COURSE OUTLINE

MTH203 Numerical Analysis

School: School of Science, Technology and Engineering

2026 | Trimester 2

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 unisc.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

In this course, you will be introduced to the mathematical analysis of numerical problems such as those that are encountered in many disciplines, including the physical sciences and engineering. You will learn to select, configure and use suitable computational tools with appropriate numerical methods for integration and optimization, simulation techniques, applications of differential equations and presentation of data. You will also learn to use MATLAB in order to explore and apply the mathematical techniques taught in the learning materials.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Learning materials – Asynchronous learning materials	2hrs	Week 1	12 times
Tutorial/Workshop 1 – on - campus tutorial/workshop	3hrs	Week 1	12 times

1.3. Course Topics

Introduction. History. The need for numerical computation. N-digit arithmetic. Numerical error. Introduction to MATLAB. Taylor series. Errors of computation. Solving nonlinear equations: - Bisection - Fixed-point iteration - Newton's method. Solving systems of linear equations: - Gaussian elimination with Partial pivoting - Decomposition methods (Matrix factorisation) (Doolittle, Choleski). Function approximation with Taylor polynomials. Interpolation: - Lagrange Polynomial - Divided differences - Finite differences. Numerical Differentiation. Numerical Integration: - Trapezoidal - Simpsons - Romberg. Solving ODEs - Euler - Modified Euler - Runge-Kutte.

2. What level is this course?

200 Level (Developing)

Building on and expanding the scope of introductory knowledge and skills, developing breadth or depth and applying knowledge and skills in a new context. May require pre-requisites where discipline specific introductory knowledge or skills is necessary. Normally, undertaken in the second or third full-time year of an undergraduate programs.

3. What is the unit value of this course?

12 units

4. How does this course contribute to my learning?

COURSE LEARNING OUTCOMES On successful completion of this course, you should be able to...		GRADUATE QUALITIES Completing these tasks successfully will contribute to you becoming...
1	Recall, explain and apply the theory, tools and techniques of topics related to numerical methods of analysis.	Knowledgeable Empowered
2	Select and combine tools and techniques in numerical analysis to solve mathematical problems in mathematics and science.	Creative and critical thinker Empowered
3	Comprehend and communicate concepts and techniques relevant to numerical analysis, using either written English or mathematical notations, as appropriate.	Knowledgeable Empowered
4	Calculate and record results accurately and precisely.	Knowledgeable Empowered

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

MTH202 or (MTH103 and MTH104)

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

MTH532 or MTH312

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

Matrix operations, Differential Calculus, Integral Calculus. Students entering MTH203 must have a strong knowledge and capability with arithmetic, exponents, logarithms, algebra and trigonometry. If students are uncertain in these topics, they are advised to undertake some self-directed study prior to the start of trimester.

5.5. Microcredential Information

Not applicable

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

Revision problems will be made available for you to work on during the first two weeks, at your own pace, which will provide you with opportunity for revision, practice, and self-evaluation regarding your preparedness for MTH203.

In addition, course-relevant problems will be processed and solved step-by-step, under the guidance of the tutor in your weekly MTH203 workshop. There will be opportunity for questions and assistance. You will also be provided with homework questions each week, which will allow you to practice and to determine for yourself if you fully understand, and can apply, that week's material.

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	Quiz/zes	Individual	10%	30 minutes	Refer to Format	In Class
All	2	Quiz/zes	Individual	50%	40 minutes each (approx)	Throughout teaching period (refer to Format)	In Class
All	3	Artefact - Technical and Scientific	Individual	40%	20 hours	Week 11	In Class

All - Assessment Task 1: Foundation skills

GOAL:	This test will address the essential, prerequisite knowledge and skills which form the foundation for Numerical Analysis.This test will encourage you to revise and practice using your foundation mathematical knowledge and techniques until you are fluent and accurate with their recall and application.
PRODUCT:	Quiz/zes
AUTHORSHIP STATEMENT:	
FORMAT:	Individual, closed-book, written test, to be held in your scheduled tutorial class (workshop) in week 3.
CRITERIA:	**No.** — **Learning Outcome assessed** 1 Marks are awarded on the basis of the correctness of final answers and the steps of mathematical working that leads to them, and the clarity of the mathematical and descriptive communication. — 2 4
GENERIC SKILLS:	Communication, Problem solving

All - Assessment Task 2: Module Tests

GOAL:	The course is identified as being composed of several modules. The module tests encourage you to revise the course material on an on-going basis and gives you an opportunity to assess your learning progress against the learning outcomes of this course. These tests also give you valuable practice in learning to solve problems independently, and to communicate your reasoning and methods.
PRODUCT:	Quiz/zes
AUTHORSHIP STATEMENT:	
FORMAT:	Individual, closed-book, written tests. Mixed practical and theoretical written questions. These tests will be run in your scheduled tutorial class (workshop)(weeks 5,7,9,12).

CRITERIA:

No.		Learning Outcome assessed
1	You will be assessed on your ability to: recall the theoretical and practical components of the course materials covered in the learning material, tutorials and readings for that module.	1
2	apply the theory and derive solutions to particular examples	1 2
3	decide which is the most appropriate method to solve a particular problem	1 2
4	communicate the methods, reasoning and working by which solutions may be calculated	3 4

GENERIC SKILLS:	Communication, Problem solving

All - Assessment Task 3: Assignment

GOAL:	This assessment task is designed to encourage you to revisit material from through the trimester and to apply it to new sets of problems. This assignment will bring together many of the concepts and techniques in a single body of work, thus forming a 'capstone' assessment piece of the course's content.
PRODUCT:	Artefact - Technical and Scientific
AUTHORSHIP STATEMENT:	
FORMAT:	This is an individual assignment, to be completed without assistance, consisting of handwritten mathematical working and, where relevant, MATLAB outputs. All solutions must follow the methods and notation taught in MTH203. The document must be structured exactly as specified on Canvas. Submission instructions (hard copy and/or scanned PDF) will be provided, and a hard copy may still be required even if submitting digitally. Within three weeks of submission, you may be asked to attend a meeting to discuss and clarify your work. Given the ample time and availability of fully worked examples, marks will be awarded for final answers only; however, all working and methods must be shown in the required format or marks will not be given.

CRITERIA:

No.		Learning Outcome assessed
1	Correct answers to problems, with correct numerical formatting and evidence of mathematical working.	1 2 3 4

GENERIC SKILLS:	Communication, Problem solving, Organisation

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.

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

> There are no required/recommended resources for this course.

8.2. Specific requirements

In order to practice many of the exercises, you will need to have access to a computer with reasonable internet access. You will also have to download and install MATLAB (at no cost to you, instructions will be provided), or use MATLAB via USCanywhere.

You may need to have capability of digitising (scanning) your written work to a pdf document, for submission of the assignment (information regarding this will be provided).

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:
(a) The final mark is in the percentage range 47% to 49.4%; and
(b) The course is graded using the Standard Grading scale

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 submissions may be penalised up to and including the following maximum percentage of the assessment task's identified value, with weekdays and weekends included in the calculation of days late:
(a) One day: deduct 5%;
(b) Two days: deduct 10%;
(c) Three days: deduct 20%;
(d) Four days: deduct 40%;
(e) Five days: deduct 60%;
(f) Six days: deduct 80%;
(g) Seven days: A result of zero is awarded for the assessment task.

The following penalties will apply for a late submission for an online examination:
Less than 15 minutes: No penalty
From 15 minutes to 30 minutes: 20% penalty
More than 30 minutes: 100% penalty

10.4. 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

10.5. 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.

10.6. General Enquiries

For course-specific questions, contact your teaching staff or Course Coordinator.

For other enquiries or to access support, please contact Student Central:

- UniSC Student Central
- UniSC Adelaide Student Central