



# ENEG12007 Creative Engineering

## Term 1 - 2023

Profile information current as at 04/05/2024 04:20 pm

All details in this unit profile for ENEG12007 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

Generating ideas, pitching a project proposal, assembling a design team, and creating a development plan are vital skills that enable engineers to establish new projects. This unit takes you through the creative process of prototyping in consultation with stakeholders. Your team must enhance your design idea by seeking external input through continued stakeholder interactions and sharing of several functional prototypes. You will pitch and demonstrate your final design to an audience of peers and professional engineers. You will apply relevant fundamental discipline knowledge and skills, as well as, project management principles. Completing this unit will enable you to discover your creativity while honing skills exhibited by productive and innovative engineers.

### 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: ENEC11007 Engineering Industry Project Investigation AND (ENEG11006 Engineering Statics OR ENEG11009 Fundamentals of Sustainable Energy) AND MATH11218 Applied Mathematics AND ENEG11008 Materials for Engineers.

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 - 2023

- Bundaberg
- Cairns
- Gladstone
- Mackay
- Online
- 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: 20%

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

Weighting: 20%

#### 3. **Written Assessment**

Weighting: 30%

#### 4. **Written Assessment**

Weighting: 30%

### 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 SUTE

**Feedback**

The assignment templated was great and saved a lot of time.

**Recommendation**

The word templates should continue to be available for student use.

#### Feedback from SUTE

**Feedback**

It wasn't clear whether a physical prototype is to be built or not.

**Recommendation**

We do require some evidence of prototyping. Acceptable prototypes include a reduced-scale physical prototype, computer-aided drawing, 3D printed prototypes, etc. These acceptable types should be discussed better with students.

#### Feedback from SUTE

**Feedback**

Distant learning can be challenging during group work.

**Recommendation**

The cloud-based project management tool, Asana, was introduced for efficient communication among group members. More focus on how this tool can help distant students communicate and work together should be discussed in class.

#### Feedback from SUTE

**Feedback**

More help is needed for the final assessment.

**Recommendation**

An additional lecture should be planned to focus on the requirements of the final assessment.

## Unit Learning Outcomes

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

1. Pitch a design idea that proposes to investigate opportunities for improvement, solve a problem or produce a new product
2. Develop a design specification and plan by incorporating relevant Australian Standards and gathering input from potential users or clients
3. Enhance the design through continued external input by sharing a series of functional prototypes which demonstrate relevant discipline knowledge and the principles of sustainable development
4. Communicate effectively, work productively, and be professionally accountable as part of a design team
5. Reflect on the processes of creative design, prototype production and stakeholder consultation.

**The Learning Outcomes for this unit are linked with the Engineers Australia Stage 1 Competency Standards for Professional Engineers in the areas of 1. Knowledge and Skill Base, 2. Engineering Application Ability and 3. Professional and Personal Attributes at the following levels:**

**Introductory**

**1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline. (LO: 3N)**

**1.4 Discernment of knowledge development and research directions within the engineering discipline. (LO: 1N)**

**Intermediate**

**1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline. (LO: 2N 3I)**

**2.1 Application of established engineering methods to complex engineering problem-solving. (LO: 2I 3I)**

**2.2 Fluent application of engineering techniques, tools and resources. (LO: 3I)**

**2.4 Application of systematic approaches to the conduct and management of engineering projects. (LO: 1N 2I 3I 4I 5I)**

**3.4 Professional use and management of information. (LO: 1N 2I 3I 4I)**

**Advanced**

**1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline. (LO: 1N 2I 3A)**

**1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (LO: 1N 2I 3A)**

**2.3 Application of systematic engineering synthesis and design processes. (LO: 1N 2I 3A 5I)**

**3.1 Ethical conduct and professional accountability. (LO: 2I 3I 4A)**

**3.2 Effective oral and written communication in professional and lay domains. (LO: 2I 3I 4A)**

**3.3 Creative, innovative and pro-active demeanour. (LO: 1A 2I 3A)**

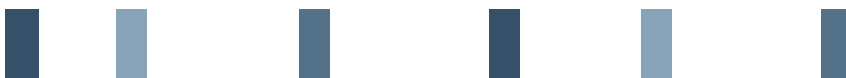
**3.5 Orderly management of self, and professional conduct. (LO: 3A 4A 5I)**

**3.6 Effective team membership and team leadership. (LO: 2I 3A 4A 5I)**

*Note: LO refers to the Learning Outcome number(s) which link to the competency and the levels: N - Introductory, I - Intermediate and A - Advanced.*

Refer to the Engineering Undergraduate Course Moodle site for further information on the Engineers Australia's Stage 1 Competency Standard for Professional Engineers and course level mapping information

<https://moodle.cqu.edu.au/course/view.php?id=1511>



## 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 - Written Assessment - 20%	•				
2 - Written Assessment - 20%		•			
3 - Written Assessment - 30%			•	•	
4 - Written Assessment - 30%				•	•

### 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					

## 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)
- Modelling software specific to project
- MS Project
- SketchUp
- Autodesk Inventor

## Referencing Style

All submissions for this unit must use the referencing style: [Harvard \(author-date\)](#)  
For further information, see the Assessment Tasks.

## Teaching Contacts

**Shah Neyamat Ullah** Unit Coordinator  
[s.ullah@cqu.edu.au](mailto:s.ullah@cqu.edu.au)

## Schedule

### Week 1 - Develop creative confidence - 06 Mar 2023

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture:</b> Introducing Creative Engineering and Ideation techniques	<b>Suggested reading:</b> Kelley Chapter 2 Dare [pp.37-42], Kelley Chapter 3 Spark [pp.67-75]	

### Week 2 - Pitch your best design ideas - 13 Mar 2023

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture:</b> Scoping out design ideas	See Moodle resources	

### Week 3 - Tools supporting creativity - 20 Mar 2023

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture:</b> Creativity tools	See Moodle resources	Download related software: SketchUp, Inventor. <b>PITCHING YOUR DESIGN IDEA</b> Due: Week 3 Friday (24 Mar 2023) 10:00 pm AEST

### Week 4 - Assemble your design team - 27 Mar 2023

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture:</b> The role of stakeholders in design	<b>Suggested reading:</b> Kelley Chapter 6 Team [pp.182-191]	<b>Design team formation</b>

### Week 5 - Define your initial design concept - 03 Apr 2023

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

**Lecture:** Design specifications, stakeholders and potential prototypes See Moodle resources

Log your design improvements and submit design change notes on Moodle.

**DESIGN SPECIFICATIONS** Due: Week 5 Friday (7 Apr 2023) 10:00 pm AEST

### Vacation Week - 10 Apr 2023

Module/Topic	Chapter	Events and Submissions/Topic
	See Moodle resources	

### Week 6 - Create a throw-away prototype - 17 Apr 2023

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture:</b> Enhanced design through consultation	<b>Suggested reading:</b> Kelley & Kelley Chapters 3, 4 and 5	Log your design improvements and submit design change notes on Moodle.

### Week 7 - Project Management - 24 Apr 2023

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture:</b> MS project	<b>Suggested reading:</b> Kelley & Kelley Chapters 3, 4 and 5	<b>Practice MS project fundamentals</b>

### Week 8 - Iterate prototype, feedback, refine - 01 May 2023

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture:</b> Prototypes with Impact	<b>Suggested reading:</b> Kelley & Kelley Chapters 3, 4 and 5	Log your design improvements and submit design change notes on Moodle.

### Week 9 - Charting your design evolution - 08 May 2023

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture:</b> Storyboard	<b>Suggested reading:</b> Kelley & Kelley Chapters 3, 4 and 5	Log your design improvements and submit design change notes on Moodle.

### Week 10 - Reflect on your design journey - 15 May 2023

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture:</b> design reflection, documentation and evidences	<b>Suggested reading:</b> Kelley & Kelley Chapters 3, 4 and 5	Log your design improvements and submit design change notes on Moodle. Prepare for team presentation.

### Week 11 - Present your design journey - 22 May 2023

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture:</b> Student presentations	<b>Suggested reading:</b> Kelley & Kelley Chapters 3, 4 and 5	Log your design improvements and submit design change notes on Moodle. <b>Design Evolution Storyboard and Presentation</b> Due: Week 11 Friday (26 May 2023) 10:00 pm AEST

### Week 12 - Reflect on your design journey - 29 May 2023

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture:</b> Student presentations	<b>Suggested reading:</b> Kelley & Kelley: Chapter 8 Next [pp.245-256]	<b>Design Evolution Presentation</b> Due: at the Engineering Project Showcase (Date TBA see Moodle)

### Review/Exam Week - 05 Jun 2023

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

**Exam Week - 12 Jun 2023**

Module/Topic

Chapter

Events and Submissions/Topic

## Assessment Tasks

### 1 PITCHING YOUR DESIGN IDEA

**Assessment Type**

Written Assessment

**Task Description**

You must pitch your design idea following the template provided on Moodle. You will include a statement of the design problem and identification of the stakeholders in the design. The submission will also include a statement of the human resources and physical resources that you anticipate will be required in order to generate a feasible design and a design prototype. Your pitch should be concise and enticing to attract students to develop your idea.

To allow your design idea to be viewed by potential teammates, you must also complete the Design Idea Form on Moodle.

**Assessment Due Date**

Week 3 Friday (24 Mar 2023) 10:00 pm AEST

**Return Date to Students**

Feedback is provided within 2 weeks of the assessment deadline for on-time submissions.

**Weighting**

20%

**Minimum mark or grade**

25%

**Assessment Criteria**

A Marking Rubric is provided on Moodle that includes indicators of attainment at the 'Sound', 'Good' and 'Excellent' levels for all aspects of the assignment such as your design idea statement, the problems and opportunities identified, the realism of your idea, the potential to create rapid prototypes, and opportunities for sustainable development.

**Referencing Style**

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

**Submission**

Online

**Submission Instructions**

Upload a single PDF AND complete the Design Idea Form on Moodle.

**Learning Outcomes Assessed**

- Pitch a design idea that proposes to investigate opportunities for improvement, solve a problem or produce a new product

### 2 DESIGN SPECIFICATIONS

**Assessment Type**

Written Assessment

**Task Description**

In teams, you will prepare an initial concept for your design project. This will include early thoughts on the design specifications, who the key stakeholders are, and what prototypes to create.



**Assessment Due Date**

Week 5 Friday (7 Apr 2023) 10:00 pm AEST

**Return Date to Students**

Feedback is provided within 2 weeks of the assessment deadline for on-time submissions.

**Weighting**

20%

**Minimum mark or grade**

25%

**Assessment Criteria**

A Marking Rubric is provided on Moodle that includes indicators of attainment at the 'Sound', 'Good' and 'Excellent' levels for all aspects of the assignment such as your design idea statement, the problems and opportunities identified, the realism of your idea, the potential to create rapid prototypes, and opportunities for sustainable development.

**Referencing Style**

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

**Submission**

Online Group

**Submission Instructions**

One team member must upload a single PDF on behalf of the team.

**Learning Outcomes Assessed**

- Develop a design specification and plan by incorporating relevant Australian Standards and gathering input from potential users or clients

### 3 Design Evolution Storyboard and Presentation

**Assessment Type**

Written Assessment

**Task Description**

In your team, record and present the evolution of your design through rapid prototyping and seeking continual feedback from your stakeholders. The written component of this assessment will include the collation of design improvement logs submitted from Week 5 and onwards. The group presentation will take place later in the term.

**Assessment Due Date**

Week 11 Friday (26 May 2023) 10:00 pm AEST

**Return Date to Students**

Feedback is provided within 2 weeks of the assessment deadline for on-time submissions.

**Weighting**

30%

**Minimum mark or grade**

25%

**Assessment Criteria**

A Marking Rubric is provided on Moodle that includes indicators of attainment at the 'Sound', 'Good' and 'Excellent' levels for all aspects of the assignment including methods of engaging with stakeholders, types of prototypes produced, and evidence of incorporating user feedback into the design.

**Referencing Style**

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

**Submission**

Online Group

### **Submission Instructions**

One member of your team must Upload a single PDF of the Design Evolution Report. All team members are expected to assist with the Design Evolution Presentation.

### **Learning Outcomes Assessed**

- Enhance the design through continued external input by sharing a series of functional prototypes which demonstrate relevant discipline knowledge and the principles of sustainable development
- Communicate effectively, work productively, and be professionally accountable as part of a design team

## **4 Evidence of learning achievements**

### **Assessment Type**

Written Assessment

### **Task Description**

Individually prepare a written document as evidence of your achievements towards the unit learning outcomes throughout the term. The document must be prepared using the Microsoft Word template provided on Moodle, and it shall contain only your work. The document must contain the following compulsory sections. Activities for this task will be based initially on Project Management tasks followed by developing a design idea through rapid prototyping and refinement.

Grade Nomination: A self-assessment of your level of achievement ('Sound', 'Good' or 'Excellent') that you believe should be awarded for each task listed in the assessment marking rubric on Moodle. For each task, you will need to substantiate your claim by including the active document links and page numbers to entries that contain evidence of meeting the associated indicators of attainment from the marking rubric. Evidence of your learning achievements will come from subsequent sections including entries in your Workbook, and Reflective Journal. An example of a Grade Nomination is provided on Moodle.

Workbook: Can be typed, handwritten (then scanned) or a combination of both but must be neat, chronological and legible. The workbook contains all your individual work and contributions to the team throughout the term. It should contain separate entries with headings and the date, such as: 'April 20 - Stakeholder engagement plan'. These entries will show when you worked on each element of the project and how your ideas and capabilities have developed through the unit. You should not go back and edit old entries as this may prohibit demonstrating skills development. The workbook will principally contain responses to set activities that will help your team to collaborate on your design project. You cannot complete these tasks retrospectively so you must be prepared to add entries to your workbook each week while working on the team project. Entries should demonstrate a variety of technical and creative skills. It is good practice to add entries to your Workbook first and then share your work with your team to ensure you retain the original work.

Reflective Journal: As with your workbook, it can be typed, handwritten (then scanned) or a combination of both but must be neat, chronological and legible. The Reflective Journal contains your thoughts about how you and your team are progressing with the project and what you have learnt and experienced either directly by doing the work or indirectly through observing others. Again, like the Workbook, It should contain entries each week while working on the project. Entries must have headings with the date and a title, such as: 'April 20 - Why I think Risk Assessment is important for engineers'. Reflective entries can demonstrate a variety of achievements like understanding how and when you learnt something, identifying effective ways to communicate and work with your peers, and comprehending the relevance of what you have learnt and experienced towards your future engineering career. You should not go back and edit old entries as this may prohibit demonstrating your development. Thus, the Reflective Journal cannot be completed retrospectively. Refer to the Reflective Writing Guide on Moodle.

You should expect that your lecturer will ask to see your Workbook and Reflective Journal at any time during the team project to ensure that you are progressing suitably towards achieving the associated unit learning outcomes.

### **Assessment Due Date**

Review/Exam Week Monday (5 June 2023) 11:45 pm AEST

**Return Date to Students**

At certification of grades

**Weighting**

30%

**Minimum mark or grade**

50%

**Assessment Criteria**

A Marking Rubric is provided on Moodle that includes indicators of attainment at the 'Sound', 'Good' and 'Excellent' levels for all tasks. Excellent level requires substantial evidences and related software certifications proving a high-level of individual effort. Tasks are based on the Project Management theory and rapid development of your design idea through prototyping and stakeholder feedback.

**Referencing Style**

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

**Submission**

Online

**Submission Instructions**

Upload a single PDF which includes active bookmarks in the Grade Nomination to all pages containing evidence of meeting the marking criteria.

**Learning Outcomes Assessed**

- Communicate effectively, work productively, and be professionally accountable as part of a design team
- Reflect on the processes of creative design, prototype production and stakeholder consultation.

## 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