School of Education

EDUC6104: Mathematics Curriculum Studies 3
Online
Semester 1 - 2024

OVERVIEW

Course Description	This course introduces students to the key concepts underlying a deep understanding of mathematical proof and topology. This course will consider the historical development of mathematical proof and topology and will examine current related pedagogical models within the field of secondary mathematics including catering for differentiated learning needs in the contemporary classroom.
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** Miss Beth Preston Beth.Preston@newcastle.edu.au -Please email for an appointment
School Office	**School of Education** V Building- Callaghan Education@newcastle.edu.au +61 2 4921 6428

SYLLABUS

Course Content
- The historical development of mathematical proof and its relationship to other forms of proof commonly accepted in contemporary society
- Forms of mathematical proof including geometric, inductive, deductive, contradiction, reductio ad absurdum and non-Euclidean geometric
- Introduction to topology
- Teaching strategies related to mathematical content
- Common misconceptions related to the mathematical content
- Differentiated learning in the contemporary classroom

Course Learning Outcomes

On successful completion of this course, students will be able to:
1. understand the key concepts related to various forms of mathematical proof and the field of topology;
2. appreciate the mathematical knowledge and beliefs that learners bring to a learning task;
3. apply a range of strategies for teaching secondary mathematics;
4. recognise the common misconceptions that students may have in regard to the mathematical content covered; and
5. recognise the benefits and issues associated with differentiated learning.

Course Materials

Lecture Materials: Lecture and/or learning materials will be made available via Canvas.
Required 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	Euclidean Geometry: Properties of Triangles and Polygons	
2	4 Mar	Euclidean Geometry: Properties of Parallel Lines and Intercepts	
3	11 Mar	Euclidean Geometry: Deductive Proofs and Proof by Contradiction	Content Assignment 1 Due: Sunday 17/3/2024 11:59PM AEST on Topics 1 and 2
4	18 Mar	Euclidean Geometry: Proofs and Methods on The Cartesian Plane	
5	25 Mar	Set Theory: Introduction	Content Assignment 2 Due: Sunday 31/3/2024 11:59PM AEST on Topics 3 and 4
6	1 Apr	Set Theory: Operations on Sets and Venn Diagrams	
7	8 Apr	Set Theory: Laws of Operations and Operations on Sets	Canvas Discussion Task (A) Due: Sunday 14/4/2024 11:59PM AEST
	Mid Term Break		Canvas Discussion Task (B) Due: Sunday 28/4 11:59PM AEST (SimTeach)
8	29 Apr	Set Theory: Sets and The Cartesian Plane	Content Assignment 3 Due: Sunday 5/5/2024 11:59PM AEST on Topics 5, 6 and 7
9	6 May	Graph Theory: Definitions and Applications	Canvas Discussion Task (C) Due: Sunday 12/5/2024 5PM AEST
10	13 May	Graph Theory : Prim's and Kruskal's Algorithms	Content Assignment 4 Due: Sunday 19/5/2024 11:59PM AEST on Topics 8 and 9
11	20 May	Graph Theory: Directed Graphs, Adjacency Matrices and Network Flow Problems	
12	27 May	Graph Theory: Vectors	Exam Date Due Friday 31/5/2024 5PM AEST
13	3 June	Revision	Content Assignment 5 Due Friday 7/6/2024 5PM AEST on Topics 11 and 12
	Exam Friday 14th June 2024 10-1pm or Sunday 16th June 2024 1-4pm		

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 Examinations	Student will select one of two times designated for the exam, these times are Friday 14th June 2024 10am-1pm or Sunday 6th June 2024 1-4pm. You will book into one of these exam time via the EDUC6104 Canvas site.	Individual	40%	1, 2, 3, 4
2	Mathematics Content Assignment	- CA 1: Sunday 17/3/2024 11:59PM - CA 2: Sunday 31/3/2024 11:59PM - CA 3: Sunday 5/5/2024 11:59PM - CA 4: Sunday 19/5/2024 11:59PM - CA 5: Friday 7/6/2024 5PM	Individual	40%	1, 2, 3, 4, 5
3	Online Discussion Task	Canvas Discussion Task (Part A): Sunday 14/4/2024 @ 11:59PM Canvas Discussion Task (Part B): Sunday 28/4/2024 @ 11:59PM Canvas Discussion Task (Part C): Sunday 12/5/2024 @ 11:59PM	Individual	20%	1, 2, 3, 4, 5

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 Examinations

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 EDUC6104 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 Friday 14th June 2024 10am-1pm or Sunday 6th June 2024 1-4pm. You will book into one of these exam time via the EDUC6104 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 17/3/2024 11:59PM
	CA 2: Sunday 31/3/2024 11:59PM
	CA 3: Sunday 5/5/2024 11:59PM
	CA 4: Sunday 19/5/2024 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.
Description	Focus pedagogy: Lesson planning and SimTeach.
	Focus strand: Measurement and Geometry
	Focus Stage: 4
	This task will consist of 3 parts
	a) Choose a outcome from within the **Stage 4 Topic: Properties of Geometrical Figures**(MAO-WM-01, MA4-GEO-C-01)
	https://curriculum.nsw.edu.au/learning-areas/mathematics/mathematics-k-10-2022/content/stage-4/fa77304c54
	Write a lesson plan on the topic above. In your lesson plan please include any relevant information such as prior knowledge or links to other topics/subject areas. (10 marks)
	b) From your lesson plan prepare a short (10 min) synopsis lesson to present via SimTeach (https://www.newcastle.edu.au/school/education/student-experience) . You do not need to provide an additional 10min lesson plan, your presentation just needs to encompass the key concepts of your lesson plan given in part (a). Dates will be provided on Canvas for SimTeach sessions.
	c) Teach your summary lesson and write a review of the lesson then reflect on the teaching experience and review your lesson plan. What changes (if any) would you make and why? (10 marks)
	References used in these posts should be formatted using the APA referencing system.
Weighting	20%
Length	Variable.
Due Date	Canvas Discussion Task (Part A): Sunday 14/4/2024 @ 11:59PM
	Canvas Discussion Task (Part B): Sunday 28/4/2024 @ 11:59PM
	Canvas Discussion Task (Part C): Sunday 12/5/2024 @ 5PM
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.
Return Method	Online
Feedback Provided	Online - Two weeks after each component is completed.

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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