



UNSW
A U S T R A L I A

Arts & Social
Sciences

School of Education

EDST6756
Extension Mathematics Method 2

Semester 2

Contents

1. LOCATION	2
2. STAFF CONTACT DETAILS.....	2
3. COURSE DETAILS.....	2
<i>Summary of Course</i>	2
<i>Aims of the Course</i>	2
<i>Student Learning Outcomes</i>	3
<i>Program Learning Outcomes (AITSL Professional Graduate Teaching Standards)</i>	3
<i>National Priority Area Elaborations</i>	4
4. RATIONALE FOR THE INCLUSION OF CONTENT AND TEACHING APPROACH.....	4
5. TEACHING STRATEGIES	4
6. COURSE CONTENT AND STRUCTURE	5
7. ASSESSMENT	6
8. RESOURCES	11

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
EDST6756 Extension Mathematics Method 2 (6 units of credit)
Semester 2 2016

2. STAFF CONTACT DETAILS

Course Coordinator: Yvette Semler
Office Location: John Goodsell, Room 132
Email: y.semmler@unsw.edu.au
Phone:
Availability: Thursday 7 – 7:30 pm or by appointment

3. COURSE DETAILS

Course Name	Extension Mathematics Method 2
Credit Points	6 units of credit
Workload	Includes 150 hours including class contact hours, readings, class preparation, assessment, follow up activities, etc.
Schedule	Lecture/ Tutorials

Summary of Course

This course continues for students studying EDST6726. The focus of this course is on being accountable for developing student's knowledge and appreciation of mathematics, through the use of formative and summative assessment, including NAPLAN results to guide teacher planning. This will include the higher level courses in the syllabus.

The main ways in which the course has changed since last time as a result of student feedback:

- Opportunities to engage with the class and practice one's skills

Aims of the Course

This course aims to:

- Further students' knowledge of the New South Wales syllabus documents for stages 4/5 and 6.
- Students will demonstrate a knowledge and understanding of the NSW Professional Teaching Standards for Graduate teachers.

Important Information

Assessment: Students must pass ALL assignments in order to pass the course. Only by passing all assignments can the Graduate Attributes (AITSL Professional Graduate Teaching Standards) be achieved.

Attendance: Students are expected to give priority to university study commitments. Unless specific and formal permission has been granted, failure to attend 80% of classes in a course may result in failure.

Student Learning Outcomes

Outcome		Assessment/s
1	Discuss classroom strategies that recognize students' different approaches to learning	1, 2
2	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
3	Investigate and discuss a variety of strategies to develop rapport with students, a positive classroom learning environment and approaches to managing student behaviour	1, 2
4	Differentiation to support students with Special Education Needs, Non-English Speaking Background students, Students with Challenging Behaviours	1, 2
5	Analyse specific teaching strategies and develop engaging materials to meet the needs of Aboriginal and Torres Strait Islander students	1,2

Program Learning Outcomes (AITSL Professional Graduate Teaching Standards)

Standard		Assessment/s
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.	1
1.5	Demonstrate knowledge and understanding of strategies for differentiating teaching to meet the specific learning needs of students across the full range of abilities.	1
2.1	Demonstrate knowledge and understanding of the concepts, substance and structure of the content and teaching strategies of the teaching area.	2
2.3	Use curriculum, assessment and reporting knowledge to design learning sequences and lesson plans.	2
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	
3.6	Demonstrate broad knowledge of strategies that can be used to evaluate teaching programs to improve student learning.	1,2
5.1	Demonstrate understanding of assessment strategies, including informal and formal, diagnostic, formative and summative approaches to assess student learning.	2
5.2	Demonstrate an understanding of the purpose of providing timely and appropriate feedback to students about their learning.	2
5.3	Demonstrate understanding of assessment moderation and its application to support consistent and comparable judgements of student learning.	2
5.5	Demonstrate understanding of a range of strategies for reporting to students and parents/carers and the purpose of keeping accurate and reliable records of student achievement.	2

National Priority Area Elaborations

Priority area		Assessment/s
A. Aboriginal and Torres Strait Islander Education	A.5, A.8	2
B. Classroom Management	B.1, B.2, B.4, B.5, B.6, B.7, B.10	1, 2
C. Information and Communication Technologies	C.3, C.4, C.5, C.6, C.8, C.13, C.14	1
D. Literacy and Numeracy	D.6, D.7, D.8, D.9, D.10, D.11, D.12, D.13, D.14, D.15, D.16, D.17, D.18, D.19	1,2
E. Students with Special Educational Needs	E.1, E.4, E.5, E.6, E.8	1,2
F. Teaching Students from Non-English Speaking Backgrounds	F.5, F.6, F.7	1,2

4. RATIONALE FOR THE INCLUSION OF CONTENT AND TEACHING APPROACH

The design of this course will enable teachers to engage with higher level syllabi eg. Extension 1 and 2. Students will be encouraged to evaluate their teaching to programs and strategies to improve student learning.

5. TEACHING STRATEGIES

Teaching strategies used during the course will include:

- Small group cooperative learning, such as Jigsaw, 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.
- 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.
- Structured occasions for reflection on learning, such as the use of learning journals, to allow students to reflect critically on and improve teaching practice and strategies.
- 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.
- Online learning from readings on the Moodle website.
- Specific numeracy and problem solving strategies.

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

6. COURSE CONTENT AND STRUCTURE

Week	Topics	
1 28 July	Classroom management ideas (Advice on Assessment 1) B.1, B.2, B.4, B.5, B.6, B.7, B.10	Student Centred Learning Dan Meyer Three Acts
2 4 Aug	INFORMative Assessment NAPLAN / ACARA proficiencies D.6, D.7, D.8, D.9, D.10, D.11, D.12, D.13, D.14, D.15, D.16, D.17, D.18, D.19	<i>Oral Presentations</i> Implementing Rich Tasks Mathalicious & NRich
3 11 Aug	Ratio, Chance & Data SUDDS (Advice on Assessment 2)	Assessment 1 due 10 Aug@ 5pm PBL & ILE <i>Oral Presentations</i>
4 18 Aug	Senior Syllabus Introducing topics in the Senior Course	<i>Oral Presentations</i> Editing your professional work
5 25 Aug	Mathematics Course Calculus <i>Oral Presentations</i> C.3, C.4, C.5, C.6, C.8, C.13, C.14	<i>Assessment 2 due 24 Aug @ 5pm</i> <i>Oral Presentations</i>
6 1 Sept	Extension 1 HSC Marking, Grading & Rubrics	<i>Oral Presentations</i> CVs
7 8 Sept	Extension 1 Permutations and combinations	<i>Oral Presentations</i> Educational Philosophy Complex numbers Ext 2
8 20 Sept	Extension 2 Volumes	<i>Oral Presentations</i> Interviews

7. ASSESSMENT

Assessment Task	Length	Weight	Student Learning Outcomes Assessed	Program Learning Outcomes Assessed	National Priority Area Elaborations	Due Date
Assessment 1 Evaluation	2500 words	40%	1 - 4	1.3, 1.5, 3.6	C.3, C.4, C.5, C.6, C.8, C.13, C.14, D.6, D.7, D.8, D.9, D.10, D.11, D.12, D.13, D.14, D.15, D.16, D.17, D.18, D.19, E.1, E.4, E.5, E.6, E.8, F.5, F.6, F.7	Online 10 August @ 5 pm
Assessment 2 Assessment and Reporting	3500 words	60%	1 - 4	2.1, 2.3, 3.6, 5.1, 5.3, 5.4	A.5, A.8, B.1, B.2, B.4, B.5, B.6, B.7, B.10, C.3, C.4, C.5, C.6, C.8, C.13, C.14, D.6, D.7, D.8, D.9, D.10, D.11, D.12, D.13, D.14, D.15, D.16, D.17, D.18, D.19,	Online 24 August @ 5pm

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. Student 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 1: Evaluation of Two Lessons

Choose two different mathematics lessons you taught during the Practicum and evaluate them. In your evaluation of each lesson, identify any significant experiences students had during the lesson, reflect on what you did as the teacher, indicate any significant decision-making moments in the lesson and explore any alternative strategies which could have been used. Include details of specific literacy and numeracy needs and strategies needed to inform the teaching of Mathematics.

For each lesson, you should:

1. **Briefly** describe the context of the lesson (e.g. the topic, syllabus reference, and class).
2. Explain how you met the needs of all students in your class, including students with special education needs, non-English speaking background students, students with particular learning needs and students needing differentiated materials including age appropriate learning for each stage of development.

3. Give the lesson plan using the template in the handbook (include rationale, outcomes, and sequence of activities).
4. Critically examine what worked and why it worked.
5. Critically examine what did not work, and why it did not.
6. Reflect on what you would do differently to improve your lesson if you could teach the lesson again. Include comments from your mentor and how you addressed any concerns.
7. Reflect on how you used ICT in your lessons and how it assisted with the development of conceptual understanding.
8. You need to demonstrate your knowledge of the outcomes and how you assessed the current level of understanding of your students, how you assessed that the outcomes had been met or how you recorded and monitored student progress.

This assignment should help prepare you for the collection in your first year of teaching of the kinds of evidence you will be required to show the NSW Institute of Teachers to attain Professional Competence.

UNSW SCHOOL OF EDUCATION
 FEEDBACK SHEET
 EDST6756 EXTENSION MATHEMATICS METHOD 2

Student Name:
 Assessment Task 1

Student No.:

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 <u>outcomes</u> in the syllabus 					
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 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 <u>engage and extend</u> all students • <u>Clear statement of syllabus outcomes</u> • <u>Lesson goal(s) clearly linked to syllabus outcomes</u> and chosen strategies • Effective use of student group structures to address teaching and learning goals 					
Familiarity with and relevance of professional and/or research literature used to support response <ul style="list-style-type: none"> • <u>Reference</u> 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 • Reference all sources of your work including yourself if you are the author 					
Structure and organisation of response <ul style="list-style-type: none"> • Well organised and useful for future teaching 					
Presentation of response according to appropriate academic and linguistic conventions <ul style="list-style-type: none"> • Clarity and accuracy in use of key terms and concepts in mathematics teaching • Appropriate academic conventions are used 					
GENERAL COMMENTS/RECOMMENDATIONS FOR NEXT TIME					

Lecturer Recommended: /20 (FL PS CR DN HD)

Date 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.**

Assessment 2: Assessment and Reporting

During your first practicum you should have observed how the Mathematics Department in your school programs, plans, moderates and administers assessment, and reports to students and parents. This includes both formative and summative assessment.

Write a reflection in which you discuss:

- the planning and programming of units of work and assessment
- the range of types of tasks used by teachers
- how effectively and explicitly tasks are linked to outcomes and teaching programs
- the methods used to give students feedback
- record-keeping processes
- reporting to students, parents and caregivers
- how assessment tasks influenced subsequent lessons
- your own contribution to all of these aspects
- your experience of ICT used
- school policies for classroom management.

You should refer to specific assessment tasks in which you were involved and you should present TWO samples of student work to illustrate your comments. You should also refer to your course texts and any relevant academic research.

NB: You MUST remove any identifying material from your samples (e.g. – name of the school or student).

Assessment criteria

You will be assessed on how well you:

1. Demonstrate your awareness of how educational processes in your practicum school meet the needs of all students including:
 - a. Aboriginal and Torres Strait Islander students
 - b. Students with Special Education needs
 - c. Non-English Speaking Background students.
2. Show your knowledge and understanding of the learning needs of the students in the school.
3. Demonstrate your understanding of the process of planning and programming of learning and assessment.
4. Discuss your observations of other teachers and their strategies.
5. Refer to specific and appropriate school data.
6. Support your comments with references to appropriate research.
7. Express yourself in grammatically correct standard Australian English.

UNSW SCHOOL OF EDUCATION
FEEDBACK SHEET
EDST6756 EXTENSION MATHEMATICS METHOD 2

Student Name:
Assessment Task 2

Student No.:

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 <u>outcomes</u> in the syllabus. 					
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 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 <u>engage and extend</u> all students. <u>Clear statement of syllabus outcomes</u> <u>Lesson goal(s) clearly linked to syllabus outcomes</u> and chosen strategies Effective use of student group structures to address teaching and learning goals. 					
Familiarity with and relevance of professional and/or research literature used to support response <ul style="list-style-type: none"> <u>Reference</u> 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. Reference all sources of your work including yourself if you are the author 					
Structure and organisation of response <ul style="list-style-type: none"> Presentation is logically structured, organised and professionally carried out. 					
Presentation of response according to appropriate academic and linguistic conventions <ul style="list-style-type: none"> Clarity and accuracy in use of key terms and concepts in mathematics teaching. Appropriate academic conventions are used 					
GENERAL COMMENTS/RECOMMENDATIONS FOR NEXT TIME					

Lecturer
Recommended: /20 (FL PS CR DN HD)

Date
Weighting: 60%

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.**

Feedback

Assessment Task	Feedback Mechanism	Feedback Date
Assessment One	Written	21/8
Assessment Two	Written	11/9

8. RESOURCES

Course 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

All students must buy or have copies of the following Mathematics syllabuses:

- NSW Board of Studies, *Mathematics 7-10 Syllabus*,
- NSW Board of Studies, *Stage 6 Syllabus, Mathematics, Preliminary and HSC Courses*,

Alternatively, it is possible to download these syllabuses from the Board of Studies website <http://www.boardofstudies.nsw.edu.au/>
<https://syllabus.bostes.nsw.edu.au/>

Further readings

Readings on the UNSW Moodle

Ernest, P. (1998). *Social constructivism as a philosophy of mathematics*: State University of New York Press.

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.

Hargreaves, E. (2005). Assessment for learning? Thinking outside the (black) box. *Cambridge Journal of Education*, 35(2), 213-224. doi: 10.1080/03057640500146880

Harrison, N. (2008). *Teaching and learning in Indigenous education*. Oxford, Sydney.

Henderson, R. (2012). *Teaching Literacies. Pedagogies and Diversity in the Middle Years*, Oxford University Press, Australia

Hiebert, J., & Lefevre, P. (1986). Conceptual and procedural knowledge in mathematics: An introductory analysis. In J. Hiebert (Ed.), *Conceptual and procedural knowledge: The case of mathematics*. (pp. 1-27): Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.

Hyde, M., Carpenter, L. & Conway, R. (2010). *Diversity and Inclusion in Australian Schools*. Oxford University Press, Australia

Killen, R. (2005). *Programming and assessment for quality teaching and learning*: Thomson/Social Science Press.

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.

Schoenfeld, A. H. (2004). The math wars. *Educational Policy*, 18(1), 253-253-286.

Skemp, R. R. (2006). Relational understanding and instrumental understanding. *Mathematics Teaching in the Middle School*, 12(2), 88-88-95.

Sullivan, P. (2011). *Teaching mathematics : using research informed strategies*. Melbourne: ACER Pres

Recommended Texts:

Pender, Bill (1999). *Cambridge Mathematics, Cambridge University Press, Year 11 3 unit*

Pender, Bill (1999). *Cambridge Mathematics, Cambridge University Press, Year 11 2 unit*

Pender, Bill (1999). *Cambridge Mathematics, Cambridge University Press, Year 12 3 unit*

Pender, Bill (1999). *Cambridge Mathematics, Cambridge University Press, Year 12 2 unit*

Goos, Stillman & Vale (2007). *Teaching Secondary School Mathematics: Research and Practice for the 21st century. Sydney, Australia: Allen & Unwin.*

Professional websites for Mathematics teachers:

www.mansw.nsw.edu.au

www.aamt.com.au

<http://www.boardofstudies.nsw.edu.au>

<https://syllabus.bostes.nsw.edu.au/>

The NSW Board of Studies. The BOS decides what is to be taught and examined, so it writes the parents informed about syllabus development, examination information etc. There are also some syllabuses and the examinations. The main function of this site is to keep teachers, students and useful reference material, links to various related sites and an annotated bibliography of texts relevant to the syllabus and to Mathematics teaching.

<http://www.det.nsw.edu.au> - The Department of Education and Training.

The DET has the responsibility for administering and staffing government schools and producing support material which can be found at:

<http://www.curriculumsupport.education.nsw.gov.au/secondary/mathematics/index>

www.studentnet.edu.au/aispd/index.html - The Association of Independent Schools

www.cecnsw.catholic.edu.au - The Catholic Education Commission

www.curriculum.edu.au - A part of the Curriculum Corporation of Victoria website

This is a tutorial which is useful if you are uncertain of how to use the internet and/or want ideas for using the internet in the classroom, teaching students how to explore English sites etc. Well worth a browse.

<http://www.nswteachers.nsw.edu.au> - The teaching standards detailed on the NSW Institute of Teachers website

<http://www.naplan.edu.au/> - The National Assessment Program Literacy and Numeracy website

<http://www.acara.edu.au/> - The Australian Curriculum, Assessment and Reporting Authority