

EDUC6107: Mathematics Curriculum Studies 6

Online

Semester 1 - 2024



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

OVERVIEW

Course Description	This course will extend students' understanding of calculus and related applications. The course will examine topics such as ordinary differential equations, multiple integrals, limits and continuity, and real or complex variable analysis. The course will also examine current related pedagogical models within the field of secondary mathematics.
Academic Progress Requirements	Nil
Assumed Knowledge	EDUC6102 - Mathematics Curriculum Studies 1
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.

COURSE OUTLINE

CONTACTS

Course Coordinator **Online**
Miss Rebecca Smith
Rebecca.Smith@newcastle.edu.au - Please email for an appointment

School Office **School of Education**
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SYLLABUS

Course Content

- Study of calculus (analysis) involving topics such as ordinary differential equations, multiple integrals, limits and continuity, real or complex variable analysis
- 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 study of calculus (analysis) involving topics such as ordinary differential equations, multiple integrals, limits and continuity, real or complex variable analysis;
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 in 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
- Sadler. D and Ward. D (2020) CambridgeMATHS Stage 6 Mathematics Extension 2 Year 12. Melbourne: Cambridge University Press. ISBN 978-1-108-77105-4

SCHEDULE

Week	Week Begins	Topic	Assessment Due
1	26 Feb	The Primitive Function	
2	4 Mar	Integration and Area	
3	11 Mar	Integration of Logarithmic and Exponential Functions	
4	18 Mar	Integration of Trigonometric Functions	Content Assignment 1 Due Sunday 24/3/2024 11:59PM AEST on Topics 1 and 2
5	25 Mar	Exponential Growth and Decay	
6	1 Apr	Projective Motion and Simple Harmonic Motion	Content Assignment 2 Due Sunday 7/4/2024 11:59PM AEST on Topics 3, 4 and 5
7	8 Apr	Implicit Differentiation and Differential Equations	Canvas Discussion Task (A) Due Sunday 14/4/2024 11:59PM AEST
Mid Term Break			
8	29 Apr	Standard Integrals	Content Assignment 3 Due Sunday 5/5/2024 11:59PM AEST on Topics 6 and 7
9	6 May	Integration by Substitution and Integration by Parts	
10	13 May	Integration by Partial Fractions	Canvas Discussion Task (B) Due Sunday 19/5/2024 11:59PM AEST
11	20 May	Volumes of Revolutions	Content Assignment 4 Due Sunday 26/5/2024 11:59PM AEST on Topics 8, 9 and 10
12	27 May	Further Integrals	Exam Date Due Friday 31/5/2024 5PM AEST
13	3 June		Content Assignment 5 Due Friday 7/6/2024 5PM AEST on Topics 11 and 12
Exam Sunday 9th June 2024 1-4pm AEST or Tuesday 11th June 2024 10-1pm			

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	Mathematics Content Examination	Student will select one of two times designated for the exam, these times are either Sunday 9th June 2024 1-4pm or Tuesday 11th June 2024 10-1pm. You will book into one of these exam time via the EDUC6107 Canvas site.	Individual	40%	1
2	Mathematics Content Assignment	CA 1: Sunday 24/3/2024 @ 11:59PM CA 2: Sunday 7/4/2024 @ 11:59PM CA 3: Sunday 5/5/2024 @ 11:59PM CA 4: Sunday 26/5/2024 @ 11:59PM CA 5: Friday 7/6/2024 @ 5PM	Individual	40%	1
3	Online Discussion Task	Canvas Discussion Task (Part A): Sunday 14/4/2024 @ 11:59PM Canvas Discussion Task (Part B): 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 - Mathematics Content Examination

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 three (3) hour paper. In Semester 1 2024 the EDUC6107 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	Three hours
Due Date	Student will select one of two times designated for the exam, these times are either Sunday 9th June 2024 1-4pm or Tuesday 11th June 2024 10-1pm. You will book into one of these exam time via the EDUC6107 Canvas site.
Submission Method	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 - Mathematics Content Assignment

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 5/5/2024 @ 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 - Online Discussion Task

Assessment Type	Online Learning Activity
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	Focus pedagogy: Unit planning / programming and Quality Teaching model Focus strand: Calculus Focus Stage: 6 This task will consist of 2 parts: a) Review the topic MA-C4 Integral Calculus . https://educationstandards.nsw.edu.au/wps/portal/nesa/11-12/stage-6-learning-areas/stage-6-mathematics/mathematics-advanced-2017/content/2606 b) Construct a unit plan for the topic MA-C4 Integral Calculus (20 marks). <ul style="list-style-type: none">• Please review the sample unit Mathematics Advanced Year 11 Sample unit: Calculus for a reference unit plan.• Provide a unit plan for a three-to-four-week teaching period.• You can decide on the number of lessons per week. You may also like to describe the school setting to provide a context for the unit plan e.g., Socioeconomic area, size of school, streamed or unstreamed classes etc.• Include details of lesson sequences, resources required, and assessment strategies designed to support student learning outcomes. Note that you are not required to include detailed assessment tasks.• Provide a justification for the approach you have taken for your unit plan. Your justification should make reference to other sources, for example, the NSW QT model, readings from your texts for this course and/or other documents provided on Canvas, in addition to any other sources that are applicable.• References used in these posts should be formatted using the APA referencing system.
Weighting	20%
Length	Length ($\pm 10\%$): 2000 words.
Due Date	Canvas Discussion Task (A) Due Sunday 14/4/2024 11:59PM AEST Canvas Discussion Task (B) Due 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 provided for this assessment. A marking rubric will be available on the Canvas website.
Return Method	Not Returned

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.

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EDUC6107

Focus pedagogy: Unit planning / programming and Quality Teaching model

Focus strand: Calculus

Focus Stage: 6

This task will consist of 2 parts:

- Review the topic MA-C4 Integral Calculus. <https://educationstandards.nsw.edu.au/wps/portal/nesa/11-12/stage-6-learning-areas/stage-6-mathematics/mathematics-advanced-2017/content/2606>
- Construct a unit plan for the topic MA-C4 Integral Calculus (20 marks).
 - Please review the sample unit [Mathematics Advanced Year 11 Sample unit: Calculus](#) for a reference unit plan.
 - Provide a unit plan for a three-to-four-week teaching period.
 - You can decide on the number of lessons per week. You may also like to describe the school setting to provide a context for the unit plan e.g., Socioeconomic area, size of school, streamed or unstreamed classes etc.
 - Include details of lesson sequences, resources required, and assessment strategies designed to support student learning outcomes. Note that you are not required to include detailed assessment tasks.
 - Provide a justification for the approach you have taken for your unit plan. Your justification should make reference to other sources, for example, the NSW QT model, readings from your texts for this course and/or other documents provided on Canvas, in addition to any other sources that are applicable.

Discussion Task worth 20% of your final grade for this course.

Criteria		Possible Marks
Part B	The response will be given a mark out of ten depending on the degree to which: <ul style="list-style-type: none"> the content of the lesson unit is clear, concise, and relevant. (10) All key information is given including resources and assessment strategies used. (5) Justification of approaches taken given and associated references made. (3) the response is written clearly without grammatical errors using correct academic referencing/resources used clearly stated. (2) 	20

The rubric below will be used for each task to determine your mark out of 20

20	Demonstrates excellent composition skills including a clear and thought-provoking response to the set question. Key issues are identified and explained with supporting material. A variety of reference material is given and properly referenced. Excellent writing skills and proper use of grammar.
18	Demonstrates a high level of composition skills including a clear and well thought out response to the set question. Key issues are identified and explained with supporting material. A variety of reference material is given and properly referenced. The student has used appropriate writing skills and grammar.
16	Demonstrates a good level of composition skills including a clear and well thought out response to the set question. Key issues are identified and explained with supporting material. A use of different reference material is given and properly referenced. The student has used appropriate writing skills and grammar
14	Demonstrates a good level of composition skills including a clear and well thought out response to the set question. Key issues are identified and explained with supporting material. Reference material is given and properly referenced yet is not diverse in its source. The student has used appropriate writing skills and grammar
12	Demonstrates a good level of composition skills including a clear and well thought out response to the set question. Key issues are identified and explained. Reference material is given and properly referenced yet is not diverse in its source. The student has used appropriate writing skills and grammar.
10	Demonstrates an adequate level of composition skills including and has answered the set question. Key issues are identified and explained. Reference material is given and properly referenced yet is not diverse in its source. The student has used appropriate writing skills and grammar.
8	Demonstrates an adequate level of composition skills and has answered the set question. Key issues are identified but not explained fully. Reference material is given yet is not diverse in its source. The student has used appropriate writing skills and grammar.
6	Demonstrates an adequate level of composition skills including a clear and has answered the set question. Key issues are identified but not explained fully. Reference material is lacking/limited and not diverse in its source.
4	Demonstrates a basic level of composition skills and has attempted to answer the set question. Reference material is lacking/limited and not diverse in its source.
2	Demonstrates a basic level of composition skills yet has not answered the set question. Reference material is lacking/limited and does not show diversity of knowledge.
0	No attempt has been made to complete this assessment