

Subject Description Form

Subject Code	BRE472
Subject Title	Information Technology and Building Information Modelling for Construction Management
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	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> 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	<p>The process of building life cycle.</p> <p>Identifying the benefits of construction IT/ BIM applications.</p> <p>Understanding core values of BIM, and its applicability in construction practice.</p> <p>The appraisal of IT/BIM systems in design, cost planning, procuring, project management and facility management.</p> <p>Understanding the fundamental theories behind AI and Big Data analytics, and existing tools.</p> <p>Exploring the use of AI and Big Data analytics in various construction applications.</p> <p>Exploring the extended use of BIM by combining it with AI and Big Data analytics.</p>

Teaching/Learning Methodology	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.																																																				
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1" data-bbox="440 412 1473 1025"> <thead> <tr> <th data-bbox="440 412 740 591" rowspan="2">Specific assessment methods/tasks</th> <th data-bbox="745 412 906 591" rowspan="2">% weighting</th> <th colspan="6" data-bbox="911 412 1473 517">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th data-bbox="911 524 1027 591">a</th> <th data-bbox="1032 524 1114 591">b</th> <th data-bbox="1118 524 1200 591">c</th> <th data-bbox="1204 524 1286 591"></th> <th data-bbox="1291 524 1372 591"></th> <th data-bbox="1377 524 1473 591"></th> </tr> </thead> <tbody> <tr> <td data-bbox="440 598 740 734">1. Individual Assignments (Tutorials)</td> <td data-bbox="745 598 906 734">20%</td> <td data-bbox="911 598 1027 734">√</td> <td data-bbox="1032 598 1114 734">√</td> <td data-bbox="1118 598 1200 734">√</td> <td data-bbox="1204 598 1286 734"></td> <td data-bbox="1291 598 1372 734"></td> <td data-bbox="1377 598 1473 734"></td> </tr> <tr> <td data-bbox="440 741 740 878">2. Focus Study Report (Group project)</td> <td data-bbox="745 741 906 878">30%</td> <td data-bbox="911 741 1027 878">√</td> <td data-bbox="1032 741 1114 878">√</td> <td data-bbox="1118 741 1200 878">√</td> <td data-bbox="1204 741 1286 878"></td> <td data-bbox="1291 741 1372 878"></td> <td data-bbox="1377 741 1473 878"></td> </tr> <tr> <td data-bbox="440 884 740 954">2. Examination</td> <td data-bbox="745 884 906 954">50%</td> <td data-bbox="911 884 1027 954">√</td> <td data-bbox="1032 884 1114 954">√</td> <td data-bbox="1118 884 1200 954">√</td> <td data-bbox="1204 884 1286 954"></td> <td data-bbox="1291 884 1372 954"></td> <td data-bbox="1377 884 1473 954"></td> </tr> <tr> <td data-bbox="440 960 740 1025">Total</td> <td data-bbox="745 960 906 1025">100%</td> <td colspan="6" data-bbox="911 960 1473 1025"></td> </tr> </tbody> </table> <p data-bbox="440 1032 1473 1115">Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p data-bbox="440 1167 1473 1361">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).</p> <p data-bbox="440 1391 1473 1547">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.</p>							Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a	b	c				1. Individual Assignments (Tutorials)	20%	√	√	√				2. Focus Study Report (Group project)	30%	√	√	√				2. Examination	50%	√	√	√				Total	100%						
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Student Study Effort Expected	Class contact:																																																				
▪ Lectures			26 Hrs.																																																		
▪ Tutorials / Laboratory sessions			13 Hrs.																																																		
Other student study effort:																																																					
▪ Self learning and recommended reading			90 Hrs.																																																		
Total student study effort			129 Hrs.																																																		

**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.

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(<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.