School of Education

EDUC6102: Mathematics Curriculum Studies 1

Online

Semester 1 - 2024

COURSE OUTLINE

OVERVIEW

Course Description

This course introduces students to the key concepts underlying a deep understanding of algebra, functions, continuity and an introduction to calculus. This course will consider the historical development of calculus and will examine current related pedagogical models within the field of secondary mathematics.

Academic Progress Requirements

Nil

Contact Hours

Online
Tutorial
Online
2 hour(s) per week(s) for 13 week(s) starting Week 1

Unit Weighting

10

Workload

Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

CONTACTS

Course Coordinator

Online
Ms Beth Preston @newcastle.edu.au
Consultation: email for appointment

Teaching Staff

Other teaching staff will be advised on the course Canvas site.

School Office

School of Education
V Building
Callaghan
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SYLLABUS

Course Content

- basic algebra: simplification, factorisation, modelling, solving equations
- functions: definitions, graphing, continuity, limits
- types of functions: linear, polynomial, logarithmic, exponential
- rates of change: applications to graphing, definitions, symbolic representations
- calculus: first principles, derivatives, integration, applications
- teaching strategies related to mathematical content
- common misconceptions related to the mathematical content

Course Learning Outcomes

On successful completion of this course, students will be able to:
1. understand the key concepts related to fundamental algebra, functions, continuity and calculus;

2. appreciate the mathematical knowledge and beliefs that learners bring to a learning task;

3. apply a range of strategies for teaching secondary mathematics; and

4. recognise the common misconceptions that students may have about the mathematical content covered.

Course Materials

Lecture Materials:

Lecture and/or learning materials will be made available via Canvas.

Recommended Text:
Pender. B, Sadler. D, Ward. D, Dorofaeff. B and Shea. J (2019) CambridgeMATHS Stage 6 Mathematics Extension 1 Year 11. Melbourne: Cambridge University Press. ISBN 978-1-108-46907-4

Pender. B, Sadler. D, Ward. D, Dorofaeff. B and Shea. J (2020) CambridgeMATHS Stage 6 Mathematics Extension 1 Year 12. Melbourne: Cambridge University Press. ISBN 978-1-108-76630-2

SCHEDULE

Week	Week Begins	Topic	Assessment Due
1	26 Feb	Review of Algebra	
2	4 Mar	Solving and Graphing `standard' Functions and Inequalities	
3	11 Mar	Calculus - First Principles	
4	18 Mar	Calculus - Differentiation of Polynomials	Content Assignment 1 Due Sunday 24/3/2024 11:59PM AEST on Topics 1 and 2
5	25 Mar	Calculus - Product, Quotient and Chain Rule	
6	1 Apr	Calculus - Tangents and Normals to the Curve	Content Assignment 2 Due Sunday 7/4/2024 11:59PM AEST on Topics 3, 4 and 5
7	8 Apr	Curve Sketching - Polynomials	Canvas Discussion Task (A) Due Sunday 14/4/2024 11:59PM AEST
Mid-Semester Recess			
Mid-Semester Recess			
8	29 Apr	Applications of Calculus - Differentiation	Canvas Discussion Task (B) Due Sunday 5/5/2024 11:59PM AEST
9	6 May	Calculus - Differentiation of Trigonometric Functions	Content Assignment 3 Due Sunday 12/5/2024 11:59PM AEST on Topics 6 and 7
10	13 May	Calculus - Differentiation of Logarithmic and Exponential Functions	Canvas Discussion Task (C) Due Sunday 19/5/2024 11:59PM AEST
11	20 May	Curve Sketching - Other Functions	Content Assignment 4 Due Sunday 26/5/2024 11:59PM AEST on Topics 8, 9 and 10
12	27 May	Further Rates of Change	Exam Date selection Due Friday 31/5/2024 5PM AEST
13	3 Jun	Revision	Content Assignment 5 Due Friday 7/6/2024 5PM AEST on Topics 11 and 12
Examination Period **Exam** Sunday 9th June 2024 1-3pm AEST or Tuesday 11th June 2024 10-12pm			
Examination Period			

ASSESSMENTS

This course has 3 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	In term test	Student will select one of two times designated for the exam, these times are either Sunday 9th June 2024 1-3pm or Tuesday 11th June 2024 10-12pm. You will book into one of these exam time via the EDUC6102 Canvas site.	Individual	40%	1
2	Essays/Written Assignments	CA 1: Sunday 24/3/2024 @ 11:59PM CA 2: Sunday 7/4/2024 @ 11:59PM CA 3: Sunday 12/5/2024 @ 11:59PM CA 4: Sunday 26/5/2024 @ 11:59PM CA 5: Friday 7/6/2024 @ 5PM	Individual	40%	1
3	Group/tutorial participation and contribution	Canvas Discussion Task (Part A): Sunday 14/4/2024 @ 11:59PM Canvas Discussion Task (Part B): Sunday 5/5/2024 @ 11:59PM Canvas Discussion Task (Part C): Sunday 19/5/2024 @ 11:59PM	Individual	20%	1, 2, 3, 4

Late Submissions The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

Assessment 1 - In term test

Assessment Type In Term Test
Purpose Final Exam: This exam will cover content in modules 1 - 12.
Description Examination questions will be based on the course material provided, including suggested mathematical exercises. The examination will consist of a two (2) hour paper. On Semester 1 2024 the EDUC6102 final exam will be a formal written exam. Details will be made available on the course Canvas site. Students are to select from one of two specified days/times in which to sit their exam. These exams will be supervised remotely (using Zoom) by the course coordinator.
Weighting 40%
Length 2 hours
Due Date Student will select one of two times designated for the exam, these times are either Sunday 9th June 2024 1-3pm or Tuesday 11th June 2024 10-12pm.. You will book into one of these exam time via the EDUC6102 Canvas site.
Submission Method Online
Online, Completed assessment will be scanned and uploaded to Canvas.

Assessment Criteria Assessment will not be marked until any and all submission requirements are met. Students' examination responses will be marked according to the marking scheme provided on the examination paper. Each question will be marked according to the accuracy of the answer provided and the clarity of the setting out of the response.
Return Method Not Returned
Feedback Provided Online - . Students can request feedback from the course coordinator after all exams have been sat and marked.

Assessment 2 - Essays/Written Assignments

Assessment Type	Written Assignment
Purpose	This task consists of 5 mathematics content assignment (worth 8% each) and will cover the material presented in Topics 1 to 12.
Description	These assignments will require the student to complete a list/set of questions related to the course material. These questions will be made available on Canvas and cover all modules within the course. These assignments must be submitted electronically in a word document format via Turnitin. These assignments must be typed using appropriate mathematical software (efofex, word equation etc.) Scanned handwritten answers will not be marked.
Weighting	40%
Length	See Canvas
Due Date	CA 1: Sunday 24/3/2024 @ 11:59PM CA 2: Sunday 7/4/2024 @ 11:59PM CA 3: Sunday 12/5/2024 @ 11:59PM CA 4: Sunday 26/5/2024 @ 11:59PM CA 5: Friday 7/6/2024 @ 5PM
Submission Method	Online
Assessment Criteria	Each question will be marked according to the accuracy of the answer provided and the clarity of the setting out of the response. Providing answers only will result in zero marks.
Return Method	Online
Feedback Provided	Online - . Two weeks after each content assignment.

Assessment 3 - Group/tutorial participation and contribution

Assessment Type	Participation
Purpose	This task consists of an online discussion task designed for you to appreciate the mathematical knowledge and beliefs that learners bring to a learning task. It will show a range of strategies for teaching secondary mathematics. You will need to recognise some common misconceptions that students may have regarding the mathematical content covered.
Description	This task consists of three parts and is aimed at Stage 4 level Mathematics: Focus pedagogy: Lesson planning and teaching strategies Focus strand: Number and Algebra Focus Stage: 4 a) Review the Stage 4 Equations Topic - https://curriculum.nsw.edu.au/learning-areas/mathematics/mathematics-k-10-2022/content/stage-4/fa2b36d99b b) Choose a teaching strategy from the list provided which you believe will assist students with the topic above. Explain why you have chosen this strategy and how you believe it is appropriate for the lesson you will create. Justify your argument with links to academic literature (10 marks) c) Write a lesson plan using the strategy you have chosen. In your lesson plan please include any relevant information such as prior knowledge or links to other topics/subject areas (10 marks)
Weighting	20%
Length	Variable
Due Date	Canvas Discussion Task (Part A): Sunday 14/4/2024 @ 11:59PM AEST Canvas Discussion Task (Part B): Sunday 5/5/2024 @ 11:59PM AEST Canvas Discussion Task (Part C): Sunday 19/5/2024 @ 11:59PM AEST
Submission Method	Online
Assessment Criteria	Assignment will not be marked until any and all submission requirements are met. A marking rubric will be available on canvas for this assessment.
Return Method	Online
Feedback Provided	Online - . Two weeks after completion of the response to peers.

ADDITIONAL INFORMATION

Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

*Skills are those identified for the purposes of assessment task(s).

Communication Methods

Communication methods used in this course include:

Course Evaluation

Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.

Oral Interviews (Vivas)

As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the Oral Examination (viva) Procedure. In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the Student Conduct Rule.

Academic Misconduct

All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to https://policies.newcastle.edu.au/document/view-current.php?id=35.

Adverse Circumstances

The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where:

1. the assessment item is a major assessment item; or
2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system;
3. you are requesting a change of placement; or
4. the course has a compulsory attendance requirement.

Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at:
https://policies.newcastle.edu.au/document/view-current.php?id=236

Important Policy Information

The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures that support a safe and respectful environment at the University.

This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.