



COURSE OUTLINE

MTH302 Applied Mathematics

Course Coordinator: Margaret Marshman (mmarshma@usc.edu.au) **School:** School of Education and Tertiary Access

2021 | Semester 2

USC Sunshine Coast
USC Moreton Bay

ON CAMPUS

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

Please go to the USC website 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 differential equations and other mathematical methods which can be used to explore and model situations in the physical, biological and engineering sciences. The course includes derivation, application, solution techniques and evaluation of mathematical models using first order, second order and n th order ordinary and partial differential equations that you will be able to apply in a range of contexts.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
ON CAMPUS			
Tutorial/Workshop 1 – A blended learning approach is used to deliver this course, including a mix of synchronous and asynchronous materials and activities accessed through Blackboard. This course will be supported by technology-enabled learning and teaching including zoom.	2hrs	Week 1	13 times
Lecture – You are required to engage with a weekly 2 hour lecture, associated activities and required/recommended course reading materials accessed through Blackboard and using the required text.	2hrs	Week 1	13 times

1.3. Course Topics

Classification and solution methods for first order differential equations
Classification and solution methods for second order differential equations
An introduction to applications and solutions of partial differential
The Laplace Transform and its uses Applications of differential equations
Interpreting differential equations in the literature

2. What level is this course?

300 Level (Graduate)

Demonstrating coherence and breadth or depth of knowledge and skills. Independent application of knowledge and skills in unfamiliar contexts. Meeting professional requirements and AQF descriptors for the degree. May require pre-requisites where discipline specific introductory or developing knowledge or skills is necessary. Normally undertaken in the third or fourth 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
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 differential equations.	Knowledgeable Empowered
2 Select and combine mathematical tools and techniques to solve mathematical problems in mathematics and science.	Creative and critical thinker Empowered
3 Communicate concepts and techniques relevant to the use of applied mathematics, using both written English and mathematical notations, as appropriate.	Knowledgeable Empowered
4 Interpret of the mathematics in the literature.	Creative and critical thinker Empowered

5. Am I eligible to enrol in this course?

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

5.1. Pre-requisites

MTH202 or MTH104

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

MTH522

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

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

Early feedback on progress will be provided in tutorial time in the first 3 weeks.

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	1a	Written Piece	Individual	10%	Set problems	Week 3	In Class
All	1b	Written Piece	Individual	10%	Set problems	Week 8	Online Assignment Submission
All	2a	Oral	Individual	20%	10 minutes	Week 4	In Class
All	2b	Activity Participation	Group	20%	1000 words	Week 11	Online Assignment Submission with plagiarism check
All	3	Examination - Centrally Scheduled	Individual	40%	2 hours	Exam Period	Exam Venue

All - Assessment Task 1a: Assignment - worked examples

GOAL:	Students successfully completing this task will have demonstrated an understanding of the modelling process with differential equations and applied this knowledge to real-world problems.	
PRODUCT:	Written Piece	
FORMAT:	Solutions to selected skill and application-based problems. Questions will be given in week 1. To be submitted during the scheduled tutorial class and/or uploaded to Blackboard.	
CRITERIA:	No.	Learning Outcome assessed
	1	application and explanation of appropriate theory, tools, and techniques to solve selected first order ordinary differential equations 1
	2	derive solutions for particular applications 2
	3	communicate the methods, reasoning and working of the solutions 3

All - Assessment Task 1b: Assignment Worked examples 2

GOAL:	Students successfully completing this task will have demonstrated an understanding of the modelling process with differential equations and applied this knowledge to real-world problems.	
PRODUCT:	Written Piece	
FORMAT:	Solutions to selected skill and application-based problems. Questions will be given in week 6. To be submitted during the scheduled tutorial class and/or uploaded to Blackboard.	
CRITERIA:	No.	Learning Outcome assessed
	1	application and explanation of appropriate theory, tools, and techniques to solve selected first order ordinary differential equations 1
	2	solution of selected mathematical problems 2
	3	communication of the methods, reasoning and working of the solutions 3

All - Assessment Task 2a: Assignment

GOAL:	Students successfully completing this task will have demonstrated an understanding of the modelling process with differential equations and applied this knowledge to a real world problem.												
PRODUCT:	Oral												
FORMAT:	Students will negotiate a problem to present to the tutorial group with the tutor. Each student will have 10 minutes to present their solution to the class. In week 1 students will be assigned a week to present.												
CRITERIA:	<table border="1"><thead><tr><th>No.</th><th></th><th>Learning Outcome assessed</th></tr></thead><tbody><tr><td>1</td><td>Correctness of calculations</td><td>1</td></tr><tr><td>2</td><td>Clarity of mathematical reasoning</td><td>2</td></tr><tr><td>3</td><td>Mathematical communication skills</td><td>3</td></tr></tbody></table>	No.		Learning Outcome assessed	1	Correctness of calculations	1	2	Clarity of mathematical reasoning	2	3	Mathematical communication skills	3
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All - Assessment Task 2b: Written report

GOAL:	Students successfully completing this task will write an interpretation of an article including differential equations as a solution to a real-world problem												
PRODUCT:	Activity Participation												
FORMAT:	Part B: A written report submitted via Safe Assign												
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All - Assessment Task 3: End of semester exam

GOAL:	The end of semester examination gives you an opportunity to demonstrate your knowledge, understanding and skills associated with the learning outcomes of the course.												
PRODUCT:	Examination - Centrally Scheduled												
FORMAT:	Individual Solutions to selected skill and application based problems.												
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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. Directed study hours may vary by location. 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 Blackboard 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	PUBLISHER
Required	Bronson, R. and Costa, G.B.	2014	Schaum's Outline of Differential Equations	McGraw-Hill

8.2. Specific requirements

Not applicable

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 Blackboard, are electronically checked through SafeAssign. This software allows for text comparisons to be made between your submitted assessment item and all other work that SafeAssign has access to.

10.2. Assessment: Additional Requirements

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. 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.

10.5. 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.

10.6. 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.

10.7. 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
- Administration of Central Examinations
- Deferred Examinations
- Student Academic Misconduct
- Students with a Disability

Visit the USC website: <http://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching>

10.8. General Enquiries

In person:

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

Tel: +61 7 5430 2890

Email: studentcentral@usc.edu.au