



**UNSW**  
SYDNEY

**Arts & Social Sciences**

**School of Education**

**EDST6756**

**Extension Mathematics Method 2**

**Semester 2, 2017**

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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 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 2017

## 2. STAFF CONTACT DETAILS

Course Coordinator: Edward Habkoug  
Email: [e.habkoug@unsw.edu.au](mailto:e.habkoug@unsw.edu.au)  
Phone:  
Availability: By email or by appointment

## 3. COURSE DETAILS

<b>Course Name</b>	Extension Mathematics Method 2	
<b>Credit Points</b>	6 units of credit	
<b>Workload</b>	Includes 150 hours including class contact hours, readings, class preparation, assessment, follow up activities, etc.	
<b>Schedule</b>		
Lecture	Thu 4pm (John Goodsell 119)	Weeks 1-8
Tutorials	Thu 5pm-7pm (John Goodsell 119)	Weeks 1-8

### **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: More opportunities to ask questions about the assessment requirements prior to the due date and greater opportunities to experiment with their teaching skills among their peers.

### **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	Identify essential elements of the NESA Mathematics Syllabuses, and strategies to support students as they transition between stages	1, 2
2	Use strong knowledge of subject content to plan and evaluate coherent, goal-oriented and challenging lessons, lesson sequences and teaching programs which will engage all students	1, 2
3	Set achievable learning outcomes to match content, teaching strategies, resources and different types of assessment for a unit of work in Mathematics	1, 2
4	Provide clear directions to organise and support prepared activities and use resources	1, 2
5	Assess and report on student learning in Mathematics to all key stakeholders	1, 2
6	Identify the characteristics of an effective Mathematics teacher and the standards of professional practice in teaching, especially the attributes of Graduate teachers	1, 2

**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
2.5	Know and understand literacy and numeracy teaching strategies and their application in teaching areas	1, 2
2.6	Implement teaching strategies for using ICT to expand curriculum learning opportunities for students	1, 2
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	National Priority Learning Area Elaborations	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	2
C. Information and Communication Technologies	C.3, C.4, C.5, C.6, C.8, C.13, C.14	1, 2
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. Mathematics, 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	Tutorials
1 27 July	Mathematical Modelling ( <b>Advice</b> on Assessment 1)  E.1, E.4, E.5, E.6, E.8	Student Centred Learning Introduction to the “Harkness” model
2 3 Aug	INFORMative Assessment NAPLAN 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 e.g. NRich Mathematics
3 10 Aug	Chance & Data Stage 4/5 ( <b>Advice</b> on Assessment 2)	IBL/Portfolios and <i>Oral Presentations</i>
4 17 Aug	Senior Syllabus Introducing topics in the HSC Senior Courses Mathematics/Mathematics Extension 1  C.3, C.4, C.5, C.6, C.8, C.13, C.14	<b>Assessment 1 due 16 Aug @ 5pm</b>  <i>Oral Presentations</i>
5 24 Aug	<b>Feedback:</b> Assessment 1 Mathematics Course HSC Calculus	<i>Oral Presentations</i>
6 31 Aug	Extension 1 HSC HSC Marking, Judging, Grading, RoSA & Rubrics	<i>Oral Presentations and Polynomials Extension 1 and 2</i>
7 7 Sept	Extension 1 HSC Permutations and combinations	<i>Oral Presentations</i> Complex numbers Ext 2
8 14 Sept	<b>Feedback:</b> Assessment 2 Further Mathematics Extension 2 topics	<b>Assessment 2 due 13 Sept. @ 5pm</b>  <i>Oral Presentations</i> Further Extension 2 topics

## 7. ASSESSMENT

Assessment Task	Length	Weight	Student Learning Outcomes Assessed	AITSL Professional Graduate Teaching Standards Assessed	National Priority Area Elaborations	Due Date
Assessment 1 Evaluation	2500 words or equivalent	40%	1 – 4	1.3, 1.5, 2.5, 2.6, 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	Week 4 16 Aug @ 5pm
Assessment 2 Assessment and Reporting	3500 words or equivalent	60%	1 – 6	2.1, 2.3, 2.4, 2.5, 2.6, 3.6, 5.1, 5.2, 5.3, 5.5	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, E.1, E.4, E.5, E.6, E.8, F.5, F.6, F.7	Week 8 13 Sept. @ 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 a Lesson

Choose **one** mathematics lesson you taught during the Practicum and evaluate it. It must be an actual lesson plan you used not a revised or modified version. In your evaluation of the 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. Validate your decisions by referring to the literature and the recommended readings.

For the mathematics lesson you chose, you should:

1. **Briefly** describe the context of the lesson (e.g. the topic, NESA Mathematics syllabus reference(s), 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 original 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 for your chosen lesson.

This assignment should help prepare you for the collection of material in your first year of teaching and is indicative 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	(-) <span style="font-size: 2em;">→</span> (+)				
<b>Understanding of the question or issue and the key concepts involved</b> <ul style="list-style-type: none"> <li>• Understanding of the task and its relationship to relevant areas of theory, research and practice</li> <li>• Rationale linked to <u>outcomes</u> in the syllabus</li> </ul>					
<b>Depth of analysis and/or critique in response to the task</b> <ul style="list-style-type: none"> <li>• Ability to plan and assess for effective learning using knowledge of the NSW syllabus documents or other curriculum requirements of the Education Act</li> <li>• Reasons for the choice of teaching and learning strategies effectively explained</li> <li>• Demonstration of knowledge, respect and understanding of the social, ethnic, cultural and religious backgrounds of students and how these factors may affect learning</li> <li>• Demonstrates knowledge of resources that will <u>engage and extend</u> all students</li> <li>• <u>Clear statement of syllabus outcomes</u></li> <li>• <u>Lesson goal(s) clearly linked to syllabus outcomes</u> and chosen strategies</li> <li>• Effective use of student group structures to address teaching and learning goals</li> </ul>					
<b>Familiarity with and relevance of professional and/or research literature used to support response</b> <ul style="list-style-type: none"> <li>• <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</li> <li>• <b>Reference all sources of your work</b> including yourself if you are the author</li> </ul>					
<b>Structure and organisation of response</b> <ul style="list-style-type: none"> <li>• Well organised and useful for future teaching</li> </ul>					
<b>Presentation of response according to appropriate academic and linguistic conventions</b> <ul style="list-style-type: none"> <li>• Clarity and accuracy in use of key terms and concepts in mathematics teaching</li> <li>• Appropriate academic conventions are used</li> </ul>					
<b>GENERAL COMMENTS/RECOMMENDATIONS FOR NEXT TIME</b>					

**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	(-) <span style="font-size: 2em;">→</span> (+)				
<b>Understanding of the question or issue and the key concepts involved</b> <ul style="list-style-type: none"> <li>Understanding of the task and its relationship to relevant areas of theory, research and practice.</li> <li>Rationale linked to <u>outcomes</u> in the syllabus.</li> </ul>					
<b>Depth of analysis and/or critique in response to the task</b> <ul style="list-style-type: none"> <li>Ability to plan and assess for effective learning using knowledge of the NSW syllabus documents or other curriculum requirements of the education act.</li> <li>Reasons for the choice of teaching and learning strategies effectively explained</li> <li>Demonstration of knowledge, respect and understanding of the social, ethnic, cultural and religious backgrounds of students and how these factors may affect learning.</li> <li>Demonstrates knowledge of resources that will <u>engage and extend</u> all students.</li> <li><u>Clear statement of syllabus outcomes</u></li> <li><u>Lesson goal(s) clearly linked to syllabus outcomes</u> and chosen strategies</li> <li>Effective use of student group structures to address teaching and learning goals.</li> </ul>					
<b>Familiarity with and relevance of professional and/or research literature used to support response</b> <ul style="list-style-type: none"> <li><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.</li> <li><b>Reference all sources of your work</b> including yourself if you are the author</li> </ul>					
<b>Structure and organisation of response</b> <ul style="list-style-type: none"> <li>Presentation is logically structured, organised and professionally carried out.</li> </ul>					
<b>Presentation of response according to appropriate academic and linguistic conventions</b> <ul style="list-style-type: none"> <li>Clarity and accuracy in use of key terms and concepts in mathematics teaching.</li> <li>Appropriate academic conventions are used</li> </ul>					
<b>GENERAL COMMENTS/RECOMMENDATIONS FOR NEXT TIME</b>					

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.**

## 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 have copies of the following NESA Mathematics syllabuses:

- *Mathematics 7-10 Syllabus (2012)*,
- *Stage 6 Syllabus, Mathematics, Preliminary and HSC Courses (current and proposed)*

It is possible to download these syllabuses from the NESA website <http://www.boardofstudies.nsw.edu.au/> or <https://syllabus.bostes.nsw.edu.au/>

### Further readings

Readings on the UNSW Moodle course page include (but not limited to):

- 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

Professional websites for Mathematics teachers:

[www.mansw.nsw.edu.au](http://www.mansw.nsw.edu.au)

[www.aamt.com.au](http://www.aamt.com.au)

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

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

NESA decides what is to be taught, and examined. It also provides information about syllabus development, assessment requirements and examination timetables. The main function of this site is to provide teachers and students 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](http://www.studentnet.edu.au/aispd/index.html) - The Association of Independent Schools

[www.cecnsw.catholic.edu.au](http://www.cecnsw.catholic.edu.au) - The Catholic Education Commission

[www.curriculum.edu.au](http://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