



# OCHS12018 Safety Science

## Term 1 - 2018

Profile information current as at 19/04/2024 12:23 am

All details in this unit profile for OCHS12018 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

The emphasis in this unit is to help you make the connection between science and safety practice so that you will think scientifically to promote evidence-based practice (EPB) as a safety professional. You will be introduced to the science that explains how hazards behave, the concept of energy conversion and how hazards cause harm. Management of health and safety risk is discussed from an evidence-informed perspective. Case studies will be used to assist you in developing an appreciation of the linkages between occupational harm and fundamental theories of physics, chemistry, physiology and social sciences.

### 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

Pre-requisite study of 24 credit points

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

- Adelaide
- Brisbane
- Bundaberg
- Distance
- Gladstone
- Melbourne
- Perth
- Rockhampton
- Sydney

### 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. **Portfolio**

Weighting: 10%

2. **Group Discussion**

Weighting: 20%

3. **Written Assessment**

Weighting: 30%

4. **Portfolio**

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 Unit coordinator reflections

##### Feedback

Assessment types should be revised to reflect the scientific nature of the material. The inclusion of online quizzes would allow for continuous assessment and immediate feedback.

##### Recommendation

Remove the current Assignment 1 (Portfolio 1) and replace with weekly quizzes.

#### Feedback from Unit coordinator reflections

##### Feedback

The use of web-based platforms for Assignment 4 creates unnecessary difficulty and does not add to the value of the assessment item. Additionally, too many marks are allocated for non-content-based criteria.

##### Recommendation

Re-format the structure of the current Portfolio (Assignment 4) and reconsider the assessment criteria.

#### Feedback from Unit coordinator reflections

##### Feedback

The case study used in Assignment 3 should be updated.

##### Recommendation

Select a new case study for use in Assignment 3 (Group Report).

## Unit Learning Outcomes

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

1. Describe the scientific nature of hazards.
2. Explain the principles of energy conversion as it applies to health and safety risk.
3. Apply scientific principles to explain occupational fatality, injury, illness and harm.
4. Utilise scientific research to improve health and safety outcomes.
5. Construct an argumentative rationale regarding the management of a hazard to achieve best-practice and continuous improvement, in a real world setting.

## Alignment of Learning Outcomes, Assessment and Graduate Attributes



### Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes				
	1	2	3	4	5
1 - Portfolio - 10%	•	•	•	•	
2 - Group Discussion - 20%	•	•	•		
3 - Written Assessment - 30%	•	•	•	•	•

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

### Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes				
	1	2	3	4	5
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 - 10%	•	•	•	•		•	•	•		
2 - Group Discussion - 20%	•	•	•	•	•	•	•	•		
3 - Written Assessment - 30%	•	•	•	•		•	•	•		
4 - Portfolio - 40%	•	•	•	•		•	•	•		

## Textbooks and Resources

### Textbooks

**There are no required textbooks.**

#### Additional Textbook Information

### 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

**Shevaun Dell** Unit Coordinator  
[s.dell@cqu.edu.au](mailto:s.dell@cqu.edu.au)

## Schedule

### Week 1 - 05 Mar 2018

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Safety Science		Introduce yourself in the Week One 'Introduce Yourself' forum so we know you can access the unit Moodle site.

### Week 2 - 12 Mar 2018

Module/Topic	Chapter	Events and Submissions/Topic
Scientific Concepts & Risk		

### Week 3 - 19 Mar 2018

Module/Topic	Chapter	Events and Submissions/Topic
Energy and the Energy Damage Model		<b>Portfolio Part 1</b> Due: Week 3 Friday (23 Mar 2018) 11:59 pm AEST

### Week 4 - 26 Mar 2018

Module/Topic	Chapter	Events and Submissions/Topic
Physical and Mechanical Hazards		

### Week 5 - 02 Apr 2018

Module/Topic	Chapter	Events and Submissions/Topic
Noise and Vibration		

### Vacation Week - 09 Apr 2018

Module/Topic	Chapter	Events and Submissions/Topic

### Week 6 - 16 Apr 2018

Module/Topic	Chapter	Events and Submissions/Topic
Light and Radiation		<b>Case Study Discussion Posts</b> Due: Week 6 Friday (20 Apr 2018) 11:59 pm AEST
<b>Week 7 - 23 Apr 2018</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Electrical Hazards		
<b>Week 8 - 30 Apr 2018</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Chemical Hazards I		
<b>Week 9 - 07 May 2018</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Chemical Hazards II		
<b>Week 10 - 14 May 2018</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Biological Hazards		<b>Group Report</b> Due: Week 10 Friday (18 May 2018) 11:59 pm AEST
<b>Week 11 - 21 May 2018</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Psychosocial Hazards		
<b>Week 12 - 28 May 2018</b>		
Module/Topic	Chapter	Events and Submissions/Topic
Recap		<b>Portfolio Part 2</b> Due: Week 12 Friday (1 June 2018) 11:59 pm AEST
<b>Review/Exam Week - 04 Jun 2018</b>		
Module/Topic	Chapter	Events and Submissions/Topic
<b>Exam Week - 11 Jun 2018</b>		
Module/Topic	Chapter	Events and Submissions/Topic
[there is no exam for this unit]		

## Assessment Tasks

### 1 Portfolio Part 1

#### Assessment Type

Portfolio

#### Task Description

Establish a Safety Science Portfolio

The purpose of this assignment is to establish a suitable storehouse for resources that support science-based safety. You are required to demonstrate appropriate use of technology for the development of a multi-medium resource (this may take the form of a Mahara portfolio, a blog or website, for example, but other platform options are available).

You are required to complete the following tasks:

1. Establish a personal portfolio for use during this Safety Science unit
2. Provide a personal profile and short biography
3. In 100 words or less, explain why evidence is important to a safety professional. Support your response with a minimum of two references.
4. Summarise the main points drawn from the learning material on scientific concepts. Include principles pertaining to science-based safety and ensure you objectively define terms.
5. In about 250 words, consider the information resources available to safety professionals (e.g. journal articles, industry reports, web sites, blogs, personal communication, codes of practice, Australian Standards, and items of

legislation), and explain why peer reviewed journal articles are highly regarded when writing reports, proposals, guidance material, essays and general academic writing. A minimum of 3 references is required.

To submit your portfolio for marking, follow the below process:

1. Download the assessment criteria sheet for assessment item 1
2. Complete the personal details area, including directions to your portfolio
3. Upload the completed sheet into assessment item 1 submission area on Moodle

### **Assessment Due Date**

Week 3 Friday (23 Mar 2018) 11:59 pm AEST

### **Return Date to Students**

Week 5 Friday (6 Apr 2018)

Marks will be available two academic weeks after the due submission dates.

### **Weighting**

10%

### **Assessment Criteria**

**Your submission will be assessed against the following criteria:**

1. Level of skill demonstrated with chosen platform (1 mark)
2. Suitability of a professional profile (1 mark)
3. Written expression and depth of discussion related to the importance of evidence (2 marks)
4. Main points clearly and accurately expressed, terms are defined objectively, and principles of science-based safety appropriately identified (3 marks)
5. Written expression and depth of discussion regarding information resources available to safety professionals (2 marks)
6. Reputable sources that are referenced and consistent with Harvard Style (1 mark)

### **Referencing Style**

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

### **Submission**

Online

### **Learning Outcomes Assessed**

- Describe the scientific nature of hazards.
- Explain the principles of energy conversion as it applies to health and safety risk.
- Apply scientific principles to explain occupational fatality, injury, illness and harm.
- Utilise scientific research to improve health and safety outcomes.

### **Graduate Attributes**

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

## **2 Case Study Discussion Posts**

### **Assessment Type**

Group Discussion

### **Task Description**

#### **Case Study Discussion Posts**

The purpose of this assignment is to demonstrate that you can (1) apply scientific principles to explain the process that resulted in damage or harm, and (2) critically review the work of others. You will be presented four case studies that involve various forms of energy.

You are required to complete four tasks: 1 case study analysis and 3 peer reviews. In so doing, you will have examined each of the four case studies for four different energy forms.

1. In less than 250 words, you are required to analyse only one of the four case studies presented, using the energy-

damage model.

- Identify the form of energy immediately before control was lost
- Identify preconditions that make the event possible
- Describe the hazard control failure mechanism
- Describe the point in time that relates to the damage event
- Identify the space transfer mechanism and describe the energy transference that led to damage
- Identify the assets damaged (recipients)
- Identify the damage threshold of the recipient

2. In less than 150 words, you are to critically peer review the work of 3 student submissions for the other three (3) case studies. In your response, start with positive comments to reinforce existing strengths. When offering suggestions for improvement watch your written tone of voice. Throughout ensure your response is relevant, specific and expressed in a respectful manner. You are required to:

- Identify what was done well and explain why
- Identify what could be improved and explain how

### **Assessment Due Date**

Week 6 Friday (20 Apr 2018) 11:59 pm AEST

Please post your responses in the dedicated case study discussion forum

### **Return Date to Students**

Week 8 Friday (4 May 2018)

Marks will be available two academic weeks after the due submission dates.

### **Weighting**

20%

### **Minimum mark or grade**

To achieve a passing grade in this unit, students must complete all four (4) assessment items and achieve 50% or more on the aggregate of all assessment items.

### **Assessment Criteria**

Your submission will be assessed against the following criteria:

#### **I. One case study analysis post (5 marks)**

Depth of analysis and level of accurately for the following:

- The identification of the form of energy immediately before control was lost
- The identification of preconditions that make the event possible
- The description of the hazard control failure mechanism
- The description of the point in time that relates to the damage event
- The identification of the space transfer mechanism and describe the energy transference that led to damage
- The identification of the assets damaged (recipients)
- The identification of the damage threshold of the recipient

#### **II. Three peer review posts (5 marks per review)**

Peer review is meaningful and insightful

- Depth of critique
- Strengths identified and reasons explained
- Weaknesses identified and ways to improve offered
- Expressed in a respectful manner

### **Referencing Style**

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

### **Submission**

Online

### **Learning Outcomes Assessed**

- Describe the scientific nature of hazards.
- Explain the principles of energy conversion as it applies to health and safety risk.
- Apply scientific principles to explain occupational fatality, injury, illness and harm.



## Graduate Attributes

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

## 3 Group Report

### Assessment Type

Written Assessment

### Task Description

The purpose of this assignment is to demonstrate application of evidence-informed thinking in regards to the management of a safety science problem.

This is a team assignment (up to 3 members). You can form your own teams. If you are not in a team by Monday of week 4, you will be assigned to a team.

### Case Study

Whites Petroleum Company has recently acquired a Liquid Petroleum Gas (LPG) storage and transfer facility that was founded in 1965. Due to past events, the managers of Whites Petroleum are aware that there is potential for Boiling Liquid Expanding Vapour Explosions (BLEVEs) in this industry. As a safety consultant, you have been asked to explain why and how BLEVEs may occur and to offer intervention strategies that are practical, cost-effective, and specific to the LPG industry. The intervention you argue needs to be based on scientific principles.

Present your proposal in the form of an argumentative rationale to the company. In your response, you should include:

1. A review of the literature relating to BLEVEs, including a summary of:

- The conditions under which BLEVEs can occur
- The chemical and physical properties of LPG
- The potential for secondary fires and explosions following a BLEVE
- Available risk control measures
- Evidence from research in the field

2. A discussion of the merits of various interventions

3. Your considered opinion concerning the most appropriate intervention, based on the evidence you have reviewed

4. Your recommendations for implementing your chosen intervention strategy

Length: 1500 words

### Assessment Due Date

Week 10 Friday (18 May 2018) 11:59 pm AEST

### Return Date to Students

Week 12 Friday (1 June 2018)

Marks will be available two weeks after the due submission dates.

### Weighting

30%

### Assessment Criteria

Your submission will be assessed against the following criteria:

Introduction (2 marks)

- The intervention you will argue for
- The direction the proposal will follow

Analyse of BLEVEs in the LPG industry (7 marks)

- The conditions under which BLEVEs can occur
- The potential for secondary fires and explosions
- The chemical and physical properties of LPG
- Lessons learned
- Interventions (control measures) available

#### Discussion (8 Marks)

- Merits of various interventions
- Consideration of hierarchies of control, practicality and cost-benefit
- Your opinion based on reputable and credible evidence
- Depth of discussion

#### Recommendations for action (4 marks)

- Clear and to the point
- Suitable implementation (action plan) for the intervention offered

#### Conclusion (2 marks)

- Implications of your proposed intervention
- Includes no new information
- Draws to a logical end

#### References (2 marks)

- Consistent with Harvard Style (located in the unit profile)
- Contains at least 10 reputable references, 4 of which are peer reviewed journal articles

#### Argument is persuasive (2 marks)

- Makes logical connections between evidence, opinion and recommendations
- Written expression is concise and precise
- Format, grammar and spelling support readability

#### Team player participation (3 marks)

- Communication
- Commitment
- Contribution

#### Referencing Style

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

#### Submission

Online

#### Submission Instructions

Each student must submit a copy of their group's report along with a copy of the group contribution form

#### Learning Outcomes Assessed

- Describe the scientific nature of hazards.
- Explain the principles of energy conversion as it applies to health and safety risk.
- Apply scientific principles to explain occupational fatality, injury, illness and harm.
- Utilise scientific research to improve health and safety outcomes.
- Construct an argumentative rationale regarding the management of a hazard to achieve best-practice and continuous improvement, in a real world setting.

#### Graduate Attributes

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

## 4 Portfolio Part 2

### Assessment Type

Portfolio

### Task Description

#### Completion of your Safety Science Portfolio

The purpose of this assignment is to demonstrate that you can evaluate and select appropriate resources for the purpose of aiding science-based safety. This assignment continues on from assessment item 1.

You are required to complete the safety science portfolio that was established for assessment item 1. You are required to complete five (5) hazard topic-pages, each covering a different form of energy. For each topic-page you are to address the following:

1. The significance of the problem (as it relates to the energy type) supported with a reference to at least one peer reviewed journal article
2. A description of underpinning science
3. Identification of hazardous situations or circumstances (e.g. industry type, occupation types, working conditions, etc.)
4. Measurement and evaluation information (e.g. measurements for energy levels, exposure limits, thresholds that inform the level or type of risk, etc.)
5. Safety strategies (e.g. regulations, codes of practice, Australian Standards and at least one peer reviewed journal article)
6. All resources are referenced. Reference list is consistent with Harvard Style
7. General layout and usability
8. Ease of information retrieval and presentation
9. Range of information resources included (e.g. text, images, tables, graphs, videos, links to external sites)
10. Depth and range of evidence presented

To submit your Portfolio for marking, follow the below process:

1. Download the assessment criteria sheet for assessment item 4
2. Complete the personal details area, including the URL to your portfolio (check that the URL will open)
3. Upload the completed sheet into assessment item 4 submission area on Moodle

### Assessment Due Date

Week 12 Friday (1 June 2018) 11:59 pm AEST

### Return Date to Students

Exam Week Friday (15 June 2018)

Provisional grades will be returned within 2 academic weeks of due date.

### Weighting

40%

### Assessment Criteria

Eight (8) marks are awarded to each of the five topic pages. Your submission will be assessed against the following criteria:

1. Investigation into the significance of the problem is supported with evidence
2. Accuracy and depth of description of the underpinning science
3. Level of hazard identification undertaken
4. Suitability of measurement and evaluation information
5. Reputability of potential safety strategies (evidence)
6. Reference list is consistent with Harvard Style
7. General layout and usability aids navigation
8. Presentation aids ease of information retrieval
9. Range of information resources included
10. Reputability of evidence presented (i.e. sources used to inform thinking)

### Referencing Style

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

### Submission

Online

## Learning Outcomes Assessed

- Describe the scientific nature of hazards.
- Explain the principles of energy conversion as it applies to health and safety risk.
- Apply scientific principles to explain occupational fatality, injury, illness and harm.
- Utilise scientific research to improve health and safety outcomes.

## 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