Subject Description Form

Subject Code	LSGI3349
Subject Title	**Geodesy**
Credit Value	3
Level	3
Pre-requisite	LSGI2373 Surveying
Objectives	The objectives of this subject are: 1. To expose the students to the underlying theoretical aspect of their professional surveying practices relating to the earth's model, and computational methods. 2. To understand reference frames and transformation methods
Intended Learning Outcomes	Upon completion of the subject, students will be able to: 1. Explain high level geodetic concepts, such as shape of the earth, reference surfaces, datum (L1, L2) 2. Explain their roles in relation to Hong Kong's horizontal and vertical control and surveying practices (L2) 3. Carry out geodetic data reduction and computations on a ellipsoid model (L3) 4. Carry out transformations between local, regional and global coordinate systems (L3)
Subject Synopsis/ Indicative Syllabus	**A. Shape of the Earth** Sphere, ellipsoid, geoid **B. Rotational Ellipsoid** Fundamental ellipsoidal parameters, geodesic, meridional and prime vertical sections **C. Coordinate Systems and Transformation** Cartesian, spherical, geodetic, geographic coordinates ellipsoidal (geodetic) to Cartesian coordinates and vice versa **D. Geodetic Datum** Global and local astronomical coordinate systems and deflection of vertical (DV), datum definition, best fitting ellipsoid and global datum, ITRF, WGS84, transformation between local, regional and global datum, Hong Kong datum and datum transformations **E. Horizontal Control** Geodetic networks, Reduction of observed distances to the ellipsoid, computations on the ellipsoid, direct and inverse problem

<table>
<tr><td></td><td>Hong Kong horizontal control, Hong Kong map projections

F. Vertical Control
Geodetic height, orthometric height, geoid undulation
Hong Kong vertical control</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>This is a bridging subject aims to familiarize the students with the underlying and high level geodetic concepts that are immediately relevant to their professional surveying practices. Students are exposed to the new concepts through lectures and reading materials. Assignments are designed to relate these concepts to their significance in professional surveying applications in Hong Kong.</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="4">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></tr>
<tr><td>1. Assignments</td><td>20</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>2. Test</td><td>20</td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>3. Examination</td><td>60</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="4"></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 assignments. A phase test will be given to assess students' basic understanding of geodetic concepts independently. Assignments will be used to assess students' appreciation of geodetic theory and their applications in control networks. A written examination will test students' knowledge on geodetic theory and how to use the theory to solve problems in control networks.
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<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures/tutorials</td><td>39 Hrs.</td></tr>
<tr><td>▪ Practical</td><td>10 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Self-study, reading and revision</td><td>56 Hrs.</td></tr>
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	Total student study effort	105 Hrs.
Reading List and References	1. Torge, W. (1991). *Geodesy*, Walter de Gruyter & Co., Berlin. 2. Hofman-Wellenhof, B., H. Lichtenegger, J. Collins, (1993). *GPS, Theory and Practice*. Springer Verlag. 3. Smith, J.R., (1997). *Introduction to Geodesy*, Wiley Series. 4. Vanicek, P. (1986). *Geodesy, the Concepts*, 2nd edition, North-Holland.	