School of Education

UNSW Arts, Design and Architecture

EDST6755

Mathematics Method 2

Term 2, 2022

Course Overview

Staff Contact Details

Convenors

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Tutors

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School Contact Information

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Acknowledgement of Country

UNSW Arts, Design and Architecture Kensington and Paddington campuses are built on Aboriginal Lands. We pay our respects to the Bidjigal and Gadigal peoples who are the Custodians of these lands. We acknowledge the Aboriginal and Torres Strait Islander peoples, the First Australians, whose lands, winds and waters we all now share, and pay respect to their unique values, and their continuing and enduring cultures which deepen and enrich the life of our nation and communities.

Image courtesy of the Office of the Pro Vice-Chancellor Indigenous [UNSW's Indigenous strategy]

Course Details

Units of Credit 6

Workload

150 hours including class contact hours, readings, class preparation, assessment, follow up activities, etc.

Summary of the Course

This is a hybrid course. It is available to both undergraduate and postgraduate students. The course content, delivery and assessment will be identical for both groups of students.

In this course, you will learn how to teach Mathematics at an advanced level in secondary contexts. You will use relevant syllabus documents to develop innovative and engaging lesson plans and curriculum plans. You will learn and practise a range of teaching strategies that maximise the learning potential of all types of learners in a safe, supportive, and highly engaged classroom environment. You will design for and implement teaching strategies that incorporate digital and other innovative strategies. You will also learn about a range of assessment and feedback strategies in the discipline, with a focus on assessment in the senior secondary school.

Course Learning Outcomes

1. Identify essential elements of the NESA Mathematics Syllabuses, and strategies to support students as they transition between stages
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
3. Set achievable learning outcome/ intentions to match content, teaching strategies, resources and different types of assessment for a unit of work in Mathematics
4. Provide clear directions to organise and support prepared activities and use resources
5. Assess and report on student learning in Mathematics to all key stakeholders
6. Identify the characteristics of an effective Mathematics teacher and the standards of professional practice in teaching, especially the attributes of Graduate teachers

Australian Professional Standards for Teachers

Standard		Assessment/s
1.1.1	Demonstrate knowledge and understanding of physical, social, and intellectual development and characteristics of students and how these may affect learning	*
1.2.1	Demonstrate knowledge and understanding of research into how students learn and the implications for teaching	*
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
1.5.1	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
2.1.1	Demonstrate knowledge and understanding of the	1, 2

	concepts, substance and structure of the content and teaching strategies of the teaching area	
2.2.1	Organise content into an effective learning and teaching sequence	1, 2
2.3.1	Use curriculum, assessment and reporting knowledge to design learning sequences and lesson plans	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	2
3.1.1	Set learning goals that provide achievable challenges for students of varying characteristics	*
3.2.1	Plan lesson sequences using knowledge of student learning, content, and effective teaching strategies	1, 2
3.3.1	Include a range of teaching strategies	*
3.4.1	Demonstrate knowledge of a range of resources including ICT that engage students in their learning	*
3.6.1	Demonstrate broad knowledge of strategies that can be used to evaluate teaching programs to improve student learning	*
4.2.1	Demonstrate the capacity to organise classroom activities and provide clear directions	*
5.1.1	Demonstrate understanding of assessment strategies, including informal and formal, diagnostic, formative, and summative approaches to assess student learning	2, 3
5.2.1	Provide feedback to students on their learning	3
5.3.1	Make consistent and comparable judgements	1, 3
5.4.1	Demonstrate the capacity to interpret student assessment data to evaluate student learning and modify teaching practice	2, 3
5.5.1	Report on student achievement	3
6.3.1	Seek and apply constructive feedback from supervisors and teachers to improve teaching practices	1
7.1.1	Understand and apply the key principles described in codes of ethics and conduct for the teaching profession	3

* Covered during the course

National Priority Area Elaborations

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

* Covered during the course

Teaching Strategies

Rationale:

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. The lectures and tutorials are designed to be supportive and friendly, as we believe that students are more engaged and learn better when given challenging tasks, thinking time and good feedback.

Teaching Strategies:

- 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 supportive environment which is inclusive of all learners.

Assessment

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Scope and sequence	40%	08/08/2022 05:00 PM	2, 3, 4, 5
2. Unit of work	60%	29/08/2022 05:00 PM	1, 3, 4, 6

Assessment 1: Scope and sequence

Due date: 08/08/2022 05:00 PM

Create a scope and sequence, including learning outcomes, covering 10 weeks for a Year 11 preliminary class. Prepare an assessment task that directly links to the teaching and learning intentions for the term's work. Indicative length: 2000 words.

A feedback sheet will be provided.

Additional details

PART 1: Create a scope and sequence, including learning outcomes, for a Year 11 Preliminary class (three terms).

PART 2: Prepare an assessment task (not an essay) that directly links to the teaching and learning intentions within **one** of the terms. Your scope and sequence must indicate when the task will occur.

Design a marking rubric, which also includes space for a holistic comment.

Provide an exemplar student answer for the assessment task. Write a feedback comment for this response outlining its strengths and indicating at least one aspect which could be further improved.

Provide solutions for the assessment task.

Assessment 2: Unit of work

Due date: 29/08/2022 05:00 PM

Using the scope and sequence prepared for Assessment 1 and the feedback received, prepare a unit of work for Stage 6 which covers approximately half the term. Indicative length: 3000 words.

A feedback sheet will be provided.

Additional details

Prepare a unit of work for the Year 12 Mathematics Standard Course which covers approximately half the term. You need to ensure the unit demonstrates you are ready to plan and teach Stage 6 effectively. Make sure you have reflected on the feedback you received for the scope and sequence you prepared for Assessment 1.

The unit of work should indicate a variety of formative assessment strategies which will provide students with feedback about:

a. what they can already do well

b. what they still need to improve

c. how they can effectively close the gap between a and b.

Include all activities and resources to support student learning. There must be at least one literacy activity/resource and one numeracy/ICT resource.

Task 3: Common Assessment Module

Structure: The Common Assessment Module will be available to work on from Week 1 of UNSW Term 2.

Weight: N/A (this a hurdle requirement that must be completed to pass the course).

Gather evidence from a variety of sources about learning outcomes; and use that information to improve learning and teaching. You will be sent further information about how to access it closer to the start of term. There will be drop-in sessions in Weeks 8-13. This is the same time that Method 2 runs (i.e., 18th July to 26th August 2022).

Note: Further information about this module will be available in Moodle.

Common Assessment Module (in-class task)

In the final Method tutorials, you will complete a task that relates to the Common Assessment Module.

This task consists of three components:

1. Collect five or six authentic student responses to preferably two assessment tasks.
2. Provide written feedback for the students which indicates strengths and areas for improvement in relation to this work sample and overall expectations/standards.
3. Write a few lines that could be included in a mid-year report comment to parents.

RUBRIC/FEEDBACK SHEET
EDST6755 MATHEMATICS METHOD 2
UNSW SCHOOL OF EDUCATION

Assessment Task 1: Scope and sequence

Specific Criteria	(-)——————————>(+)				
Understanding of the question or issue and the key concepts involved • Understands the task and its relationship to relevant areas of theory, research and practice • Uses syllabus documents and terminology clearly and accurately • Sequences tasks and activities to suit logical learning progression • Integrates assessment task logically with learning intentions and learning sequence • Provides effective formative feedback for student sample • Understands the task and its relationship to relevant areas of theory, research and practice • Uses syllabus documents and terminology clearly and accurately • Sequences tasks and activities to suit logical learning progression • Integrates assessment task logically with learning intentions and learning sequence • Provides effective formative feedback for student sample					
Depth of analysis and critique in response to the task • Includes key syllabus content to allow demonstration of appropriate selection of outcomes for Preliminary • Demonstrates understanding of the NSW Quality Teaching framework, the School Excellence Framework and NESA Assessment Guidelines					

Specific Criteria	(-)——————————>(+)				
• Includes key syllabus content to allow demonstration of appropriate selection of outcomes for Preliminary • Demonstrates understanding of the NSW Quality Teaching framework, the School Excellence Framework and NESA Assessment Guidelines					
Familiarity with and relevance of professional and/or research literature used to support response • Demonstrates understanding of the need to differentiate lessons to cater for diverse learners including Aboriginal and Torres Strait Islander and EAL/D students • Understands effective assessment practices • Demonstrates understanding of the need to differentiate lessons to cater for diverse learners including Aboriginal and Torres Strait Islander and EAL/D students • Understands effective assessment practices					
Structure and organisation of response • Organises and structures scope and sequence according to NESA guidelines and requirements • Follows NESA assessment guidelines • Organises and structures scope and sequence according to NESA guidelines and requirements • Follows NESA assessment guidelines					
Presentation of response according to appropriate academic and linguistic conventions • Shows excellent command of English grammar conventions including spelling, syntax, and punctuation • Shows excellent command of English grammar conventions including spelling, syntax, and punctuation					

Specific Criteria	(-)——————————>(+)
General comments/recommendations for next time:	

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 contextualise 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.

RUBRIC/FEEDBACK SHEET
EDST6755 MATHEMATICS METHOD 2
UNSW SCHOOL OF EDUCATION

Assessment Task 2: Unit of work

Specific Criteria	(-)——————————>(+)				
Understanding of the question or issue and the key concepts involved • Demonstrates knowledge of selected Stage 6 course and syllabus outcomes • Sequences tasks and activities to suit logical learning progression and meet selected outcomes for Year 12 • Integrates formative assessment strategies throughout the unit of work • Demonstrates knowledge of selected Stage 6 course and syllabus outcomes • Sequences tasks and activities to suit logical learning progression and meet selected outcomes for Year 12 • Integrates formative assessment strategies throughout the unit of work					
Depth of analysis and critique in response to the task • Demonstrates understanding of academic and cultural diversity • Includes a variety of pedagogical strategies to suit content of the Stage 6 course • Designs appropriate activities and outlines lessons in sufficient detail without providing full plans • Provides effective feedback opportunities to inform students of their progress • Demonstrates understanding of academic and cultural diversity • Includes a variety of pedagogical strategies to suit content of the Stage 6 course • Designs appropriate activities and outlines lessons in sufficient					

Specific Criteria	(-)——————————>(+)				
detail without providing full plans • Provides effective feedback opportunities to inform students of their progress					
Familiarity with and relevance of professional and/or research literature used to support response • Demonstrates understanding of the need to differentiate lessons to cater for diverse learners • Understanding of a range of effective assessment practices • Demonstrates understanding of the need to differentiate lessons to cater for diverse learners • Understanding of a range of effective assessment practices					
Structure and organisation of response • Demonstrates ability to plan using backward mapping to meet selected outcomes • Presentation of effective and engaging learning sequence • Demonstrates ability to plan using backward mapping to meet selected outcomes • Presentation of effective and engaging learning sequence					
Presentation of response according to appropriate academic and linguistic conventions • Writes using correct Standard Australian English • Has proofread and edited work to avoid typos and incorrect usage • Writes using correct Standard Australian English • Has proofread and edited work to avoid typos and incorrect usage					

Specific Criteria	(-)——————————>(+)
General comments/recommendations for next time:	

Recommended: **/20 (FL PS CR DN HD)** **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 contextualise 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.

Attendance Requirements

School of Education Attendance Requirement

The School of Education (SED) requires students meet a minimum attendance requirement of 80% of all scheduled classes (i.1. lectures, tutorials, workshops, seminars) for all courses. Attendance in person is required for tutorials, seminars, and workshops when course are delivered in face-to-face mode. It is the responsibility of students to ensure that their attendance is recorded for the face to face either by electronic means or via an attendance register. Attendance in online or blended mode will be assessed through digital. Further information can be found here.

Course Schedule

View class timetable

Timetable

Date/Module	Type	Content
1	Lecture	• Discussion of the course outline and assessment 1 • Why teach Mathematics? • Teaching for understanding: Common misconceptions
	Tutorial	• Dan Meyer: Three Act Lessons • Oral presentations
2	Lecture	• Alternate problem-solving methods. Solving one problem in different ways. • How can this strategy address National Priority Areas?
	Tutorial	• Teaching ratios • Oral presentations
3	Lecture	• Mathematics Advanced Course, trigonometry • Asking good questions
	Tutorial	• Year 11 topics, advice on HSC exam techniques, and common mistakes. • Oral presentations
4	Lecture	• Literacy and numeracy demands • Working mathematically
	Tutorial	• Educational Philosophy • Preparing and applying for a job • Oral presentations
5	Lecture	• Extension 1 Mathematics Course • Identifying areas of concern for students

	Tutorial	**Hurdle Requirement as class activity** • Assessment and learning • Self and peer assessment • Moderation • Feedback **Online course evaluation**
6	Lecture	• Mathematics Standard Course • Using ICT, syllabus requirements
	Tutorial	• Curriculum, reference sheet, The topic of Finance. • Oral presentations

Resources

Prescribed Resources

Required readings

- 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 buy copies of the following Mathematics syllabuses:

- *Mathematics 7-10 Syllabus*,
- *(New) Stage 6 Syllabus, Mathematics Advanced, Extension 1 and 2,*

Alternatively, 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

See readings on 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 Press

Recommended texts

- Watson, A., Jones, K., & Pratt, D. (2013). *Key Ideas in Teaching Mathematics: Research-based guidance for ages 9-19*. OUP Oxford.

Professional websites for Mathematics teachers

- www.mansw.nsw.edu.au
- www.aamt.com.au
- http://www.nesa.nsw.edu.au
- http://educationstandards.nsw.edu.au/wps/portal/nesa/11-12/stage-6-learning-areas/stage-6-mathematics
- The Department of Education and Training http://www.det.nsw.edu.au. 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
- The Association of Independent Schools www.studentnet.edu.au/aispd/index.html
- The Catholic Education Commission www.cecnsw.catholic.edu.au
- Curriculum Corporation of Victoria website www.curriculum.edu.au. 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.
- The teaching standards detailed on the NSW Institute of Teachers website http://www.nswteachers.nsw.edu.au
- The National Assessment Program Literacy and Numeracy website http://www.naplan.edu.au/
- The Australian Curriculum, Assessment and Reporting Authority http://www.acara.edu.au/

Submission of Assessment Tasks

Turnitin Submission

If you encounter a problem when attempting to submit your assignment through Turnitin, please telephone External Support on 9385 3331 or email them on externalteltsupport@unsw.edu.au . Support hours are 8:00am – 10:00pm on weekdays and 9:00am – 5:00pm on weekends (365 days a year). If you are unable to submit your assignment due to a fault with Turnitin you may apply for an extension, but you must retain your ticket number from External Support (along with any other relevant documents) to include as evidence to support your extension application. If you email External Support you will automatically receive a ticket number, but if you telephone you will need to specifically ask for one. Turnitin also provides updates on their system status on Twitter.

Generally, assessment tasks must be submitted electronically via either Turnitin or a Moodle assignment. In instances where this is not possible, it will be stated on your course's Moodle site with alternative submission details.

For information on how to submit assignments online via Moodle: https://student.unsw.edu.au/how-submit-assignment-moodle

Academic Honesty and Plagiarism

Plagiarism is using the words or ideas of others and presenting them as your own. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement.

UNSW groups plagiarism into the following categories:

Copying: Using the same or very similar words to the original text or idea without acknowledging the source or using quotation marks. This includes copying materials, ideas or concepts from a book, article, report or other written document, presentation, composition, artwork, design, drawing, circuitry, computer program or software, website, internet, other electronic resource, or another person's assignment without appropriate acknowledgement.

Inappropriate paraphrasing: Changing a few words and phrases while mostly retaining the original information, structure and/or progression of ideas of the original without acknowledgement. This also applies in presentations where someone paraphrases another's ideas or words without credit and to piecing together quotes and paraphrases into a new whole, without appropriate referencing.

Collusion: Working with others but passing off the work as a person's individual work. Collusion also includes providing your work to another student for the purpose of them plagiarising, paying another person to perform an academic task, stealing or acquiring another person's academic work and copying it, offering to complete another person's work or seeking payment for completing academic work.

Inappropriate citation: Citing sources which have not been read, without acknowledging the "secondary" source from which knowledge of them has been obtained.

Duplication ("self-plagiarism"): Submitting your own work, in whole or in part, where it has previously been prepared or submitted for another assessment or course at UNSW or another university.

Correct referencing practices

The UNSW Academic Skills support offers resources and individual consultations. Students are also reminded that careful time management is an important part of study. One of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and proper referencing of sources in preparing all assessment items.

UNSW Library has the ELISE tool available to assist you with your study at UNSW. ELISE is designed to introduce new students to studying at UNSW but it can also be a great refresher during your study. Completing the ELISE tutorial and quiz will enable you to:

- analyse topics, plan responses and organise research for academic writing and other assessment tasks
- effectively and efficiently find appropriate information sources and evaluate relevance to your needs
- use and manage information effectively to accomplish a specific purpose
- better manage your time
- understand your rights and responsibilities as a student at UNSW
- be aware of plagiarism, copyright, UNSW Student Code of Conduct and Acceptable Use of UNSW ICT Resources Policy
- be aware of the standards of behaviour expected of everyone in the UNSW community
- locate services and information about UNSW and UNSW Library

Academic Information

Due to evolving advice by NSW Health, students must check for updated information regarding online learning for all Arts, Design and Architecture courses this term (via Moodle or course information provided.)

For essential student information relating to:

- requests for extension;
- late submissions guidelines;
- review of marks;
- UNSW Health and Safety policies;
- examination procedures;
- special consideration in the event of illness or misadventure;
- student equity and disability;
- and other essential academic information, see

https://www.unsw.edu.au/arts-design-architecture/student-life/resources-support/protocols-guidelines

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