



UNSW
SYDNEY

School of Education

EDST6756
Extension Mathematics Method 2

Term 2 2022

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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, Design & Architecture
School of Education
EDST6756 Extension Mathematics Method 2 (6 units of credit)
Term 2 2022

2. STAFF CONTACT DETAILS

Course Coordinator(s): Mark Goreta
Email: m.goreta@student.unsw.edu.au
Availability: By appointment

3. COURSE DETAILS

Course Name	Extension Mathematics Method 2
Credit Points	6 units of credit
Workload	150 hours including class contact hours, readings, class preparation, assessment, follow up activities, etc.
Schedule	http://classutil.unsw.edu.au/EDST_T2.html#EDST6756T2C

SUMMARY OF THE COURSE

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

STUDENT LEARNING OUTCOMES

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

AUSTRALIAN PROFESSIONAL STANDARDS FOR TEACHERS

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 linguistic, cultural, religious, and socioeconomic backgrounds.
1.4	Demonstrate broad knowledge and understanding of the impact of culture, cultural identity, and linguistic background on the education of students from Aboriginal and Torres Strait Islander backgrounds
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.
2.1	Demonstrate knowledge and understanding of the concepts, substance and structure of the content and teaching strategies of the teaching area
2.2	Organise content into an effective learning and teaching sequence
2.3	Use curriculum, assessment and reporting knowledge to design learning sequences and lesson plans
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
3.2	Plan lesson sequences using knowledge of student learning, content, and effective teaching strategies
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

3.6	Demonstrate broad knowledge of strategies that can be used to evaluate teaching programs to improve student learning
4.1	Identify strategies to support inclusive student participation and engagement in classroom activities
4.2	Demonstrate the capacity to organise classroom activities and provide clear directions
5.1	Demonstrate understanding of assessment strategies, including informal and formal, diagnostic, formative, and summative approaches to assess student learning
5.2	Demonstrate an understanding of the purpose of providing timely and appropriate feedback to students about their learning
5.3	Demonstrate understanding of assessment moderation and its application to support consistent and comparable judgements of student learning
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

NATIONAL PRIORITY AREA ELABORATIONS

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

4. RATIONALE FOR THE INCLUSION OF CONTENT AND TEACHING APPROACH

The design of this course will enable teachers to engage with higher level syllabuses e.g., Mathematics Advanced, 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, Think, Pair, Share, 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

Module	Topics	Tutorials
1	<ul style="list-style-type: none"> An overview of the national literacy and numeracy learning progression and how these are structured. A more in-depth understanding of the national numeracy learning progression (adapted version for NSW) and how this can be used to support teaching programs and for targeted teaching of numeracy. 	<ul style="list-style-type: none"> Plan a Stage 4 or Stage 5 lesson which references both the NSW mathematics syllabus and the national numeracy learning progression. Develop strategies to formatively assess numeracy within a classroom setting.
2	<ul style="list-style-type: none"> Further explore the link between working mathematically and numeracy and understand how mathematics and numeracy are interconnected. Investigate how numeracy is represented within other KLAs. Learn what a contemporary mathematics lesson with a focus on numeracy looks like. Examine some approaches used by schools to support numeracy development. 	<ul style="list-style-type: none"> Develop a contemporary mathematics lesson which looks beyond the classroom for resources and ideas. It needs to be meaningful for students and encourages self-exploration. Investigate ways to evaluate/assess numeracy during this lesson.
3	<p>Senior Syllabus</p> <ul style="list-style-type: none"> Learn about the HSC Advanced Mathematics Topic Statistical Analysis: MA-S2 and MA-S3. 	<ul style="list-style-type: none"> Discuss different technologies useful to present the numeracy portfolio required for Assessment 2. Examine how sites such as DFAT, ABS, BOM, AIHW, UN and WHO can be used to create rich student exploratory tasks.
4	<p>Senior Syllabus</p> <ul style="list-style-type: none"> Learn about the HSC Extension 1 and Extension 2 Topics on Vectors. 	<ul style="list-style-type: none"> Examine a selection of HSC questions to develop an understanding of how students approach questions from different perspectives. Develop strategies for creating effective marking criteria for HSC assessment tasks.
5	<p>Senior Syllabus</p> <ul style="list-style-type: none"> Learn about the HSC Extension 1 and Extension 2 Topics on Proofs. 	<ul style="list-style-type: none"> Develop an understanding of the HSC band descriptors for mathematics and learn how to characterise your students who are at the cut offs levels between bands.
6	<p>Senior Syllabus</p> <ul style="list-style-type: none"> Learn about the HSC Extension 2 Topic on Complex Numbers. 	<ul style="list-style-type: none"> An activity relevant to student's interest.

7. 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. (2016). *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 K-10 Syllabus (2012)*,
- *(New) Stage 6 Syllabus, Mathematics Standard, Advanced, Extension 1 and 2 courses*

It is possible to download these syllabuses from the NESA website

<http://educationstandards.nsw.edu.au/wps/portal/nesa/11-12/stage-6-learning-areas/stage-6-mathematics>

Further readings

Readings on the UNSW Moodle course page may 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. 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), 253-286.
- Skemp, R. R. (2006). Relational understanding and instrumental understanding. *Mathematics Teaching in the Middle School*, 12(2), 88-95.
- Sullivan, P. (2011). *Teaching Mathematics: using research informed strategies*. Melbourne: ACER Press

Professional websites for Mathematics teachers:

- www.mansw.nsw.edu.au
- www.aamt.com.au
- <https://www.nctm.org/>
- <http://educationstandards.nsw.edu.au/wps/portal/nesa/home>
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 - The Association of Independent Schools
- www.cecsw.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
- [NESA National Numeracy Learning Progression \(adapted for NSW syllabuses - May 2018\) \(educationstandards.nsw.edu.au\)](http://educationstandards.nsw.edu.au)

8. ASSESSMENT

Assessment Task	Length	Weight	Student Learning Outcomes Assessed	Australian Professional Standards Assessed	National Priority Area Elaborations Assessed	Due Date
Assessment 1	Case study of a numeracy initiative (1500 words equivalent)	40%	1-5	1.3, 1.5, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 3.2, 3.3, 3.4, 3.6, 4.1, 4.2, 5.1, 5.2	A5, 8 C3, 4, 5, 6, 8, 13, 14 D6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 E1, 4, 5, 6, 8 F5, 6, 7	Friday 5 th August by 5pm
Assessment 2	Portfolio and rationale 3500 words equivalent	60%	1-5	1.2, 1.3, 1.5, 2.1, 2.3, 2.4, 2.5, 3.3, 3.4, 5.1, 5.2, 5.3, 5.5	A5, 8 B1, 2, 4, 5, 6, 7, 10 C3, 4, 5, 6, 8, 13, 14 D6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 E1, 4, 5, 6, 8 F5, 6, 7	Friday 26 th August by 5pm

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 on the dates specified above. Students are also required to keep all drafts, original data, and other evidence of the authenticity of their 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

Assessment 1: Case study of a numeracy initiative

Choose one mathematics lesson that you taught during your Practicum. This must be an actual lesson and not a revised or modified version. Describe the lesson and identify the specific strategies that you used to support numeracy. Indicate any significant experiences with students specifically involving numeracy and reflect upon what you did as a teacher and how you could have made the learning better. Explain how this reflection informs your teaching practice.

Detail an alternative approach to the one above for improving student numeracy for a mathematics class. Describe the characteristics of the students, their learning needs, and abilities. Outline how this approach supports student's numeracy development and is relevant for all students within this class. Include an explanation of any formative and/or summative assessment/s that you would use. Support your assessment with references to literature and the recommended readings.

Assessment 2: Portfolio of numeracy material with supporting rationale

Create a portfolio of material to support numeracy across the school curriculum. The portfolio needs to include annotations to justify your selection of material.

Write a rationale for your chosen material and explain how as a mathematics teacher and as an educator you could contribute to a whole school numeracy approach. Support your rationale with references to literature and the recommended readings.

UNSW SCHOOL OF EDUCATION
FEEDBACK SHEET
EDST6756 EXTENSION MATHEMATICS METHOD 2

Student Name:

Student No.:

Assessment Task 1: **Case study of a numeracy initiative**

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 and to the national numeracy learning progression 					
Depth of analysis and/or critique in response to the task <ul style="list-style-type: none"> • Clearly describes teaching experiences to justify choices of teaching strategies • Ability to critically reflect upon teaching practices to initiate improvement. • 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 <u>extend all</u> students • Demonstrates an understanding of different strategies for assessing and evaluating numeracy • Ability to plan and assess for effective learning using knowledge of the NSW syllabus documents, the national numeracy learning progression or other curriculum requirements of the Education Act 					
Familiarity with and relevance of professional and/or research literature used to support response <ul style="list-style-type: none"> • Refer 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:

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.

UNSW SCHOOL OF EDUCATION
FEEDBACK SHEET
EDST6756 EXTENSION MATHEMATICS METHOD 2

Student Name:

Student No.:

Assessment Task 2: **Portfolio and rationale**

SPECIFIC CRITERIA	(-)	—————>			(+)
Understanding of the question or issue and the key concepts involved <ul style="list-style-type: none"> • Understanding the task and its relationship to relevant areas of theory, research, and practice • Rationale linked to outcomes in the syllabus and to the numeracy learning progression 					
Depth of analysis and/or critique in response to the task <ul style="list-style-type: none"> • Justifications for the choice of material for the portfolio and its relevance to numeracy • Demonstrated ICT skills for the presentation of the portfolio and its annotations • Rationale for the selection of material to support numeracy development across the curriculum • Demonstrated understanding of the link between working mathematically and numeracy and how numeracy is represented within other KLAs • Demonstrated understanding of a whole school numeracy approach and the ability to communicate their own involvement • Demonstration of knowledge, respect and understanding of the social, ethnic, cultural, and religious backgrounds of students and how these factors may affect learning 					
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 • 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.**