School of Education

UNSW Arts, Design and Architecture

EDST6725

Mathematics Method 1

Term 1, 2022

Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Yvette Semler	y.semler@unsw.edu.au			

School Contact Information

School of Education
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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 begin to learn how to teach Mathematics in secondary contexts. You will use relevant syllabus documents to develop innovative and engaging lesson plans. You will learn and practise a range of effective teaching strategies designed to engage a diversity of learners in a safe and supportive classroom environment. You will learn how to use digital and other innovative resources to assess and improve learning in the discipline and to develop language, literacy and numeracy skills across the curriculum. Through self and peer evaluation you will also learn how to present yourself in a professional, supportive manner.

Course Learning Outcomes

1. Identify foundational aspects and structure of the NESA Mathematics Syllabuses and the depth of subject knowledge required to implement the syllabuses
2. Evaluate how student characteristics affect learning and evaluate implications for teaching students with different characteristics and from diverse backgrounds
3. Use a range of strategies to plan and teach effective lessons to engage all students, address relevant syllabus outcomes and ensure a safe learning environment
4. Select appropriate resources, including ICT, to engage students and expand learning opportunities
5. Design and evaluate formative assessment strategies and use assessment information to improve learning
6. Practise the ethical and professional values expected of 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
1.2.1	Demonstrate knowledge and understanding of research into how students learn and the implications for teaching.	1, 2
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 socio-economic backgrounds.	1, 2
1.4.1	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
1.5.1	Demonstrate knowledge and understanding of strategies for differentiating	2

	teaching to meet the specific learning needs of students across the full range of abilities.	
2.1.1	Demonstrate knowledge and understanding of the concepts, substance and structure of the content and teaching strategies of the teaching area.	1, 2
2.2.1	Organise content into an effective learning and teaching sequence.	1
2.3.1	Use curriculum, assessment and reporting knowledge to design learning sequences and lesson plans.	1, 2
2.4.1	Demonstrate broad knowledge of, understanding of and respect for Aboriginal and Torres Strait Islander people to promote reconciliation between Indigenous and non-Indigenous Australians.	1
2.5.1	Know and understand literacy and numeracy teaching strategies and their application in teaching areas.	1
2.6.1	Implement teaching strategies for using ICT to expand curriculum learning opportunities for students.	1, 2
3.1.1	Set learning goals that provide achievable challenges for students of varying abilities and characteristics.	1, 2
3.2.1	Plan lesson sequences using knowledge of student learning, content, and effective teaching strategies in teaching.	2
3.3.1	Include a range of teaching strategies in teaching.	1, 2
3.4.1	Demonstrate knowledge of a range of resources, including ICT, that engage students in their learning.	1, 2
3.5.1	Demonstrate a range of verbal and non-verbal communication strategies to support student engagement.	1, 2
4.1.1	Identify strategies to support inclusive student participation and engagement in classroom activities.	1
4.2.1	Demonstrate the capacity to organise classroom activities and provide clear directions.	1
6.3.1	Seek and apply constructive feedback from supervisors and teachers to improve teaching practices.	2

National Priority Area Elaborations

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

Teaching Strategies

Please refer to the information in Moodle

Assessment

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Lesson plan	40%	Monday 28/3/2022	1, 2, 3, 4, 5, 6
2. Unit of work outline	60%	Monday 2/5/2022	1, 2, 3, 4, 5, 6

Assessment 1: Lesson plan

Due date: Monday 28/3/2022

Plan and design one 60-minute lesson for a mixed-ability, Stage 4 class. The lesson plan must follow a standard format and be presented using the template provided. Indicative length: 2000 words.

A feedback sheet will be provided.

Additional details

Plan your lesson for a class in a comprehensive high school which would typically include EAL/D students, Indigenous students and students with various religious and cultural backgrounds. Some students may have low levels of literacy. Differentiation to cater for some students is therefore required. Appropriate differentiation strategies are scaffolding, group work and/or an alternative task or mode of presentation.

1. Write a rationale for your lesson plan. Your rationale should address the questions: What do I want the students to learn? Why is it important? What strategies will I use? What assessment for learning strategies will I use to monitor progress?
2. Prepare the lesson plan to demonstrate how you will use appropriate structure, activities, strategies and formative assessment to develop understanding of the material.

Make sure you:

- choose a lesson from the Stage 4 topics of Fractions, or Decimals or Percentages.
- support your rationale using references indicating your professional reading
- choose appropriate outcomes and lesson content
- demonstrate knowledge of effective teaching and learning strategies
- use appropriate format and provide sufficient detail for an effective lesson plan
- include an aspect of literacy/numeracy which integrates with the lesson focus
- provide in full one activity (which may be ICT-based)
- check rubric requirements

Assessment 2: Unit of work outline

Due date: Monday 2/5/2022

Prepare an outline for a unit of work for a Stage 5 class. The unit of work should cover the first five lessons (but do not prepare full lesson plans). Include a rationale (600-800 words) for the unit. Indicative length: 3000 words.

A feedback sheet will be provided.

Additional details

In the rationale:

- provide a brief outline of the school and class context
- state precisely what you want the students to learn and why it is important
- justify how the topic of Trigonometry will be adapted to suit the needs and abilities of this class
- justify your teaching strategies by referring to readings, research and material presented in lectures and the Quality Teaching framework
- demonstrate how differentiation will support a diverse range of learners
- state the prior knowledge students have to begin this unit and discuss how you would assess and build on this prior knowledge.

Include in your unit outline:

- the learning intention(s) for each lesson
- one full activity for formative assessment
- one ICT-based activity that enhances the learning of a particular concept that assists student conceptual understanding e.g. Dynamic Geometry
- one group-work task with a focus on literacy/numeracy which goes beyond learning definitions e.g. matching task, misconceptions task, explanations task
- one incursion/excursion/performance/product activity e.g. outdoor lesson
- outlines only for the other teaching materials required (specify the link and identify the purpose)

RUBRIC/FEEDBACK SHEET
EDST6725 MATHEMATICS METHOD 1
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Assessment Task 1: Lesson plan

Specific Criteria	(-)——————————>(+)				
Understanding of the question or issue and the key concepts involved • Understanding of the task and its relationship to relevant areas of theory, research and practice • Rationale linked to outcomes in the syllabus					
Depth of analysis and critique in response to the task • Ability to plan and assess for effective learning by using knowledge of the NSW syllabus documents or other curriculum requirements of the education act • Reasons for the choice of teaching and learning strategies effectively explained • Demonstration of knowledge, respect and understanding of the social, ethnic, cultural and religious backgrounds of students and how these factors may affect learning • Demonstrates knowledge of resources that will engage and extend all students • Sharing of helpful resources with your colleagues either via Moodle or in hardcopy • Clear statement of syllabus outcomes • Lesson goal(s) clearly linked to syllabus outcomes 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 • Reference specifically to material, research and ideas					

Specific Criteria	(-)——————————>(+)				
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					
Presentation of response according to appropriate academic and linguistic conventions • Clarity and accuracy in use of key terms and concepts in mathematics teaching					
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
EDST6725 MATHEMATICS METHOD 1
UNSW SCHOOL OF EDUCATION

Assessment Task 2: Unit of work outline

Specific Criteria	(-)——————————>(+)				
Understanding of the question or issue and the key concepts involved • Understanding of the task and its relationship to relevant areas of theory, research and practice • Rationale linked to outcomes in the syllabus					
Depth of analysis and critique in response to the task • Ability to plan and assess for effective learning by designing a detailed lesson on the SED lesson template, using knowledge of the NSW syllabus documents or other curriculum requirements of the education act • Lesson details include timing and questions /examples asked • 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 • Demonstration of knowledge of resources that will engage and extend all students • Clear statement of syllabus outcomes • Lesson goal(s) clearly linked to syllabus outcomes 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 • Reference specifically to material, research and ideas					

Specific Criteria	(-)——————————>(+)				
presented in method lectures, readings from the prescribed text and other sources, relevant lectures from the combined method lecture series and from the professional experience lectures on diversity					
Structure and organisation of response					
Presentation of response according to appropriate academic and linguistic conventions • Clarity and accuracy in use of key terms and concepts in mathematics teaching					
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
Week 1:14 February - 18 February	Lecture	**Introduction to the Course** • Working with the Australian Curriculum, e.g. IB, NSW Mathematics Syllabus K-10 • how students learn Mathematics & Classroom Engagement • What are the Proficiencies? Working Mathematically?
	Tutorial	• Physical, social and intellectual development of students and how this affects their engagement in learning • Stage Progressions & Transitions between activities • Questioning Techniques – pre/post testing • Planning & classroom talk moves
Week 2: 21 February - 25 February	Lecture	**Teaching strategies** • Literacy and Numeracy in the Mathematics Classroom • Teaching strategies to respond to individual needs and different cultural backgrounds and impact for Aboriginal and Torres Strait Islander students • Importance of matching teaching strategies to individual needs • Providing clear directions
	Tutorial	• Meeting the literacy and numeracy needs of all students in the classroom • Structuring instructions

		• Developing culturally responsive teaching strategies and resources
Week 3: 28 February - 4 March	Lecture	**Lesson Planning** • Setting challenging learning goals in lesson planning • Number & Algebra: Decimals, Fractions and Percentages
	Tutorial	**Setting high expectations for learning** • Strategies for making learning goals explicit for students • Writing a lesson plan
Week 4: 7 March - 11 March	Lecture	**Differentiation** • What is differentiation? How is it implemented in the classroom to meet student needs? • Promoting inclusive student participation and engagement in the classroom **Using ICT** • Appropriate selection of ICT resources to support learning • Number & Algebra
	Tutorial	• Applying strategies for differentiation to lessons • Using ICT to engage students with subject content
Week 5: 14 March - 18 March	Lecture	**Organisation of classroom activities** • Individual, pair, and group work • Self and peer assessment **Number & Algebra: Introducing Algebra**
	Tutorial	• Effective transitions between activities • Tracking progress e.g. student logs, exit tickets • Microteaching
Week 6: 21 March - 25 March	Lecture	**Teaching strategies** • Hands-on Mathematics • Measurement & Geometry: GeoGebra
	Tutorial	• Workshop to explore and evaluate the

		suitability of teaching strategies/resources to meet learning goals and outcomes • Microteaching
Week 7: 28 March - 1 April	Lecture	**Unit planning** • Sequencing subject content across lessons within a unit of work • Measurement & Geometry: Area & Volume
	Tutorial	• Content selection and scope of content for effective lesson sequences for one stage • *Using Scootle and Program Builder* • **Prepare your unit plan for peer feedback next week** • Microteaching
Week 8: 4 April - 8 April	Lecture	**Unit planning** • Including formative assessment • Number & Algebra: Graphs
	Tutorial	• Importance of timely and on-going feedback • Peer Feedback on unit plan • Dynamic Geometry Practice
Week 10: 18 April - 22 April *ASYNCHRONOUS class	Lecture	**Unit planning** • The balancing act: teacher v. student directed learning • Measurement & Geometry: Trigonometry
	Tutorial	• Organising for independent learning and mixed ability classes
Week 11: 25 April - 29 April	Lecture	**What to expect on practicum?** • Bringing it all together • Student engagement
	Tutorial	• Becoming a reflective teacher through the feedback cycle • MyExperience on-line course evaluation

Resources

Prescribed Resources

Required Texts

- Cavanagh, M., & Prescott, A. (2014). *Your Professional experience handbook* : *A guide for preservice* teachers. Sydney: Pearson.
- Goos, M., Stillman, G., & Vale, C. (2016). *Teaching secondary school mathematics: Research and practice for the 21st century*. Sydney: Allen & Unwin. Australian Curriculum for NSW for K-10, Stage 6.

Further Readings

- Amado, N., Carreira, S., & Jones, K. (Eds.). (2018). *Broadening the Scope of Research on Mathematical Problem Solving: A Focus on Technology, Creativity and Affect*. Springer
- Boaler, J. (2010). The elephant in the classroom: Helping children learn and love maths. London: Souvenir Press Limited.
- Finger, G., Russell, G., Jamieson-Proctor, R., & Russell, N. (2006). Transforming learning with ICT: Making IT happen. Frenchs Forest: Pearson Australia.
- Harrison, N. (2008). Teaching and learning in indigenous education, Melbourne: Oxford University Press.
- Henderson, R. (2012). Teaching literacies, pedagogies and diversity in the middle years. Melbourne: Oxford University Press.
- Hyde, M., Carpenter, L., & Conway, R. (2010). Diversity and inclusion in Australian schools. Melbourne: Oxford University Press.
- Jones, K., & Smith, K. (1997). Student Teachers Learning to Plan Mathematics Lessons. Paper presented at the 1997 Annual Conference of the Association of Mathematics Education Teachers (AMET1997). Leicester. 15-17 May 1997.
- Martin, K. (2008). The intersection of Aboriginal knowledges, Aboriginal literacies and new learning pedagogy for Aboriginal students. In Healy, A. (Ed.) Multiliteracies and diversity in education: New pedagogies for expanding landscapes (pp. 59-81). Melbourne: Oxford University Press.
- Murray, M. (2011). A very good literacy focus on mathematics (Books 1-8). Sydney: Mathematical Publications.
- Price, K. (2012). Aboriginal and Torres Strait Islander education: An introduction for the teaching profession. Cambridge University Press.
- *Reys et al. (2019). Helping Children Learn Mathematics, 3rd Australian Edition*
- Watson, A., Jones, K., & Pratt, D. (2013). Key ideas in teaching mathematics: Research-based guidance for ages 9-19. Oxford: Oxford University Press.

Recommended Websites

- https://www.educationstandards.nsw.edu.au/wps/portal/nesa/home (Students can download syllabuses from the Board of Studies website)
- https://education.nsw.gov.au/
- https://www.aisnsw.edu.au/
- https://www.csnsw.catholic.edu.au/
- www.curriculum.edu.au
- https://education.nsw.gov.au/teaching-and-learning/curriculum
- https://education.nsw.gov.au/teaching-and-learning/aec/aboriginal-education-in-nsw-public-

schools
- https://www.nap.edu.au/
- https://www.acara.edu.au/

Professional Associations

- www.mansw.nsw.edu.au
- https://aamt.edu.au/
- https://www.merga.net.au/
- https://www.science.org.au/education/academy-school-education-programs/resolve-mathematics-inquiry

Additional Resources

- https://www.youcubed.org/
- https://www.desmos.com/
- https://nrich.maths.org/adventsecondary
- https://www.geogebra.org/
- https://www.nctm.org/Classroom-Resources/Illuminations/Interactives/Cube-Nets/

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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