GEOM90040 Mathematics of Spatial Information

Credit Points:	12.5
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2015, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 48 hours, comprising of two hours of lectures and two hours of lab exercises per week. Total Time Commitment: 200 hours
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 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
Coordinator:	Assoc Prof Allison Kealy
Contact:	Associate Professor Allison Kealy **a.kealy@unimelb.edu.au (https://mce_host/faces/htdocs/a.kealy@unimelb.edu.au)**
Subject Overview:	**AIMS** In this subject students will learn about the range of computational techniques applicable to problems commonly arising in surveying and spatial information. This subject applies the mathematical and computational knowledge acquired in COMP20005 Engineering Computation; MAST10007 Linear Algebra (or its equivalent). The content of this subject is relevant to GEOM90033 Satellite Positioning Systems, and GEOM90039 Advanced Surveying and Mapping. The subject is of particular relevance to students wishing to establish a career in surveying engineering, mining, mapping, or spatial information in general, and is also relevant to a range of civil engineering disciplines where the capture and processing of spatial or survey measurements to meet a specific performance specification should be considered. **INDICATIVE CONTENT** Least squares adjustment, survey measurement errors, survey network design and adjustment, coordinate systems, geodetic datum, datum transformations.
Learning Outcomes:	**INTENDED LEARNING OUTCOMES (ILO)** Having completed this unit the student is expected to: 1 Define parameters of an ellipsoid as a mathematical representation of the Earth's surface and use it for computations relevant to surveying, mapping, navigation and geodesy 2 Manipulate coordinates on the basis of understanding the concepts of datums, coordinate systems and map projections 3 Use vector theory to solve fundamental problems associated with practice in surveying and spatial information

	4 Apply least square theory appropriately to solve simple adjustment and estimation problems in spatial science.
Assessment:	10 x written assignments (each of approximately 100 words), weekly (30%). The total time commitment for the assignments is approximately 40 hours of work. Associated with Intended Learning Outcomes (ILOs) 1-4 Major Assignment (20%) (approximately 1000 words). The total time commitment for this major assignment is approximately 30 hours of work (ILOs 1-4) 1-hour class test, around mid-semester (approximately 500 words) (10%) (ILOs 1-2) 3-hour examination (40%) (ILOs 1-4). Hurdle requirement: Students must pass the written examination at the end of the semester in order to pass this subject.
Prescribed Texts:	TBA
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 undertake problem identification, formulation, and solution # Understanding of social, cultural, global, and environmental responsibilities and the need to employ principles of sustainable development # Capacity for creativity and innovation # Understanding of professional and ethical responsibilities, and commitment to them # Capacity for lifelong learning and professional development.
Notes:	**LEARNING AND TEACHING METHODS** The subject is based principally on presentations by experienced industry professionals who present case studies in their area of expertise. Computer laboratory exercises are used reinforce the theory as well as to showcase the practical application of this material. **INDICATIVE KEY LEARNING RESOURCES** Lecture materials and notes will be provided via the LMS. **CAREERS / INDUSTRY LINKS** Presenters from the private land surveying industry will provide students with the material for this subject. Real world case studies will demonstrate the applicability of this material across the broader surveying and spatial industry.
Related Course(s):	Master of Information Technology Master of Philosophy - Engineering Ph.D.- Engineering
Related Majors/Minors/ Specialisations:	MIT Spatial Specialisation Master of Engineering (Spatial)