Subject Description Form

Subject Code	LSGI536
Subject Title	Remote Sensing Image Processing
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Concepts and principles of GIS
Objectives	Remote sensing is a modern technique for rapid acquisition of land and geographic information. This subject is to provide students with: principles and technology for remote sensing image acquisition, theories and techniques for the storage and compression of remote sensing image data; methodology for the manipulation of digital images for quality improvement; techniques for the extraction of geometric and thematic information from remote sensing image data; and the applications of remote sensing data.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. be familiar with basic physical concepts of electro-magnetic energy; b. be familiar with the 'state of the art' in earth resource monitoring from satellite platforms; c. explain how computers handle image data, and the different data formats; d. possess the practical skills to process digital images; e. have the knowledge of remote sensing platforms and systems to make recommendations for project planning for environmental monitoring in Hong Kong; f. discuss the various factors that influence the accuracy of geometric data extracted from satellite imagery; g. accurately articulate the various processing theories and methods applied in object extraction and orthoimage production.
Subject Synopsis/ Indicative Syllabus	• Acquisition of remote sensing image data: Principles of photography and scanning, physical foundation of multi-spectral imaging. • Storage of remote sensing image data: Image formats; image storage, image compression. • Radiometric (pictorial) processing of remote sensing image data: Image enhancement; filtering; image restoration. • Geometric processing of remote sensing image data: Sensor models, geometric rectification (orthoimage generation), edge detection for line and building extraction, image matching for DTM generation. • Thematic processing of remote sensing image data: Manual interpretation, automated image classification, image indices. • Applications: Change detection, land-use mapping ...

Teaching/Learning Methodology	Lab sessions are used to reinforce the theories and methodology introduced during the lectures and to enable students to gain practical problem solving skills; Reports and presentations are to enhance students' all round development.
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.	d.	e.	f.	g.
Continuous assessment	50%	✓	✓	✓	✓	✓	✓	✓
Final examination	50%	✓	✓	✓	✓	✓	✓	✓
Total	100%							

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Continuous assessment consists of four components, assignments, presentation, phase test and practical work. The phase test will assess students' basic understanding of physical concepts and the state of the art of the discipline, independently. Practical work will be used to reinforce, and assess students' understanding of the image processing practice and skills gained during the course. The assignment and presentation are linked and allow students to independently investigate a designated topic and present their findings so developing their critical thinking and professional presentation attributes.

A written examination will test students' independent skills of expression, knowledge of the discipline, and the ability to apply procedures and concepts to defined problems of environmental management in Hong Kong.

Reading List and References

<u>Journals and Magazines</u>

Imaging Notes

International Journal of Remote Sensing

ISPRS Journal of Photogrammetry and Remote Sensing

Photogrammetric Engineering and Remote Sensing

Photogrammetric Record

<u>Books</u>

Lillesand, T., Kiefer, R., Chipman, J.W., (2009), *Remote Sensing and Image Interpretation* (6th Ed.). Wiley, New York, Chichester.

McGlone, J.C. (ed.), (2004), *Manual of Photogrammetry* (5th Ed.), American Society for Photogrammetry and Remote Sensing. Falls Church, Va.

Mikhail, E.M., J.S. Bethel and J.C. McGlone (2001). *Introduction to modern photogrammetry*. John Wiley & Sons, New York.

Ryerson, R. (ed.), (2004), *Manual of Remote Sensing* (3rd Ed.), American Society for Photogrammetry and Remote Sensing. Falls Church, Va.