



# EDED14355 *STEM Education and Engagement*

## Term 1 - 2017

Profile information current as at 21/05/2024 12:29 am

All details in this unit profile for EDED14355 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

It is well recognised that future generations require strong educational foundations in order to navigate our changing world. The renewed national focus on Science, Technology, Engineering and Mathematics (STEM) in primary school education will ensure that young Australians become equipped with the necessary STEM skills and knowledge that they need to succeed in a changing world. STEM education refers collectively to the teaching of the disciplines of science, technology, engineering and mathematics and also to a cross-disciplinary approach to teaching that increases student interest in STEM related fields and improves students' problem solving and critical analysis skills. In this unit, you will build on the knowledge acquired in previous science, technology and mathematics units. You will apply problem based learning theory and pedagogical principles that underpin inquiry approaches and collaboration to design, conduct and evaluate first hand investigations in the science, technology, engineering or mathematics areas applicable to primary school classrooms. You will consolidate your knowledge in STEM disciplines and develop your pedagogical skills to increase student engagement and participation in STEM.

### Details

Career Level: *Undergraduate*

Unit Level: *Level 4*

Credit Points: 6

Student Contribution Band: 7

Fraction of Full-Time Student Load: 0.125

### Pre-requisites or Co-requisites

Prerequisites: EDCU12038 Teaching for Mathematical Proficiency EDCU12039 Digital and Design Technologies EDCU12040 Biological and Earth and Space Sciences EDCU13020 Mathematics Curriculum EDCU13017 Chemical and Physical Sciences

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 - 2017

- Bundaberg
- Distance
- Mackay
- Noosa
- 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: 50%

#### 2. **Practical and Written Assessment**

Weighting: 50%

### 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. Design and conduct first hand investigations in science, technology, engineering or mathematics
2. Apply the principles of scientific inquiry to design STEM learning experiences
3. Evaluate examples of STEM projects and identify real world situations
4. Implement teaching strategies that are learner centered and can support learners including those with diverse educational needs.

### Australian Professional Standards for Teachers (Graduate Level)

- 1.2 Understand how students learn
- 1.5 Differentiate teaching to meet the specific needs of students across the full range of abilities
- 2.1 Content and teaching strategies of the teaching area
- 2.2 Content selection and organisation
- 2.6 Information and Communication Technology (ICTs)
- 3.1 Establish challenging learning goals
- 3.2 Plan, structure and sequence learning programs
- 3.3 Use teaching strategies
- 3.4 Select and use resources
- 3.6 Evaluate and improve teaching programs
- 4.1 Support student participation
- 4.5 Use ICT safely, responsibly and ethically
- 6.2 Engage in professional learning and improve practice
- 6.3 Engage with colleagues and improve practice

## Alignment of Learning Outcomes, Assessment and Graduate Attributes



### Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes			
	1	2	3	4
<b>1 - Written Assessment - 50%</b>	•	•	•	•
<b>2 - Practical and Written Assessment - 50%</b>	•	•	•	•

### Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes			
	1	2	3	4
<b>1 - Communication</b>			•	•
<b>2 - Problem Solving</b>	•	•	•	
<b>3 - Critical Thinking</b>	•	•	•	
<b>4 - Information Literacy</b>		•	•	

Graduate Attributes	Learning Outcomes			
	1	2	3	4
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 - Written Assessment - 50%			•	•				•		
2 - Practical and Written Assessment - 50%	•	•	•		•	•	•	•		

## 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: [American Psychological Association 6th Edition \(APA 6th edition\)](#)

For further information, see the Assessment Tasks.

## Teaching Contacts

**Linda Pfeiffer** Unit Coordinator  
[l.pfeiffer@cqu.edu.au](mailto:l.pfeiffer@cqu.edu.au)

## Schedule

**Week 1 - 06 Mar 2017**

Module/Topic	Chapter	Events and Submissions/Topic
STEM literature	Details of weekly readings can be found on Moodle.	

**Week 2 - 13 Mar 2017**

Module/Topic	Chapter	Events and Submissions/Topic
PBL and inquiry approaches	Details of weekly readings can be found on Moodle.	

**Week 3 - 20 Mar 2017**

Module/Topic	Chapter	Events and Submissions/Topic
Research design and first-hand investigations	Details of weekly readings can be found on Moodle.	

**Week 4 - 27 Mar 2017**

Module/Topic	Chapter	Events and Submissions/Topic
Science, technology and mathematics reviewed	Details of weekly readings can be found on Moodle.	

**Week 5 - 03 Apr 2017**

Module/Topic	Chapter	Events and Submissions/Topic
Engineering principles	Details of weekly readings can be found on Moodle.	

**Vacation Week - 10 Apr 2017**

Module/Topic	Chapter	Events and Submissions/Topic

**Week 6 - 17 Apr 2017**

Module/Topic	Chapter	Events and Submissions/Topic
STEM lesson design	Details of weekly readings can be found on Moodle.	<b>Written Assessment</b> Due: Week 6 Thursday (20 Apr 2017) 11:45 pm AEST

**Week 7 - 24 Apr 2017**

Module/Topic	Chapter	Events and Submissions/Topic
Project design for engagement activities	Details of weekly readings can be found on Moodle.	

**Week 8 - 01 May 2017**

Module/Topic	Chapter	Events and Submissions/Topic
STEM experts and collaboration	Details of weekly readings can be found on Moodle.	

**Week 9 - 08 May 2017**

Module/Topic	Chapter	Events and Submissions/Topic
Evaluation of STEM projects	Details of weekly readings can be found on Moodle.	

**Week 10 - 15 May 2017**

Module/Topic	Chapter	Events and Submissions/Topic
Differentiation and learner-centred approaches	Details of weekly readings can be found on Moodle.	

**Week 11 - 22 May 2017**

Module/Topic	Chapter	Events and Submissions/Topic

STEM variations

Details of weekly readings can be found on Moodle.

### Week 12 - 29 May 2017

Module/Topic	Chapter	Events and Submissions/Topic
Unit Review		<b>Practical and Written Assessment</b> Due: Week 12 Thursday (1 June 2017) 11:45 pm AEST

### Review/Exam Week - 05 Jun 2017

Module/Topic	Chapter	Events and Submissions/Topic
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### Exam Week - 12 Jun 2017

Module/Topic	Chapter	Events and Submissions/Topic
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## Assessment Tasks

### 1 Written Assessment

#### Assessment Type

Written Assessment

#### Task Description

This assessment task requires you to plan and conduct a first-hand investigation in the science, technology, engineering and/or mathematics area. The investigation involves carrying out your own experiment to collect your own data. The investigation must follow an action research design and include background (literature review), methodology, data collection, data analysis and conclusion linking to real-world situations. Further information about the assessment including ideas for investigations will be provided on the Moodle site and throughout weekly content. The investigation will follow the CSIRO CREST Award design (Creativity in Science and Technology) for pre-service teachers.

#### Assessment Due Date

Week 6 Thursday (20 Apr 2017) 11:45 pm AEST

#### Return Date to Students

Feedback on this assessment response will be provided in sufficient time to allow for academic support and advice as necessary to inform students' responses to the next task.

#### Weighting

50%

#### Assessment Criteria

Deep knowledge and understanding of chosen problem through the use of background research.

Clear, logical and coherent methodology design.

Appropriate data collection techniques explained and employed.

Extensive data analysis presented.

Comprehensive conclusion linking to real-world situations.

Cohesive writing consistent with academic conventions. Extensive use of relevant and credible sources for explanation of concepts.

Australian Professional Standards for Teachers (Graduate Career Stage) demonstrated:

1.2 Understand how students learn

2.6 Information and Communication Technology (ICTs)

3.1 Establish challenging learning goals

6.2 Engage in professional learning and improve practice

#### Referencing Style

- [American Psychological Association 6th Edition \(APA 6th edition\)](#)

#### Submission

Online

#### Learning Outcomes Assessed

- Design and conduct first hand investigations in science, technology, engineering or mathematics
- Apply the principles of scientific inquiry to design STEM learning experiences
- Evaluate examples of STEM projects and identify real world situations
- Implement teaching strategies that are learner centered and can support learners including those with diverse educational needs.

### **Graduate Attributes**

- Problem Solving
- Critical Thinking
- Information Literacy
- Ethical practice

## **2 Practical and Written Assessment**

### **Assessment Type**

Practical and Written Assessment

### **Task Description**

You are required to collaborate with STEM experts in their fields to develop a STEM event in which learner engagement is transformed by the use of hands-on approaches utilising learner-centeredness and is applied across a range of abilities. The STEM event will be designed for learners from diverse backgrounds for a one hour session. The one hour time slot can be broken down into shorter 10 - 15 minute "stations" if you choose. A STEM event, for example, could be a session conducted in your school hall during science week where the learners might investigate buoyancy by designing, building and testing a boat using aluminium foil.

Develop a design in which inquiry approaches are used to support and enhance student-centred, authentic and problem-based learning. The STEM event details need to be presented as a portfolio in an online format such as a weebly, wix, wiki or webpage with links to the event activity details, teacher resources explaining the STEM content, expert contacts, real-world applications, a budget, sample student consent forms, detailed schedule and resources needed. Examples of past STEM events and ideas will be available on the Moodle site and throughout the weekly content.

### **Assessment Due Date**

Week 12 Thursday (1 June 2017) 11:45 pm AEST

### **Return Date to Students**

Feedback on this assessment response will be provided in sufficient time to allow for academic support and advice as necessary to inform students' responses to the next task.

### **Weighting**

50%

### **Assessment Criteria**

Comprehensive use of hands-on and authentic approaches.

Deep knowledge and understanding of STEM content.

Highly developed range of strategies for differentiation.

Appropriate use of ICTs.

Extensive portfolio including activity sessions, teacher resources, sample budget, consent forms, schedule and resources. Cohesive writing consistent with academic conventions.

Australian Professional Standards for Teachers (Graduate Career Stage) demonstrated:

1.2 Understand how students learn

1.5 Differentiate teaching to meet the specific needs of students across the full range of abilities

1.6 Strategies to support full participation of students with disability

2.6 Information and Communication Technology (ICTs)

3.1 Establish challenging learning goals

3.6 Evaluate and improve teaching programs

4.1 Support student participation

6.2 Engage in professional learning and improve practice

6.3 Engage with colleagues and improve practice

### **Referencing Style**

- [American Psychological Association 6th Edition \(APA 6th edition\)](#)

### **Submission**

Online

### **Learning Outcomes Assessed**

- Design and conduct first hand investigations in science, technology, engineering or mathematics
- Apply the principles of scientific inquiry to design STEM learning experiences
- Evaluate examples of STEM projects and identify real world situations
- Implement teaching strategies that are learner centered and can support learners including those with diverse educational needs.

#### **Graduate Attributes**

- Communication
- Problem Solving
- Critical Thinking
- Team Work
- 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