

## Subject Description Form

<b>Subject Code</b>	LSGI2652
<b>Subject Title</b>	<b>Utility Surveying and Management</b>
<b>Credit Value</b>	2
<b>Level</b>	2
<b>Pre-requisite/ Co-requisite/ Exclusion</b>	Nil
<b>Objectives</b>	<p>This is a fundamental subject for all the students enrolled in the programme. The aims of the subject are:</p> <ul style="list-style-type: none"> <li>• Providing an understanding of the fundamental knowledge and technologies of utility surveying and management of different utility types (drainage, sewerage, water supplies, power, gas, telecommunication, etc.) covered in subsequent years of specialized studies.</li> <li>• Enabling students to clearly understand the relationship between the subject knowledge and other disciplines in geomatics.</li> </ul>
<b>Intended Learning Outcomes</b>	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Describe the functions, characteristics and construction of subsurface utility of various kinds (L2)</li> <li>2. Describe the principles of various utility surveying and monitoring techniques (L2)</li> <li>3. Describe the utility's information management systems and their components (L2)</li> <li>4. Describe the role of utility surveying and management among broad disciplines (L2)</li> </ol>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p><b>A. Subsurface Utilities</b> Types of underground utilities; construction and attributes of each type of utility; mapping of subsurface utilities and its importance.</p> <p><b>B. Techniques for Utility Surveying</b> Positioning and condition survey. Understanding of record drawings, Electromagnetic detection (active and passive systems); Ground Penetrating Radar (GPR); interpretations of GPR images; sonar techniques for underwater utilities; acoustic techniques for leak positioning, CCTV inspection, utility health monitoring; stepped approach for different levels of tasks</p> <p><b>C. Utility Management</b> Database for subsurface utilities; utility information systems; utility operation and maintenance</p> <p><b>D. Utility Surveying and Management (USM) Profession</b></p>

	Academic and professional position of USM; knowledge structure for a USM profession; Hong Kong and China utility surveying associations; international perspective of USM							
<b>Teaching/Learning Methodology</b>	Lecture	Tutorial/practical	Experiment	Field survey	Guest lecture	Site visit	On-line learning	
	√		√	√				
	Students' understanding on different expected learning outcomes will be assessed continuously by essay writing and an end-term test. Proper proportion of questions at different difficulty levels will be set to evaluate students' achievement in different outcome objectives.							
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
			1	2	3	4		
	End-term test	50	√	√	√	√		
	A short group essay in week 3	10	√	√	√	√		
	A full group essay in week 13	40	√	√	√	√		
Total	100 %							
	Students' understanding on different expected learning outcomes will be assessed continuously by essay writing and an end-term test. Proper proportion of questions at different difficulty levels will be set to evaluate students' achievement in different outcome objectives. For group essays in week 3 and 13, student will select a topic of their own interest and opt for three levels of essay according to their ability and expectation: elementary level 1 positioning and mapping; intermediate level 2: condition survey and diagnosis; and advanced level 3: management perspective. The three levels will have different mark-grade conversion scales in which the level 1 is the strictest one. Students are required to make close link between the general principles, and one or more than one case-specific scenario(s) in or outside Hong Kong to encourage critical thinking.							
<b>Student Study Effort Expected</b>	Class contact:							
	▪ Lectures/experiment/field survey						26 Hrs.	
	Other student study effort:							
	▪ Self-study, reading and report						50Hrs.	
	Total student study effort						76 Hrs.	
<b>Reading List and References</b>	1. H. Jeong, C. Arboleda, D. Abraham, D. Halpin, L. Bernold (2003), <i>Imaging and Locating Buried Utilities</i> , Report no. FHWA/IN/JTRP-2003/12 Purdue							

	<p>University.</p> <ol style="list-style-type: none"> <li>2. Metje et al. (2007) Mapping the Underworld – State-of-the-art review (22): 568-586.</li> <li>3. Radiodetection Ltd. (2008) <i>abc &amp; xyz of locating buried pipes and cables for the beginner and the specialist</i>.</li> <li>4. Wong K. and Allan R.J. (2009) <i>Hong Kong Conduit Condition Evaluation Codes</i>, Utility Training Institute.</li> <li>5. Mark E. Everett (2013). <i>Near-surface applied geophysics</i>, Cambridge University Press.</li> <li>6. Hao et al. (2012) Condition assessment of the buried utility service infrastructure, <i>Tunnelling and Underground Space Technology</i> (28) 331-344.</li> <li>7. Liu Z., Kleiner Y. (2013) State of the art review of inspection technologies for condition assessment of water pipes, <i>Measurement</i> (46), 1-15.</li> <li>8. Birken R. and Oristaglio M. (2014) Ch. 12 Mapping subsurface utilities with mobile electromagnetic geophysical sensor arrays, in <i>Sensor Technologies for Civil Infrastructures: Applications in Structural Health Monitoring</i>, Ed. by Ming L. Wang, Jerome P. Lynch, Hoon Sohn. Woodhead Publishing.</li> <li>9. Occupational Safety and Health Administration. (2018). <a href="#"><i>OSHA Training Toolbox Talk: Working Safely Around Underground Utilities at Excavation Sites</i></a>.</li> <li>10. Salazar, D. (2020). <a href="#"><i>Underground Locators: Everything You Need to Know</i></a>. Engineer Warehouse Learning Center. Retrieved 06 June 2020.</li> <li>11. British Standards Institution (BSI) PAS 128:2022 (2022) Specification for underground utility detection, verification and location.</li> <li>12. Department of Land Surveying and Geo-Informatics (LSGI) (2019), <i>Specifications 1,1 Pipe Cable Locating/Electromagnetic Locating</i>.</li> <li>13. Department of Land Surveying and Geo-Informatics (LSGI) (2019) <i>Specification 1,2 Ground Penetrating Radar (GPR)</i>.</li> <li>14. Department of Land Surveying and Geo-Informatics (LSGI) (2021) <i>Specification 1,3 Laser Scanning Survey (LiDAR)</i>.</li> <li>15. Department of Land Surveying and Geo-Informatics (LSGI) (2021) <i>Specification 2,1 Visual Inspection</i>.</li> <li>16. Department of Land Surveying and Geo-Informatics (LSGI) (2019) <i>Specification 2,2 Acoustic Leak Detection (ALD)</i>.</li> <li>17. Department of Land Surveying and Geo-Informatics (LSGI) (2021) <i>Specification 2,3 Flow monitoring for Drains/Sewers (FM)</i>.</li> </ol>
--	---