Arts & Social Sciences

School of Education

EDST6726
Extension Mathematics Method 1

Semester 1, 2018

Contents

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 and Gadigal 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 uoc)
   Semester 1, 2018

2. **STAFF CONTACT DETAILS**

   Course Coordinator: Yvette Semler
   Email: y.semler@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_S1.html

Summary of 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).

Based on last year's student feedback, the following course changes have been made:
- *More opportunity to use class time to experiment with teaching skills*

Important information
- **Assessment**: Please note that all students must pass **all** assignments to pass the course, and they must pass the course to go on placement for PE 1.
- **Attendance:** Students are expected to give priority to university study commitments. Unless specific and formal permission has been granted, attendance at less than 80% of classes in a course may result in failure.

Student Learning Outcomes

Outcome	
1	Identify foundational aspects and structure of the NSW board of Studies Mathematics for stages 4, 5 and 6
2	Design lesson plans and teaching units which demonstrate essential links between outcomes, assessment, teaching strategies and lesson planning.
3	Discuss classroom strategies that recognise students' different approaches to learning.
4	Analyse specific assessment strategies for a diverse range of students
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.

AITSL Professional Graduate Teaching Standards

Standard	
1.2	Demonstrate knowledge and understanding of research into how students learn and the implications for teaching.
1.3	Demonstrate knowledge of teaching strategies that are responsive to the learning strengths and needs of students from diverse linguistics, cultural, religious and socioeconomic backgrounds.
2.1	Demonstrate knowledge and understanding of the concepts, substance and structure of the content and teaching strategies of the teaching area.
2.4	Demonstrate broad knowledge of, understanding of and respect for Aboriginal and Torres strait Islander histories, cultures and languages
2.5	Know and understand literacy and numeracy teaching strategies and their application in teaching areas
2.6	Implement teaching strategies for using ICT to expand curriculum learning opportunities for students
3.3	Include a range of teaching strategies.
3.4	Demonstrate knowledge of a range of resources including ICT that engage students in their learning.

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

Week	Weekly Topic
1 26 Feb – 2 March	What is Mathematics? How has it changed in recent years? What is expected of Mathematics teachers? Where can you find resources? What professional networks are there to help you? Mathematics Syllabus in the Continuum of K-12 A1-6, B1-5, C1-6, D2-4,6, E1-4, F3-6 Presenter: Kate Patten
2 5 - 9 March	Meeting the needs of all students **Priority Areas** Students with additional support needs E1-4 *Student Presentations*
3 12 – 16 March	Lesson starters and Rich Tasks. Analysing Lessons Observing Lessons and reflecting on classroom practice. What is best practice? *Student Presentations*
4 19 – 23 March	Teaching with Technology: Geogebra & Marble Sliders **Priority Areas** ICT C1-6 *Class Quiz* *Student Presentations*
5 26 – 29 March	Good Friday: No <u>Friday</u> class this week
Mid-semester break (March 30th – April 8th)	
6 9 – 13 April	High Performing Students *ICT skills* *Feedback Assessment 1/ Preparation for Assessment 2* **Priority Areas** Students with special educational Needs E1-4 *Student Presentations*

7 16 – 20 April *School Holidays Wk 1	Mathematics General Course Meeting the needs of Aboriginal and Torres Strait Islander Education **Priority Areas** Indigenous A1-9 Teaching Students from NESB F3, 4 Class Quiz *Student Presentations*
8 23 – 27 April **ANZAC Day 25th April** *School Holidays Wk 2	Mathematics Standard Course Planning lessons & units of work *Student Presentations* Presenter: Kate Patten
9 30 April – 4 May	Preliminary & HSC Mathematics Course Teaching for Understanding *Student Presentations*
10 7 – 11 May	Preparation for Professional Experience Class Quiz *Feedback Assessment 2
11 14 – 18 May	<u>**Catch up**</u> Managing the mathematics classroom Dealing with challenging behaviours Student engagement Survey **Priority Areas** Classroom Management B1-5 *Student Presentations*
	Professional Experience **4th June – 29th June 2018**

7. 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.	40%	1, 3, 7, 8	1.2, 1.3, 2.1, 3.3, 3.4	A1-9, B1-5, D1-19	Week 4 Date 22 March Due 5pm
2. Technology	3 000 words	40%	1, 8, 9	1.2, 1.3, 2.6, 3.3 3.4	A1-9, B1-5, C1-6, D1-19	Week 8 Date 26 April Due 5pm
3. Class Quizzes	Based on readings and lectures	20%	1, 3, 7, 8, 9	1.2, 1.3, 2.1, 2.5, 3.3	A1-9, C1-6, D1-19	Week 4,7,10 Due 5pm

Students are required to follow their lecturer's instructions when submitting their work for assessment. All assessment will be submitted **online via Moodle (Turnitin) by 5pm**. *Students no longer need to use a cover sheet. 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.*

Assessment Details

1. Creating an Assessment Task for a topic in Mathematics (40%)
Construct a 20-minute rich assessment task for a topic/s from the Stage 4 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 proficiencies are being used in the task. (Reasoning, Problem Solving, Fluency, Understanding)
- 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, Geometer's Sketchpad etc.) to help students learn a particular mathematical concept.

- 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 (20%) over the weeks 4,7,10 and will be based on lectures and readings in this course.

Student Name: Student No.:

Assessment Task 1 Creating an Assessment Task

Specific criteria	(-) ——————— (+)				
Understanding of the question or issue and the key concepts involved • 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 • 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 • 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.**

Student Name: Student No.:
Assessment Task 2 Using Technology in Teaching

Specific criteria	(-) ———————— (+)				
Understanding of the question or issue and the key concepts involved • 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 • 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 • 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.**

8. 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. (2007). *Teaching secondary school mathematics: Research and practice for the 21st century*. Sydney: Allen & Unwin

NSW Board of Studies Stage 4, 5 & 6 Syllabuses
Australian Curriculum Documents for NSW Stage 4 and Stage 5

Required Readings

- Anstey, M. & Bull, G. (2006) T*eaching and learning multiliteracies: Changing times, changing literacies.* Curriculum Press, Melbourne.
- Attwood, B. (2005), *Telling the truth about Aboriginal history.* All and 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 Board of Studies website
www.boardofstudies.nsw.edu.au or http://www.bostes.nsw.edu.au

https://education.nsw.gov.au/
http://libguides.csu.edu.au/HSC/maths
www.cecnsw.catholic.edu.au
www.curriculum.edu.au
www.curriculumsupport.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