GEOM90039 Advanced Surveying and Mapping

Credit Points:	12.5
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2015, Parkville This subject commences in the following study period/s: February, Parkville - Taught on campus. May require overnight stays. Students need to be available for the duration of the teaching period.
Time Commitment:	Contact Hours: An intensive 14 day course with 20 hours of lectures and 60 hours practical, problem based learning exercises. Total Time Commitment: 140 hours
Prerequisites:	Successful completion of the following subject is required to enrol:

Subject	Study Period Commencement:	Credit Points:
GEOM90033 Satellite Positioning Systems	Semester 2	12.50

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 (mailto:a.kealy@unimelb.edu.au)**
Subject Overview:	**AIMS** In this subject students will be presented with a real world surveying problem which they will be required to solve through the integration, application and advancement of the theoretical and practical knowledge they have acquired throughout their study. The subject builds on the knowledge acquired in GEOM90033 Satellite Positioning Systems and GEOM90040 Adjustment Theory and Practice with regards to survey network design and adjustment as well as fundamental Geodesy and associated computations. Student knowledge of practical field surveying techniques learnt in GEOM20015 Surveying and Mapping, or equivalent from other subjects, forms the basic grounding for the subject. The subject is of particular relevance to students wishing to establish a career in engineering, mining or cadastral surveying. It is also relevant to a range of mapping, spatial, land surveying and engineering disciplines where the capture and processing of spatial or survey measurements to meet a specific performance specification should be considered. **INDICATIVE CONTENT**

	High precision GPS surveying, practical application of Geodetic theory, survey network design and adjustment, least squares adjustment theory, GPS reference station networks, precise levelling, coordinate systems, geodetic datum, geoid.
Learning Outcomes:	**INTENDED LEARNING OUTCOMES (ILO)** Having completed this unit the student is expected to: 1 Plan, schedule, cost and complete an advanced, high precision survey job 2 Critically assess and apply the appropriate field methodology, equipment and processing techniques for a specific survey task 3 Use a range of techniques for managing survey errors and biases including results verification, quality control 4 Design and develop innovative techniques and approaches to solving complex survey problems 5 Maintain a balance between survey accuracy and the overall cost of the work 6 Manage a large survey project.
Assessment:	1. Three practical exercises (due on the first day of the on-campus component) that review fundamental literature and computing procedures in high precision surveying including Exercise 1: GNSS data processing (5%) Exercise 2: Network Adjustment (5%) Exercise 3: Journal paper review (5%) The submission for each practical exercise is a report (equivalent of 1000 words). Requires participation in two webinar sessions of 3 hours each. Requires approximately 10 hours of work. Addresses Intended Learning Outcomes (ILOs) 1-5. 2. Two practical exercises (due across the first week of the subject) that review fundamental field procedures in high precision surveying including Practical 1: RTK vs levelling (5%) Practical 2: GNSS network processing (5%) The submission for each practical exercise is a report (equivalent of 1000 words), that documents the methodology, results and analysis. Requires approximately 5 hours of work. ILOs 1-5. 3. Preparation of tender documentation and client interaction. The submission consists of a report and presentation (equivalent to 1500 words) describing their proposed design and methodology to achieve the specification for the survey job they have been allocated (equivalent to 1500 words). Due in the first week of the subject. Requires approximately 15 hours of work (25%). ILOs 1-5. 4. A scientific paper summarising the results of the field work and data processing, which assesses the technical merits of their chosen methodology based on the results achieved against the performance criteria required by the job - no more than 10 pages. Requires approximately 35 hours of work (50%). ILOs 1-6. Hurdle Requirement: It is a hurdle requirement of this subject that students achieve a mark of 50% or higher for all assessable components.
Prescribed Texts:	None
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 communicate effectively, with the engineering team and with the community at large # Ability to manage information and documentation # Ability to function effectively as an individual and in multidisciplinary and multicultural teams, as a team leader or manager as well as an effective team member # 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** This subject is delivered as a two week intensive. The subject is based principally on practical exercises coordinated by both the academic staff and experienced industry professionals. Presentations are used to communicate the necessary theoretical concepts which are then reinforced through a field practical exercise. A three day residential component is conducted off campus for students to apply their knowledge to a real world problem for which they are

	required to develop, design and present both an oral and written solution for assessment by both an industry and academic panel. **Note**: Details of the specific survey site will be provided on the first day of teaching. As the site selection may require overnight stays, students should make arrangements to be available for the duration of the teaching period. **INDICATIVE KEY LEARNING RESOURCES** Guidelines for surveying tasks can be found at **www.icsm.gov.au/publications/sp1/sp1v1-7.pdf (http://www.icsm.gov.au/publications/sp1/sp1v1-7.pdf)** **CAREERS / INDUSTRY LINKS** Presenters from relevant government departments and private land surveying industry will provide students with the background to their survey tasks as well as available industry tools. They will liaise with the students to ensure that their survey methodologies are aligned with industry best practice. The residential component of this subject will enhance student's practical experience of real world surveying as well as the process of liaising with clients and meeting client requirements.
Related Course(s):	Master of Philosophy - Engineering Ph.D.- Engineering
Related Majors/Minors/ Specialisations:	Master of Engineering (Spatial)