UniSC

COURSE OUTLINE

MTH201 Calculus II and Linear Algebra

School: School of Science, Technology and Engineering

2026 | Trimester 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 build upon and further the concepts learned in the first-year introductory courses. The Calculus component extends the mathematics from single-variable to multi-variable, which will not only provide a deeper understanding and appreciation for the extensibility of mathematics, but will prepare the students for solving real-world problems that involve multi-directional change, such as fluid mechanics. The linear algebra component also builds on previous work in matrices and vectors, and provides a foundation for methods in numerical computation and analysis. These topics will provide a strong, relevant foundation for all students who take the course; engineers, teachers and mathematicians.

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, Face-to-face	2hrs	Week 1	12 times

1.3. Course Topics

Multivariate functions: Surfaces

Partial differentiation

Differentiation on scalar fields

- The del operator
- Gradients and directional derivatives

Differentiation on vector fields

- Divergence
- Curl

Integration over scalar fields:

- Iterated Integrals (find area of a region in the plane)
- Integration over surfaces and volumes (double and triple integrals)

Calculus with Parametric systems.

Introduction to the Laplace Transform (time permitting)

Vector spaces and vector subspaces

Linear combinations and Span

Linear Independence and Bases

Linear maps

Eigenvalues and Eigenvectors

Inner product spaces and orthogonality

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	GRADUATE QUALITIES
On successful completion of this course, you should be able to...	Completing these tasks successfully will contribute to you becoming...
1 Recall, explain and apply the theory, tools and techniques of topics related to multi-variate Calculus and Linear Algebra.	Knowledgeable
2 Use Problem solving strategies and mathematical reasoning to interpret, analyse and solve familiar and unfamiliar problems in mathematics, science and engineering, using multi-variate Calculus and Linear Algebra.	Creative and critical thinker
3 Calculate and record results accurately and precisely.	Empowered

COURSE LEARNING OUTCOMES	GRADUATE QUALITIES
On successful completion of this course, you should be able to...	Completing these tasks successfully will contribute to you becoming...
4 Interpret and communicate using mathematical terminology, symbols and conventions.	Engaged

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

> MTH104 or MTH202

5.2. Co-requisites

> Not applicable

5.3. Anti-requisites

> Not applicable

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

As per prerequisite courses: Introductory Differential and Integral Calculus; Matrix and Vector operations.

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 access to Task 1 from Week 1 of trimester. It is not due until the end of Week 4 to give students every opportunity to measure their progress and gauge their future success. In addition, formative feedback during on-campus tutorials will provide further calibration to support the view formed.

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%	No more than 8 selected problems detailed in a pre-designed document up to 5 pages allowing students to complete the task in the document itself and submit.	Week 4	In Class
All	2	Examination - not Centrally Scheduled	Individual	30%	90 min	Week 7	In Class
All	3	Artefact - Technical and Scientific	Individual	20%	No more than 8 selected problems detailed in a pre-designed document up to 5 pages allowing students to complete the task in the document itself and submit.	Week 10	To Supervisor
All	4	Examination - not Centrally Scheduled	Individual	30%	90 min	Week 12	In Class

All - Assessment Task 1: Task 1 Written solutions to selected problems

GOAL:	This assessment task is designed to encourage you to revisit material from the calculus component of the course and to apply it to new problems. This assignment will bring together many of the concepts and techniques in a single body of work, which will also help with preparation for the Calculus Tutorial Test.
PRODUCT:	Artefact - Technical and Scientific
FORMAT:	This is an individual assignment. Students submit a .pdf format copy of their work through the course website.
CRITERIA:	**No.** / **Learning Outcome assessed**
	1 Your written work will be assessed against criteria including the implementation of an appropriate strategy, the completion of all calculations with sufficient precision and communicating the solution in a clear and precise way. ① ② ③ ④
GENERIC SKILLS:	Communication, Problem solving, Organisation, Information literacy

All - Assessment Task 2: Task 2 Calculus Tutorial Test

GOAL:	The Calculus Tutorial Test gives you an opportunity to demonstrate your knowledge, understanding and skills associated with this component of the course.
PRODUCT:	Examination - not Centrally Scheduled
FORMAT:	This is an individual assessment task. Limited time, written responses to pre-prepared problems. To be undertaken during on-campus tutorial sessions.

CRITERIA:	No.		Learning Outcome assessed
	1	recall the theoretical and practical concepts from the Calculus component of the course.	1
	2	apply the theory and derive solution to selected problems.	2 3
	3	decide which is the most appropriate method to solve a particular problem .	1
	4	communicate the methods, reasoning and working by which solutions may be calculated.	4

GENERIC SKILLS:	Communication, Problem solving, Organisation

All - Assessment Task 3: Task 3 Written solutions to selected problems

GOAL:	This assessment task is designed to encourage you to revisit material from the linear algebra component of the course and to apply it to new problems. This assignment will bring together many of the concepts and techniques in a single body of work, which will also help with preparation for the linear algebra examination.
PRODUCT:	Artefact - Technical and Scientific
FORMAT:	This is an individual assignment. Students submit a .pdf format copy of their work through the course website.

CRITERIA:	No.		Learning Outcome assessed
	1	Your submission will be evaluated for appropriate selection and use of method, correct working and final result, and quality of mathematical communication. All evidence of working and methods used must be provided.	1 2 3 4

GENERIC SKILLS:	Communication, Problem solving

All - Assessment Task 4: Task 4 Linear Algebra Tutorial Test

GOAL:	The Linear Algebra Tutorial Test gives you an opportunity to demonstrate your knowledge, understanding and skills associated with this component of the course.
PRODUCT:	Examination - not Centrally Scheduled
FORMAT:	This is an individual assessment task. Limited time, written responses to pre-prepared problems. To be undertaken during on-campus tutorial sessions.

CRITERIA:	No.		Learning Outcome assessed
	1	recall the theoretical and practical elements of the Linear Algebra component of the course.	1
	2	apply the theory and derive solutions to selected problems.	2 3
	3	decide which is the most appropriate method to solve a particular problem .	1
	4	communicate the methods, reasoning and working by which solutions may be calculated	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

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	Seymour Lipschutz, Marc Lipson	2018	Schaum's Outline of Linear Algebra, Sixth Edition	6	McGraw-Hill Education

8.2. Specific requirements

Standard scientific calculator. A computer with internet access, in order to be able to use course software off-campus, but which is available on https://anywhere.usc.edu.au , may be of benefit.

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

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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. 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 or using the SafeZone app. For general enquires contact the SafeUniSC team by phone 07 5456 3864 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 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