

Subject Description Form

Subject Code	LSGI547
Subject Title	Advanced Geographic Information Systems
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Recommended background knowledge: the knowledge introduced in the subject of Principles and Concepts of GIS
Objectives	To provide the students with an understanding of the latest development in geographic information systems covering: spatial data quality control, three-dimensional data modeling, data capture from high spatial/spectral/temporal resolution spaceborne imager and lidar
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. master the new knowledge in GIS including spatial data quality control, three-dimensional data modeling, and data capture from high spatial/spectral/temporal resolution satellite imagers and lidar (L5); b. analyze the newly developed knowledge of GIS (L5).
Subject Synopsis/ Indicative Syllabus	<ul style="list-style-type: none"> • GeoAI-based uncertainty modeling and data quality control for human spatial data: Uncertainty-based spatial description, uncertainty in spatial models, quality control for spatial data • Three-dimensional modeling for GIS: 3D geospatial data sensing and modeling, simultaneous localization and mapping (SLAM), 3D BIM model/2D floorplan generation, map layer generation, positioning based on smart terminals and map. , • Dynamic and multi-resolution data mode: The Voronoi model for dynamic representation, the integrated TIN and Grid multi-resolution model, a dynamic method for generating multi-resolution TIN models • Capturing spatial data based on high resolution satellite image: High resolution satellite images, image rectification models, object extraction from high resolution satellite images • Advanced topics about the trends of GIS
Teaching/Learning Methodology	Lectures are used to introduce key components. Seminars and guided study are to stimulate group discussions on selected topics. Assignments and self-study are designed to reinforce the subject material.

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.
	Assignment-1	25%	✓	
	Assignment-2	25%	✓	
	Project	50%	✓	✓
Total	100%			
<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>It consists of 100% continuous assessment through one project and two assignments. Two assignments are designed to monitor student learning on fundamental concepts at knowledge level. Problem based learning is carried out during the project and this will contribute to the all round development of students.</p>				
Student Study Effort Expected	Class contact:			
	▪ Lectures/seminars		39 Hrs.	
	Other student study effort:			
	▪ Self-study and revision		26 Hrs.	
	▪ Preparation to assignments and project		40 Hrs.	
	Total student study effort:		105 Hrs.	
Reading List and References	<u>Journals</u>			
	Geoinformatica International Journal of Geographical Information Science ISPRS Journal for Photogrammetry and Remote Sensing Photogrammetric Engineering and Remote Sensing Transactions in GIS International Journal of Applied Earth Observation and Geoinformation Remote Sensing of Environment			
Reading List and References	<u>Books</u>			
	Longley, P., M. Goodchild, D. Maguire and D. Rhind, 2010, <i>Geographic Information Systems and Science</i> , John Wiley & Sons, INC., England. Shi, W.Z., 2009, <i>Principle of modeling uncertainties in spatial data and spatial analyses</i> , Taylor & Francis Group/ CRC Press, New York.			

	Shi W.Z., Michael Goodchild, Brain Lees and Yee Leung, 2012, <i>Advances in Geo-Spatial Information Science</i> , Taylor and Francis, 285 pages. Stain, A. W.Z. Shi and W. Bijker (ed), 2008, <i>Quality Aspects of Spatial Data Mining</i> , CRC Press Taylor & Francis Group, 364 pages.
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