School of Education

EDUC6739: K-6 Mathematics

Callaghan
Trimester 2 - 2024

COURSE OUTLINE

OVERVIEW

Course Description

In this course Initial Teacher Education Students (ITES) explore: the relevant curriculum and syllabus documents; strategies and resources for programming, teaching and assessing primary mathematics; the role and value of mathematics in the broader school curriculum; the place of mathematics in the K- 10 mathematics continuum (particularly the links between Stage 3 and 4 mathematics); ways of differentiating mathematics curriculum to meet the diverse mathematical needs of learners including Indigenous and Torres Strait Islander students; perspectives of mathematics skills development incorporating EAL and Aboriginal learners; and pedagogies that have the capacity to promote equity and social justice for diverse learners. There will be a particular focus on instructional approaches relevant to teaching the areas of the NSW Mathematics K-10, Number and Algebra; Measurement and Space; Statistics and Probability; and Working Mathematically.

Assumed Knowledge

An undergraduate degree or equivalent

Contact Hours

Lecture
Online
12 hour(s) per Term Full Term

Tutorial *
Face to Face on Campus
24 hour(s) per Term Full Term

* This contact type has a compulsory requirement.

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

Callaghan
Mr Glyn Regler
Glyn.Regler@newcastle.edu.au
Consultation: email to make an appointment

Teaching Staff

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

School Office

School of Education
VG30, V Building
Callaghan
education@newcastle.edu.au
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SYLLABUS

Course Content

- Principles and practices of teaching and learning mathematics in K-6 settings (including strategies for programming, teaching and assessing mathematics)
- The role and value of Mathematics in the broader school curriculum as mathematical capacities
- The content, structure and organisation of the NSW K-10 Mathematics syllabus and Australian Curriculum: Mathematics
- Strategies for differentiating mathematics curriculum to meet the diverse mathematical needs of learners including Indigenous and Torres Strait Islander students
- Instructional approaches relevant to teaching the areas of the NSW Mathematics K-10 Syllabus: Number and Algebra; Measurement and Space; Statistics and Probability; and Working Mathematically
- Examining perspectives of mathematical skill development incorporating EAL and Aboriginal learners
- Exploring pedagogies that have the capacity to promote equity and social justice for diverse learners

Course Learning Outcomes

On successful completion of this course, students will be able to:

1. Demonstrate knowledge of the principles and practices of teaching and learning mathematics in K-6 school contexts (including strategies for programming, teaching and assessing).
2. Identify the role of language in mathematics learning and investigate the implications of how language is used in mathematical contexts.
3. Navigate the content, structure and organisation of the NSW K-10 Mathematics curriculum and explore its relationship to the Numeracy.
4. Differentiate curriculum to meet the diverse mathematical needs of learners including Indigenous and Torres Strait Islander students.
5. Utilise instructional approaches relevant to teaching the strands of the NSW Mathematics K-10 Mathematics Syllabus and the Australian Curriculum: Mathematics.
6. Examine perspectives of mathematical skill development incorporating EAL and Aboriginal learners.
7. Explore pedagogies that have the capacity to promote equity and social justice for diverse learners.

Course Materials

Required Text:
Siemon, D., Beswick, K., Brady, K., Clark, J., Faragher, R., & Warren, E. (2020).*Teaching Mathematics: Foundations to middle years* (3 ed.). South Melbourne, Victoria: Oxford University Press.

Recommended Text:

- Sullivan, P. & Lilburn, P. (2017). *Open-ended Maths Activities* (Revised edition). South Melbourne: Oxford University Press.

- Teaching mathematics: Using research-informed strategies
  Overview of research - Research article – Sullivan, P. (2011) Teaching Mathematics: Using research-informed strategies (acer.edu.au) Chapter 5, page 24 to 30

COMPULSORY REQUIREMENTS

In order to pass this course, each student must complete ALL of the following compulsory requirements:

Contact Hour Requirements:

- Tutorial
  - There is a compulsory attendance requirement in this course
  - A minimum of 80% attendance is required to pass the course

SCHEDULE

EDUC6739 K-6 Mathematics **Teaching mathematics: Using research-informed strategies (Recommended Reading)** **Overview of research** - Research article – Sullivan, P. (2011)Teaching Mathematics: Using research-informed strategies (acer.edu.au) Chapter 5, page 24 to 30					
Week	**Week Begins Siemom (2021) Links**	**Topic (Lecture)**	**Learning activity (Tutorial)**	**Assessment Due**	**Readings**
UNDERSTANDING THE MATHS SYLLABUS AND PEDAGOGIES (Part 1)					
1	13 May Chapter 1 & 2	Introduction to EDUC6739 Effective Principles for Maths Instruction	Maths Anxiety K-2 Syllabus, Numeracy Progressions		Issues in the Teaching of Mathematics, Dr Sarah Buckley, Senior Research Fellow, Australian Council for Educational Research MTT_Mathematics_Anxiety.pdf (education.vic.gov.au)
2	20 May Chapter 7	Connectionist Approach and Big Ideas	Lesson Planning K-2 Micro Learning		Boaler J and Williams C (2017) What is mathematical beauty? Teaching through big ideas and connections [PDF 2.4 MB]. *youcubed*, Stanford.
TEACHING NUMBER AND ALGEBRA (Part 2)					
3	27 May Chapters 4 & 5 and Ch 12 & 13	Multiplicative Thinking	Practical applications for Multiplicative thinking Forming groups (syllabus)		MULTIPLICATIVE THINKING Prepared by Dr Dianne Siemon, TEACHING AND LEARNING MATHEMATICS - (education.vic.gov.au)
4	3June Chapter 14	the proficiencies and reasoning (WM) How to create your own challenging tasks	Number and Place Value Trust the Count		Building Place Value number-knowledge-part-6.pdf
5	10 June Chapter 15	Additive Thinking	Practical applications for Additive thinking Renaming and regrouping (syllabus)		1-Trusting-the-Count.pdf (wynnvaleschool.sa.edu.au) Common Misunderstandings - Level 1 Trusting the Count (education.vic.gov.au)
6	17 June Chapter 16 & 18	Interpreting Fractions	Partitioning Factions Proportional Thinking		Developing an Understanding of the Size of Fractions tdt_F_gould1 (2).pdf Peter Gould (AAMT)
TEACHING AND LEARNING (Part 3)					
7	24 June Chapter 8	Catering for diversity in the maths classroom	Differentiation incl. EALD. Aboriginal and Torres Straight Islanders and neurodiverse students	Assign 1 Sunday 25 June 23:59	Dr Chris Matthews – Culture and Mathematics https://www.youtube.com/watch?v=ZSnhdhltw3w Watch from 6mins to 36:35 mins Differentiating Maths Instruction https://mel0215doeplasprod.blob.core.windows.net/uploads/mypl/scorm/rg05177b-v2/course/en/assets/cf43857efbfd4d3b16454a9d0ec8d9076819e73e.pdf
8	1 July Chapter 6	Effective Assessment strategies - for, as and of Learning	Opportunities for assessment		Teachers-Guide-To-Assessment.pdf (act.gov.au)

TEACHING MEASUREMENT AND GEOMETRY & STATISTICS AND PROBABILITY (Part 4)					
9	8 July Chapters 19,20 & 21	3D Space, 2D Space, Angles and Position Technology TPACK	2D special structures Length, perimeter, area, angles 3D special structures Capacity		**The TPACK Framework** (1) New Messages! (powerschool.com)
10	15 July Pp682 – 687 & Chapters 22 & 23	Non spatial measurement Temperature, Mass & time	Data and Chance		Chance/probability (nsw.gov.au) Look at stage 2 and Stage 3 activities Data, Data Collection and Representation, Single Variable Data Analysis (nsw.gov.au) Look at Data, Data Collection and Representation, Single Variable Data Analysis
NUMERACY (Part 5)					
11	22 July Chapter 9	Exploring practical applications with real life links	Problem Solving LANTITE		**Try this practice test for LANTITE – note any areas where you have difficulty:** Numeracy-practice-test-questions-Oct_2019.pdf (acer.edu.au)
12	29 July	Responding to ITES students' needs for the teaching of Maths	Consultation	Assign 2 Sunday 6 Aug 23:59	

ASSESSMENTS

This course has 2 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting
1	Series of Lesson Plans - 50%	Sunday, end of Week 7, 23:59	Individual	50%
2A	Unit Plan 2A - 30%	Sunday, 4 August, 23:59	Individual	30%
2B	Literacy Journal 2B 20%	Sunday 28 July 23:59	Individual	20%

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 - Series of Lesson Plans - 50%

Assessment Type Written Assignment

Purpose The purpose of this written assignment is for ITES to plan a series of lessons utilising the K-6 Mathematics syllabus documents, demonstrating a holistic understanding of curriculum. In so doing, they apply advanced in-depth specialised knowledge related to the teaching of Mathematics in the primary classroom.

Description ITES will plan a series of lessons, assessment and associated resources, using a variety of student grouping strategies. They will demonstrate an understanding of the K-6 NSW Mathematics syllabus documents and understanding of planning engaging maths lessons based on a needs analysis. A work sample (given on BB) from a primary school student will be analysed and this analysis will assist with planning for the class.

Weighting 50%
Due Date Sunday 30 June (end of Week 7), 11.59pm

Submission Method Online via Turnitin

Assessment Criteria Students are assessed on their ability to plan engaging, relevant and appropriate lessons,

assessment tasks and associated resources.

In order to achieve a pass mark, ITES will:

1. Accurate analysis of student work sample identifying mathematical reasoning, understandings and errors;
2. Succinct and engaging lessons planned as part of a series of three lessons using this analysis;
3. Description and explanation of grouping strategies for differentiation of tasks and teaching and learning and assessment activities catering for diverse student needs, incorporating the use of ICT-based assessment tasks;
4. Demonstration of ability to plan lessons based on the principles and practices of K-6 Mathematics indicating competency with navigation of the content, structure and organisation of the 2012 K-6 Maths Syllabus and choice and development of appropriate resources to support student learning;
5. Validation through and well supported by quality references to suitable research evidence.
6. Academic standards of writing and APA referencing are of a high standard.

Return Method Online
Feedback Provided Online via Turnitin

Assessment 2A - Unit Plan - 30%

Assessment Type Proposal / Plan

Purpose Programming for Maths K-6 with differentiation and rationale

Description Write a program for four (4) lessons in one Mathematics strand (other than Number and Algebra) including all Working Mathematically Processes. The program is for the class for which you have been given a needs analysis / class profile (on Canvas). Incorporate grouping strategies, differentiation (particularly and specifically for the EALD students in your given class) and choose appropriate resources to support learning. You do not have to include commercial resources with the assignment but any original resources (e.g. recording sheets, games) need to be attached and screenshots of any technology based resources should be included. ICT resources should be utilised appropriately.

The required proformas for the program overview will be provided on Canvas.

Write a 750 word rationale justifying your teaching and learning choices and reflect on how you have catered for the diversity in your classroom, particularly commenting on the EALD students in your given class.

Weighting 30%
Due Date Sunday, 4 August, 23.59pm

Submission Method Online via Turnitin

Assessment Criteria In order to achieve a pass mark, ITES will:

1. Succinct and engaging lessons planned as part of a 3 lesson maths program incorporating a clear understanding of differentiation, especially for EALD students;
2. Description and explanation of grouping strategies for differentiation of tasks catering to diverse student needs;
3. Demonstration of ability to plan lessons as a program, based on the principles and practices of K-6 Mathematics indicating competency with navigation of the content, structure and organisation of the current K-6 Mathematics Syllabus and choice and development of appropriate resources to support student learning (particularly and specifically for the EALD students in your class);
4. Demonstration of the ability to write a short succinct rationale justifying your teaching and learning choices and reflects on how you have catered for the diversity in your classroom (particularly and specifically for the EALD students in your class). You should

use appropriate references to support your rationale; and

5. Academic standards of writing and APA referencing are of a high standard.

Return Method Online
Feedback Provided Online via Turnitin

Assessment 2B – Literacy Journal - 20%

Assessment Type Weekly readings and written discussion

Purpose A demonstrated understanding that students have met the Outcomes of this course.

Description This section requires students to submit a weekly Literature Journal entry for each of the required readings outlined on the course 'Weekly schedule' for weeks 1, 2, 3, 4, 5, 6, 8, 9, 10, 11 on canvas. Submissions are weekly and are submitted through the Assignments portal on Canvas and must be completed on the appropriate Literature Journal proforma. Marks are awarded for quality of the Journal submissions, as well as timeliness and completion of all components.

Weighting 20%

Length 2000-word equivalent

Due Date Weekly

Submission method Through Canvas

Assessment criteria Students are assessed on their ability to clearly identify and critically explore a mathematical concept or field of research related to mathematics education through a literature review, weekly literature journal entries and links to lesson planning;

1. Demonstration of the ability to clearly articulate and critically explore a maths concept, field of research and produce a succinct and clear literature review stating the relevance of the topic, its significance and outlining a number of different perspectives showing a wide engagement with the field.
2. Discussion and findings in the literature review are clear and pertinent
3. Academic standards of writing and APA 7th referencing are of a high standard
4. Ability to produce a timely and complete Literature review entry weekly using appropriate proforma

Return method Online

Feedback provided During weekly tutorials

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).

Attendance

Attendance/participation will be recorded in the following components:

- Tutorial

Method of recording:

- Roll taken in class; there is a required 80% attendance

It is expected you attend the face to face tutorial, and it is required you attend a minimum of 80%. The lecture will be available for watching prior to the tutorial.

Communication Methods

Communication methods used in this course include:

- Canvas Course Site: Students will receive communications via the posting of content or announcements on the Canvas course site.
- Email: Students will receive communications via their student email account.
- Face to Face: Communication will be provided via face to face meetings or supervision.

Please check emails and Canvas regularly.

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. Please see the Student Academic Integrity Policy for more information.

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.

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 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.

EDUC6739 MATHEMATICS K-6 Analysis of student work sample & development of 3 lessons using OEECD Lesson Plan						
SERIES OF THREE LESSONS = 50%						
Criteria		**HD** Outstanding standard indicating comprehensive knowledge and understanding of relevant materials; mastery of skills; and achievement of all assessment criteria.	**D** Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; sound development of skills; and achievement of all assessment criteria.	**C** Very Good standard indicating a high level of knowledge and understanding of the relevant materials; reasonable development of skills; and achievement of most assessment criteria.	**P** Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; satisfactory development of skills; and achievement of most assessment criteria	**F** Inadequate evidence of stated criteria.
ASSIGNMENT PRESENTATION						
Use given proformas	/5	1	1	1	1	0.5-0
Literacy		2	1.75	1.25	1	0.5-0
Bibliography APA 7th reference		2	1.75	1.25	1	0.5-0
ANALYSIS						
Big Idea/s - enduring understandings	/10	2	1.75	1.25	1	0.5-0
Learning needs/analysis		2	1.75	1.25	1	0.5-0
Learning Directions from analysis of work sample		2	1.75	1.25	1	0.5-0
Outcomes and Descriptors (Content and WM)		2	1.75	1.25	1	0.5-0
Progressions		2	1.75	1.25	1	0.5-0
OEECD LESSONS						
3 lessons	/35	3	3	3	1.5	1 - 0
Outcomes (Content and WM), Focus Area, Content Group & points		4	3.5	3	2	1 - 0
Orientation		4	3.5	3	2	1 - 0
Explicit Teaching		5	4	3	2.5	1.5 - 0
Exploration Group work, ICT embedded Hands on, creative activities, NOT worksheets in Exploration		5	4	3	2.5	1.5 - 0
Differentiation		5	4	3	2.5	1.5 - 0
Formative Assessment		4	3.5	3	2	1 - 0
Educationally appropriate 'Resources' referenced in APA7th		2	1.75	1.25	1	0.5-0
Consolidation		3	2.5	2	1.5	1 - 0
TOTAL	**/50**					

EDUC6739 MATHEMATICS K-6 Programming for Maths K-6 with differentiation and rationale						
SERIES OF FOUR LESSONS IN A PROGRAM FORMAT AND RATIONALE TO SUPPORT CHOICES = 30%						
Criteria		**HD** Outstanding standard indicating comprehensive knowledge and understanding of relevant materials; mastery of skills; and achievement of all assessment criteria.	**D** Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; sound development of skills; and achievement of all assessment criteria.	**C** Very Good standard indicating a high level of knowledge and understanding of the relevant materials; reasonable development of skills; and achievement of most assessment criteria.	**P** Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; satisfactory development of skills; and achievement of most assessment criteria	**F** Inadequate evidence of stated criteria.
ASSIGNMENT PRESENTATION						
Use given proformas Literacy	/3	3	2.5	2	1.5	1-0
PROGRAM						
Program is clearly based on needs analysis from given class context Program overview of 4 lessons Appropriate focus area and WM Outcomes Appropriate content groups and pointers **Explicit Teaching** (linked to above) **Exploration** Group work, ICT embedded Hands on, creative activities, NOT worksheets in Exploration Differentiation for EAL/D Assessment -What/How	/15	15	12	9	7.5	7-0
RATIONALE						
Justify your teaching choices How and why you have catered for EAL/D Well structured Appropriate references/ contemporary relevant research Intext and reference list APA 7th style	/12	12	10	8	6	5-0
TOTAL	**/30**					

Assessment 2 Part B – Literature Journal				
For each of the 10 weeks of Journal submissions, responses are marked as follows				
Literature journal submission addresses **few** (1 or none) of the following: ☐ Timely submission within no more than 1 week of the Journal due date ☐ Thorough and complete submission, addressing all components of the Literature Journal Proforma ☐ Summaries of content are clear and show critical commentary and some original thought in relation to content ☐ All required questions/prompts have been addressed adequately	Literature journal submission addresses **some (2)** of the following: ☐ Timely submission within no more than 1 week of the Journal due date ☐ Thorough and complete submission, addressing all components of the Literature Journal Proforma ☐ Summaries of content are clear and show critical commentary and some original thought in relation to content ☐ All required questions/prompts have been addressed adequately	Literature journal submission addresses **most** (3) of the following: ☐ Timely submission within no more than 1 week of the Journal due date ☐ Thorough and complete submission, addressing all components of the Literature Journal Proforma ☐ Summaries of content are clear and show critical commentary and some original thought in relation to content ☐ All required questions/prompts have been addressed adequately	Literature journal submission addresses **all** of the following: ☐ Timely submission within no more than 1 week of the Journal due date ☐ Thorough and complete submission, addressing all components of the Literature Journal Proforma ☐ Summaries of content are clear and show critical commentary and some original thought in relation to content ☐ All required questions/prompts have been addressed adequately	**wk 1**
0.5 or 0	**1**	**1.5**	**2**	
0.5 or 0	**1**	**1.5**	**2**	**wk 2**
0.5 or 0	**1**	**1.5**	**2**	**wk 3**
0.5 or 0	**1**	**1.5**	**2**	**Wk 5**
0.5 or 0	**1**	**1.5**	**2**	**Wk 6**
0.5 or 0	**1**	**1.5**	**2**	**Wk 7**
0.5 or 0	**1**	**1.5**	**2**	**Wk 8**
0.5 or 0	**1**	**1.5**	**2**	**wk 9**
0.5 or 0	**1**	**1.5**	**2**	**w10**

0.5 or 0	1	1.5	2	w1 1
			Total Part B	**/20**