

**City University of Hong Kong
Course Syllabus**

**offered by Department of Systems Engineering
with effect from Semester A 2024 / 25**

Part I Course Overview

| | |
|--|--|
| Course Title: | <u>Energy Conservation and Management</u> |
| Course Code: | <u>SYE6108</u> |
| Course Duration: | <u>One Semester</u> |
| Credit Units: | <u>3</u> |
| Level: | <u>P6</u> |
| Medium of Instruction: | <u>English</u> |
| Medium of Assessment: | <u>English</u> |
| Prerequisites: <i>(Course Code and Title)</i> | <u>Nil</u> |
| Precursors: <i>(Course Code and Title)</i> | <u>Nil</u> |
| Equivalent Courses: <i>(Course Code and Title)</i> | <u>ADSE6108 Energy Conservation and Management (offered until 2023/24)</u> |
| Exclusive Courses: <i>(Course Code and Title)</i> | <u>Nil</u> |

Part II Course Details

1. Abstract

This course aims to: (1) understand the technological, social, economic and environmental factors related to the use of fossil fuels and renewable energy; (2) understand the major energy consumers in buildings, transportation and industrial processes; and (3) identify effective energy conservation and conduct energy audits and management systems.

Topics include: energy sources and environmental impact; energy in buildings; energy-efficient industrial processes; waste heat recovery; energy storage; energy auditing; energy strategies and management.

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. | Energy source and its environmental impact | 25% | ✓ | ✓ | |
| 2. | Energy efficiency, generation, and storage | 25% | ✓ | ✓ | |
| 3. | Energy audits and management | 25% | ✓ | ✓ | |
| 4. | Energy strategies, policy, economics method and analysis | 25% | ✓ | ✓ | |
| | | 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 real-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. Learning and Teaching Activities (LTAs)

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

| LTA | Brief Description | CILO No. | | | | Hours/week (if applicable) |
|-------------|---|----------|---|---|---|----------------------------|
| | | 1 | 2 | 3 | 4 | |
| Lecture | Lectures on the topics of the keyword syllabus. | ✓ | ✓ | ✓ | ✓ | 3 hours/week |
| Office Hour | Discussions of course materials | ✓ | ✓ | ✓ | ✓ | 1 hour/week |

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 | | |
| Continuous Assessment: <u>30</u> % | | | | | | |
| Individual report | ✓ | ✓ | ✓ | ✓ | 30% | |
| Examination: <u>70</u> % (duration: 2 hours, if applicable) | | | | | | |
| | | | | | 100% | |

For a student to pass the course, at least 30% of the maximum mark for the examination should be obtained.

5. Assessment Rubrics

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

Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter

| Assessment Task | Criterion | Excellent (A+, A, A-) | Good (B+, B, B-) | Fair (C+, C, C-) | Marginal (D) | Failure (F) |
|----------------------|--|--------------------------|---------------------|---------------------|-----------------|-----------------------------------|
| 1. Examination | Apply the knowledge of mathematics, science and engineering to economic energy audit and analysis. | High | Significant | Moderate | Basic | Not even reaching marginal levels |
| 2. Individual report | Understand some of the techniques, skills, and modern trends for energy conservation and management. | High | Significant | Moderate | Basic | Not even reaching marginal levels |

Applicable to students admitted in Semester A 2022/23 to Summer Term 2024

| Assessment Task | Criterion | Excellent (A+, A, A-) | Good (B+, B) | Marginal (B-, C+, C) | Failure (F) |
|----------------------|--|--------------------------|-----------------|-------------------------|-----------------------------------|
| 1. Examination | Apply the knowledge of mathematics, science and engineering to economic energy audit and analysis. | High | Significant | Moderate/Basic | Not even reaching marginal levels |
| 2. Individual report | Understand some of the techniques, skills, and modern trends for energy conservation and management. | 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.)

- Energy sources and its consumption now and then
- Environmental impact: global warming and climate change
- Energy audits and management in buildings
- Heating, ventilating, air conditioning and lighting technologies
- Energy in major appliances, electric motor system and transportation
- Industrial energy efficiency and energy management
- Waste Heat Recovery and heat Pumps
- Energy generation by low-or zero-C technologies
- Energy storage technologies
- Economics method and analysis
- Energy strategies and management

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. | “Energy Management and Conservation Handbook,” CRC press, 2007. |
| 2. | “Energy and the Environment,” Wiley, 1999. |
| 3. | “Handbook of Energy Audits,” 5 th edition, Fairmont Press, 1998. |

2.2 Additional Readings

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

NIL