USC

Course Outline

Code: MTH104
Title: Introductory Calculus

School of: Science & Engineering
Teaching Session: Semester 2
Year: 2020
Course Coordinator: Dr Robert McDougall Email: rmcdouga@usc.edu.aul
Course Moderator: Dr Lauren Thornton

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

This course is designed to ensure you have the essential working knowledge for problem-solving in basic calculus to support mathematics topics in science and engineering. You will develop the technical skills needed for differentiation, integration and their applications, as well as several techniques for solving first order differential equations through applications.

1.2 Course topics

Elements of the theory and practice for differentiation with applications, for integration and its applications, and techniques for solving the standard first order differential equations through applications. The use of MATLAB to investigate topics in numerical calculus is included.

2. What level is this course?

100 level Introductory - Discipline knowledge and skills at foundational level, broad application of knowledge and skills in familiar contexts and with support. Normally associated with the first full-time 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?

Specific Learning Outcomes On successful completion of this course you should be able to:	**Assessment Tasks** You will be assessed on the learning outcome in task/s:	**Graduate Qualities or Professional Standards mapping** Completing these tasks successfully will contribute to you becoming:
Use problem solving strategies and mathematical reasoning to interpret, analyse and solve familiar and unfamiliar calculus problems in mathematics, science and engineering.	Task 1 Task 2 Task 3	Creative and critical thinkers. Knowledgeable.
Model problem solutions following detailed specifications to explore several software features of MATLAB.	Task 2	Knowledgeable. Ethical.
Interpret and communicate using mathematical terminology, symbols and conventions.	Task 1 Task 2 Task 3	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 Enrolment restrictions

Nil

5.2 Pre-requisites

Nil

5.3 Co-requisites

Nil

5.4 Anti-requisites

MTH202

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

6.2 Details of early feedback on progress

In Week 3 of this course, a sample from your folio of worked problems will be submitted to the Discussion Board for peer review.

6.3 Assessment tasks

Task No.	Assessment Tasks	Individual or Group	Weighting %	What is the duration / length?	When should I submit?	Where should I submit it?
1	Assignment	Individual	20	4 weeks	Week 4	Submit as PDF attachment to dedicated email account
2	Assignment	Individual	30	6 weeks	Week 10	Submit as PDF attachment to dedicated email account
3	Assignment	Individual	50	3 days	Week 13	Submit as PDF attachment to dedicated email account
			100%			

Assessment Task 1: Assignment

Goal:	To use problem solving strategies and mathematical reasoning to interpret, analyse and solve familiar and unfamiliar calculus problems in mathematics, science and engineering, and to interpret and communicate using mathematical terminology, symbols and conventions
Product:	This task comprises the solution of a series of problems from the material of Weeks 1 to 3.
Format:	Handwritten and word-processed PDF copy with USC cover sheet.
Criteria:	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.

Assessment Task 2: Assignment

Goal:	1. To reinforce and develop your knowledge of calculus and its language to solve familiar and unfamiliar problems. 2. To investigate topics in numerical calculus through software modelling.
Product:	This task comprises the solutions to a series of problems from the material of Weeks 1 to 9, and the modelling of problem solutions following detailed specifications to explore several software features of MATLAB. It is completed over the first 10 weeks of the course and submitted at the end of Week 10.
Format:	The Assignment comprises two parts and will be available from the course website before Week 4. Part A is a series of worded problems based on material covered in the first nine weeks of the course. Part B is a list of tasks specifying the way a problem is to be modelled using MATLAB. Handwritten and word-processed PDF copy with USC cover sheet.
Criteria:	1. For the calculus 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. 2. For the MATLAB software component, marks are awarded for the submission of the documents mentioned in the Task Specifications and the correctness of the completed set tasks.

Assessment Task 3: Assignment

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 calculus problems in mathematics, science and engineering, and to interpret and communicate using mathematical terminology, symbols and conventions.
Product:	This task comprises the solution of a series of problems from the material of Weeks 1 to 12.
Format:	Handwritten and word-processed PDF copy with USC cover sheet. The assignment comprises of six (6) questions, all of equal value. Students may attempt as many problems as they wish. ANY 50 marks from the 60 available will be considered a complete assignment.
Criteria:	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.

7. What are the course activities?

7.1 Directed study hours

The directed study hours listed here are a portion of the workload for this course. 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.

This course will be delivered via technology-enabled learning and teaching. All lectures will remain in this mode for Semester 2 2020. When government guidelines allow, students that elected on-campus study via the class selection process will be advised when on campus tutorials and practical sessions will resume.

Location:	Directed study hours for location:
Sippy Downs	Lectures: 13 x 2hrs per week; Tutorials: 13 x 3hrs per week
Fraser Coast	Lectures: 13 x 2hrs per week; Tutorials: 13 x 3hrs per week
Moreton Bay	Lectures: 13 x 2hrs per week; Tutorials: 13 x 3hrs per week

7.2 Course content

Week # / Module #	What key concepts/content will I learn?
Module 1 (2 weeks)	Introduction to a mathematical interpretation of change
Module 2 (3 weeks)	Techniques for differentiation and applications
Module 3 (4 weeks)	Techniques for integration and applications
Module 4 (4 weeks)	Techniques for solving first order differential equations through applications.

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

Please note that 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)

Please note that you need to have regular access to the resource(s) listed below. This text is also the prescribed text for MTH103 Introduction to Applied Mathematics.

Author	Year	Title	Publisher
Washington, Evans, Boue & Martin	2020	Basic Technical Mathematics with Calculus; SI Version (11th Edition)	Pearson, USA

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. Risk management

Health and safety risks for this course have been assessed as low.

It is your responsibility as a student 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. It is also your responsibility to familiarise yourself with the University's general health and safety principles by reviewing the online Health Safety and Wellbeing training module 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

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%
b) The course is graded using the Standard Grading scale
c) You have not failed an assessment task in the course due to academic misconduct

10.3 Assessment: Submission penalties

Late submission of assessment tasks will 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 and supply the required documentation to negotiate an outcome.

10.4 Study help

In the first instance, you should contact your tutor, then the Course Coordinator. Additional assistance is provided to all students through Academic Skills Advisers. To book an appointment or find a drop-in session go to Student Hub.

Contact Student Central for further assistance: +61 7 5430 2890 or studentcentral@usc.edu.au

10.5 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

10.6 General Enquiries

In person:

- **USC Sunshine Coast** - Student Central, Ground Floor, Building C, 90 Sippy Downs Drive, Sippy Downs
- **USC South Bank** - Student Central, Building A4 (SW1), 52 Merivale Street, South Brisbane
- **USC Gympie** - Student Central, 71 Cartwright Road, Gympie
- USC Moreton Bay - Service Centre, Building A – Ground Floor, 1 Moreton Bay Parade, Petrie
- **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