

**City University of Hong Kong
Course Syllabus**

**offered by School of Energy and Environment
with effect from Semester B 2018/19**

Part I Course Overview

Course Title: Carbon Audit and Management

Course Code: SEE6115

Course Duration: One semester

Credit Units: 3

Level: P6

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) SEE8115 Carbon Audit and Management

Exclusive Courses:
(Course Code and Title) Nil

Part II Course Details

1. Abstract

This course aims to provide the students with the knowledge and principles needed to carry out carbon audits in a number of sectors. To examine the impact of carbon emission to our environment. To appreciate the function of carbon audits as a means to help business sectors and corporations in estimating their carbon footprints thereby setting objectives to manage and reduce these carbon footprints. To learn the various methods/approaches of reducing energy consumption and carbon emissions. To explore the basic carbon audit processes and learn the necessary skills to undertake such audit. As energy consumption is often one of the dominating factors in carbon footprint analysis, the students will also learn energy auditing and various energy management opportunities (EMOs). To learn approaches to carbon offsetting and carbon trading.

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.	Identify the effects of carbon emissions on the environment and the challenges faced.	10%	✓		
2.	Apply techniques of energy efficiency and conservation to manage the energy consumption and carbon emissions.	30%		✓	
3.	Conduct economic and life cycle analysis of energy and carbon reduction measures; Review the relevant regulations relevant to energy consumptions.	10%	✓	✓	✓
4.	Develop the carbon footprint calculator for relevant processes. Reflect on how organisations can offset and trade emissions.	20%	✓		✓
5.	Perform basic energy and carbon audit for a range of sectors.	30%	✓	✓	✓
		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	Lectures are used to describe and illustrate the basic concepts and the working principles.	✓	✓	✓	✓	✓	2 hrs per wk
Tutorial	Tutorials are used to explain their suitable applications through practical examples, numerical exercises, real cases, class assignments and discussions.	✓	✓	✓	✓	✓	1 hr per wk
Analysis	Students to analyse data sets and examples to demonstrate critical thinking and interpretation of energy and carbon auditing.	✓	✓	✓	✓	✓	3 hrs per 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%							
Assignments	✓	✓	✓	✓	✓	20%	
Mid-term test	✓	✓	✓		✓	20%	
In-class exercises	✓	✓	✓	✓	✓	20%	
Examination: 40% (duration: 2 hours, if applicable)							
						100%	

1. **Assignments** are in the form of procedural descriptions, assigned numerical analysis and discussions, and technical writing on project cases.
2. A **Test** may consist of short questions, multiple-choice questions, and numerical calculations.

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 Assessment Rubrics.

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-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. In-class exercises	Ability to analyse, calculate and solve practical problems in carbon and energy auditing	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Assignments	Ability to analyse, calculate and solve practical problems in carbon and energy auditing	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Mid-term test	Ability to apply engineering knowledge and skills to analyse, calculate, and solve problems related to energy and carbon auditing	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. Final exam	Ability to analyse, calculate and solve practical problems in carbon and energy auditing	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.)

Climate change and potential challenges; Greenhouse gas emission and environmental impact; Energy management and auditing; Building energy consumption; Finance and life cycle assessments; Carbon management and auditing. Carbon audit guidelines in Hong Kong; International practice, trend and standard; Carbon footprint calculator. Carbon Offsetting and Emissions trading; Description and analysis of historical and current issues addressed by emissions trading systems. Systems for post Paris agreement, Kyoto Protocol implementation in different countries; the European Union emissions trading system.

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.	Commercial energy auditing reference handbook. Steve Doty, Lilburn, GA : Fairmont Press 2008.
2.	Energy Audit of Building Systems: An Engineering Approach (Mechanical Engineering Series). Moncef Krarti, CRC Press 2000.

2.2 Additional Readings

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

1.	EMSD. Code of Practice for Energy Efficiency of Air Conditioning Installations. (latest revision)
2.	EMSD. Code of Practice for Energy Efficiency of Electrical Installations. (latest revision)
3.	EMSD. Code of Practice for Energy Efficiency of Escalator Installations. (latest revision)
4.	EMSD. Code of Practice for Energy Efficiency of Lighting Installations. (latest revision)
5.	EMSD. Hong Kong Energy End-use Data (latest version)
6.	EMSD. Performance-based Building Energy Code. (latest revision)
7.	EMSD. Voluntary Energy Efficiency Labelling Scheme (EELS) (latest revision)