

Subject Description Form

Subject Code	BSE463
Subject Title	Design of Mechanical Systems in Buildings
Credit Value	3
Level	4
Pre-requisite Co-requisite Exclusion	ENG2001 and EE3009A
Objectives	<p>(1) To provide students with a comprehensive understanding of air conditioning system, refrigeration and indoor environmental issues for different kinds of buildings common to Hong Kong; and</p> <p>(2) To provide students with a comprehensive understanding in formulating practical energy policies.</p>
Intended Learning Outcomes	<p>Upon successful completion of the subject, students are expected to:</p> <p><u>Professional / academic knowledge and skills</u></p> <p>(a) Be able to have basic knowledge of thermal systems in buildings. (b) Be able to undertake the thermodynamic and application analysis of vapour compression refrigeration systems. (c) Be able to select a proper method for estimating operation energy use for a given building air-conditioning system on the basis of understanding the energy analysis requirement, and the calculation principles of current major building energy analysis methods. (d) Be able to undertake the design and analysis of ventilation systems for general contaminants control on the basis of understanding the function and working principles of contaminants control, and able to undertake the ventilation measurements for evaluating the ventilation of contaminants control.</p> <p><u>Attributes for all roundedness</u></p> <p>(e) Be able to communicate to others in a clear and concise manner through written reports, drawings and oral presentation; and (f) Be able to develop the skills and abilities to undertake, independently, a major piece of investigation work in a specialist subject area.</p>
Subject Synopsis/ Indicative Syllabus	<p>This subject provides a basic understanding of air conditioning system, refrigeration and indoor environment issues for different kinds of buildings common to Hong Kong. The syllabus includes air conditioning fundamentals, loads estimation, fan and duct sizing, ventilation for acceptable air quality and refrigeration plant exclusively designed for non BSE students.</p>
Teaching/Learning Methodology	<p>Students are briefed in the first lecture for the expected subject outcomes. Teaching is conducted in the form of interactive lecture, supplemented by worked examples, case study and mini project. Handouts were distributed one week before the lecture session.</p>

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
			a	b	c	d	e	f
	1. Group assignment	15%			✓		✓	✓
	2. Test	25%	✓	✓	✓	✓		
	3. End-of-semester examination	60%	✓	✓	✓	✓		
Total	100%							
Students are required to demonstrate presentation and communication abilities through different types of assessments, which include written report, drawings and written assessment.								
Student Study Effort Required	Class contact:							
	▪ Lectures		27 Hrs.					
	▪ Tutorials		6 Hrs.					
	Other student study effort:							
	▪ Test & Examination		6 Hrs.					
	▪ Mini Project		11 Hrs.					
	▪ Self-study		80 Hrs.					
	Total student study effort		130 Hrs.					
Reading List and References	<p>Authors: Shan K Wang, Zalman Lavan & Paul Norton Title: Air Conditioning and Refrigeration Engineering Publisher: Boca Raton, Fla.: CRC Press, c2000 PolyU Call Number: TH7687.W363 2000</p>							
	<p>Authors: A.F.E. Wise & J.A. Swaffield Title: Water, Sanitary and Waste Services for Buildings Publisher: 5th Edition, Oxford; Woburn, Mass: Butterworth – Heinemann, 2002 PolyU Call Number: TD345.W5 2002</p>							
	<p>Authors: T.D. Eastop & A. McConkey Title: Applied Engineering Thermodynamics for Technologists Publisher: 5th Edition, Essex, England: Longman; New York: Wiley 1993 PolyU Call Number: TJ265.E3 1993</p>							
	<p>Author: Hazim B. Awbi Title: Ventilation of Buildings Publisher: 2nd Edition, London; New York, N.Y.: Spon Press 2003 PolyU Call Number: TH7653.A9 2003</p>							