



UNSW
SYDNEY

Arts & Social Sciences

School of Education

EDST6726

Extension Mathematics Method 1

Term 1, 2020

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IMPORTANT:

For student policies and procedures relating to assessment, attendance and student support, please see website, <https://education.arts.unsw.edu.au/students/courses/course-outlines/>

The School of Education acknowledges the Bedegal people as the traditional custodians of the lands upon which we learn and teach.

1. LOCATION

Faculty of Arts and Social Sciences
School of Education
EDST6726 Extension Mathematics Method 1 (6 units of credit)
Term 1, 2020

2. STAFF CONTACT DETAILS

Lecturer: Edward Habkoug
Email: e.habkoug@unsw.edu.au
Availability: Please email to arrange an appointment

3. COURSE DETAILS

Course Name	Extension Mathematics Method 1
Credit Points	6 units of credit (uoc)
Workload	Includes 150 hours including class contact hours, readings, class preparation, assessment, follow up activities, etc.
Schedule	http://classutil.unsw.edu.au/EDST_T1.html

SUMMARY OF THE COURSE

This course is designed as an extension Mathematics method course focusing on a deep understanding of pedagogical content knowledge for Mathematics teaching. Students will critically examine syllabuses. Students will appraise a range of strategies for teaching and assessing Mathematics and consider elements needed for quality teaching specific to Mathematics. Students enrolling in this course must also complete EDST6725 – Mathematics Method 1 (6uoc).

THE MAIN WAYS IN WHICH THE COURSE HAS CHANGED SINCE LAST TIME AS A RESULT OF STUDENT FEEDBACK:

- To allow more time in tutorials to work on additional mathematical problems that promote the development of the working mathematical proficiencies in Stage 4, 5 and/or 6.
- To provide more opportunity to use tutorial time to experiment with teaching skills

STUDENT LEARNING OUTCOMES

Outcome	Assessment/s
1 Identify foundational aspects and structure of NSW Mathematics for stages 4, 5 and 6	1, 2, 3
2 Design lesson plans and teaching units which demonstrate essential links between outcomes, assessment, teaching strategies and lesson planning.	1, 2
3 Discuss classroom strategies that recognise students' different approaches to learning.	1, 2
4 Analyse specific assessment strategies for a diverse range of students.	1, 2
5 Develop appropriate and engaging resources for the Mathematics classroom that take into account students' skills, interests and prior achievements and that respect the social, ethnic and religious backgrounds of students.	1, 2

AUSTRALIAN PROFESSIONAL STANDARDS FOR TEACHERS

Standard	Assessment/s
1.2.1 Demonstrate knowledge and understanding of research into how students learn and the implications for teaching.	1, 2
1.3.1 Demonstrate knowledge of teaching strategies that are responsive to the learning strengths and needs of students from diverse linguistics, cultural, religious and socioeconomic backgrounds.	1, 2
2.1 Demonstrate knowledge and understanding of the concepts, substance and structure of the content and teaching strategies of the teaching area.	1, 2, 3
2.4.1 Demonstrate broad knowledge of, understanding of and respect for Aboriginal and Torres strait Islander histories, cultures and languages	1, 2
2.5.1 Know and understand literacy and numeracy teaching strategies and their application in teaching areas	1, 2
2.6.1 Implement teaching strategies for using ICT to expand curriculum learning opportunities for students	1, 2
3.3.1 Include a range of teaching strategies.	1, 2
3.4.1 Demonstrate knowledge of a range of resources including ICT that engage students in their learning.	1, 2, 3

4. RATIONALE FOR THE INCLUSION OF CONTENT AND TEACHING APPROACH

This subject aims to develop best practice in teaching based on current research. During the course students will expand their knowledge of The Australian Curriculum for New South Wales documents. Lectures, tutorials and assignments will cover a variety of approaches to teaching and learning in the Mathematics classroom. Emphasis will be given to the relationship between Mathematics, literacy and numeracy, the proficiencies, the general capabilities, and the role and value of Mathematics in the curriculum and the community.

Student-centred activities will form the basis of the course. These activities will draw on the prior knowledge of the students and will allow them to engage in relevant and challenging experiences that mirror those they will be expected to design for the secondary students they will later teach.

5. TEACHING STRATEGIES

- Explicit teaching, including lectures, to demonstrate an understanding of students' different approaches to learning and the use of a range of teaching strategies to foster interest and support learning.
- Small group cooperative learning to understand the importance of teamwork in an educational context and to demonstrate the use of group structures as appropriate to address teaching and learning goals.
- Extensive opportunities for whole group and small group dialogue and discussion, allowing students the opportunity to demonstrate their capacity to communicate and liaise with the diverse members of an education community, and to demonstrate their knowledge and understanding of method content.
- Structured occasions for reflection on learning to allow students to reflect critically on and improve teaching practice.
- Online learning from readings on the Moodle website.
- Online discussions.
- Peer teaching in a simulated classroom setting.

These activities will occur in a classroom climate that is supportive and inclusive of all learners.

6. COURSE CONTENT AND STRUCTURE

- For details of Micro Teaching see EDST 6725 and will be conducted in that course

Module	Lecture	Tutorial
1 20 Feb	What is Mathematics? <ul style="list-style-type: none"> • What has changed in Mathematics Education in recent years? • What is expected of Mathematics teachers today? 	<ul style="list-style-type: none"> • Stage 4 – 6 Mathematics Syllabus in the Continuum of K-12 • Where can you find resources? • What professional networks are/is there to help you?
2 27 Feb	Meeting the needs of all students <ul style="list-style-type: none"> • Teaching a class with students of varying ability • Streaming in a subject with sequential content – what options may be available? 	<ul style="list-style-type: none"> • Planning lessons & units of work using ideas from the lecture • <i>Student Presentations</i>
3 5 Mar	Lesson Starters and Rich Tasks <ul style="list-style-type: none"> • Analysing lesson structure and content • Using 'rich' tasks as assessment tools • Working Mathematically (NESA) • What is considered best practice today? 	<ul style="list-style-type: none"> • Writing Assessments (Planning for Assessment 1) • <i>Student Presentations</i>
4 12 Mar	Teaching with 'Technology' <ul style="list-style-type: none"> • e.g. Geogebra, Desmos, Mathspace, Edrolo, Adusu Algebra 	<ul style="list-style-type: none"> • Keeping students on task in a BYOD classroom • <i>Class Quiz</i> • <i>Student Presentations</i>
5 19 Mar	High Performing Students <ul style="list-style-type: none"> • Developing their ICT and/or thinking skills 	<ul style="list-style-type: none"> • Catering for gifted students • <i>Student Presentations</i>
6 26 Mar	Stage 6 Mathematics Standard Course Overview	<ul style="list-style-type: none"> • Role of NAPLAN • <i>Student Presentations</i>
7 2 Apr	Stage 6 Mathematics Standard Course <ul style="list-style-type: none"> • Further Planning lessons & units of work General Feedback from Assessment 1	<ul style="list-style-type: none"> • <i>Class Quiz</i> • <i>Student Presentations</i>
8 9 Apr	Stage 6 HSC Mathematics Advanced Course overview <ul style="list-style-type: none"> • Teaching for understanding and application 	<ul style="list-style-type: none"> • The use of technology in teaching for understanding (Planning for Assessment 2) • <i>Student Presentations</i>
9 30 Apr	Stage 6 HSC Mathematics Advanced Courses ctd	<ul style="list-style-type: none"> • <i>Student Presentations</i> • Teaching for understanding and application
10 7 May	Preparation for Professional Experience <ul style="list-style-type: none"> • Managing the mathematics classroom • Maintaining student engagement • Observing lessons and reflecting on classroom practice 	<ul style="list-style-type: none"> • MyExperience on-line course evaluation • <i>Class Quiz</i>

Professional Experience

7. RESOURCES

Required Texts

Cavanagh, M. & Prescott, A. (2014). *Your professional experience handbook: A guide for preservice teachers*. Sydney: Pearson.

Goos, M., Stillman, G., & Vale, C. (2016). *Teaching secondary school mathematics: Research and practice for the 21st century*. Sydney: Allen & Unwin

NSW Board of Studies Stage 4, 5 & 6 Syllabuses
<http://educationstandards.nsw.edu.au/wps/portal/nesa/home>

Australian Curriculum Documents for NSW Stage 4 and Stage 5

Required Readings

- Anstey, M. & Bull, G. (2006) *Teaching and learning multiliteracies: Changing times, changing literacies*. Curriculum Press, Melbourne.
- Attwood, B. (2005), *Telling the truth about Aboriginal history*. Allen & Unwin, Crows Nest.
- Boaler, J. (2010). *The Elephant in the Classroom: How to teach kids learn and love mathematics*
- Finger, G., Russell, G., Jamieson-Proctor, R. & Russell, N. (2006) *Transforming Learning with ICT Making IT Happen*. Pearson Australia
- Gibbons, P (2002) *Scaffolding language, scaffolding learning: Teaching second language learners in the mainstream classroom*. Portsmouth, Heinemann.
- Henderson, R. (2012). *Teaching Literacies. Pedagogies and Diversity in the Middle Years*, Oxford University Press, Australia
- Hyde, M., Carpenter, L. & Conway, R. (2010). *Diversity and Inclusion in Australian Schools*. Oxford University Press, Australia
- Jones, K. and Smith, K. (1997), Student Teachers Learning to Plan Mathematics Lessons. Paper presented at the 1997 Annual Conference of the Association of Mathematics Education Teachers (AMET1997). Leicester. 15-17 May 1997
- Martin, K. (2008). The intersection of Aboriginal knowledges, Aboriginal literacies and new learning pedagogy for Aboriginal students. In Healy, A (Ed.) *Multiliteracies and diversity in education: New pedagogies for expanding landscapes*. Pp 59-81. Oxford University Press, Melbourne.
- Price, K (2012), *Aboriginal and Torres Strait Islander Education: An Introduction for the Teaching Profession*. Cambridge University Press
- Watson, A., Jones, K., & Pratt, D. (2013). *Key Ideas in Teaching Mathematics: Research-based Guidance for Ages 9-19*. Oxford University Press. Also available as an iBook or on Kindle.

Recommended Websites

Students can download syllabuses from the NESA website

<http://educationstandards.nsw.edu.au/wps/portal/nesa/home>

<https://education.nsw.gov.au/>

<http://libguides.csu.edu.au/HSC/math>

www.cecsw.catholic.edu.au

www.curriculum.edu.au

www.curriculum.support.education.nsw.gov.au

www.aboriginaleducation.nsw.edu.au/index.html

www.nswteachers.nsw.edu.au

www.mansw.nsw.edu.au

www.efofex.com

<http://nrich.maths.org/>

www.aamt.com.au

www.hsc.csu.edu.au

www.tes.co.uk/teaching-resources

www.desmos.com

www.merga.net.au

www.geogebra.org

www.scootle.edu.au

mathslinks.net

8. ASSESSMENT

Assessment Task	Length	Weight	Student Learning Outcomes Assessed	AITSL Standards	National Priority Area Elaborations	Due Date
1. Writing Assessment tasks	2 500 words equiv.	30%	1, 2, 4	1.2.1, 1.3.1, 2.1.1, 3.3.1, 3.4.1	A1-9, B1-5, D1-19	Friday 27/3/2020 5.00pm
2. Technology	3 000 words	40%	1, 2, 3, 4, 5	1.2.1, 1.3.1, 2.6.1, 3.3.1, 3.4.1	A1-9, B1-5, C1-6, D1-19	Friday 8/5/2020 5.00pm
3. Class Quizzes	Based on readings and lectures	30%	1, 2, 3, 4, 5	1.2.1, 1.3.1, 2.1.1, 2.5.1, 3.3.1	A1-9, C1-6, D1-19	As allocated in tutorials Weeks 4,7,10

Submission of assessments

Students are required to follow their lecturer's instructions when submitting their work for assessment. All assessment will be submitted online via Moodle by 5pm. Students are also required to keep all drafts, original data and other evidence of the authenticity of the work for at least one year after examination. If an assessment is mislaid the student is responsible for providing a further copy. Please see the Student Policies and Procedures for information regarding submission, extensions, special consideration, late penalties and hurdle requirements etc. <https://education.arts.unsw.edu.au/students/courses/course-outlines/>

Assessment Details

1. Creating a Rich Task for a topic in Mathematics (30%)

Construct a 20-minute rich assessment task for a topic/s from the Stage 4 or 5 NSW Mathematics syllabus using your ICT skills to present it.

- The assessment should be a written assessment task (e.g. it can be an end of unit test or an assessable project).
- Identify all NSW syllabus *outcomes* in the task and show how they are linked to the questions in the assessment.
- You will need a written reflection to explain why you think it is a good assessment and how you would modify this task to meet the needs of your students (differentiation). You must avoid giving your own opinion without any backing from research literature on assessments in Mathematics.
- Explain how the WM proficiencies are being used in the task.
- Explain and justify whether your task is Assessment for learning, Assessment of learning or Assessment as learning.
- Explain how you could use this task to inform your teaching.
- Include solutions and justify your marking criteria for this task.
- Include a rubric for the task.
- Word counts for such assessments may vary greatly. If you are unsure about this aspect, please email me for further clarification.

2. The use of technology in teaching mathematical concepts (40%)

Explain how you would use a computer-based mathematical tool (e.g. Geogebra, Autograph, MSExcel, Wolfram Alpha, Desmos, Geometer's Sketchpad etc.) to help students learn a particular mathematical concept from the Stage 5 or Stage 6 (Mathematics Advanced or Mathematics Standard **Year 11 only**).

- Identify a mathematical concept that you wish to teach using technology as an aide.
- Identify all the NSW syllabus outcomes in the task and show how they are linked to the activity.
- Include an instruction worksheet for students to use for this activity using your ICT skills.
- Include a lesson plan (see SED template). Include a detailed introduction to engage your students, enabling prompts and extending questions in your lesson plan.
- You will need a written annotation to explain how the technology nominated in your task assists the students in better understanding the chosen concept. You must also identify how you would modify this task to meet the needs of your students (differentiation) as well as how you would carry out assessment for learning (AfL) in the process. Avoid giving your own opinion without any backing from research literature.
- Demonstrate your concept electronically (e.g. using "show me" app or video link etc.) so that a student who has missed the lesson could understand the new concept by being sent the link (see flipped classrooms). Be prepared to share this with your fellow preservice teachers.

Assessment 3 consists of short answer quizzes (30%) over the weeks 4,7,10 and will be based on being familiar with Mathematics content in all Stages, lectures and/or readings in this course.

UNSW SCHOOL OF EDUCATION
 FEEDBACK SHEET
 EDST6726 EXTENSION MATHEMATICS METHOD 1

Student Name:

Student No.:

Assessment Task 1 Creating an Assessment Task

Specific criteria	(-)	_____	(+)
Understanding of the question or issue and the key concepts involved <ul style="list-style-type: none"> • Understanding of the task and its relationship to relevant areas of theory, research and practice. • Rationale linked to outcomes in the syllabus. • Show evidence of critical analysis and reflection. 			
Depth of analysis and/or critique in response to the task <ul style="list-style-type: none"> • Ability to plan and assess for effective learning by designing an assessment task, marking criteria and rubric using knowledge of the NSW syllabus documents or other curriculum requirements of the education act. • Reasons for the choice of questions and why it is a good task effectively explained • Demonstration of knowledge, respect and understanding of the social, ethnic, cultural and religious backgrounds of students and how these factors may affect learning. • Demonstrates knowledge of resources that will engage and extend all students. • Clear statement of syllabus outcomes • Assessment/Task goal(s) clearly linked to syllabus outcomes and chosen strategies • Correct use of Mathematical terminology • Syllabus related terminology clearly explained and justified appropriately 			
Familiarity with and relevance of professional and/or research literature used to support response <ul style="list-style-type: none"> • Reference specifically to material, research and ideas presented in method lectures, readings from the prescribed text and other sources, relevant lectures from the combined method lecture series and from the professional experience lectures on diversity. 			
Structure and organisation of response			
Presentation of response according to appropriate academic and linguistic conventions			
General comments/recommendations for next time			

Lecturer

Recommended: /20 (FL PS CR DN HD)

Date

Weighting: 30%

NB: The ticks in the various boxes are designed to provide feedback to students; they are not given equal weight in determining the recommended grade. Depending on the nature of the assessment task, lecturers may also contextualize and/or amend these specific criteria. **The recommended grade is tentative only, subject to standardisation processes and approval by the School of Education Learning and Teaching Committee.**

UNSW SCHOOL OF EDUCATION
 FEEDBACK SHEET
 EDST6726 EXTENSION MATHEMATICS METHOD 1

Student Name:

Student No.:

Assessment Task 2 Using Technology in Teaching

Specific criteria	(-)	_____	(+)
Understanding of the question or issue and the key concepts involved <ul style="list-style-type: none"> • Understanding of the task and its relationship to relevant areas of theory, research and practice. • Rationale linked to outcomes in the syllabus. • Show evidence of critical analysis and reflection. 			
Depth of analysis and/or critique in response to the task <ul style="list-style-type: none"> • Ability to plan and assess for effective learning by designing a detailed lesson on the proforma, using knowledge of the NSW syllabus documents or other curriculum requirements of the education act. • Reasons for the choice of teaching and learning strategies effectively explained • Demonstration of knowledge, respect and understanding of the social, ethnic, cultural and religious backgrounds of students and how these factors may affect learning. • Demonstrates knowledge of resources that will engage and extend all students. • Clear statement of syllabus outcomes • Lesson/Task goal(s) clearly linked to syllabus outcomes and chosen strategies • Correct mathematical terminology • Correct use of syllabus related terminology 			
Familiarity with and relevance of professional and/or research literature used to support response <ul style="list-style-type: none"> • Reference specifically to material, research and ideas presented in method lectures, readings from the prescribed text and other sources, relevant lectures from the combined method lecture series and from the professional experience lectures on diversity. 			
Structure and organisation of response			
Presentation of response according to appropriate academic and linguistic conventions			
General comments/recommendations for next time			

Lecturer

Date

Recommended: /20 (FL PS CR DN HD)

Weighting: 40%

NB: The ticks in the various boxes are designed to provide feedback to students; they are not given equal weight in determining the recommended grade. Depending on the nature of the assessment task, lecturers may also contextualize and/or amend these specific criteria. **The recommended grade is tentative only, subject to standardisation processes and approval by the School of Education Learning and Teaching Committee.**