EDUC90618 Mathematics: Problem Solving & Reasoning

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	This subject is not offered in 2013.
Time Commitment:	Contact Hours: 24 hours. Total Time Commitment: 125 hours. Attendance at all classes (tutorial/seminars/practical classes/lectures/labs) is obligatory. Failure to attend 80% of classes will normally result in failure in the subject.
Prerequisites:	None
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	None
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Students Experiencing Academic Disadvantage Policy, academic requirements for this subject are articulated in the Subject Overview, Objectives, Assessment and Generic Skills sections of this entry.It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and the Disability Liaison Unit: http://www.services.unimelb.edu.au/disability/
Contact:	Education Student Centre 234 Queensberry Street Phone: +61 3 8344 8285
Subject Overview:	This subject will focus on research and issues related to the teaching and learning of mathematics in primary and secondary classrooms through the use of problem solving and mathematical modelling. Modelling and problem solving are seen as approaches to teaching mathematics, ways of doing mathematics and mathematical content in their own right. They focus particularly on questions related to how we think mathematically and learn more deeply in a mathematical environment that emphasises big ideas in mathematics teaching. Topics include: trends in mathematical modelling and problem solving research; attitudes to and conceptions of problem solving and modelling; problem solving and modelling and working mathematically; interdisciplinarity; assessment; developing challenging tasks to increase cognitive demand; managing the problem solving/modelling classroom; teaching students to address a challenge; raising the level of mathematical competence required for informed citizenship and lifelong learning; increasing students' confidence in using mathematics to solve problems; the role of technology in facilitating modelling and problem solving.
Objectives:	Students completing this course should be able to: # Identify and demonstrate a sound understanding of educational research and practice in the area of teaching and learning mathematics through problem solving and mathematical modelling in schools;Investigate and critically analyse the impact of an issue related to using problem solving or mathematical modelling in a school situation; # Propose courses of action in response to an issue or to problems arising from an issue related to researching, teaching and/learning through or by problem solving or mathematical modelling; # Investigate the consequences of a particular issue for a given school setting related to researching, teaching and/learning through or by problem solving or mathematical modelling and devise a response to address any problems arising from the issue # Provide reasoned arguments to support any course of action recommended to resolve or minimise the problems arising from a particular issue related to researching, teaching and/ learning through or by problem solving or mathematical modelling; and,

	# Specify how current teaching practice might be modified to more adequately address the consequences of a particular issue related to teaching and/learning through or by problem solving or mathematical modelling.
Assessment:	A 1,000 word academic report exploring issues related to researching, teaching and/or learning through an approach using problem solving and/or mathematical modelling, due late in the semester, 20% A ten minute oral presentation on the academic report, due late in the semester as individually scheduled, 20% A 3,000 word research-based report, due end of semester, 60%
Prescribed Texts:	None
Recommended Texts:	Blum, W., Galbraith, P., Niss, M., Henn, H.-W. (Eds.). (2007). Modelling and applications in mathematics education, New ICMI Studies Series no. 10. New York: Springer. Clarke, D. J., Goos, M., & Morony, W. (2007). Problem solving and working mathematically: An Australian perspective. ZDM—The International Journal on Mathematical Education, 39(5-6), 475-490. Lesh, R., & Zawojewski, J. (2007). Problem solving and modelling. In F. Lester (Ed.), Second handbook of research o mathematics teaching and learning (pp. 763-804). Charlotte, NC: IAP. Stillman, G. A., Brown, J. P., & Galbraith, P. L. (2008). Research into the teaching and learning of applications and modelling in Australasia. In H. Forgasz, A. Barkatsas, A. Bishop, B. Clarke, S. Keast, W-T. Seah, & P. Sullivan (Eds.), Research in mathematics education in Australasia 2004-2007 (pp. 141-164). Rotterdam, The Netherlands: Sense Publishers. Stillman, G., Cheung, K-C., Mason, R., Sheffield, L., Sriraman, B., & Ueno, K. (2009). Challenging mathematics: Classroom practices. In E. Barbeau & P. Taylor (Eds.), Challenging mathematics in and beyond the classroom: The 16th ICMI study, New ICMI Studies Series no. 12 (pp. 243-283). New York: Springer.
Breadth Options:	This subject is not available as a breadth subject.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	Students completing this course should be able to: # Demonstrate a superior knowledge and understanding of educational theory and practice in general and in the area of teaching and learning mathematics through problem solving and mathematical modelling in particular; # Express informed opinions on these issues; # Have an understanding of the theory and practice of educational research needed to evaluate research literature and carry out appropriate research activity in this area; # Make effective use of the findings of educational writings and research in addressing professional problems; # Have the depth of knowledge and understanding that will enable them to be a resource for colleagues in particular professional situations; # Demonstrate an appreciation of professional responsibilities and ethical principles which should characterise leaders in the education profession.
Related Course(s):	Master of Education (Stream 100B)Coursework Master of Education (Stream 150)