

In Progress

Please note that this Unit Profile is still in progress. The content below is subject to change.



MATH12225 *Applied Computational Modelling*

Term 1 - 2025

Profile information current as at 12/02/2025 01:54 pm

All details in this unit profile for MATH12225 have been officially approved by CQU University 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

Applied Computational Modelling will further your understanding of and ability in mathematical modelling of scientific and engineering problems. You will use built-in MATLAB functions to solve general problems in various disciplines. You will also learn to program in MATLAB to obtain solutions to complex problems through both analytical and numerical approaches. This unit will teach you to approach problems in a way that demonstrates a clear, logical, and systematic procedure of modelling through integrating mathematical and programming knowledge and techniques. You will also learn how to document problems and findings. Course work leads you to approach posed problems in a way that demonstrates a clear, logical, and systematic procedure of modelling through integrating mathematical and programming knowledge and techniques learnt.

Details

Career Level: *Undergraduate*

Unit Level: *Level 2*

Credit Points: 6

Student Contribution Band: 7

Fraction of Full-Time Student Load: 0.125

Pre-requisites or Co-requisites

Pre-requisite: MATH11219

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 - 2025

- 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: 30%

3. **Online Test**

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](#).

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 Student Evaluations - Areas to Improve.

Feedback

Some students felt that clarity of expectations could be improved.

Recommendation

Before attempting assessment questions, the unit coordinator should consider including a short introduction explaining the learning required.

Feedback from SUTE Student Unit Evaluations - Unit Rating.

Feedback

Some students felt that more useful knowledge & skills could be incorporated into the unit.

Recommendation

Machine learning should be considered a useful skill for all engineering disciplines. Phase this in during 2025.

Feedback from SUTE Student Unit Evaluations - Unit Rating.

Feedback

Some students felt that content could be more relevant to engineering.

Recommendation

Setting assignments and tutorials should be considered so that the relevance of computer modelling through coding becomes even clearer for Mechanical and Civil students, e.g., water flow analysis (Civil) and cyclical thermal analysis (Mechanical).

Unit Learning Outcomes

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

1. Solve general problems in various disciplines using existing functions in MATLAB
2. Program in MATLAB to solve complicated problems
3. Manipulate and interpret input/output data utilising existing tools in MATLAB
4. Formulate and implement procedures of mathematical modelling for authentic situations where analytical solutions exist
5. Design and implement procedures of numeric modelling to develop useful solutions to complex applications
6. Document the solution to posed problems in a way that demonstrates a clear, logical, and systematic procedure of modelling.

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:

Intermediate 1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline. (LO: 1I 2I 4N 5I) 1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline. (LO: 1I 2I 3I 4I 5I) 1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (LO: 1N 2I 4I 5N 6N) 2.3 Application of systematic engineering synthesis and design processes. (LO: 1I 3I 4I) 2.4 Application of systematic approaches to the conduct and management of engineering projects. (LO: 2N 4I 5N 6N) 3.1 Ethical conduct and professional accountability. (LO: 4I 5N) 3.4 Professional use and management of information. (LO: 2I 3N 4I 5I 6I)

Advanced 1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline. (LO: 1I 2A 4N 5I) 1.4 Discernment of knowledge development and research directions within the engineering discipline. (LO: 1I 2N 4I 5A) 1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline. (LO: 1I 2N 3I 4A 5I) 2.1 Application of established engineering methods to complex engineering problem-solving. (LO: 1I 2A 4N) 2.2 Fluent application of engineering techniques, tools and resources. (LO: 1A 2A 3I 4A 5I 6I) 3.2 Effective oral and written communication in professional and lay domains. (LO: 4A 5I 6I) 3.3 Creative, innovative and pro-active demeanour. (LO: 2A 3I 4I) 3.5 Orderly management of self, and professional conduct. (LO: 4A) 3.6 Effective team membership and team leadership. (LO: 2I 4A 5I 6I)

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	6
1 - Written Assessment - 20%		•	•	•	•	•
2 - Written Assessment - 30%	•	•			•	•
3 - Online Test - 50%	•		•	•		

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
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

Information for Textbooks and Resources has not been released yet.

This information will be available on Monday 17 February 2025

Academic Integrity Statement

Information for Academic Integrity Statement has not been released yet.

This unit profile has not yet been finalised.