451-208 Computational Methods in Geomatics

Credit Points:	12.50
Level:	2 (Undergraduate)
Dates & Locations:	This subject is not offered in 2009.
Time Commitment:	Contact Hours: Twenty-four hours of lectures and 24 hours of tutorials. Total Time Commitment: Not available
Prerequisites:	620-161 Introductory Mathematics and 620-140 Intermediate Mathematics or 620-141 Mathematics A
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 Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, 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 Student Equity and Disability Support: http://services.unimelb.edu.au/disability
Subject Overview:	The objective of this subject is to apply theories gained in earlier mathematical studies to fundamental problems associated with practice in geomatics. Topics covered include spherical trigonometry including properties of spherical triangles, development of fundamental formulae relating elements, area and spherical excess, application in navigation, map projections and positional astronomy; vector geometry for geomatics including vector representation of spatial relationships between points, line and planes, applications in positioning, mining surveying, solid modelling, reference frames and spatial analysis representations of curves on the ellipsoid as vector chains; geometry of the ellipsoid, the ellipsoid as a geodetic reference surface, coordinate systems, geocentric cartesian, curvilinear and universal transverse mercator (UTM), plane curves, loxodromes and geodesics computations on the UTM map grid; transformations between reference frames, rotation matrices for moving vectors between reference frames, properties of orthogonal matrices, conformal transformations in two and three dimensions; and algorithms for solving simultaneous linear equations, algorithms for general and symmetric matrix inversion, conditioning matrices for inversion, solutions for redundant linear equations, solutions for non-linear simultaneous equations, applications to curve fitting by least-squares methods.
Assessment:	One 3-hour written examination at the end of semester (60%). 10-weekly 3-page assignments (4% each).
Prescribed Texts:	None
Recommended Texts:	Information Not Available
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:	# ability to apply knowledge of basic science and engineering fundamentals # in-depth technical competence in at least one engineering discipline

	# ability to undertake problem identification, formulation and solution # expectation of the need to undertake lifelong learning, capacity to do so # openness to new ideas and unconventional critiques of received wisdom
Notes:	Students enrolled in the BSc (pre-2008 degree), BASc or a combined BSc course will receive science credit for the completion of this subject
Related Course(s):	Bachelor of Geomatic Engineering Bachelor of Geomatic Engineering & Bach of Planning & Design(Prop&Const) Bachelor of Geomatic Engineering and Bachelor of Arts Bachelor of Geomatic Engineering and Bachelor of Information Systems Bachelor of Geomatic Engineering and Bachelor of Science Graduate Diploma in Geomatics Science