Subject Description Form

Subject Code	LSGI2373
Subject Title	**Surveying**
Credit Value	4
Level	2
Pre-requisite/ **Co-requisite/** **Exclusion**	Nil
Objectives	• To provide an understanding of the fundamental principles and techniques of land surveying. • To enable students become proficient in the use of conventional and modern land surveying equipment • To ensure the proper application of principles and methods when carrying out survey tasks.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: 1. Describe the functions and operation of modern survey equipment (L2) 2. Explain sources of errors in survey measurements and apply proper field procedures to reduce or eliminate these errors (L3) 3. Describe how a survey coordinate system is established and the conversion from one plane coordinate system to another (L2) 4. Compare different control and positioning techniques and their booking methods (L3) 5. Correctly apply the control and positioning techniques under different site conditions and specification requirements (L3) 6. Confidently carry out the LSGI 2361A Field Scheme I project according to specification (L4)
Subject Synopsis/ Indicative Syllabus	**A. Basic Concepts** Geomatics, data collection, units of measurements, gradient, scale, direction and angle, orientation, geoid, ellipsoid, coordinate systems Fundamentals of plane coordinate computations: rectangular and polar coordinates, rectangular coordinates using distance and azimuth. **B. Operation of Modern Surveying Instruments** Construction and measurement principle of angular, distance and height determination instruments (digital theodolite, total station, leveling instrument). Instrumental errors. Error checking, calibration, and corrections.

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C. Measurement Techniques

Taping, ordinary leveling, theodolite observation, trigonometric heighting.

D. Basic Positioning Techniques

Radiation, angular and length intersection, 2-point resection, 3-point resection

E. Control Survey

Horizontal and vertical control, site reconnaissance, triangulation, trilateration, triangulateration, traverse, survey monumentation.

F. Basic Principle of Satellite Positioning

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<tr><td>Teaching/Learning Methodology</td><td>Lectures are designed with an hour of teaching and half-hour for learning feedback. Basic principles and computation methods are introduced in lecture and trials on the application methods and computation examples are done in the learning feedback section. The subject materials, video demonstrations, work examples, useful web sites and required readings will be uploaded to the on-line platform for students' easy reference. Students' practical skills will be developed through a series of practical exercises. After finishing these exercises, students will be able to confidently carry out LSGI2361 Field Scheme I project. The concept of team work and team spirit will be promoted in field practical exercises.</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="6">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><td>6</td></tr>
<tr><td>1. Phase tests</td><td>15</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>2. Practical work</td><td>15</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>3. Survey camp</td><td>20</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>4. Examination</td><td>50</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>5. Online Tutorial on Academic Integrity</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>100</td><td colspan="6"></td></tr>
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Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Students' practical and equipment operation skills will be continuously assessed in field practical exercises and practical test. Students'

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	understanding on different expected learning outcomes and the integrated knowledge will be assessed by the final test and a mini project. Proper proportion of questions at different difficulty levels will be set to evaluate students' achievement in different outcome objectives. In order to gain a pass for this subject, students of the HDG Programme are required to complete the Online Tutorial on Academic Integrity. The Tutorial's eCertificate must be submitted with the final report (of the survey camp). Failure to submit the eCertificate will result in failure of this subject.	
Student Study Effort Expected	Class contact:	
	▪ Lectures	26 Hrs.
	▪ Field practical exercises	44 Hrs.
	▪ Survey camp	40 Hrs.
	Other student study effort:	
	▪ Reading and report writing	30 Hrs.
	Total student study effort	140 Hrs.
Reading List and References	Textbook: Schofield, W. (2007). *Engineering Surveying*. 6th ed., Elsevier. Recommended: Bannister, A., Raymond, S. and Baker, R. (1998). *Surveying*. 7th Edition, Pearson Prentice Hall. Vosselman, G., Maas. H.-G. (2010). *Airborne and Terrestrial Laser Scanning.* Whittles Publishing. Armenakis, C., Patias, P. (2019). *Unmanned Vehicle Systems for Geomatics: Towards Robotic Mapping.* Whittles Publishing. Xing, M., Lu, Z., Yu, H. (2020). *InSAR and Data Processing.* MDPI – Multidisciplinary Digital Publishing. Dong, P., Chen, Q. (2017). *LiDAR Remote Sensing and Applications.*Taylor & Francis Group.	