

Subject Description Form

Subject Code	BSE3513
Subject Title	Engineering Management and Building Information Modeling
Credit Value	3
Level	3
Pre-requisite Co-requisite Exclusion	Nil Nil Nil
Objectives	<ol style="list-style-type: none"> 1. Familiarises students with basic contract administration in building services engineering works. 2. Enables students to understand and apply management science techniques and procedures to the practice of building services engineering. 3. Offers students a practical, hands-on introduction to Building Information Modelling and related computer based techniques for the documentation and modelling of building design
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a) explain the basics, benefits and drawbacks of various forms of procurement, tendering, and contractual arrangements for a building services engineering project; b) explain the legal rights, obligations, responsibilities and liabilities in the provisions in the standard forms of building services contract as well as disputes resolution mechanisms; c) apply cost, time and resources control for building services installation in construction projects; and d) apply management science techniques for project management; e) understand recent development in Building Information Modelling and be able to translate this knowledge into their own professional background; and f) gain hands-on modelling and analytical skills and are able to use a range tools to conduct modelling and analysis work as well as team collaboration practices.
Subject Synopsis/ Indicative Syllabus	<p>A review of project procurement methods adopted by the Hong Kong construction and facility management sectors: conventional contractual arrangement, design and build, management contracting, project management, build-operate-transfer, etc.</p> <p>Tendering and estimating: Introduction to tender documentation and tendering process; competition and negotiation; contractor selection and nomination; quantity surveying practice for building services installation; bills of quantities; unit rate build-up, sub-contract work, preliminaries and temporary works.</p> <p>Contractual arrangements: Types of building contracts and sub-contracts; contractual arrangements; contract documentation; standard form of contracts and sub-contracts; rights and obligations of contracting parties; architects instructions; possession of site; practical completion; defects rectification and liability; variations, reimbursement of loss and expense; recovery of fluctuations; insurance. Contract stages and procedures; planning and programming of work; statutory requirement; liaison with statutory bodies and authorities; contract payments and accounts.</p> <p>Resolution of disputes: Contract provisions and procedures for arbitration and mediation; litigation; alternative dispute resolution.</p> <p>Application of management science principles and techniques for project management, planning and control: Project management techniques; Gantt charts, network flow models; cash flow planning; cost, time and resource planning and control; understanding of project management software in control process & lifecycle costing analysis; decision tree, decision making and risk analysis.</p> <p>A review and application of Building Information Modelling and related computer based techniques for building design and documentation in Building Services Engineering Industry: Revit as an example of BIM application, parametric modelling, BIM for design collaboration and decision-making.</p>

Teaching/Learning Methodology	A problem based approach will be adopted in the delivering of this subject. Contact sessions will comprise a combination of lectures, tutorials/mini-workshops. Case studies will be given for students to work in groups to solve real-life problems.																																																					
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1" data-bbox="403 398 1353 853"> <thead> <tr> <th data-bbox="403 398 708 495" rowspan="2">Specific assessment methods/tasks</th> <th data-bbox="708 398 863 495" rowspan="2">% weighting</th> <th colspan="6" data-bbox="863 398 1353 495">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th data-bbox="863 495 948 555">a,b</th> <th data-bbox="948 495 1032 555">c, d</th> <th data-bbox="1032 495 1115 555">e</th> <th data-bbox="1115 495 1200 555">f</th> <th data-bbox="1200 495 1284 555"></th> <th data-bbox="1284 495 1353 555"></th> </tr> </thead> <tbody> <tr> <td data-bbox="403 555 708 616">In-class assessment I</td> <td data-bbox="708 555 863 616">20</td> <td data-bbox="863 555 948 616">✓</td> <td data-bbox="948 555 1032 616">✓</td> <td data-bbox="1032 555 1115 616"></td> <td data-bbox="1115 555 1200 616"></td> <td data-bbox="1200 555 1284 616"></td> <td data-bbox="1284 555 1353 616"></td> </tr> <tr> <td data-bbox="403 616 708 676">Group Project</td> <td data-bbox="708 616 863 676">20</td> <td data-bbox="863 616 948 676"></td> <td data-bbox="948 616 1032 676"></td> <td data-bbox="1032 616 1115 676">✓</td> <td data-bbox="1115 616 1200 676">✓</td> <td data-bbox="1200 616 1284 676"></td> <td data-bbox="1284 616 1353 676"></td> </tr> <tr> <td data-bbox="403 676 708 781">End-of-semester examination</td> <td data-bbox="708 676 863 781">60</td> <td data-bbox="863 676 948 781">✓</td> <td data-bbox="948 676 1032 781">✓</td> <td data-bbox="1032 676 1115 781">✓</td> <td data-bbox="1115 676 1200 781">✓</td> <td data-bbox="1200 676 1284 781"></td> <td data-bbox="1284 676 1353 781"></td> </tr> <tr> <td data-bbox="403 781 708 853">Total</td> <td data-bbox="708 781 863 853">100</td> <td colspan="6" data-bbox="863 781 1353 853"></td> </tr> </tbody> </table> <p data-bbox="403 902 1442 965">Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p>								Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a,b	c, d	e	f			In-class assessment I	20	✓	✓					Group Project	20			✓	✓			End-of-semester examination	60	✓	✓	✓	✓			Total	100						
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Reading List and References	<p data-bbox="403 1514 1278 1543">Ashworth, A. Contractual Procedures in the Construction Industry, Prentice Hall.</p> <p data-bbox="403 1559 1481 1588">Ashworth, A. Pre-contract Studies: Development Economics, Tendering and Estimating, Blackwell.</p> <p data-bbox="403 1603 1110 1632">Hills, M. Building Contract Procedures in Hong Kong, Longman.</p> <p data-bbox="403 1648 1145 1677">Taylor III, B.W. Introduction to Management Science, Prentice Hall.</p> <p data-bbox="403 1693 1485 1760">McGraw Hill Construction, 2008, Building Information Modelling (BIM): Transforming Design and Construction to Achieve Greater Industry Productivity, New York, United States.</p> <p data-bbox="403 1776 1485 1843">Wallace, I.N.D. Hudson's Building and Engineering Contracts: including the duties and liabilities of architects, engineers and surveyors, Sweet & Maxwell.</p> <p data-bbox="403 1872 1406 1939">Agreement & Schedule of Conditions of Building Contract for use in the Hong Kong Special Administrative Region, Standard Form of Building Contract - With Quantities, 2005 Edition.</p>																																																					