Subject Description Form

Subject Code	LSGI2224
Subject Title	**Geo-referencing Systems**
Credit Value	3
Level	2
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	The objectives of this subject are: 1. To provide an understanding of the fundamental concepts of Space-time reference systems and realization of geodetic datum in local and global scale 2. To be able to use various map projections for different applications, with a focus on the Hong Kong Reference Systems
Intended Learning Outcomes	At the end of this subject students who gain a pass will be able to: 1. Describe the basic concepts of various geodetic space and time reference systems (L2) 2. Use various transformations for different geodetic reference systems (L3) 3. Understand geodetic datum and realization of reference frames (L2) 4. Apply different map projection methods for various applications (L3)
Subject Synopsis/ Indicative Syllabus	A. Concepts of geodetic space and time reference systems B. Coordinate and time systems in geodesy Earth-fix earth-centred system, Ellipsoidal system, Astronomic System, Celestial system, time systems C. Transformations among various coordinate systems D. Local and global geodetic datum E. Realization of Reference frame F. Concepts of Map projections G. Universal Transverse Mercator (*UTM*) *Projection* H. Hong Kong Geodetic Datum and Map Projection

<table>
<tr><td>Teaching/Learning Methodology</td><td>Students are exposed to the new concepts through lectures and extensive reading materials</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. Assessment</td><td>40%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>2. 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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Students’ understanding on different expected learning outcomes on the concepts, methodology and theories will be assessed with continuous assignments, phase test and a final exam. Students’ abilities and skills of analytical, critical and creative thinking will be assessed with challenging problems embedded in the test and exam.</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures</td><td>26 Hrs.</td></tr>
<tr><td>▪ Tutorial</td><td>13 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Self study, reading and revision</td><td>66 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>105 Hrs.</td></tr>
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</td></tr>
<tr><td>Reading List and References</td><td>

Map projection transformation : principles and applications / Qihe H. Yang, John P. Snyder, Waldo R. Tobler (2000)
Map projections : cartographic information systems / Erik W. Grafarend, Rey-Jer You, Rainer Syffus (2014)
Jonathan IIiffe, Roger Lott (2008). Datums and Map Projections For Remote Sensing, GIS and Surveying. 2nd Edition, Whittles Publishing.
Soffel, M., & Langhans, R. (2013). Space–Time. In Space-Time Reference Systems (pp. 49-60). Springer, Berlin, Heidelberg.
Van Sickle, J. (2017). Basic GIS coordinates. CRC press.

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	6. Boucher, C., & Wilkins, G. A. (Eds.). (2012). *Earth Rotation and Coordinate Reference Frames: Edinburgh, Scotland, August 10–11, 1989* (Vol. 105). Springer Science & Business Media. 7. Geodesy / Wolfgang Torge, Jürgen Müller(2012) 8. Mugnier, C. J. (2022) Coordinate Systems of the World: Datums and Grids. 9. Introduction to geometrical and physical geodesy : foundations of geomatics / Thomas H. Meyer (2010) 10. Vanicek, P., & Krakiwsky, E. J. (2015).*Geodesy: the concepts*. Elsevier. 11. Hooijberg, M. (2008). *Geometrical geodesy*. Springer, Berlin.