Subject Description Form

Subject Code	LSGI2281
Subject Title	**Mapping Science**
Credit Value	3
Level	2
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	1. To give students a basic knowledge of topographic maps, essential elements of their design and the data sources used. 2. Provide a clear insight into the concepts and representations of scale, relief and features with respect to topographic maps. 3. Provide a sound base relating to coordinate systems and projections used in topographic mapping. 4. Familiarise students with the mapping systems used in Hong Kong. 5. Introduce the basics of spatial data infrastructure (SDI) and building information modelling (BIM).
Intended Learning Outcomes	Upon completion of the subject, students will be able to: 1. Be familiar with the essential elements of topographic maps (L1) 2. Know the basic sources of data used to create topographic maps (L2) 3. Be able to convert field data into a simple topographic map (L2) 4. Articulate the principles of scale, direction, elevation, projection and coordinate transformation (L2) 5. Have the basic knowledge of Hong Kong maps to provide the foundation for future projects using both hardcopy and digital maps (L2) 6. Have the basic understanding of elementary SDI and BIM and their interoperability (L2)
Subject Synopsis/ Indicative Syllabus	**A. Map concepts** The reduction of the real world to the symbolic, history of maps, data sources used to create maps, scale, grid, direction, elevation and projection. Raster, vector, hard copy and digital maps. **B. Hong Kong map systems** Topographic series (1:1000, 1:5000, 1:20000, 1:50000 & 1:100000), digital maps (iB1000, iB5000, iB10000 and iB20000), countryside series, geological series, map indexing system. **C. The concept of map scale**

	The concept of scale, its representation, influence of scale on map detail, map generalisation. **D. Creation of a simple plan / large-scale topographic map** Identify primary data sources (land surveying and GPS) and secondary data sources (aerial photos and remote sensing imagery), including both terrain and ground features **E. Map symbol systems and symbol perception** Principles, conventions, map layout, conventional symbols used in Hong Kong topographic maps. **F. Representation of relief, natural and cultural features** Terrain interpretation from spot height, contour, hypsometric colouring, hill shading, hydrographic features, vegetation, boundary, built-up areas, transportation. **G. Map projections** The Earth's geometry, planar and spherical coordinates, transformations, properties of projections and applications, examples from cylindrical, conical and azimuthal groups, UTM grid, Hong Kong Grid, transformation between different coordinate systems. **H. SDI and BIM** Basic concepts of SDI and BIM, importance of SDI and BIM for modern urban development and construction
Teaching/Learning Methodology	Teaching and learning materials will be placed on-line for students to download easily. Contact hours will be used for formal lectures, and practical work. Group projects will form a part of the practical work and this will introduce students to a problem-solving approach. Thereby, students will be encouraged to use initiative and explore a wide range of solutions. Channels for on-line discussion will be created whereby concepts and issues can be addressed informally, outside the classroom situation.
Assessment Methods in Alignment with Intended Learning Outcomes	

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		1	2	3	4	5	6
1. In-class practicals	40	√	√	√	√		
2. Test	10	√	√	√	√	√	√
3. Examination	50	√	√	√	√	√	√

	Total	100 %	

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. A phase test will be given to assess students' basic understanding of map design and interpretation independently. Practical work will be used to assess students' appreciation of the cartographic practice and skills gained during the course. A written examination will test students' independent skills of expression, as well as knowledge of map production and interpretation, and traditional mapping concepts.

Students need to pass both continuous assessment and examination in order to pass the whole subject.

Student Study Effort Expected	Class contact:	
	▪ Lectures/tutorials	26 Hrs.
	▪ Practicals	26 Hrs.
	Other student study effort:	
	▪ Preparation of practicals / tutorials	27 Hrs.
	▪ Self-study, reading and revision	26 Hrs.
	Total student study effort	105 Hrs.

Reading List and References

Textbooks:

1. Terry A. Slocum, Robert B McMaster, Fritz C. Kessler, Hugh.H Howard (2022). *Thematic Cartography and Geovisualization, 4th edition*, CRC Press
2. Kenneth Field (2018). *Cartography. 1st edition*; Esri Press

Recommended:

1. Keates, J.S. (1989). *Cartographic Design and Production*. 2nd ed., Longman Scientific & Technical.
2. Maling, D.H. (1993). *Coordinate Systems and Map Projections*. 2nd ed., Pergamon Press.
3. Przybyla J (2010). *The Next Frontier for BIM: Interoperability with GIS*, Journal of Building Information Modeling, The National Institute of Building Sciences. Washington, DC. pp. 14-18.