

MTH103 Introduction to Applied Mathematics

School: School of Science, Technology and Engineering

2024 Semester 1

UniSC Sunshine Coast
UniSC Moreton Bay

**BLENDED
LEARNING**

Most of your course is on campus but you may be able to do some components of this course online.

Please go to usc.edu.au for up to date information on the teaching sessions and campuses where this course is usually offered.

1. What is this course about?

1.1. Description

This course is designed to ensure you have the working knowledge for problem-solving in non-calculus areas to support topics in science and engineering. You will explore measurement and calculation; vector and matrix methods; geometry and trigonometry; and the algebra and graphing of linear, quadratic, exponential and logarithmic functions to model problems in context. Your skills in the recall, use and communication of the mathematics presented in this course provides the foundation for further studies in mathematics.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Learning materials – Self-paced video resources which cover the course content.	2hrs	Week 1	13 times
Tutorial/Workshop 1 – These tutorial workshops will be a session combining the demonstration of key examples and individual problem solving.	2hrs	Week 1	13 times
Seminar – On campus seminar	1hr	Week 1	2 times

1.3. Course Topics

- Measurement and calculation
- Vector applications in science and engineering
- Matrix methods and applications
- Geometry and trigonometry
- Modelling with linear, quadratic, exponential and logarithmic functions.

2. What level is this course?

100 Level (Introductory)

Engaging with discipline knowledge and skills at foundational level, broad application of knowledge and skills in familiar contexts and with support. Limited or no prerequisites. Normally, associated with the first full-time study year of an undergraduate program.

3. What is the unit value of this course?

12 units

4. How does this course contribute to my learning?

COURSE LEARNING OUTCOMES	GRADUATE QUALITIES MAPPING	PROFESSIONAL STANDARD MAPPING *
On successful completion of this course, you should be able to...	Completing these tasks successfully will contribute to you becoming...	Engineers Australia Stage 1 Professional Engineer Competency Standards
1 Use Problem solving strategies and mathematical reasoning to interpret, analyse and solve familiar and unfamiliar problems in mathematics, science and engineering.	Knowledgeable Creative and critical thinker	1.2
2 Develop a spreadsheet following detailed task specifications to explore several software features and provide an explanation of one of the outcomes.	Knowledgeable Ethical	2.2
3 Interpret and communicate using mathematical terminology, symbols and conventions.	Empowered	3.2

* Competencies by Professional Body

CODE	COMPETENCY
ENGINEERS AUSTRALIA STAGE 1 PROFESSIONAL ENGINEER COMPETENCY STANDARDS	
1.2	Knowledge and Skill Base: Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.
2.2	Engineering Application Ability: Fluent application of engineering techniques, tools and resources.
3.2	Professional and Personal Attributes: Effective oral and written communication in professional and lay domains.

5. Am I eligible to enrol in this course?

Refer to the [UniSC Glossary of terms](#) for definitions of “pre-requisites, co-requisites and anti-requisites”.

5.1. Pre-requisites

Not applicable

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

MTH102

5.4. Specific assumed prior knowledge and skills (where applicable)

Senior Mathematics A, B or C or equivalent (for example MTH100 or TPP115) is recommended. It is assumed you can add, subtract, multiply and divide real numbers by hand and by calculator as appropriate; use general algebraic techniques (such as simplification and factorisation, rearranging equations, solving an equation to determine the value of one variable); and can solve problems in elementary geometry and trigonometry.

6. How am I going to be assessed?

6.1. Grading Scale

Standard Grading (GRD)

High Distinction (HD), Distinction (DN), Credit (CR), Pass (PS), Fail (FL).

6.2. Details of early feedback on progress

Students will have the opportunity to reflect on their progress as they prepare the Task 1 Assignment submission due in Week 4 before the Census date. Students who do not feel they are ready to proceed can withdraw from the course without academic penalty or financial cost at that time. Any student who would like to discuss their progress is welcome to make arrangements with the Course Coordinator or Tutor as needed.

6.3. Assessment tasks

DELIVERY MODE	TASK NO.	ASSESSMENT PRODUCT	INDIVIDUAL OR GROUP	WEIGHTING %	WHAT IS THE DURATION / LENGTH?	WHEN SHOULD I SUBMIT?	WHERE SHOULD I SUBMIT IT?
All	1	Artefact - Technical and Scientific	Individual	20%	2 weeks	Week 4	Online Submission
All	2	Artefact - Technical and Scientific	Individual	30%	Completed over 8 weeks	Week 8	Online Submission
All	3	Examination - Centrally Scheduled	Individual	50%	135 minutes	Exam Period	Online Assignment Submission with plagiarism check

All - Assessment Task 1: Task 1 Assignment

GOAL:	To use problem solving strategies and mathematical reasoning to interpret, analyse and solve familiar and unfamiliar problems in applied mathematics, science and engineering, and to interpret and communicate using mathematical terminology, symbols and conventions.							
PRODUCT:	Artefact - Technical and Scientific							
FORMAT:	This is an assignment prepared individually by each student. It will be released at the beginning of Week 3 and is due at the end of Week 4. You will submit a .PDF document through the course website.							
CRITERIA:	<table border="1"> <thead> <tr> <th>No.</th> <th></th> <th>Learning Outcome assessed</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>A detailed marking scheme awards marks based on the choice of appropriate problem-solving strategy, the correctness of its implementation and the interpretation of the outcomes.</td> <td>1 3</td> </tr> </tbody> </table>	No.		Learning Outcome assessed	1	A detailed marking scheme awards marks based on the choice of appropriate problem-solving strategy, the correctness of its implementation and the interpretation of the outcomes.	1 3	
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All - Assessment Task 2: Task 2 Assignment

GOAL:	To use problem solving strategies and mathematical reasoning to interpret, analyse and solve familiar and unfamiliar problems in applied mathematics, science and engineering, and to interpret and communicate using mathematical terminology, symbols and conventions. Develop a spreadsheet following detailed task specifications to explore several software features and an explanation of one of the outcomes.										
PRODUCT:	Artefact - Technical and Scientific										
FORMAT:	The Assignment comprises two parts and will be available from the course website in Week 1. Part A is a series of worded problems based on material covered in the first seven weeks of the course. Part B is a list of tasks specifying the way a spreadsheet is to be constructed and discussed. You will submit a .PDF document through the course website.										
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1	For the problem-solving component, a detailed marking scheme awards marks based on the choice of appropriate problem-solving strategy, the correctness of its implementation and the interpretation of the outcomes.	1 3									
2	For the spreadsheeting component, marks are awarded for the submission of the documents mentioned in the Task Specifications and the correctness of the completed set tasks.	2									

All - Assessment Task 3: Task 3 Examination

GOAL:	To assess your exit skills in the theory and application of the course material using problem solving strategies and mathematical reasoning to interpret, analyse and solve familiar and unfamiliar problems in mathematics, science and engineering, and to interpret and communicate using mathematical terminology, symbols and conventions.	
PRODUCT:	Examination - Centrally Scheduled	
FORMAT:	The examination comprises of questions relating to content from Week 1 to Week 13 to be completed within the given time frame and submitted to Canvas.	
CRITERIA:	No.	Learning Outcome assessed
	1	A detailed marking scheme awards marks based on the choice of appropriate problem-solving strategy, the correctness of its implementation and the interpretation of the outcomes 1 3

7. Directed study hours

A 12-unit course will have total of 150 learning hours which will include directed study hours (including online if required), self-directed learning and completion of assessable tasks. Student workload is calculated at 12.5 learning hours per one unit.

7.1. Schedule

PERIOD AND TOPIC	ACTIVITIES
Module 1 (2 weeks) Measurement and calculation	Learning Resources
Module 2 (3 weeks) Vector applications in science and engineering	Tutorial/Workshop
Module 3 (3 weeks) Matrix methods and applications	Reading nominated sections of the textbook. Practice problem-solving using selected problems from the text.
Module 4 (2 weeks) Geometry and Trigonometry	
Module 5 (3 weeks) Function algebra/graphing	

8. What resources do I need to undertake this course?

Please note: Course information, including specific information of recommended readings, learning activities, resources, weekly readings, etc. are available on the course Canvas site– Please log in as soon as possible.

8.1. Prescribed text(s) or course reader

Please note that you need to have regular access to the resource(s) listed below. Resources may be required or recommended.

REQUIRED?	AUTHOR	YEAR	TITLE	EDITION	PUBLISHER
Required	Allyn J. Washington,Michelle Boué,Richard Evans,Elizabeth Fabbroni Martin	0	Basic Technical Mathematics with Calculus	11	n/a

8.2. Specific requirements

It is recommended that you possess a good quality scientific hand-calculator. You will not require a graphics, programmable or CAS calculator for this course.

9. How are risks managed in this course?

Health and safety risks for this course have been assessed as low. It is your responsibility to review course material, search online, discuss with lecturers and peers and understand the health and safety risks associated with your specific course of study and to familiarise yourself with the University's general health and safety principles by reviewing the [online induction training for students](#), and following the instructions of the University staff.

10. What administrative information is relevant to this course?

10.1. Assessment: Academic Integrity

Academic integrity is the ethical standard of university participation. It ensures that students graduate as a result of proving they are competent in their discipline. This is integral in maintaining the value of academic qualifications. Each industry has expectations and standards of the skills and knowledge within that discipline and these are reflected in assessment.

Academic integrity means that you do not engage in any activity that is considered to be academic fraud; including plagiarism, collusion or outsourcing any part of any assessment item to any other person. You are expected to be honest and ethical by completing all work yourself and indicating in your work which ideas and information were developed by you and which were taken from others. You cannot provide your assessment work to others. You are also expected to provide evidence of wide and critical reading, usually by using appropriate academic references.

In order to minimise incidents of academic fraud, this course may require that some of its assessment tasks, when submitted to Canvas, are electronically checked through Turnitin. This software allows for text comparisons to be made between your submitted assessment item and all other work to which Turnitin has access.

10.2. Assessment: Additional Requirements

Eligibility for Supplementary Assessment

Your eligibility for supplementary assessment in a course is dependent of the following conditions applying:

The final mark is in the percentage range 47% to 49.4%

The course is graded using the Standard Grading scale

You have not failed an assessment task in the course due to academic misconduct

10.3. Assessment: Submission penalties

Late submission of assessment tasks may be penalised at the following maximum rate:

- 5% (of the assessment task's identified value) per day for the first two days from the date identified as the due date for the assessment task.

- 10% (of the assessment task's identified value) for the third day - 20% (of the assessment task's identified value) for the fourth day and subsequent days up to and including seven days from the date identified as the due date for the assessment task.

- A result of zero is awarded for an assessment task submitted after seven days from the date identified as the due date for the assessment task. Weekdays and weekends are included in the calculation of days late. To request an extension you must contact your course coordinator to negotiate an outcome.

10.4. SafeUniSC

UniSC is committed to a culture of respect and providing a safe and supportive environment for all members of our community. For immediate assistance on campus contact SafeUniSC by phone: [07 5430 1168](tel:0754301168) or using the [SafeZone](#) app. For general enquires contact the SafeUniSC team by phone [07 5456 3864](tel:0754563864) or email safe@usc.edu.au.

The SafeUniSC Specialist Service is a Student Wellbeing service that provides free and confidential support to students who may have experienced or observed behaviour that could cause fear, offence or trauma. To contact the service call [07 5430 1226](tel:0754301226) or email studentwellbeing@usc.edu.au.

10.5. Study help

For help with course-specific advice, for example what information to include in your assessment, you should first contact your tutor, then your course coordinator, if needed.

If you require additional assistance, the Learning Advisers are trained professionals who are ready to help you develop a wide range of academic skills. Visit the [Learning Advisers](#) web page for more information, or contact Student Central for further assistance: +61 7 5430 2890 or studentcentral@usc.edu.au.

10.6. Wellbeing Services

Student Wellbeing provide free and confidential counselling on a wide range of personal, academic, social and psychological matters, to foster positive mental health and wellbeing for your academic success.

To book a confidential appointment go to [Student Hub](#), email studentwellbeing@usc.edu.au or call 07 5430 1226.

10.7. AccessAbility Services

Ability Advisers ensure equal access to all aspects of university life. If your studies are affected by a disability, learning disorder mental health issue, injury or illness, or you are a primary carer for someone with a disability or who is considered frail and aged, [AccessAbility Services](#) can provide access to appropriate reasonable adjustments and practical advice about the support and facilities available to you throughout the University.

To book a confidential appointment go to [Student Hub](#), email AccessAbility@usc.edu.au or call 07 5430 2890.

10.8. Links to relevant University policy and procedures

For more information on Academic Learning & Teaching categories including:

- Assessment: Courses and Coursework Programs
- Review of Assessment and Final Grades
- Supplementary Assessment
- Central Examinations
- Deferred Examinations
- Student Conduct
- Students with a Disability

For more information, visit <https://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching>

10.9. Student Charter

UniSC is committed to excellence in teaching, research and engagement in an environment that is inclusive, inspiring, safe and respectful. The [Student Charter](#) sets out what students can expect from the University, and what in turn is expected of students, to achieve these outcomes.

10.10. General Enquiries

In person:

- **UniSC Sunshine Coast** - Student Central, Ground Floor, Building C, 90 Sippy Downs Drive, Sippy Downs
- **UniSC Moreton Bay** - Service Centre, Ground Floor, Foundation Building, Gympie Road, Petrie
- **UniSC SouthBank** - Student Central, Building A4 (SW1), 52 Merivale Street, South Brisbane
- **UniSC Gympie** - Student Central, 71 Cartwright Road, Gympie
- **UniSC Fraser Coast** - Student Central, Student Central, Building A, 161 Old Maryborough Rd, Hervey Bay
- **UniSC Caboolture** - Student Central, Level 1 Building J, Cnr Manley and Tallon Street, Caboolture

Tel: +61 7 5430 2890

Email: studentcentral@usc.edu.au