Subject Description Form

Subject Code	LSGI3804
Subject Title	**Urban Big Data Analytics**
Credit Value	3
Level	3
Pre-requisite	Nil
Objectives	This course aims to provide in-depth knowledge and hands-on techniques on urban big data analytics. This course will introduce the concept of urban big data, and the methods for acquiring, processing, and analyzing these data sets. It will also introduce applications for urban planning, environmental analysis, transportation and mobility, housing, urban sustainability and resilience, business intelligence, and urban socio-economics.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Understand the definition and principles of urban big data (1) b. Obtain broad knowledge in fundamental concepts, algorithms and techniques for big data mining and their applications to large-scale data warehouses and big data analytics (2) c. Understand solutions and issues in big data mining and analytics (3)
Subject Synopsis/ Indicative Syllabus	A. Introduction of urban big data B. Big data acquisition C. Big data processing and management o Aggregation o Systematic, stochastic, and gross error cleaning o Database technologies and spatiotemporal indexing D. Method and techniques in big data analysis and mining o Urban big data mining and knowledge discovery o Distributed and parallel computing o Deep learning and artificial intelligence o Visualization of urban big data o Bias of urban big data E. Urban big data applications o Transportation o Traffic monitoring o Urban planning o Smart cities o Urban logistics o Urban infrastructure

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Business intelligence
Internet of things

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<tr><td>Teaching/Learning Methodology</td><td>1. Lectures to explain theories and methodology;
2. Assignments to reinforce the theories and methodology introduced during the lectures, so as to enable students to gain deeper understanding of the principles and techniques, to become critical in thinking; and
3. A group project is designed to enhance the critical thinking, team spirit, problem solving skill, leadership and presentation skill.</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="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td></td><td></td><td></td></tr>
<tr><td>1. Lab assignments</td><td>30%</td><td>√</td><td>√</td><td>√</td><td></td><td></td><td></td></tr>
<tr><td>2. Project (Report and presentation)</td><td>70%</td><td>√</td><td>√</td><td>√</td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="6"></td></tr>
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<tr><td>Student Study Effort Expected</td><td>
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<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures</td><td>26 Hrs.</td></tr>
<tr><td>▪ Lab Sessions</td><td>26 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Project</td><td>60 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>112 Hrs.</td></tr>
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<tr><td>Reading List and References</td><td>Zheng Yu. Urban Computing. MIT Press, 2019.
Wang, S. and Goodchild, M. F. CyberGIS for Geospatial Innovation and Discovery. Springer, Dordrecht, Netherlands, 2018.
Townsend, Anthony M. Smart cities: Big data, civic hackers, and the quest for a new utopia. WW Norton & Company, 2013.
O'sullivan, David, and David Unwin. Geographic information analysis. John Wiley & Sons, 2014.
O'sullivan, Arthur. Urban economics. McGraw-Hill/Irwin, 2007.</td></tr>
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