



AINV20009 Accident Forensics and Engineering

Term 1 - 2019

Profile information current as at 03/05/2024 07:01 pm

All details in this unit profile for AINV20009 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, students will develop an advanced understanding of the role forensic engineering methods and victim pathology play in informing accident investigation and causation. Students will also appraise the contribution of engineers and the engineering profession, safety engineering concepts, safe design, engineering failure analysis to accident investigation and prevention. The contribution of principles and methods of fire investigation and the role of meteorology are also analysed. All students are required to attend a Residential School.

Details

Career Level: *Postgraduate*

Unit Level: *Level 8*

Credit Points: 6

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.125

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 1 - 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 Postgraduate 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. **Group Discussion**

Weighting: 20%

2. **Written Assessment**

Weighting: 40%

3. **Written Assessment**

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 Student feedback

Feedback

Assessment gave latitude to think broadly about the topics

Recommendation

Continue with the current assessment items.

Feedback from student feedback

Feedback

As residential school is early in the term, it may be worthwhile delivering some of the content at the residential school to help prepare for activities

Recommendation

Review residential school program to see if some lectures can be included.

Unit Learning Outcomes

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

1. Discuss the role and effect of safety engineering and prevention through design on the causation and prevention of accidents.
2. Analyse forensic investigation contexts and methods from the engineering disciplines including mechanical, electrical, civil and chemical engineering for establishing accident causation factors.
3. Examine the methods of engineering failure analysis and their contribution to accident forensics.
4. Examine the contribution of victim pathology in identification of the biomechanics of injury causality and the implication for future design and injury prevention.
5. Explore the nature of fires and the principles and techniques for fire investigation.
6. Examine the impact of meteorology on accident causation and associated methods of investigation.

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 - Group Discussion - 20%	•	•			•	•
2 - Written Assessment - 40%	•		•			
3 - Written Assessment - 40%		•		•		

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
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						

Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes							
	1	2	3	4	5	6	7	8
1 - Group Discussion - 20%	○	○	○	○	○	○	○	
2 - Written Assessment - 40%	○	○	○	○	○	○		
3 - Written Assessment - 40%	○	○	○	○	○	○		

Textbooks and Resources

Textbooks

There are no required textbooks.

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

Prue Howard Unit Coordinator
p.howard@cqu.edu.au

Schedule

Week 1 - 11 Mar 2019

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Unit and Moodle Live Zoom Lecture Topic: Safety engineering & prevention - Engineering design		

Week 2 - 18 Mar 2019

Module/Topic	Chapter	Events and Submissions/Topic
Live Zoom Lecture Topic: Safety engineering & prevention - Crashworthiness		Submit topic for Oral Presentation at Res School

Week 3 - 25 Mar 2019

Module/Topic	Chapter	Events and Submissions/Topic
Live Zoom Lecture Topic: Engineering Failure Analysis (Stress, strain, Forces, Materials)		Confirmation of Oral Presentation topics for Res School Contribute to Moodle Group discussion

Week 4 - 01 Apr 2019

Module/Topic	Chapter	Events and Submissions/Topic
Live Zoom Lecture Topic: Engineering Failure Analysis (Metallurgy, Fatigue)		

Week 5 - 08 Apr 2019

Module/Topic	Chapter	Events and Submissions/Topic
Live Zoom Lecture Topic: Forensic Engineering Investigation Methods (Surveying, Physical and Laboratory testing, Event data recorders)		

Vacation Week - 15 Apr 2019

Module/Topic	Chapter	Events and Submissions/Topic
Compulsory Residential School Note - attendance at this residential school is a requirement to be eligible for a pass grade in this unit. Residential School activities will include: <ul style="list-style-type: none"> • fatigue testing • vibration demonstrations • surveying • tension testing • site visit to investigate crashworthiness • visit by QPS Forensic Crash Unit • oral presentations 		Residential School - Mon 15 April (approx 1pm) - Thurs 18 April (Approx 12 noon) 2019 - Bundaberg Crash Lab This allows travel to Bundaberg with arrival approx 12.30pm.

Week 6 - 22 Apr 2019

Module/Topic	Chapter	Events and Submissions/Topic
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Live Zoom Lecture Topic: Forensic Engineering Investigation Methods (computer modelling, photography, videos)

Residential School Portfolio Due: Week 6 Friday (26 Apr 2019) 11:59 pm AEST

Week 7 - 29 Apr 2019

Module/Topic	Chapter	Events and Submissions/Topic
Live Zoom Lecture Topic: Vehicle Dynamics		

Week 8 - 06 May 2019

Module/Topic	Chapter	Events and Submissions/Topic
Live Zoom Lecture Topic: Vehicle Accident Case Study		

Week 9 - 13 May 2019

Module/Topic	Chapter	Events and Submissions/Topic
Live Zoom Lecture Topic: Meteorology and accidents		Literature Review Due: Week 9 Friday (17 May 2019) 11:59 pm AEST

Week 10 - 20 May 2019

Module/Topic	Chapter	Events and Submissions/Topic
Live Zoom Lecture Topic: Victim Pathology		

Week 11 - 27 May 2019

Module/Topic	Chapter	Events and Submissions/Topic
Live Zoom Lecture Topic: Fire investigation		Contribute to Moodle Group discussion

Week 12 - 03 Jun 2019

Module/Topic	Chapter	Events and Submissions/Topic
Live Zoom Lecture Topic: Review & reflection		Contribute to Moodle Group discussion

Review/Exam Week - 10 Jun 2019

Module/Topic	Chapter	Events and Submissions/Topic
		Contribute to Moodle Group discussion

Exam Week - 17 Jun 2019

Module/Topic	Chapter	Events and Submissions/Topic
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Assessment Tasks

1 Class Discussion and Moodle Activities

Assessment Type

Group Discussion

Task Description

Discussion topics related to the unit content of Accident Forensics and Engineering will be introduced in the News forum at stages throughout the term. These will then be discussed by the cohort on the Moodle discussion forum, where you will develop and share your final understandings.

You are expected to participate in each of these discussions as they form a part of the assessment activities for this unit. 4 topics will be introduced throughout the term. You must initiate one discussion per topic and respond to at least one discussion per topic. Your response will be aimed at extending the knowledge of the cohort on that topic. This process will allow you to demonstrate your knowledge and understanding of key concepts.

For each topic (5 marks), you are expected to:

- initiate a discussion within one week of the topic being given.
- respond to a discussion within 2 weeks of the topic being given.

The submissions will be marked at the end of the three week period. This will allow for feedback for further submissions. No responses will be allowed after the end of the two week period.

Topics will include:

- The role of safety engineering through design.
- Vicim pathology
- Meteorology
- Fire investigation

Assessment Due Date

As per unit schedule

Return Date to Students

Within three weeks of submission

Weighting

20%

Assessment Criteria

A suggested length of 300 words per discussion item, and 200 words per response is a guide for this assessment item. Each topic discussion will be assessed as shown below.

- Original topic post demonstrates an understanding of the concept being assessed (2.5 marks)
- Original topic post is referenced correctly (0.5 marks)

Responses to other students constructively extends the conversations (2 marks)

Referencing Style

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

Submission

Online

Submission Instructions

Submission via the discussion forum in Moodle

Learning Outcomes Assessed

- Discuss the role and effect of safety engineering and prevention through design on the causation and prevention of accidents.
- Analyse forensic investigation contexts and methods from the engineering disciplines including mechanical, electrical, civil and chemical engineering for establishing accident causation factors.
- Explore the nature of fires and the principles and techniques for fire investigation.
- Examine the impact of meteorology on accident causation and associated methods of investigation.

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management
- Ethical and Professional Responsibility
- Leadership

2 Residential School Portfolio

Assessment Type

Written Assessment

Task Description

You will be required to report on your activities undertaken during your practicum experience at the residential school.

The task will require you to complete two components.

Part A: Oral Presentation (10%)

You will be allocated a topic by the end of week 3. Prepare and present an oral presentation, supported by visual media, which you will deliver to the class during the residential school. In this presentation you will investigate the role of engineering within accident investigation through research into a specific piece of engineering equipment or an engineering process. While your presentation will be assessed at the residential school, a copy of the slides/supporting media must be submitted as part of the Part B written report.

Part B: Written report (30%)

During the residential school you will visit a site to investigate crashworthiness, and be visited by accident investigators. You will also conduct engineering tests. You will write a report that addresses the following points:

- Assess the forensic engineering methods used in establishing accident causation factors
- Investigate the function and benefit of contemporary accident forensics technologies
- Discuss the results of the practical activities and include the results (including the survey map) in your report
- Discuss the role of engineering design in impacting crashworthiness
- Include slides/supporting media from oral presentation as an appendix

Further details will be provided to you at the residential school.
More details will be provided on Moodle and in the class sessions.

Assessment Due Date

Week 6 Friday (26 Apr 2019) 11:59 pm AEST

Return Date to Students

Within three weeks of submission

Weighting

40%

Assessment Criteria

The report will be assessed as shown below.

- Description of the activities undertaken at the residential school.
- Results of the practical activities
- Discussion of the results of practical activities
- Development of survey map
- Reflection of learnings from the visit by experts
- Reflection on learnings from the site visit
- Reflection with examples on where the knowledge gained at the residential school may be applied by accident investigators.
- Discussion of design improvements that could be made to impact crashworthiness - based on site visit.

The presentation will be assessed as shown below.

- Quality of content of presentation
- Quality of presentation skills
- Quality of visual media used

A detailed marking rubric will be available in moodle at the commencement of term

Referencing Style

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

Submission

Online

Learning Outcomes Assessed

- Discuss the role and effect of safety engineering and prevention through design on the causation and prevention of accidents.
- Examine the methods of engineering failure analysis and their contribution to accident forensics.

Graduate Attributes

- Knowledge
- Communication

- Cognitive, technical and creative skills
- Research
- Self-management
- Ethical and Professional Responsibility

3 Literature Review

Assessment Type

Written Assessment

Task Description

You are required to find and identify case studies where engineering forensics were used to help identify the cause of the accident.

You will discuss how at least 4 engineering forensics methods were used and contributed to the investigation/s. You may be able to identify more than one forensic engineering method in a single case study. The number of case studies you identify will be dependant on how many engineering methods were used in the investigation. You will discuss the strengths and weaknesses of those methods and what their contributions were to the investigation. Aim to illustrate the breadth of methods and techniques that were available to the investigators. Draw conclusions about the efficacy/usefulness of the forensic analysis in establishing accident causation.

The format of your assessment will be a report in Word or pdf. It should contain all the relevant figures, tables and diagrams

The report shall not exceed 3000 words.

More details will be provided on Moodle and in the class sessions.

Assessment Due Date

Week 9 Friday (17 May 2019) 11:59 pm AEST

Return Date to Students

Within three weeks of submission

Weighting

40%

Assessment Criteria

The report will be assessed as shown below.

- Identified and explained at least 4 forensic engineering methods
- quality of the assessment of the forensic engineering methods identified
- breadth of methods and techniques that were available to the investigators
- conclusions about the efficacy/usefulness of the forensic analysis in establishing accident causation
- accuracy and consistency of referencing
- quality of report style, grammar and spelling

More details will be provided on Moodle and in the class sessions.

A detailed marking rubric will be available in moodle at the commencement of term

Referencing Style

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

Submission

Online

Learning Outcomes Assessed

- Analyse forensic investigation contexts and methods from the engineering disciplines including mechanical, electrical, civil and chemical engineering for establishing accident causation factors.
- Examine the contribution of victim pathology in identification of the biomechanics of injury causality and the implication for future design and injury prevention.

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management
- Ethical and Professional Responsibility

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