Subject Description Form

Subject Code	BRE470
Subject Title	Information Technology and Building Information Modelling for Construction
Credit Value	3
Level	4
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	This subject is intended to develop an understanding of the practical application of computer systems and packages in building life cycle process and the application of building information modelling (BIM) in construction.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. understand and demonstrate knowledge of building life cycle process. b. understand and demonstrate knowledge of the application of computer systems, BIM, Artificial Intelligence (AI), and Big Data analytics in various procurement stages of a building project. c. appraise commercially available and tailor-made computer packages and BIM application in building life cycle process.
Subject Synopsis/ Indicative Syllabus	The process of building life cycle. Identifying the benefits of construction IT/ BIM applications. Understanding core values of BIM, and its applicability in construction practice. The appraisal of IT/BIM systems in design, cost planning, procuring, project management and facility management. Understanding the fundamental theories behind AI and Big Data analytics, and existing tools. Exploring the use of AI and Big Data analytics in various construction applications. Exploring the extended use of BIM by combining it with AI and Big Data analytics.

<table>
<tr><td>Teaching/Learning Methodology</td><td>Lectures and tutorials will be run throughout the semester period. A lecture schedule outlining the topics to be covered will be distributed to students in the first lecture of the semester. During the tutorials, students will be required to assess and use various IT/BIM tools (e.g., Revit, Navisworks, AI/Big Data analytics packages) and to prepare group assignments.</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>a</td><td>b</td><td>c</td><td></td><td></td><td></td></tr>
<tr><td>1. Individual Assignments (Tutorials)</td><td>20%</td><td>√</td><td>√</td><td>√</td><td></td><td></td><td></td></tr>
<tr><td>2. Focus Study Report (Group project)</td><td>30%</td><td>√</td><td>√</td><td>√</td><td></td><td></td><td></td></tr>
<tr><td>2. Examination</td><td>50%</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>
</table>
Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Coursework and examination will each constitute 50% of the overall assessment for the subject. The coursework mark will be based on the individual assignments and one group project (i.e., a focus study on potential applications of IT systems, BIM, AI, and Big Data analytics to solve existing practical problems during the life cycle of the building projects).

The examination will be based on a 2 hours examination gearing towards the materials covered in the lecture periods and background readings. Coursework by assignment and group projects will be set to assess the students' abilities and skills required in this subject.
</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>▪ Tutorials / Laboratory sessions</td><td>13 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Self learning and recommended reading</td><td>90 Hrs.</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Total student study effort</td><td>129 Hrs.</td></tr>
</table>
</td></tr>
</table>

Reading List and References	ASCE Journal of Computing in Civil Engineering (http://*www.asce.org).* *Automation in Construction*. An International Research Journal. (http://*www.elsevier.com/locate/autocon).* Bryde, D., Broquetas, M. and Volm, J.M. (2013). *The Project Benefits of Building Information Modelling (BIM)*, International Journal of Project Management, Volume 31, Number 7, pp. 971-980. Construction Industry Council (2014/15), Roadmap / Standard for Building Information Modelling in Hong Kong's Construction Industry. Eastman, C., Eastman, C.M., Teicholz, P., Sacks, R. and Liston, K. (2011). BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors, John Wiley & Sons. Electronic Journal of Information Technology in Construction (http://*www.itcon.org).* Azhar, S. (2011). Building information modeling (BIM): Trends, benefits, risks, and challenges for the AEC industry. Leadership and management in engineering, 11(3), 241-252. Gu, N., & London, K. (2010). Understanding and facilitating BIM adoption in the AEC industry. Automation in construction, 19(8), 988-999. Darko, A., Chan, A. P., Adabre, M. A., Edwards, D. J., Hosseini, M. R., & Ameyaw, E. E. (2020). Artificial intelligence in the AEC industry: Scientometric analysis and visualization of research activities. Automation in Construction, 112, 103081. Bilal, M., Oyedele, L. O., Qadir, J., Munir, K., Ajayi, S. O., Akinade, O. O., ... & Pasha, M. (2016). Big Data in the construction industry: A review of present status, opportunities, and future trends. Advanced engineering informatics, 30(3), 500-521.