COIT20275 *Systems Science and Engineering*
Term 2 - 2022

All details in this unit profile for COIT20275 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 you are introduced to the discipline of Systems Engineering, and how Systems Engineering is positioned within the broader context of Systems Science. While a major emphasis is the Systems Engineering lifecycle and the benefits that arise from adopting a lifecycle perspective to system design, key design attributes (usability, reliability, maintainability and sustainability) and their integration into the overall lifecycle are also discussed. Management issues (baselines, testing, configuration management, development methodologies and standards) are addressed.

Details

Career Level: *Postgraduate*
Unit Level: *Level 9*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites

Co-requisite: BUSN20016 Research in Business.
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 2 - 2022

- Brisbane
- Melbourne
- Online
- 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 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: 30%
2. **Written Assessment**
Weighting: 40%
3. **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 Unit Coordinator's Self Reflection

Feedback
Students enjoy team-based authentic assignments in this unit.

Recommendation
Continue to provide authentic assessments in the unit.

Unit Learning Outcomes

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

1. Use systems thinking and a lifecycle approach to analyse and devise solutions for complex problems
2. Critically review the key management activities that underpin Systems Engineering projects
3. Justify the use of the top-down, stakeholder focused, lifecycle driven approach that characterises the Systems Engineering process
4. Critically review the key engineering activities that underpin Systems Engineering projects.

N/A

Alignment of Learning Outcomes, Assessment and Graduate Attributes

— N/A Level • Introductory Level • Intermediate Level • Graduate Level ∘ Professional Level ∘ Advanced Level

Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes			
	1	**2**	**3**	**4**
1 - Written Assessment - 30%	•			
2 - Written Assessment - 40%		•	•	
3 - Written Assessment - 30%	•			•

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes			
	1	**2**	**3**	**4**
1 - Knowledge		∘	∘	∘
2 - Communication	∘	∘	∘	∘
3 - Cognitive, technical and creative skills	∘	∘	∘	∘

Graduate Attributes	Learning Outcomes			
	1	2	3	4
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 - Written Assessment - 30%		○	○	○	○	○		
2 - Written Assessment - 40%	○	○	○	○	○			
3 - Written Assessment - 30%	○	○	○	○	○			

Textbooks and Resources

Textbooks
COIT20275

Prescribed

Systems Engineering Practice
Revised Edition (2018) (2018)
Authors: M.J. Ryan and I. Faulconbridge
Argos Press
Canberra , ACT , Australia
ISBN: 978-1-921138-07-2
Binding: Paperback

View textbooks at the CQUniversity Bookshop

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- MS Office

Referencing Style

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

Teaching Contacts

Lily Li Unit Coordinator
l.li@cqu.edu.au

Schedule

Week 1 - 11 Jul 2022

Module/Topic	Chapter	Events and Submissions/Topic
The systems landscape	Textbook: Chapter 1	

Week 2 - 18 Jul 2022

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to systems engineering	Textbook: Chapter 1	

Week 3 - 25 Jul 2022

Module/Topic	Chapter	Events and Submissions/Topic
Requirements engineering	Textbook: Chapter 2	

Week 4 - 01 Aug 2022

Module/Topic	Chapter	Events and Submissions/Topic
Conceptual design	Textbook: Chapter 3	

Week 5 - 08 Aug 2022

Module/Topic	Chapter	Events and Submissions/Topic
Preliminary design	Textbook: Chapter 4	

Vacation Week - 15 Aug 2022

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 22 Aug 2022

Module/Topic	Chapter	Events and Submissions/Topic
Detailed design and development Construction/production	Textbook: Chapters 5 & 6	Submit assignment 1 **Written Assessment** Due: Week 6 Friday (26 Aug 2022) 11:59 pm AEST

Week 7 - 29 Aug 2022

Module/Topic	Chapter	Events and Submissions/Topic
Operational use and system support Testing	Textbook: Chapters 7 & 8	

Week 8 - 05 Sep 2022

Module/Topic	Chapter	Events and Submissions/Topic
Development approaches	Textbook: Chapter 11	

Week 9 - 12 Sep 2022

Module/Topic	Chapter	Events and Submissions/Topic
Design for usability	Online materials	

Week 10 - 19 Sep 2022

Module/Topic	Chapter	Events and Submissions/Topic
Design for reliability and maintainability	Online materials	

Week 11 - 26 Sep 2022

Module/Topic	Chapter	Events and Submissions/Topic

| Producibility, disposability and sustainability
Model-based systems engineering | Online materials | Submit assignment 2

Written Assessment Due: Week 11 Friday (30 Sept 2022) 11:59 pm AEST |

Week 12 - 03 Oct 2022

Module/Topic	Chapter	Events and Submissions/Topic
Systems engineering management Systems engineering standards Model-based systems engineering	Textbook: Chapters 8 & 9 Online materials	

Review/Exam Week - 10 Oct 2022

Module/Topic	Chapter	Events and Submissions/Topic

Exam Week - 17 Oct 2022

Module/Topic	Chapter	Events and Submissions/Topic
		Submit assignment 3 **Written Assessment** Due: Exam Week Monday (17 Oct 2022) 11:59 pm AEST

Term Specific Information

Unit Coordinator: Dr. Lily Li, CQU Rockhampton campus
Phone: +61 7 49232267
Email: l.li@cqu.edu.au

Assessment Tasks

1 Written Assessment

Assessment Type
Written Assessment

Task Description
In this group assessment, you are required to write a 2000-word report that critically analyses the conceptual design phase of a systems engineering project. Your report should address the stakeholders' needs and the system requirements. The topic and details for this assessment will be available on the unit website in Week 1.
The group must consist of 3 students. The size may be adjusted by the tutor depending on the class size.

Assessment Due Date
Week 6 Friday (26 Aug 2022) 11:59 pm AEST

Return Date to Students
Week 8 Friday (9 Sept 2022)
Results and feedback will be returned to the students within two weeks after the submission

Weighting
30%

Assessment Criteria
The assessment criteria are as follows (total marks: 60; weighting: 30%):

1. Introduction (5 marks)
2. Stakeholder needs (10 marks)
3. Conceptual design process (15 marks)
4. System requirements (15 marks)

5. Conclusion (5 marks)
6. Research skills including referencing (5 marks)
7. Writing skills and presentation and teamwork (5 marks)

Referencing Style

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

Submission
Online Group

Submission Instructions
Only group leaders make submissions

Learning Outcomes Assessed

- Use systems thinking and a lifecycle approach to analyse and devise solutions for complex problems

Graduate Attributes

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

2 Written Assessment

Assessment Type
Written Assessment

Task Description
In this group assignment, you are required to write a 2000-word report that critically reviews a DfX methodology of your choosing. The topic and details for this assessment are available on the unit website. Please note this is a general review of methodologies. You may or may not use the same case study from your previous assessment.

Assessment Due Date
Week 11 Friday (30 Sept 2022) 11:59 pm AEST

Return Date to Students
Review/Exam Week Friday (14 Oct 2022)
Results and feedback will be returned to the students within two weeks after the submission

Weighting
40%

Assessment Criteria
The assessment criteria are as follows (total marks: 80; weighting: 40%):

1. Introduction (5 marks)
2. Overview of the methodology (purpose, inputs, outputs, staging in the life cycle, supporting processes) (20 marks)
3. Discussion of
   - Guidelines (10 marks)
   - Tools/approaches/methods (15 marks)
   - Metrics (15 marks)
4. Conclusion (5 marks)
5. Research skills (5 marks)
6. Writing skills and presentation (5 marks)

Referencing Style

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

Submission
Online Group

Submission Instructions
Only group leaders make submissions

Learning Outcomes Assessed

- Critically review the key management activities that underpin Systems Engineering projects
- Justify the use of the top-down, stakeholder focused, lifecycle driven approach that characterises the Systems Engineering process

Graduate Attributes

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

3 Written Assessment

Assessment Type
Written Assessment

Task Description
Model-Based Systems Engineering (MBSE) is an approach to address multi-disciplinary and distributed systems engineering. The growing system complexity requires new methods to keep costs, time and quality under control. In this assignment, you are required to create a short annotated bibliography on MBSE. You should annotate at least 3 articles from international journals. The word limit is around 1,500. You may or may not use the references and the case studies from your previous assessments. The topic and details for this assessment are available on the unit website.

Assessment Due Date
Exam Week Monday (17 Oct 2022) 11:59 pm AEST

Return Date to Students

On certification day

Weighting
30%

Assessment Criteria
The assessment criteria are as follows (total marks: 60; weighting: 30%):

1. Introduction (5 marks)
2. Annotations (3 references) (45 marks)
   - Description (15 marks)
   - Explanation (15 marks)
   - Evaluation (15 marks)
3. Conclusion (5 marks)
4. Writing skills and presentation (5 marks)

Referencing Style

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

Submission
Online

Submission Instructions
Each student needs to submit this assessment

Learning Outcomes Assessed

- Use systems thinking and a lifecycle approach to analyse and devise solutions for complex problems
- Critically review the key engineering activities that underpin Systems Engineering projects.

Graduate Attributes

- Knowledge

- Communication
- Cognitive, technical and creative skills
- Research
- Self-management

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