and easy to follow. Present your results and working on clearly annotated diagrams. Include all the necessary calculations and assumptions made in your solution.

Referencing Style

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

Submission

Online

Learning Outcomes Assessed

- Analyse structures to assess the degree of indeterminacy and structural stability
- Determine reactions, internal forces and displacements in statically determinate and indeterminate structures
- Analyse trusses and beams with moving loads and develop influence lines
- Solve a variety of truss and simple beam problems using the stiffness method
- Demonstrate a professional level of communication

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence

Examination

Outline

Complete an invigilated examination.

Date

During the examination period at a CQUniversity examination centre.

Weighting

40%

Length

180 minutes

Minimum mark or grade

50

Exam Conditions

Closed Book.

Materials

Calculator - non-programmable, no text retrieval, silent only

Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments).

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