

### Subject Description Form

<b>Subject Code</b>	LSGI523
<b>Subject Title</b>	Smart Cities: Technologies and Solutions
<b>Credit Value</b>	3
<b>Level</b>	5
<b>Pre-requisite/ Co-requisite/ Exclusion</b>	Nil
<b>Objectives</b>	This course aims to provide an in-depth view into the core concepts of smart cities, the key technologies that underpin their developments, as well as various urban solutions and policy implications. Students will obtain a comprehensive view of the history and evolution of smart cities, the role of new technologies (e.g., urban computing, spatial data infrastructure, artificial intelligence, internet of things), as well as government structures, ideologies and notions of citizenship in shaping Smart City initiatives.
<b>Intended Learning Outcomes</b>	Upon completion of the subject, students will be able to: <ol style="list-style-type: none"> <li>a. Identify salient spatial, technological and governance characteristics of smart cities</li> <li>b. Obtain in-depth knowledge of emerging technologies and solutions for smart city developments</li> <li>c. Participate in a social science discourse on smart city developments in Hong Kong, the Greater Bay Area (GBA) and beyond</li> <li>d. Critically analyze and evaluate smart city initiatives with respect to contents, sectors, governance and citizenship, and meanwhile, develop ideas to design smart city initiatives</li> </ol>
<b>Subject Synopsis/ Indicative Syllabus</b>	<ol style="list-style-type: none"> <li>1. Introduction to smart cities <ul style="list-style-type: none"> <li>• Smart city concepts, characteristics, and components</li> <li>• History and evolution of smart cities</li> <li>• Overview of the state-of-art technologies</li> </ul> </li> <li>2. Smart city infrastructures and technologies <ul style="list-style-type: none"> <li>• Urban sensing and internet of things</li> <li>• Spatial big data analytics</li> <li>• Artificial intelligence</li> <li>• Information and communication technologies (ICTs)</li> <li>• 3D spatial data infrastructure</li> <li>• Cloud &amp; edge computing</li> <li>• Urban computing</li> <li>• Robotics</li> <li>• Human-Machine Interactions</li> </ul> </li> <li>3. Smart city solutions – perspectives from governments, industries, and academia. <ul style="list-style-type: none"> <li>• Smart <i>governance</i> (e.g., Common Spatial Data Infrastructure and interoperability)</li> <li>• Smart <i>environment</i> (e.g., urban air quality monitoring and control; water pollution, urban heat island; urban light pollution; urban tree management)</li> </ul> </li> </ol>

	<ul style="list-style-type: none"> <li>• Smart <i>mobility</i> (e.g., traffic management in cities; walkability)</li> <li>• Smart <i>economy</i> (e.g., financial technologies; smart tourism; construction and property management)</li> <li>• Smart <i>living</i> (e.g., ageing population; smart home; sustainable urban development)</li> <li>• Smart <i>people</i> (e.g., education on smart cities)</li> </ul> <p>4. Privacy and ethics</p> <p>5. Student innovation on future smart cities</p> <ul style="list-style-type: none"> <li>• Direct students to propose a new idea on smart cities in one of the six areas mentioned above (or beyond) using the latest technologies</li> <li>• Write a report on the feasibility, design and implementation of the idea</li> <li>• Use PolyU Campus or the city of Hong Kong as a living laboratory for the design</li> <li>• Present on the design to the whole class and invite guests from industry or public sectors who are interested in smart cities proposals</li> </ul>																						
<p><b>Teaching/Learning Methodology</b></p>	<p>1. Lectures and seminars to explain smart city concepts, government practices, and technological innovations in smart cities.</p> <p>2. Extracurricular reading and in-class presentations to reinforce learning experiences</p> <p>3. A final report that allows students to provide a comprehensive review of smart city development &amp; initiatives in contemporary cities, along with their proposed urban solutions by incorporating the latest smart city technologies.</p>																						
<p><b>Assessment Methods in Alignment with Intended Learning Outcomes</b></p>	<table border="1" data-bbox="438 1108 1385 1429"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="4">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> </tr> </thead> <tbody> <tr> <td>1. Continuous Assessment</td> <td>100%</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>Total</td> <td>100%</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Generative AI can only serve as a tool for assisting initial idea development and proofreading for project presentation and report, and any involvement of generative AI tools must be clearly acknowledged and referenced. Students are required to make close link between the subject contents and the proposed case-specific scenario to encourage critical thinking.</p>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)				a	b	c	d	1. Continuous Assessment	100%	✓	✓	✓	✓	Total	100%				
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**Reading List and  
References**

Noveck, Beth Simone. Smart citizens, smarter state: The technologies of expertise and the future of governing. Harvard University Press, 2015.

Batty, Michael, et al. "Smart cities of the future." The European Physical Journal Special Topics 214.1 (2012): 481-518.

Nam, Taewoo, and Theresa A. Pardo. "Conceptualizing smart city with dimensions of technology, people, and institutions." Proceedings of the 12th annual international digital government research conference: digital government innovation in challenging times. ACM, 2011.

Townsend, Anthony M. Smart cities: Big data, civic hackers, and the quest for a new utopia. WW Norton & Company, 2013.

Singleton, Alex D., Seth Spielman, and David Folch. Urban analytics. Sage, 2017.