

## EDUC90618 Mathematics: Problem Solving & Reasoning

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| <b>Credit Points:</b>                    | 12.5   |
| <b>Level:</b>                            | 9 (Graduate/Postgraduate)  |
| <b>Dates &amp; Locations:</b>            | This subject is not offered in 2015.   |
| <b>Time Commitment:</b>                  | Contact Hours: 24 Total Time Commitment: 170 hours   |
| <b>Prerequisites:</b>                    | None   |
| <b>Corequisites:</b>                     | None   |
| <b>Recommended Background Knowledge:</b> | None   |
| <b>Non Allowed Subjects:</b>             | None   |
| <b>Core Participation Requirements:</b>  | 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, Learning Outcomes and Assessment Requirements of this entry. The University is dedicated to provide support to those with special requirements. Further details on the disability support scheme can be found at the Disability Liaison website: <a href="http://www.services.unimelb.edu.au/disability">http://www.services.unimelb.edu.au/disability</a>  |
| <b>Contact:</b>                          | <b>Contact Us (<a href="https://enquiry.app.unimelb.edu.au/?cc=MGSE-ALL&amp;fn=MGSE">https://enquiry.app.unimelb.edu.au/?cc=MGSE-ALL&amp;fn=MGSE</a>)</b><br>Call: 13 MELB (13 6352)   |
| <b>Subject Overview:</b>                 | 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 reasoning. Problem solving is seen as an approach to teaching mathematics, a way of doing mathematics and mathematical content in its own right. Problem solving and reasoning 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 reasoning and problem solving research; attitudes to and conceptions of problem solving and reasoning; problem solving, reasoning and working mathematically; interdisciplinarity; assessment; developing challenging tasks to increase cognitive demand; managing the problem solving/reasoning 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 reasoning and problem solving. |
| <b>Learning Outcomes:</b>                | On completion of the subject students will be able to: <ul style="list-style-type: none"> <li># Clearly Identify what defines the proficiency strands "Problem Solving" and "Reasoning" of the Australian National Curriculum;</li> <li># Devise teaching strategies that implement problem solving and reasoning in the classroom;</li> <li># Identify and demonstrate a sound understanding of educational research and practice in the area of teaching and learning mathematics through problem solving and reasoning in schools;</li> <li># Demonstrate confidence in using mathematics to solve problems.</li> </ul>   |
| <b>Assessment:</b>                       | There are three assessment tasks: A 1,500 word academic report exploring issues related to researching, teaching and/or learning through an approach using problem solving /or reasoning, due late semester, 30% A 10 minute oral presentation (equivalent 1,000 words) due late semester, 20% A 2,500 word research-based report, due end semester, 50% Attendance at all classes (tutorial/seminars/practical classes/lectures/labs/online classes) is obligatory. Failure to attend 80% of classes will normally result in failure in the subject.  |
| <b>Prescribed Texts:</b>                 | None   |
| <b>Recommended Texts:</b>                | 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.  |

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|                           | <p>Clarke, D. J., Goos, M., &amp; Morony, W. (2007). Problem solving and working mathematically: An Australian perspective. <i>ZDM—The International Journal on Mathematical Education</i>, 39(5-6), 475-490.</p> <p>Lesh, R., &amp; Zawojewski, J. (2007). Problem solving and modelling. In F. Lester (Ed.), <i>Second handbook of research o mathematics teaching and learning</i> (pp. 763-804). Charlotte, NC: IAP.</p> <p>Stillman, G. A., Brown, J. P., &amp; 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, &amp; P. Sullivan (Eds.), <i>Research in mathematics education in Australasia 2004-2007</i> (pp. 141-164). Rotterdam, The Netherlands: Sense Publishers.</p> <p>Stillman, G., Cheung, K-C., Mason, R., Sheffield, L., Sriraman, B., &amp; Ueno, K. (2009). Challenging mathematics: Classroom practices. In E. Barbeau &amp; P. Taylor (Eds.), <i>Challenging mathematics in and beyond the classroom: The 16th ICMI study</i>, New ICMI Studies Series no. 12 (pp. 243-283). New York: Springer.</p> |
| <b>Breadth Options:</b>   | This subject is not available as a breadth subject.   |
| <b>Fees Information:</b>  | Subject EFTSL, Level, Discipline & Census Date, <a href="http://enrolment.unimelb.edu.au/fees">http://enrolment.unimelb.edu.au/fees</a>   |
| <b>Generic Skills:</b>    | <p>Students completing this subject should be able to:</p> <ul style="list-style-type: none"> <li># 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 reasoning in particular;</li> <li># Express informed opinions on these issues;</li> <li># 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;</li> <li># Make effective use of the findings of educational writings and research in addressing professional problems;</li> <li># Have the depth of knowledge and understanding that will enable them to be a resource for colleagues in particular professional situations;</li> <li># Demonstrate an appreciation of professional responsibilities and ethical principles which should characterise leaders in the education profession.</li> </ul>  |
| <b>Related Course(s):</b> | <p>Master of Education<br/> Master of Education<br/> Master of Numeracy</p>   |