

GE2306: ENERGY AND TECHNOLOGY

Effective Term

Semester B 2024/25

Part I Course Overview

Course Title

Energy and Technology

Subject Code

GE - Gateway Education

Course Number

2306

Academic Unit

Materials Science and Engineering (MSE)

College/School

College of Engineering (EG)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

GE Area (Primary)

Area 3 - Science and Technology

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course explores the fundamental concepts of energy and its critical role in our environment, highlighting the importance for individuals across all fields to understand and engage with energy issues. Students will gain knowledge about various energy sources, their conversion technologies, and the environmental implications of energy consumption. The course includes diverse assessments such as reading assignments, field trip reports, projects, a mid-term test, and a final examination. Students will develop their communication skills through oral and written presentations of their assignments, fostering a comprehensive understanding of their potential contributions to solving energy challenges.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Demonstrate the capacity for self-directed learning on topics related to energy and technology by completing individual reading assignments and self-guided research projects.	20	x		
2	Explain the basic methodologies and techniques for the harvesting of energy from various sources and in different forms through written exams and oral presentations.	20		x	
3	Demonstrate critical analytical skills by comparing the operating principles of alternative sources of energy and their current status of development.	20		x	
4	Calculate the efficiencies for energy conversion from the different sources, interpreting information and numerical data in assignments and exams.	20		x	
5	Demonstrate the ability to work effectively in a team through active participation in assigned group report.	20	x		

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.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture and seminar	Students will engage in formal lectures and discuss technical concepts related to energy and technology.	2, 3, 4	3 hours per week
2	Reading	Students will be given weekly reading assignments, which may include book chapters or journal/magazine articles.	1, 2	Students are expected to spend 2 hours per week on reading.
3	Group field trip report & presentation	- Field Trip: Students will participate in a field trip to CLP Power Low Carbon Energy Education Centre at CityUHK. They will pay special attention to the pollution control measures adopted by the company/organization. - Report and Presentation: After the field trip, each group will prepare a report and present it in a 15-minute session followed by a 5-minute Q&A.	1, 2, 3, 4, 5	Students are expected to prepare the report and presentation for over 10 hours in the semester.

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Group Field Trip Report & Presentation	1, 2, 3, 4, 5	30	Each student group needs to prepare a report after the field trip visit, followed by a presentation. Marks will be given for the presentation as well as the response to questions raised by instructor(s) or other students. Each group member will be asked to rate on the participation for all other group members. Course leader will investigate if some students have problems. For students performed poorly to participate in the group report, marks will be deducted accordingly.

2	Take-home Assignments	1, 2	10	Students need to submit 2 take-home assignments.
3	Mid-term Test	2, 3, 4	10	Students will find that the mid-term test and examination questions are derived from the lecture notes and assigned readings.

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Assessment Rubrics (AR)**Assessment Task**

1. Group Field Trip Report & Presentation

Criterion

Good presentation skills and good English pronunciations are expected.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

2. Mid-term test

Criterion

Answer questions professionally.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

3. Examination

Criterion

Answer questions professionally.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

- History of energy consumption.
- Geology and nature of fossil fuels.
- Energy flow of the Earth. Introduction to alternative sources of energy.
- Nuclear power.
- Solar power.
- Wind power.
- Hydroelectric power, tidal power. Wave power, ocean thermal energy conversion.
- Geo-thermal power and biomass.
- The hydrogen economy. Hydrogen combustion and fuel cells.
- Energy-efficient light emitting diodes.
- Nanotechnology and energy.

Reading List

Compulsory Readings

Title	
1	Alternative Energy Sources, Efstathios Michaelides, online access from SpringerLink, CityU Library
2	Energy: Its Use and the Environment, Fourth Edition, Hinrichs & Kleinbach, Thomson (TJ163.9 .H55 2013)
3	Scientific American, e-journal, online access from CityU Library

Annex (for GE courses only)

A. Please specify the Gateway Education Programme Intended Learning Outcomes (PILOs) that the course is aligned to and relate them to the CILOs stated in Part II, Section 2 of this form:

Please indicate which CILO(s) is/are related to this PILO, if any (can be more than one CILOs in each PILO)

PILO 1: Demonstrate the capacity for self-directed learning

1

PILO 2: Explain the basic methodologies and techniques of inquiry of the arts and humanities, social sciences, business, and science and technology

2

PILO 3: Demonstrate critical thinking skills

3

PILO 4: Interpret information and numerical data

4

PILO 7: Demonstrate an ability to work effectively in a team

5

B. Please select an assessment task for collecting evidence of student achievement for quality assurance purposes. Please retain at least one sample of student achievement across a period of three years.

Selected Assessment Task

Group field trip report