



ENEC12012 Stress Analysis

Term 3 - 2019

Profile information current as at 30/04/2024 05:04 am

All details in this unit profile for ENEC12012 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 develop skills to analyse the stresses in a structural member subjected to various actions such as axial force, torsion, bending moments and shear force using the principles of mechanics of materials. You will learn how individual structural members resist and transfer the stresses as well as ways in which they can fail. You will document the process of modelling, testing and analysis and communicate, work and learn, both individually and in teams in a professional manner. Students enrolled in mixed mode are required to attend a compulsory Residential School.

Details

Career Level: *Undergraduate*

Unit Level: *Level 2*

Credit Points: 6

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.125

Pre-requisites or Co-requisites

Prerequisites: [ENEG11006 Engineering Statics OR ENEC12007 Analysis of Structures] AND [MATH11219 Engineering Mathematics] AND [ENEG11008 Materials for Engineers OR ENEC12005 Materials Science and Engineering]

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 - 2019

- Mixed Mode

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 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. **Online Quiz(zes)**

Weighting: 10%

2. **In-class Test(s)**

Weighting: 20%

3. **Practical and Written Assessment**

Weighting: 10%

4. **Examination**

Weighting: 60%

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 lecturer was helpful and willing to help. Study resources such as tutorial recordings and solution files are helpful.

Recommendation

This practice will continue in the next offer.

Feedback from Moodle

Feedback

Assessment structure could be improved.

Recommendation

As the current assessment structure has shown to increase the exam and overall pass rates, continue the current assessment strategy and monitor the overall class performance. Discuss the assessment structure and expectations with students at the start of the term.

Feedback from Moodle

Feedback

Assessment requirements were sometimes not clear.

Recommendation

Review the assessment information and continue to discuss assessment requirements in the tutorials.

Unit Learning Outcomes

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

1. Apply the fundamental theories and analytical techniques to solve problems in mechanics of materials
2. Analyse the behaviour of structural members subjected to axial force, torsion, bending moment and shear force
3. Determine principal stresses and discuss failure criteria for a range of engineering materials
4. Demonstrate a professional level of communication and teamwork.

The learning outcomes are linked to **Engineers Australia Stage 1 Competencies** and also **Discipline Capabilities**

Alignment of Learning Outcomes, Assessment and Graduate Attributes



Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes			
	1	2	3	4
1 - Online Quiz(zes) - 10%	•		•	
2 - In-class Test(s) - 20%		•		
3 - Practical and Written Assessment - 10%				•

Assessment Tasks	Learning Outcomes			
	1	2	3	4
4 - Examination - 60%	•	•	•	

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				

Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes									
	1	2	3	4	5	6	7	8	9	10
1 - Online Quiz(zes) - 10%	•	•	•	•		•				
2 - In-class Test(s) - 20%	•	•	•	•						
3 - Practical and Written Assessment - 10%	•	•		•		•				
4 - Examination - 60%	•	•	•	•						

Textbooks and Resources

Textbooks

ENEC12012

Prescribed

MECHANICS OF MATERIALS

7th Edition (SI Units) (2015)

Authors: Ferdinand P. Beer, E. Russell Johnston, Jr., John T. DeWolf, David Mazurek

Mc Graw Hill Education

New York , NY , USA

ISBN: 9789814595247

Binding: Hardcover

IT Resources

You will need access to the following IT resources:

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

Referencing Style

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

For further information, see the Assessment Tasks.

Teaching Contacts

Hassan Baji Unit Coordinator

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Schedule

Week 1 - 11 Nov 2019

Module/Topic	Chapter	Events and Submissions/Topic
Concept of Stress Mechanical Properties of Materials	Chapters 1 and 2	

Week 2 - 18 Nov 2019

Module/Topic	Chapter	Events and Submissions/Topic
Axial Loading	Chapter 2	

Week 3 - 25 Nov 2019

Module/Topic	Chapter	Events and Submissions/Topic
Torsion	Chapter 3	Progressive Test 1: The test opens at 09:00 AM on Monday.

Week 4 - 02 Dec 2019

Module/Topic	Chapter	Events and Submissions/Topic
Pure Bending I: Pure Bending - Symmetric Bending	Sections 4.1 to 4.5	Progressive Test 1: The test closes at 09:00 AM on Monday.

Vacation Week - 09 Dec 2019

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

Week 5 - 16 Dec 2019

Module/Topic	Chapter	Events and Submissions/Topic
Pure Bending II: Unsymmetric Bending	Sections 4.8, 4.11 and 4.13	Progressive Test 2: The test opens at 09:00 AM on Monday.

Week 6 - 23 Dec 2019

Module/Topic	Chapter	Events and Submissions/Topic
Shearing Stresses in Beams and Thin-Walled Members I	Chapter 6	Progressive Test 2: The test closes at 09:00 AM on Monday.

Week 7 - 06 Jan 2020

Module/Topic	Chapter	Events and Submissions/Topic
Shearing Stresses in Beams and Thin-Walled Members II	Chapter 6	

Week 8 - 13 Jan 2020

Module/Topic	Chapter	Events and Submissions/Topic
Combined Loading	Sections 4.7 & 4.9 Sections 8.1 & 8.3	Progressive Test 3: The test opens at 09:00 AM on Monday.

Week 9 - 20 Jan 2020

Module/Topic	Chapter	Events and Submissions/Topic
Transformation of Stress & Strain (Principal Stresses)	Chapters 7 & 8	Progressive Test 3: The test closes at 09:00 AM on Monday. Residential School and Class Exam Mid-Term Examination Due: Week 9 Tuesday (21 Jan 2020) 11:45 pm AEST

Week 10 - 27 Jan 2020

Module/Topic	Chapter	Events and Submissions/Topic
Deflection of Beams	Chapter 9	

Week 11 - 03 Feb 2020

Module/Topic	Chapter	Events and Submissions/Topic
Column Buckling	Chapter 10	Progressive Test 4: The test opens at 09:00 AM on Monday.

Week 12 - 10 Feb 2020

Module/Topic	Chapter	Events and Submissions/Topic
Review		Progressive Test 4: The test closes at 09:00 AM on Monday. Practical Reports Due: Week 12 Monday (10 Feb 2020) 11:45 pm AEST

Exam Week - 17 Feb 2020

Module/Topic	Chapter	Events and Submissions/Topic
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Term Specific Information

Mid-term Exam (In-Class Test) will be held on 21 January 2020 (morning - time to be confirmed). It is the student's responsibility to ensure you are available on that day and able to attend in-person. All students are attending the residential school on this date and able to sit the test at either **Cairns or Rockhampton** campuses, but if any students who are not attending the residential school should be able to attend to their nearest campus given the availability of resources. If you have any questions regarding this arrangement, you must contact the unit coordinator **before** the end of week 2. This Mid-term Exam (In-Class Test) can't be rescheduled.

Assessment Tasks

1 Progressive Test(s)

Assessment Type

Online Quiz(zes)

Task Description

This assessment task consists of four **Progressive Tests** in the form of online quizzes. Each Test consists of a number of numerical questions.

Important Notes:

- Each Test is set for 60 minutes. You have 60 minutes from when you start your attempt to submit your answers. If you start but leave a test and come back to it later, your 60 min time may have lapsed and you will be scored - zero for that attempt.
- You can attempt the Test up to TWO times within the given time frame (generally 1 week) as specified in the Schedule. The test will be automatically closed after the end of the given time frame.
- The final mark will be the **Highest** of all the attempts.
- Even though the tests are open for a few days, it is expected that your first attempt would be on the first day.
- Tests cannot be deferred.

Number of Quizzes

4

Frequency of Quizzes

Other

Assessment Due Date

Please see the Schedule

Return Date to Students

Immediately after the test

Weighting

10%

Assessment Criteria

Due to the nature of the assessment, only the final answer will be considered. Full marks will be given for each correct answers, but there will be no partial marks.

Referencing Style

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

Submission

Online

Learning Outcomes Assessed

- Apply the fundamental theories and analytical techniques to solve problems in mechanics of materials
- Determine principal stresses and discuss failure criteria for a range of engineering materials

Graduate Attributes

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

2 Mid-Term Examination

Assessment Type

In-class Test(s)

Task Description

Mid-Term Examination will be conducted in the form of an in-class test during the residential school week.

Sections covered until week 6 (inclusive) will be examined during this assessment.

Duration of the Test: 2 hours

Format: The answer sheet will be provided.

Standard calculator is allowed.

The exam is closed book; however, a single A4 sheet with formulas written in both sides is allowed.

Assessment Due Date

Week 9 Tuesday (21 Jan 2020) 11:45 pm AEST

Return Date to Students

Week 11 Tuesday (4 Feb 2020)

Two weeks after the exam the results will be returned.

Weighting

20%

Minimum mark or grade

25%

Assessment Criteria

Each question will be assessed for the criterion accuracy and correct answers.

- Correct application of mathematics and arithmetic
- Answers clearly identified and explained
- Correct results/explanation

In addition, the following criteria also will be considered:

Evidence of correct procedures

- All necessary steps in the analysis are followed in the correct order
- Clear presentation of mathematical working

Evidence of an understanding of the topic

- Use of correct principles and theories
- Interpretation of results as necessary

Professional presentation

- Appropriate use of diagrams, clear diagrams
- Correct use of terminology, conventions

- Clear English in the explanation of procedure and interpretation of results

Referencing Style

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

Submission

Offline

Learning Outcomes Assessed

- Analyse the behaviour of structural members subjected to axial force, torsion, bending moment and shear force

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy

3 Practical Reports

Assessment Type

Practical and Written Assessment

Task Description

Practical exercises assist the student to achieve the Learning Outcomes for this unit. Students required to complete the laboratory activities as per instruction given in the **Practical Instruction Sheets**. The Practical Instruction Sheets and report requirements will be given on the Moodle site.

Assessment Due Date

Week 12 Monday (10 Feb 2020) 11:45 pm AEST

Lab work will be done in week 9 on Monday and Tuesday and due date for submission of lab report is week 12.

Return Date to Students

Exam Week Monday (17 Feb 2020)

Feedback for the practical lab will be returned in two weeks.

Weighting

10%

Minimum mark or grade

50% of the total marks for the reports are required to pass this unit.

Assessment Criteria

Each report will be assessed separately for the criterion accuracy and correct procedure as required in the Instruction.

- Correct application of mathematics and arithmetic
- Results clearly identified and explained
- Correct results/explanation

In addition, the report as a whole will be assessed against the following criteria:

Evidence of correct procedures

- All necessary steps in experiment and reporting are followed in the correct order
- Clear presentation of results obtained
- Evidence of checking results (mathematical, graphical, logic-common sense)

Evidence of understanding of the topic

- Explanation of possible error in the experiment
- Interpretation of results

Professional presentation

- Appropriate use of diagrams, clear diagrams
- Correct use of terminology, conventions

- Clear English in the explanation of procedure and interpretation of results

Referencing Style

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

Submission

Online

Submission Instructions

All Reports should be submitted as single PDF file

Learning Outcomes Assessed

- Demonstrate a professional level of communication and teamwork.

Graduate Attributes

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

Examination

Outline

Complete an invigilated examination.

Date

During the examination period at a CQUniversity examination centre.

Weighting

60%

Length

180 minutes

Minimum mark or grade

50%

Exam Conditions

Restricted.

Materials

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

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

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