



# AINV20009 Accident Forensics and Engineering

## Term 1 - 2018

Profile information current as at 10/04/2024 03:10 am

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 - 2018

- 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. **Written Assessment**

Weighting: 40%

#### 2. **Written Assessment**

Weighting: 40%

#### 3. **Group Discussion**

Weighting: 20%

### 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**

Student suggested increasing the engineering focus during the residential school.

##### **Recommendation**

Residential school activities should be revised to include engineering testing/investigation aspects.

#### Feedback from student feedback

##### **Feedback**

Assessment does not give timely feedback before next item

##### **Recommendation**

Assessment items and their timing are to be reviewed to allow more time for feedback to students.

#### Feedback from student feedback

##### **Feedback**

Need more engineering analysis

##### **Recommendation**

Unit content is to be reviewed to include more engineering analysis.

#### Feedback from student feedback

##### **Feedback**

Great interaction with staff

##### **Recommendation**

Ensure that current high levels of interaction between staff and students remain.

## 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](mailto:p.howard@cqu.edu.au)

## Schedule

### Week 1 - 05 Mar 2018

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Unit and Moodle		
Safety engineering & prevention (engineering design and crashworthiness)		

### Week 2 - 12 Mar 2018

Module/Topic	Chapter	Events and Submissions/Topic
Forensic Engineering Investigation Methods (Surveying, Physical and Laboratory testing, Event data recorders)		Contribute to Moodle Group discussion

### Week 3 - 19 Mar 2018

Module/Topic	Chapter	Events and Submissions/Topic
Engineering Failure Analysis (Stress, strain, Forces, Materials)		

### Week 4 - 26 Mar 2018

Module/Topic	Chapter	Events and Submissions/Topic
Engineering Failure Analysis (Metallurgy, Fatigue)		

### Week 5 - 02 Apr 2018

Module/Topic	Chapter	Events and Submissions/Topic
Residential School		Residential School - Tues 3 - Thurs 5 April 2018 - Bundaberg Crash Lab

**Vacation Week - 09 Apr 2018**

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

**Week 6 - 16 Apr 2018**

Module/Topic	Chapter	Events and Submissions/Topic
Forensic Engineering Investigation Methods (computer modelling, photography, videos)		<b>Residential School Portfolio</b> Due: Week 6 Monday (16 Apr 2018) 11:55 pm AEST

**Week 7 - 23 Apr 2018**

Module/Topic	Chapter	Events and Submissions/Topic
Crashworthiness and biomechanics		

**Week 8 - 30 Apr 2018**

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

**Week 9 - 07 May 2018**

Module/Topic	Chapter	Events and Submissions/Topic
Fire investigation		Contribute to Moodle Group discussion  <b>Literature Review</b> Due: Week 9 Friday (11 May 2018) 11:55 pm AEST

**Week 10 - 14 May 2018**

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

**Week 11 - 21 May 2018**

Module/Topic	Chapter	Events and Submissions/Topic
Review & reflection		

**Week 12 - 28 May 2018**

Module/Topic	Chapter	Events and Submissions/Topic
Review & reflection		<b>Class Discussion and Moodle Activities</b> Due: Week 12 Friday (1 June 2018) 11:55 pm AEST

**Review/Exam Week - 04 Jun 2018**

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

**Exam Week - 11 Jun 2018**

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

## Assessment Tasks

### 1 Residential School Portfolio

**Assessment Type**

Written Assessment

**Task Description**

During the compulsory residential school, you will be engaged in a number of practical activities to apply the knowledge you have learned. Details of each activity will be provided during the residential school, however they will include:

- Forensic Engineering & Crashworthiness assessment
- Engineering Failure Analysis
- Surveying

- Site visit
- Oral presentation. You will be required to research and describe to the class how a specific piece of engineering equipment works. You will be given your equipment item prior to the residential school. This will share a number of engineering contexts with the class. Examples of equipment could include a brake; an LED; a compressor. A range of items covering the different areas of engineering will be given to the class.

You will collate these activities as a portfolio and submit it for assessment.  
More details will be provided on Moodle and in the class sessions.

#### **Assessment Due Date**

Week 6 Monday (16 Apr 2018) 11:55 pm AEST

#### **Return Date to Students**

Week 7 Friday (27 Apr 2018)

#### **Weighting**

40%

#### **Assessment Criteria**

As a general rule assessment criteria for all assessment items include

1. (90%) Content - includes the accuracy, relevance and application of key concepts, analysis, argument, language and grammar used in answering a question or report (see marking criteria for individual requirements).
2. (10%) References - includes the provision of a reference list and the application of the Harvard style for referencing information, data, tables or images sourced for the assignment or report.

A more detailed marking criteria sheet will be provided to you in Moodle.

#### **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

## **2 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 be required to discuss how at least 4 engineering forensics methods were used and contributed to the investigation. 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 should discuss the strengths and weaknesses of those methods and what their contributions were to the investigation.

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

#### **Assessment Due Date**

Week 9 Friday (11 May 2018) 11:55 pm AEST

#### **Return Date to Students**

Week 11 Friday (25 May 2018)

#### **Weighting**

40%

### Assessment Criteria

There is no word limit for this assessment item, however a guide of approximately 3000 words is suggested.

As a general rule assessment criteria for all assessment items include

1. (90%) Content - includes the accuracy, relevance and application of key concepts, analysis, argument, language and grammar used in answering a question or report (see marking criteria for individual requirements).
2. (10%) References - includes the provision of a reference list and the application of the Harvard style for referencing information, data, tables or images sourced for the assignment or report.

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

### 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

## 3 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.

You must initiate a discussion within one week of the topic being given, and then you must respond to a discussion within 2 weeks of the topic being given. The submissions will be marked at the end of the two 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.
- Victim pathology
- Meteorology
- Fire investigation

Each topic will be worth 25% of the assignment mark.

### Assessment Due Date

Week 12 Friday (1 June 2018) 11:55 pm AEST

### Return Date to Students

Exam Week Friday (15 June 2018)

Feedback on each of the four submissions will be made with 2 weeks of the 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.



As a general rule assessment criteria for all assessment items include

1. (90%) Content - includes the accuracy, relevance and application of key concepts, analysis, argument, language and grammar used in answering a question or report (see marking criteria for individual requirements).
2. (10%) References - includes the provision of a reference list and the application of the Harvard style for referencing information, data, tables or images sourced for the assignment or report.

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

### **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

## 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