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	(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 (2) To provide students with a comprehensive understanding in formulating practical energy policies.
Intended Learning Outcomes	Upon successful completion of the subject, students are expected to: <u>Professional / academic knowledge and skills</u> (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. <u>Attributes for all roundedness</u> (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.
Subject Synopsis/ Indicative Syllabus	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.
Teaching/Learning Methodology	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.

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

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

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

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

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

Author: Francis W.H. Yik
Title: Fundamentals, Design & Control of Air-conditioning Systems
Publisher: Francis W. H. Yik 2020