

Subject Title:	Maths Method 1		
Subject Code:	EDU4MS1	Credit Points:	15
Teaching Period:	Semester 1	Mode:	Blended
Prerequisite:		Level:	4
Subject Description:			
<p>This subject is designed to establish a knowledge and skill base for pre-service teachers in the areas of curriculum, pedagogy, planning, assessment and reporting in Mathematics Education for secondary students in the junior and middle years of secondary schooling (Years 7-10). The subject is designed to develop students' understanding of contemporary theory, concepts and skills in Mathematics as applied in the classroom context with a particular focus on cross-curriculum priorities. Theoretical concepts, pedagogical principles and state and national curriculum structures within Mathematics are examined and applied in the evaluation, design and implementation of learning resources that are responsive to the needs of diverse learners.</p>			
Intended Learning Outcomes (ILOs) & Australian Professional Standards for Teachers (APST)			
Upon successful completion of this subject, you will be able to:			APST
1	Demonstrate knowledge and understanding of the concepts, substance and structure of the content and teaching strategies of Mathematics, and an in-depth understanding of how students learn in Mathematics.	2.1	
2	Critically analyse, plan, synthesise and implement a range of Mathematics learning and teaching activities and sequences for junior and middle year students (Years 7-10). These include a variety of pedagogical approaches and resources (including safe and ethical pedagogy and use of resources including ICT) appropriate to state and national curricula.	2.2, 2.6, 3.1, 3.2, 3.3, 3.4, 4.4	
3	Describe, design, and evaluate a unit of work involving a variety of teaching strategies which cater for individual differences in student learning across a range of abilities, and integrate literacy and numeracy capabilities and cross curriculum priorities of state and national curricula in Mathematics at junior and middle years of secondary schooling (Year 7-10).	2.5, 2.6, 3.3, 4.1	
4	Examine the relationships between assessment, feedback and reporting, learning task design, student engagement and understanding in Mathematics. Apply these relationships to the development and modification of curriculum documents.	2.3, 5.1	

Assessment:				
Assessment Summary		Word Count Equivalence	%	APST
1	Task 1: Evaluation of Teaching Resources	1800	40	2.1, 2.2, 2.3, 2.5, 2.6, 3.1, 3.2, 3.3, 3.4, 4.1, 4.4, 5.1
2	Task 2: Curriculum-based Unit Plan	2700	60	2.1, 2.2, 2.3, 2.5, 3.1, 3.2, 3.3, 4.1, 5.1
Assessment Details (including Assessment Criteria)				
1	<p>Evaluation of Teaching Resources</p> <p>Pre-service teachers will be assigned a topic for teaching in the Years 7-10 curriculum. The student can indicate the system they are addressing and why. They will perform an intensive resource collection to suit the topic. They will source 30 resources from a variety of quality locations inclusive of those developed by Government and Professional Associations. From these resources they will select five to perform a cognitive audit, and indicate the concepts learnt and how they are conveyed with the use of this resource. The precise contribution to student learning will cover awareness and understanding of an applicability for student learning styles, differentiation, technology applications, engagement for all and those anxious with maths, hands-on learning activities, assessment, innovation and creativity. For each activity pre-service teachers will indicate how they would use this in the classroom. A showcase of one of these activities will be prepared in a microteaching session. The show case will be marked with graduate standards in mind and provide formative feedback to scaffold Task 1 submission. For each of the 25 resources that were not used, student will identify the weaknesses of the resource and explain why it was not selected.</p> <p>Assessment Criteria</p> <ol style="list-style-type: none"> 1. Identification of five different resources with references. Expected ICT orientation and where to use – referring to study design. The level of the activity should be suited to the cohort and strategies for use identified. 2. Analysis –Purely describes the resource. What type? What it entails? How easy to use and assessable? References expected. 3. Pedagogy –How this can be used in teaching and learning. Its limitations, benefits (engagement and educational value) and strategies for use and flexibility in the field. References expected. 4. Structure, grammatical & spelling accuracy, presentation 5. Referencing (APA 6th) 			
2	<p>Curriculum-based Unit Plan</p> <p>In the same topic as Task 1 the student will design a three week unit of work to be compiled and submitted from class content that covers “Introduction”, “Planning”, “Curriculum” and “Assessment and Reporting”. Not all of the topics need to be covered. Pre-service teachers will need to use teacher judgement as to the timing and sequence required. It is expected that the Task 1 resource collection will be thoughtfully used, but not exclusively used, to develop this Task.</p> <p>This unit of work is to include one overview plan for a unit (no at a glance is required), one detailed lesson plan, reference to one diagnostic, one formative and one summative assessment task, a clear orientation to selected curriculum (curriculum document, learning area, learning level), an approach to the integration of literacy and numeracy and an overarching justification and illustration of pedagogical and curricular considerations (incorporating evidence and philosophy based on ongoing class-based discussions and readings). An evaluation should be conducted whereby suggestions exist for the second iteration of this program.</p> <p>Assessment Criteria</p> <ol style="list-style-type: none"> 1. The rationale for discipline content and pedagogical approaches are clearly outlined and thoughtfully considered for purposeful learning 2. The unit plan is correctly developed from F-10 Curriculum/Australian Curriculum/VCAA documents with fine-tuned attention to intended learning areas, outcomes and levels of learning in the discipline 3. The unit of work includes a coherent overview and detailed lesson plan with strong evidence of the interactive nature of teaching and learning. 4. The unit plan is engagingly scaffolded and solidly aligned with the rationale and containing appropriately placed assessment tasks 			

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| | <ol style="list-style-type: none">5. The unit plan and lesson address best use of resources in teaching as identified in Task 16. Must include an approach to teaching literacy and numeracy and integration of digital technologies |
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Learning Resources	
Required Texts	
1	<p>Maths Continuum http://www.education.vic.gov.au/school/teachers/teachingresources/discipline/maths/continuum/pages/mathcontin.aspx?Redirect=2 Maths Curriculum Australiancurriculum.edu.au/mathematics/curriculum/f-10?layout=1 VCAA F-10 Curriculum http://www.vcaa.vic.edu.au/pages/foundation10/f10index.aspx</p>
Recommended Reading	
1	<p>Homework and Learning Mathematics, Australian Primary Mathematics Classroom. Volume 14 Issue 4 (2009) Grootenboer, Peter. Retrieved from: http://search.informit.com.au.ez.library.latrobe.edu.au/fullText;dn=968846640879861;res=IELHSS</p>
2	<p>Hogan, J. Australian Mathematics Teacher; v.58 n.4 p.14-16; October 2002</p>
3	<p>Hogan, John. Mathematics and numeracy: has anything changed? Are we any clearer? Are we on track? [online]. Australian Mathematics Teacher; v.68 n.4 p.4-7; 2012. Availability:<http://search.informit.com.au/fullText;dn=197390;res=AEIPT> ISSN: 0045-0685. [cited 23 Jun 16].</p>
4	<p>Jones, K., Jones, J. L., & Vermette, P. J. (2010). THE CONSTRUCTIVIST MATHEMATICS CLASSROOM. Mathematics Teaching, (219), 33-35. Retrieved from: http://search.proquest.com.ez.library.latrobe.edu.au/docview/879423475?OpenUrlRefId=info:xri/sid:primo&accountid=12001</p>
5	<p>Mathematics: Content and Pedagogy. Ediger, Marlow. College Student Journal, 43(3) (Sept 2009), 714-717 Retrieved from: http://go.galegroup.com.ez.library.latrobe.edu.au/ps/retrieve.do?sgHitCountType=None&sort=RELEVANCE&docType=Article&prodId=EAIM&tabID=T002&searchId=R1&resultListType=RESULT_LIST&searchType=AdvancedSearchForm&contentSegment=&currentPosition=1&searchResultsType=SingleTab&inPS=true&userGroupName=latrobe&docId=GALE%7CA206687063&contentSet=GALE%7CA206687063</p>
6	<p>MAV site Retrieved from: http://mav.vic.edu.au/members-area/problems-for-upper-secondary/276-jumping-frogs.html It can also be accessed online in an interactive IT form: http://nrich.maths.org/1246</p>
7	<p>Ollerton, M (2014) Differentiation in Mathematics Classrooms, Mathematics Teaching, 240, p 43-46. http://search.proquest.com.alpha2.latrobe.edu.au/publication/publications_48811?accountid=12001 Access to Mathematics Is Vital for Equity, Thomas, J. (Oct 2009) Australasian Science30.9: 37-38. http://search.proquest.com.ez.library.latrobe.edu.au/docview/223693743?accountid=12001&OpenUrlRefId=info:xri/sid:primo</p>
8	<p>Online Reading Australian Newspaper 2014 article re. NAPLAN http://www.theaustralian.com.au/news/features/busting-the-naplan-myths/story-e6frg6z6-1226913710635?nk=2755d0bd8d88b237dcbfc159156d52b3 The Age 2013 http://www.theage.com.au/comment/righting-some-wrong-thinking-on-naplan-20130515-2imns.html The Guardian 2014 http://www.theguardian.com/world/2014/mar/07/naplan-my-school-site-stress-pupils-says-adrian-piccolo</p>

Learning Activities Overview:		
Week	Learning Topic	Learning Activities/Readings
1	Mathematics Learning Introduction to Mathematics curriculum in Victoria and Australia.	<p>Pre-service teachers will be introduced and learn to actively navigate a broad range of curriculum documents and resources:</p> <ul style="list-style-type: none"> • www.victoriancurriculum.vcaa.vic.edu.au • www.vcaa.vic.edu.au/pages/foundation10/f10index.aspx • www.vcaa.vic.edu.au/pages/foundation10/viccurriculum/viccurr-resources.aspx • Maths Continuum http://www.education.vic.gov.au/school/teachers/teachingresources/discipline/maths/continuum/pages/mathcontin.aspx?Redirect=2 • Australiancurriculum.edu.au/mathematics/curriculum/f-10?layout=1 • AusVELS (until Dec 2016) will be archived http://ausvels.vcaa.vic.edu.au/Mathematics/Overview/Rationale-and-VCAA-F-10-Curriculum • VCAA F-10 Curriculum http://www.vcaa.vic.edu.au/pages/foundation10/f10index.aspx <p>Aims</p> <p>Through participation pre-service teachers will view both the junior and the senior mathematics curriculums looking ACARA, the F-10 Curriculum and the Victorian curriculum.</p> <p>Discussion around e5, POLT, VIT and AISTL will frame the existing knowledge and enable the building of understanding of Mathematics learning and teaching in context.</p> <p>Set a starting point in what it is to be a quality mathematics teacher and develop a common understanding of our teaching which will develop during this subject. Set a mandate for ourselves and a reflective point through the subject.</p> <p>A topic area in the F-10 curriculum will be assigned to each student and a resource collection will commence from this point. Begins the scaffolding of Task 1.</p>
2	Numeracy And Literacy in Maths teaching	<p>Investigation of articles related to this topic. Idea movement in ten years? Readings will include:</p> <ul style="list-style-type: none"> • Mathematics and numeracy: is there a difference? Hogan, J. Australian Mathematics Teacher; v.58 n.4 p.14-16; October 2002 • Hogan, John. Mathematics and numeracy: has anything changed? Are we any clearer? Are we on track? [online]. Australian Mathematics Teacher; v.68 n.4 p.4-7; 2012. Availability:<http://search.informit.com.au/fullText;dn=197390;res=AEIPT> ISSN: 0045-0685. [cited 23 Jun 16]. <p>Numeracy in Primary teaching where a Primary Maths lecturer presents the teaching from a primary prospective. Text books available and it is highly recommended to have one as a resource to aid differentiated teaching. Examples:</p> <ul style="list-style-type: none"> • Hogan, J. Australian Mathematics Teacher; v.58 n.4 p.14-16; October 2002 • Hogan, John. Mathematics and numeracy: has anything changed? Are we any clearer? Are we on track? [online]. Australian Mathematics Teacher; v.68 n.4 p.4-7; 2012. Availability:<http://search.informit.com.au/fullText;dn=197390;res=AEIPT> ISSN: 0045-0685. [cited 23 Jun 16].

		<p>How does literacy fit into this picture? The unique language of mathematics.</p> <p>Start resources hunt for assigned Task 1. In groups based on topics as a sharing approach essential for busy teachers. Modelling group and cooperative practices as a pedagogical approach.</p>
3	NAPLAN	<p>Encounter the NAPLAN experience and investigate the tests based on the content in the Maths F-10 Curriculum and the literacy components. Audit on basis of both.</p> <p>What is the controversy re NAPLAN in the media?</p> <ul style="list-style-type: none"> • Australian Newspaper 2014 article re. NAPLAN http://www.theaustralian.com.au/news/features/busting-the-naplan-myths/story-e6frg6z6-1226913710635?nk=2755d0bd8d88b237dcbfc159156d52b3 • The Age 2013 http://www.theage.com.au/comment/righting-some-wrong-thinking-on-naplan-20130515-2jmns.html • The Guardian 2014 http://www.theguardian.com/world/2014/mar/07/naplan-my-school-site-stress-pupils-says-adrian-piccolo <p>Investigate the content of VCAL/VET Numeracy and Maths Skills</p>
4	Reflections from Placement and Curriculum teaching ideas.	<p>Using design tools in mathematics teaching aid thinking approaches and literacy skills.</p> <p>Example of the Parking Lot Tool to raise and discuss what we have sighted in maths teaching. Using quality teaching tools in maths education. Other design tools investigated here through process worksheets. From student learning Feb 2006 disc. VCAA.</p> <p>Case study discussion of schools you have sighted in placement – no names required</p> <p>Perform a teacher planning step of identifying the qualities you want in a class from the task in session 1 and how you will implement this and the criteria in Task 1. A lesson plan and a unit plan exemplar are provided.</p> <p>Readings to think deeper about maths teaching:</p> <ul style="list-style-type: none"> • This article ties teaching mathematics to the educational theorists. Jones, K., Jones, J. L., & Vermette, P. J. (2010). THE CONSTRUCTIVIST MATHEMATICS CLASSROOM. Mathematics Teaching, (219), 33-35. Retrieved from: http://search.proquest.com.ez.library.latrobe.edu.au/docview/879423475?OpenUrlRefId=info:xri/sid:primo&accountid=12001 • Mathematics: Content and Pedagogy. Ediger, Marlow. College Student Journal, 43(3) (Sept 2009), 714-717 Retrieved from: http://go.galegroup.com.ez.library.latrobe.edu.au/ps/retrieve.do?sgHitCountType=None&sort=RELEVANCE&docType=Article&prodId=EAIM&tabID=T002&searchId=R1&resultListType=RESULT_LIST&searchType=AdvancedSearchForm&contentSegment=&currentPosition=1&searchResultsType=SingleTab&inPS=true&userGroupName=latrobe&docId=GALE%7CA206687063&contentSet=GALE%7CA206687063 • Homework and Learning Mathematics, Australian Primary Mathematics Classroom. Volume 14 Issue 4 (2009) Grootenboer, Peter. Retrieved from: http://search.informit.com.au.ez.library.latrobe.edu.au/fullText;dn=968846640879861;res=IELHSS

		<p>Recommendation watching The CODE (BBC documentary) Links to sections Numbers, Shapes, Predictions – opportunities to design teaching activities.</p> <p>Sharing portal of quality resources Task 1 Scaffolding</p>
5	Professional Associations	<p>MAV Overview. A plethora of resources and a community for the future. An MAV representative will visit for a guest lecture based on the resources and how to use their site as most schools have licences. This session indicates the opportunities that MAV offers to teachers and future teachers. Student membership also recommended. It is a hands-on activity based session where you see another maths teacher teaching.</p>
6	Resources Collection, preparation for micro teaching – Hands-on Algebra.	<p>Investigation of a hands on activity (Jumping Frogs). Can be accessed a. MAV site Retrieved from: http://mav.vic.edu.au/members-area/problems-for-upper-secondary/276-jumping-frogs.html b. It can also be accessed online in an interactive IT form: http://nrch.maths.org/1246</p> <p>What maths teaching have we encountered in placement? Observational reflection of teaching practice. This will be compared to the quality maths teaching listing previously developed to see if any modifications are required.</p> <p>Hands on activity – MAV design Stripes and Squares. Visual hands on expanding and factorising. Work through activity in groups. How would we teach this? Design a teaching sequence for Jumping Frogs or Stripes and Squares. What assessment would be appropriate? What is the purpose of assessment? This becomes automatic thinking when sighting (in a way auditing) activities encountered.</p> <p>Access available resources in Paul Swan books, http://www.teaching.com.au/catalogue?catalogue=MTA&category=MTA-DR-PAUL-SWAN-RESOURCES and Geo Series https://www.origoeducation.com/# and share in groups based on Task 1 topic other online resource options will be overviewed and shared including Black Douglas site, RIME, http://www.math.harvard.edu/~knill/mathmovies/, Scootle, Mathematica, Maths Continuum, Maths cupboard in schools, data logging equipment, op shops for books, look everywhere, etc. and share on our LMS site.</p> <p>Design a hands on task for your Task 1 and prepare as a microteaching moment in the next class. We will record and feedback will be in a safe place. Test your task 1 material will help scaffold your Task 2 lesson plan. Collaboratively work in topic groups share micro-teaching assist both Task 1 & Task 2 suitable content.</p>
7	Data logging	<p>Hands on activity with data logging equipment. How and where it can be used in maths classes. What can it record? What can it do? Bridge into Science/Sport/Home Economics etc. teaching with Maths. This session will be conducted in a lab with materials. Modelling group and cooperative practices. Layer within this contextual teaching (Dewey, 1910).</p>
8	Microteaching, feedback and scaffolding of Task 2	<p>Video record and feedback of microteaching moment. Test your task 1 material will help scaffold your Task 1. Share the written activity with the group.</p>
9	Differentiation and Goal Setting	<p>Readings: •Ollerton, M (2014) Differentiation in Mathematics Classrooms, Mathematics Teaching, 240, p 43-46.http://0-</p>

		<p>search.proquest.com.alpha2.latrobe.edu.au/publication/publications_48811?accountid=12001</p> <ul style="list-style-type: none"> •Access to Mathematics Is Vital for Equity, Thomas, J. (Oct 2009) Australasian Science30.9: 37-38. http://search.proquest.com.ez.library.latrobe.edu.au/docview/223693743?accountid=12001&OpenUrlRefId=info:xri/sid:primo •Embracing the Principles and Standards for School Mathematics: An Inquiry into the Pedagogical and Instructional Practices of Mathematics Teachers in High-Poverty Middle Schools Mckinney, S & Frazier, W (2008) A Journal of Educational Strategies, Issues and Ideas, Vol.81(5), p.201-210 http://search.proquest.com.ez.library.latrobe.edu.au/docview/196883327?OpenUrlRefId=info:xri/sid:primo&accountid=1200 <p>Review previous activities encountered and model how to differentiate for the classroom.</p>
10	Creative Curriculum and combatting mathematics anxiety	<p>Discussion of creativity, innovation and ways of thinking. How does pedagogy meet with thinking styles? How can the teacher best accommodate different ways of thinking? And setting appropriate goals for all.</p> <p>Overview of (those who haven't self-tested this is available):</p> <ul style="list-style-type: none"> •VAK test •Gardner's Multiple intelligences •De Bono's Hats (There is a De Bono's Hats game for working within this domain) •IQ and EQ tests •HBDI <p>Thinking and interacting with: e5, POLT, Blooms Taxonomy for higher order thinking. Ultimately variety is the key to engagement and addressing all thinking styles.</p> <p>Add to this 21st Century Skills. An interesting read is Fullan for his 6 Cs. Character, Citizenship, Communication, Critical Thinking and Problem Solving, Collaboration and Teamwork, and Creativity and Imagination.</p> <p>Some articles re maths anxiety – pre-service teachers research and bring to the next session for discussion.</p>
11	The Value of Assessment Practices	<p>Diagnostic, Formative and Summative Assessment practices and record keeping in mathematics to plot student improvement while involving the individual in their own learning plan.</p> <p>Article search and research</p> <p>How to use Excel as a mark book activity.</p> <p>The cycle that is assessment and what is effective assessment in mathematics. Ways we can assess brainstorm.</p> <p>New goal setting</p>
12	Issues in Mathematics education	<p>Unpicking the issues in maths education from the articles collected from previous sessions as reflective practice.</p> <p>Consider an issue in maths education worthy of investigation and do some first stage reading. This will start you in the first steps for our next method subject.</p>

		Quality maths teacher brainstorm. This will identify how we have moved and develop a new consensus in the group. Reflective stage.
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Assessment	
Assessment Task No.	Description of task:
1	Evaluation of Teaching Resources
APST	Description of how each Graduate Teacher Standards is Taught, Practiced and Assessed
1.2	(Act. = Activity) (T) Week 1, 2, 9, 10
2.1	(P) Week 1 Act. 2, 2 Act. 2, 4 Act. 1, 9 (ALL), 10 (ALL) (T) Week 1, 2, 3, 6, 8 (P) Week 1 Act. 1, Week 2 Act. 1, Week 3 Act. 3, Week 6 Act. 1, 3, Week 8
2.5	(A) Task 1 (T) Week 2
2.6	(A) Task 1 (T) Week 6 Act.4, Week 7 (ALL), All 2.1 information (P)
3.3	(A) Task 1 (T) Week 1, 5, 6, 7 (P) Week 1 Act. 4, Week 5 (ALL), Week 6 (ALL), Week 7, Week 10 (A) Task 1
3.4	(T) Week 1, 3, 5, 6, 7
4.1	(P) Week 1 Act.4, Week 3 (ALL), Week 5, Week 6 Act. 1, 3, 4, & 5, Week 7 (A)Task 1 (T) Week 1, 4, 6, 7, 10
4.4	(P) Week 1 Act. 3, Week 4 Act. 2, Week 6 (ALL), Week 7, Week 10 Act. 3 (T) Week 6, 7, 10 (P) Week 6 Act. 5, Week 7, Week 10 Act. 5 (A) Task 1
Assessment Task No	Description of task:
2	Curriculum-based Unit Plan
APST	Description of how each Graduate Teacher Standards is Taught, Practiced and Assessed
1.5	(T) Week 9, 10 (P) Week 9 Act. 1, Week 10 Act. 1
2.2	(T) Week 1, 2, 4, 6 (P) Week 1 Act.4, Week 2, Act.4, Week 4 Act. 4, Week 6 Act.4&5, Week 9 (ALL) (A) Task 2
2.3	(T) Week 6, 11 (P) Week 6 Act. 3, Week 8 (ALL), 11 (ALL), (A) Task 2
2.5	(T) Week 2, 3, 4 (P) Week 2 (ALL), Week 3 Act 1 & 3, 4 (A) Task 2
3.1	(T) Week 1, 2, 9, 10, 11 (P) Week 1 Act 2, Week 9 (ALL), Week 10, Week 11 Act. 5 (ALL) (A) Task 2
3.2	(T) Week 1, 2, 4, 6 (P) Week 1 Act.4, Week 2, Act.4, Week 4 Act. 4, Week 6 Act.4&5, Week 9 (ALL) (A) Task 2
4.1	(T) Week 1, 4, 6, 7, 10 (P) Week 1 Act. 3, Week 4 Act. 2, Week 6 (ALL), Week 7, Week 10 Act. 3 (A) Task 2
5.1	(T) Week 6, 8, 11 (P) Week 6 Act. 3, Week 8, Week 11 (ALL) (A)Task 2
5.2	(T) Week 8, 11 (ALL) (P) Week 8, Week 11 (ALL) (A)Task 2