City University of Hong Kong
Course Syllabus

offered by School of Energy and Environment
with effect from Semester B 2015/16

Part I Course Overview

Course Title:	Energy Efficiency and Conservation Technologies
Course Code:	SEE8112
Course Duration:	One semester
Credit Units:	3
Level:	R8
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: *(Course Code and Title)*	Nil
Precursors: *(Course Code and Title)*	Nil
Equivalent Courses: *(Course Code and Title)*	SEE6102 Energy Efficiency and Conservation Technologies
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

This course aims to provide students with basic knowledge onenergy usage and energy efficiency, especially for building and transportation systems. Operating principles of power transmission and distribution, heating, ventilation and air-conditioning (HVAC), lighting, transportation etc. will be taught in class. Advanced energy efficient systems and technologies will be described. Methods to reduce energy consumption, such as energy labelling scheme, energy management and audit will be introduced.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs[#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Solve problems on power transmission, heat transfer and humidity control	20		√	
2.	Analyze energy use in building systems	40		√	
3.	Analyze energy use in transportation systems	10		√	
4.	Apply advanced and innovative energy-efficient systems and technologies	20	√	√	
5.	Describe energy audit, energy codes and energy efficiency registration schemes	10		√	
		100%			

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: *Accomplishments*
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.						Hours/week (if applicable)
		1	2	3	4	5		
Lecture	Explain key concepts, such as theories related to energy usage and conservation technologies	√	√	√	√	√		2.5 hrs/wk
Tutorial, class demo	Solidify students' concepts with practice	√	√	√	√	√		0.5 hr/wk

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.						Weighting*	Remarks
	1	2	3	4	5			
Continuous Assessment: 60%								
In-class test	√	√		√			30%	
Assignment	√	√	√	√	√		30%	
Examination: 40% (duration: 2 hours , if applicable)								
** The weightings should add up to 100%.*							100%	

To pass a course, a student must do ALL of the following:

1) obtain at least 30% of the total marks allocated towards coursework (combination of assignments, pop quizzes, term paper, lab reports and/ or quiz, if applicable);
2) obtain at least 30% of the total marks allocated towards final examination (if applicable); and
3) meet the criteria listed in the section on Grading of Student Achievement.

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Adequate (C+, C, C-)	Marginal (D)	Failure (F)
1. In-class test	Ability to analyse and solve practical problems related to energy usage and conservation technologies	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Assignment	Ability to evaluate and analyse questions related to energy usage and conservation technologies	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Final exam	Ability to analyse and solve practical problems related to energy usage and conservation technologies	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

- Introduction to efficiency
- Power transmission, distribution and quality
- Heating and air-conditioning
- Heat transfer and heat exchange, waste heat recovery
- Humidity and ventilation systems
- Lighting equipments; electronic ballasts
- Electrical appliances; motors; energy efficiency labelling scheme
- Energy management and audit
- Energy use in transportation systems

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	
2.	
3.	

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	ASHRAE, ASHRAE Handbooks, US:Atlanta. (latest revision)
2.	Mitchell, J.W., Braun, J.E., Principles of Heating, Ventilation, and Air Conditioning in Buildings, Wileys & Sons, 2013.
3.	Pita, E.G., Refrigeration Principles and Systems, Business News Publishing Company, 1991.
4.	Szokolay, S.V., Introduction to Architectural Science: the Basis of Sustainable Design, Routledge, 2014.
5.	Hundy, G.F., Trott, A.R., Welch, T.C. Refrigeration and Air-conditioning, 4th edition, Elsevier, 2008.
6.	Çengel, Y.A., Turner, R.H., Cimbala J. M., Fundamentals of Thermal-Fluid Sciences, Third edition, McGraw Hill, 2008.
7.	Thumann, A., Mehta, D. P., Handbook of Energy Engineering, 7th edition, CRC Press, 2013.
8.	CIBSE (Chartered Institution of Building Services Engineers). CIBSE guides. (latest revision).
9.	EMSD. Code of Practice for Energy Efficiency of Air Conditioning Installations. (latest revision)
10.	EMSD. Code of Practice for Energy Efficiency of Electrical Installations. (latest revision)
11.	EMSD. Code of Practice for Energy Efficiency of Escalator Installations. (latest revision)
12.	EMSD. Code of Practice for Energy Efficiency of Lighting Installations. (latest revision)
13.	EMSD. Hong Kong Energy End-use Data (latest version)
14.	EMSD. Performance-based Building Energy Code. (latest revision)
15.	EMSD. Voluntary Energy Efficiency Labelling Scheme (EELS) (latest revision)

16.	1. Hong Kong Government Architecture Services Department website: http://www.archsd.gov.hk/ 2. Hong Kong Government Electrical & Mechanical Services Department website: http://www.emsd.gov.hk/ 3. Sustainable Development Unit website: http://www.susdev.gov.hk/html/en/index.htm 4. Energy Design Information website: http://www.energydesignresources.com