

## Subject Description Form

<b>Subject Code</b>	BRE453
<b>Subject Title</b>	Building Services II
<b>Credit Value</b>	3
<b>Level</b>	4
<b>Pre-requisite /</b>	BRE349
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. Provide further knowledge of building services engineering systems, including the ventilation and air conditioning system, acoustics and vibration control systems, and information systems;</li> <li>2. Understand the importance of the quality of installation and proper co-ordination on the overall performance and maintainability of buildings;</li> <li>3. Provide students an understanding that sustainability can be achieved by environmental-friendly design of building services systems.</li> </ol>
<b>Intended Learning Outcomes</b>	<p><i>Students will demonstrate their ability to:-</i></p> <ol style="list-style-type: none"> <li>a. Understand the principles and various attributes of ventilation and air conditioning systems;</li> <li>b. Have an understanding of the importance of energy conservation in buildings for environmental protection, and the use of renewable resources in buildings for sustainability;</li> <li>c. Perform analyses on acoustic and vibration control of building services systems;</li> <li>d. Have an understanding of the concepts of green buildings, intelligent building, building automation, and information system of buildings;</li> <li>e. Properly co-ordinate the installation, commissioning and maintenance of various building services systems; and perform life-cycle cost analysis for selection of appropriate building services systems.</li> </ol>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p>Integrated design: factors affecting selection of services/systems. Provision of space in the building to accommodate building services. Structural integrity of building services equipment. Sound and vibration attenuation features. Provisions for safe operation and maintenance.</p> <p>Building services engineering system for intelligent buildings: introduction to information transmission systems, communication and protection system, call systems, public address system and Building automation/management systems.</p> <p>The concepts and importance of energy conservation and energy efficiency for environmental protection, environmental protection and maintenance of building services systems, selection of environmentally friendly products and materials used in building services systems.</p>

	<p>Co-ordination and management of design and installation of various building services systems during the design and construction stages in particular the builder's works; and testing and commissioning of building services systems.</p> <p>Indoor air quality and sick building syndrome.</p> <p>The impacts of life-cycle-cost on planning and implementation. An appreciation of capital and operating costs. Implication of low cost inefficient equipment, poor installation, inadequate access for maintenance.</p>																																	
<p><b>Teaching/Learning Methodology</b></p>	<p>The subject can be divided into three main parts; introduction to complex building services systems; management, co-ordination, installation and maintenance of the building services systems; and introduction to sustainable buildings and environmental-friendly design of building services systems.</p> <p>A “case oriented” approach is to be adopted for teaching the subject; A number of up-to-date case studies on building services systems of high-rise buildings are used to illustrate the current state-of-the-art on the design and operation of complex building service systems. Where applicable, practitioners from the industries will be invited to present lecture on the management of the building services installations and on operation and maintenance of building services systems.</p> <p>The subject will be delivered through lectures, laboratories (where applicable) and small groups tutorials. The lectures and laboratories aim at introducing theories, concepts and practices whereas tutorials are for in-depth small group discussions.</p>																																	
<p><b>Assessment Methods in Alignment with Intended Learning Outcomes</b></p>	<table border="1" data-bbox="443 1084 1465 1462"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="5">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> <th>e</th> </tr> </thead> <tbody> <tr> <td>1. Coursework</td> <td>40</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>2. Examination</td> <td>60</td> <td>√</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> <td></td> </tr> </tbody> </table> <p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>Examination and coursework will contribute 60% and 40% of the overall mark for the subject respectively. Students must pass both the examination and coursework components in order to secure an overall pass for the subject.</p> <p>The coursework comprises a presentation and an in-class/online test. The presentation covers topics that has been introduced in the lecture/tutorials. Through the presentation, the learning experience is expected to be deepened. The in-class/online test in term of short questions for a variety of topics covered aims at reinforcing students' knowledge on fundamental principles and general skills on design and analysis building services system. The end-of –semester examination serves to assess the overall learning outcomes attainment with questions on both qualitative and qualitative domains.</p>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					a	b	c	d	e	1. Coursework	40	√	√	√	√	√	2. Examination	60	√	√	√	√	√	Total	100					
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<b>Student Study Effort Expected</b>	Class contact:	
	▪ Lectures	26 Hrs.
	▪ Tutorials	13 Hrs.
	Other student study effort:	
	▪ Independent study including assignments and project works	81 Hrs.
	Total student study effort	120 Hrs.
<b>Reading List and References</b>	<p><b>Reading List:</b></p> <p><b>Recommended:</b></p> <p>Grondzik, Walter T; Alison G. Kwok, (2019) <i>Mechanical and Electrical Equipment for Buildings</i>, 13th Edition, Wiley</p> <p>Chadderton D.V. (2013) <i>Building Services Engineering</i>, 6<sup>th</sup> ed., Taylor &amp; Francis.</p> <p>Greeno R. (2013) <i>Building Service, Technology and Design</i>, Routledge.</p> <p>CIBSE (1994) <i>Building Services Maintenance Management</i>, CIBSE</p> <p>CIBSE (2016). <i>Air Conditioning and Refrigeration</i>, CIBSE</p> <p><b>Supplementary:</b></p> <p>Various publications at Hong Kong Green Building Council</p> <p>Atkin B. (1993) <i>Intelligent Buildings: Application of IT and Building Automation to High Technology Construction Projects</i>, Unicom Seminars, England</p>	