

Subject Description Form

Subject Code	BSE1572
Subject Title	Introduction to Building Ecology
Credit Value	3
Level	1
Pre-requisite Co-requisite Exclusion	Nil Nil Nil
Objectives	<p>Buildings and urban environments are highly interconnected ecosystems. The specific objective of this subject is to enable students to acquire the right blend of building design strategies to use energy, materials, water, and land in the most efficient and effective manner to achieve building ecology.</p> <p>The aim of the subject is to enable students to:</p> <ul style="list-style-type: none"> ○ understand the interconnection between buildings and urban environments; ○ be aware of the needs of building ecology; ○ be aware of how buildings negatively impact building ecology; ○ devise strategies to achieve building ecology ; and ○ assess and review performance of different strategies.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ul style="list-style-type: none"> (a) consider the interconnection between the buildings and urban environments; (b) give an account of the importance of building ecology; (c) analyze the performance of different building designs; (d) identify strategies to help create building ecology; (e) apply strategies to achieve building ecology; and (f) evaluate effectiveness of different strategies. <p>Building ecology is a pattern of resource use that aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also in the indefinite future. The knowledge conveyed to the students is closely linked to work in the construction industry, and shall promote higher order thinking and equip them with skills for active enquiry and life-long learning.</p>
Subject Synopsis/ Indicative Syllabus	<p>Building ecology is very broad topic, embracing social, technological, economic and environmental aspects. This subject offers a good opportunity to combine students' knowledge from diverse fields in a coherent manner. The subject emphasizes the integration of the built, climatic and human components in achieving building ecology. The subject contents are aligned with the pyramid for ecological development as follows:</p> <p>Pyramid Base - Understanding the Needs</p> <ul style="list-style-type: none"> ○ Urban Environments: Introduction to today's earth, overview of ecosystems; impact of ecosystem destruction. ○ Buildings: Understanding the interconnection between buildings and urban environment; micro and macro environments, ecological impact. <p>Second Tier - Identifying the Problems</p> <ul style="list-style-type: none"> ○ Building design and operation: Understanding resources consumption and environmental loadings of different design and operational characteristics.

	<ul style="list-style-type: none"> ○ Socio-economic Impacts: Understanding socio-economic impacts of resources consumption and environmental loadings. <p>Pyramid Apex - Solutions</p> <ul style="list-style-type: none"> ○ Design strategies: efficient use of resources; embodied energy; architectural decisions (location, size, orientation, windows and glazing; shading devices, etc.), construction methods. ○ Materials Selection: Low emission materials; materials with recycled content; timber from rapidly renewable sources. ○ Systems: Introduction of energy and water efficient appliances; alternative energy sources (clean energy sources, renewable energy technologies); water recycling. 																																						
Teaching/Learning Methodology	<p>The subject will be delivered via lectures, tutorials and student-centred seminars led by subject lecturers complimented with site visit and in-class quiz.</p> <p>The lectures aim at introducing the students with the ecological development pyramid with focus on building design and operation characteristics.</p> <p>The tutorials aim to supplement lectures, seminars and site visit. The tutorials will facilitate learning to achieve all intended learning outcomes.</p> <p>The student-centred seminar aims to provide students with the opportunities to conduct self-learning on a selected topic. This allows them to search for information, conduct measurements and experiments, organize relevant materials, and to present their findings orally and writing a report.</p> <p>The site visit aims at giving students experience of broad range of places in Hong Kong such as the Kadoorie farm, the wetland park, the traditional village, the Zero Carbon Building, or even commercial and residential buildings to appreciate how new constructions and technologies integrate with the woodland, hills, and coastlines for betterment of ecological development in Hong Kong. Students will need to consider whether design strategies employed elsewhere can be applied in Hong Kong.</p> <p>With the basic understanding of the ecological development pyramid, the in-class quiz aims to enable students becoming more familiar with the needs, the problems and the solutions for the ecological development of Hong Kong.</p> <p>Students' efforts include self-reading, writing of site visit and project reports, presentation of their works in seminars, and in-class quiz.</p>																																						
Assessment Methods in Alignment with Intended Learning Outcomes	<p>The subject will be continuously assessed. Variety of assessment methods are adopted to assess the key outcomes, including:</p> <ol style="list-style-type: none"> 1. a student-centred seminar report and presentation that require students to integrate all they have learnt in the subject for achieving the ILOs; 2. a site visit report that requires students to interpret all they have learnt in the subject for achieving the ILOs; and 3. an in-class quiz that requires students to consider and aware of the importance of building ecology. <table border="1" data-bbox="395 1794 1426 2080"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="6">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> <th>f</th> </tr> </thead> <tbody> <tr> <td>1. seminar report and presentation</td> <td>40</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>2. site visit report</td> <td>30</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>3. in-class quiz</td> <td>30</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a	b	c	d	e	f	1. seminar report and presentation	40	✓	✓	✓	✓	✓	✓	2. site visit report	30	✓	✓	✓	✓	✓	✓	3. in-class quiz	30	✓	✓				
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	Total	100 %	
Student Study Effort Expected	Class contact:		
	▪ Lecture		18 Hrs.
	▪ Tutorial		6 Hrs.
	▪ Seminar		9 Hrs.
	▪ Site visit		6 Hrs.
	Other student study effort:		
	▪ Preparation for seminar and workshop		32 Hrs.
	▪ Self study		49 Hrs.
	Total student study effort		
Reading List and References	<ul style="list-style-type: none"> – Graham P, Building Ecology : First Principles for a Sustainable Built Environment, Blackwell Science, Oxford, 2003. – Environmental Protection Department and the Electrical and Mechanical Services Department. Guidelines to for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, or Institutional Purposes) in Hong Kong, 2010 Edition. Free download at: http://www.epd.gov.hk/epd/sites/default/files/epd/english/climate_change/files/Guidelines_English_2010.pdf – BEAM Society, BEAM Plus for New Buildings Version 1.2,2012 Free download at: http://www.hkgbc.org.hk/eng/BEAMPlus_NBEB. – Sustainable Building Technical Manual. Free download at http://freshstart.ncat.org/articles/ptipub.htm – Industrial Centre, Building Services and Intelligent Home technologies in the Industrial Centre of the Hong Kong Polytechnic University. (http://www.ic.polyu.edu.hk/units_office/division.htm) – Los Alamos National laboratory, LANL Sustainable Design Guide, 2002. Free download at www.engstandards.lanl.gov/esm/architectural/Sustainable.pdf – Touzard C, and Dupré F M, Going green in Hong Kong: tips and addresses for environmentally-friendly living in Hong Kong, Eco Control and Solution Ltd, 2007. GE199.C62 T68 2007 – US Department of Energy, The business case for sustainable design in federal facilities. Free download at http://www1.eere.energy.gov/femp/program/sustainable_businesscase.html – Online resources centre of the Sustainable Development Division, HKSAR Government. Free download at http://sdd-resource.internad.hk/en/index.asp. – Additional materials such as papers published by the subject lecturers and co-researchers 		