Subject Description Form

Subject Code	LSGI3321A
Subject Title	**Remote Sensing**
Credit Value	3
Level	3
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	• To give students a background to the current state of development of the remote sensing discipline including basic principles of imaging, image processing and data types and sources • To develop students' skills in image processing • To encourage students to examine ways of applying their knowledge and skills to actual environmental problems and situations
Intended Learning Outcomes	Upon completion of the subject, students will be able to: 1. Be familiar with basic physical concepts of electro-magnetic energy (L1) 2. Be familiar with the 'state of the art' in earth resource monitoring from satellite platforms (L2) 3. Explain how computers handle image data, and the different data formats (L3) 4. Possess the practical skills to process digital images (L2) 5. Have the knowledge of remote sensing platforms and systems to make recommendations for project planning for environmental monitoring in Hong Kong (L3)
Subject Synopsis/ Indicative Syllabus	A. Introduction to remote sensing and physical principles of imaging B. Spectral reflectance of earth surface features and spectral response patterns C. Sensors and platforms: aircraft, satellites and scanning systems D. Digital images and image display: grey scale, pseudocolour and multispectral images E. Image restoration, pre-processing and rectification F. Digital image processing: contrast enhancement, image arithmetic, image classification, object extraction; SAR image processing G. Applications of remote sensing in the urban environment and in the natural environment

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<tr><td></td><td></td></tr>
<tr><td>Teaching/Learning Methodology</td><td>Teaching and learning materials will be delivered on-line for students to download easily. Contact hours will be used for formal lectures, hybrid problem-solving and practical work. Group projects will form a part of the practical work and these will require students to use initiative and explore a wide range of solutions.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="5">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>1.Written Examination</td><td>50</td><td>√</td><td>√</td><td>√</td><td></td><td>√</td></tr>
<tr><td>2. Practical assignments</td><td>40</td><td></td><td></td><td>√</td><td>√</td><td></td></tr>
<tr><td>3. Multiple Choice (phase) test</td><td>10</td><td>√</td><td>√</td><td></td><td></td><td>√</td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="5"></td></tr>
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Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Continuous assessment consists of two components, 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. A written examination will test students' independent skills of expression, knowledge of the discipline, and the ability to apply procedures and concepts to a defined problem of environmental management in Hong Kong.
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<tr><td>Student Study Effort Expected</td><td>Class contact:</td><td></td></tr>
<tr><td></td><td>▪ Lecture</td><td>26 Hrs.</td></tr>
<tr><td></td><td>▪ Practical</td><td>26 Hrs.</td></tr>
<tr><td></td><td>Other student study effort:</td><td></td></tr>
<tr><td></td><td>▪ Reading of textbook and journal papers</td><td>23Hrs.</td></tr>
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	▪ Assignment completion and writing	40 Hrs.
	Total student study effort	115 Hrs.
Reading List and References	1. Lillesand, T. and Keifer 2015, Remote Sensing and Image Interpretation, 7th ed.Wiley. 2. Mather, P. and Koch M. 2010, Computer processing of remotely sensed images, 4th Edition, Wiley. 3. Elachi C. and van Zyl J. 2021. Introduction to the Physics and Techniques of Remote Sensing, 3rd Edition, John Wiley & Sons, Inc. Recommended: 1. Campbell, J.B. and Wynne R.H. (2011). Introduction to remote sensing. Guilford Press, New York. 2011. 2. Robinson A. H. et al., (1996) Elements of Cartography. 6th Edition, Wiley & Sons, New York. Supplementary: 1. The International Journal of Remote Sensing, The Remote Sensing Society, UK. 2. ISPRS Journal of Photogrammetry and Remote Sensing. Elsevier, Amsterdam. 3. Photogrammetric Engineering and Remote Sensing**.** American Society of Photogrammetry, USA. 4. Remote Sensing of Environment. Elsevier. 5. IEEE Transactions on Geoscience and Remote Sensing. IEEE	