

Subject Description Form

Subject Code	LSGI548
Subject Title	Advanced Surveying
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Knowledge in surveying and survey adjustment.
Objectives	To understand the advanced concepts and principles of surveying and to develop in-depth understanding of selected contemporary topic areas in surveying.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. relate local surveying activities to the global surveying applications; b. analyze modern surveying data using advanced adjustment methodologies; c. gain insight on modern surveying technologies and their applications.
Subject Synopsis/ Indicative Syllabus	<ul style="list-style-type: none"> • International Terrestrial Reference System (ITRS) and its realization (ITRF) and WGS84; Global and local datum and their transformation; EGM2008 and local geoid determination in relation to GPS levelling. • Tidal datums, sonar positioning, multibeam echo sounder, geotechnical instrumentation, terrestrial and airborne laser scanning for surveying. • High precision GPS surveying, precise orbits and processing for high precision large scale relative positioning using multi-station 3D adjustment; Modern adjustment techniques for GPS ties and densification adjustment. • Local earthbound and space born interferometric synthetic aperture radar (INSAR) for deformation measurements; Deformation analysis and interpretation. • Cadastre, Land Information System and Spatial Data Infrastructure; Legal cadastre, Titles registration and Deeds registration; Hong Kong cadastral system land registration and land boundary survey; National and regional development strategy on Spatial Data Infrastructure.
Teaching/Learning Methodology	The subject puts emphasis on student-centred active learning. While some of the fundamental concepts and principles are covered in formal lectures, students will be given opportunities to learn by carrying out research on selected contemporary topics in engineering surveying and conducting relevant experiments during seminars/tutorials, guided study, assignments and self-study.

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)		
			a.	b.	c.
	Assignment and project	60%	✓	✓	✓
	Final test	40%	✓	✓	✓
	Total	100%			
<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>Assignments are needed to reinforce concepts learned during the lectures. Project is used to test students' abilities to transfer learnt concepts into practice and use them for solving professional problems. Final test is designed to monitor student learning at knowledge level.</p>					
Student Study Effort Expected	Class contact:				
	▪ Lectures		30 Hrs.		
	▪ Tutorials		9 Hrs.		
	Other student study effort:				
	▪ Final Project		45 Hrs.		
	▪ Self-study		25 Hrs.		
	Total student study effort:		109 Hrs.		
Reading List and References	<p>Dale, P. and McLaughlin, J. (1999). <i>Land Administration</i>, Oxford University Press, 169pages.</p> <p>Heritage, G.L. and A.R.G. Large (2009). <i>Laser scanning for the environmental sciences</i>. Wiley-Blackwell, Chichester.</p> <p>Leick, A., 2003, <i>GPS Satellite Surveying</i>, 3rd Ed., Wiley.</p> <p>Manual on hydrography, IHO, 2005</p> <p>Mikhail, E.M. and Gracie G., 1981, <i>Analysis and Adjustment of Survey Measurements</i>, Van Nostrand Reinhold, New York.</p> <p>Schofield, W., 2001, <i>Engineering Surveying</i>, Butterworth-Heinemann Ltd.</p> <p>Uren, J. and W.F. Price, 1994, <i>Surveying for Engineers</i>, 3rd Ed. Macmillan.</p> <p>Vanicek, P. and E. Krakiwsky, 1986, <i>Geodesy - The Concept</i>, 2nd Ed. Elsevier.</p> <p>Vosselman, G. and H-G. Maas (2010). <i>Airborne and terrestrial laser scanning</i>. Whittles, Caithness.</p>				

	<p>Willoughby, P. and Wilkinson, M. (1995). <i>Registration of Titles in Hong Kong</i>. Butterworths, 421pages.</p> <p>Wolf P.R., 1997, <i>Adjustment Computations: Statistics and Least Squares in Surveying and GIS</i>, Wiley & Sons, Inc.</p>
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SDF-LSGI548_8.2022