City University of Hong Kong
Course Syllabus

offered by Department of Materials Science and Engineering
with effect from Summer Term 2018

Part I Course Overview

Course Title:	**Energy and Technology**
Course Code:	**GE2306**
Course Duration:	**One semester**
Credit Units:	**3**
Level:	**A2, B2**
Proposed Area: *(for GE courses only)*	☐ Arts and Humanities ☐ Study of Societies, Social and Business Organisations ☑ Science and Technology
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)*	**Nil**
Exclusive Courses: *(Course Code and Title)*	**Nil**

Part II Course Details

1. Abstract

Energy and environment is the topic that should be of concern to everybody, irrespective of the field of profession. This course will introduce some basic concepts to the topic. It is expected that irrespective of the major that the students are pursuing, they can understand the roles that they can play in the energy problems. The assessments for students consist of reading, take-home assignment, group field trip reporting, mid-term test, and final examination. Students will also be invited to present, both orally and in writing, their assignments.

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.	Demonstrate the capacity for self-directed learning on topics related to energy and technology.		√		
2.	Explain the basic methodologies and techniques for the harvesting of energy from different sources and in different forms.			√	
3.	Demonstrate critical analytical skills by comparing the operating principles of alternative sources of energy and their current status of development.			√	
4.	Interpret information and numerical data by calculating the efficiencies for energy conversion from the different sources.			√	
5.	Demonstrate the ability to work effectively in a team by showing active participation on assigned group project.		√		
** If weighting is assigned to CILOs, they should add up to 100%.*		100%			

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

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 and seminar	To introduce/discuss some technical concepts.		√	√	√		3* hours per week
Reading	Students will be given weekly a number of reading assignments, which may cover book chapters or journal/magazine articles.	√	√				Students are expected to spend 2 hours per week on reading.
Group field trip report & presentation	A field trip will be arranged in to groups (consist of 5 students) in which to visit power generation or heavy power usage facilities in Hong Kong or the Pearl River Delta. Students will be asked to pay special attention on to the related measures adopted by the company/organization for pollution control. Examples for the trip will be: Langham Place Hotel Mongkok, Hong Kong Science Museum. Group report will be conducted after the field trip. Then, each group will give a 15 minutes presentation of the report, and 5 minutes will be reserved for other groups to ask questions.	√	√	√	√	√	Students are expected to make a 4 hours field trip in the semester.

*Assuming this is the number of hours for lecture and seminar in a regular semester, Semester A or B.

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: 50 %							
Group Field Trip Report & Presentation	√	√	√	√	√	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 project work, marks will be deducted accordingly.
Take-home Assignments	√	√				10%	Students need to submit 2 take-home assignments.
Mid-term test		√	√	√		10%	Questions in the mid-term test and examination will be based on the lecture notes and reading assignments.
Examination		√	√	√		50%	
Examination^: 50% (duration: 2 hours, if applicable)							
** The weightings should add up to 100%.*						100%	

^ For a student to pass the course, at least 40% of the maximum mark for the examination must be obtained.

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. **Group Field Trip Report & Presentation**	Good presentation skills and good English pronunciations are expected.	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. **Take home Assignments**	Satisfactory understanding of the topic is necessary.	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Mid-term test	Answer questions professionally.	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. Examination	Answer questions professionally.	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

- History of energy consumption. Global patterns in energy production and consumption. Fossil fuel current reserves.
- Geology and nature of fossil fuels. Formation and properties of coal, oil and gas. Pollution control techniques. The main pollutants from fossil fuels and the current status of technology to reduce emissions of sulphur, NOx and particulate emissions from power plants and cars.
- Energy flow of the Earth. Introduction to alternative sources of energy. The operating principles, current status of the technology and environmental impacts of alternative energy sources:
  - 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.
  - Nanotechnology and energy.

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.	Alternative Energy Sources, Efstathios Michaelides, online access from SpringerLink, CityU Library

2.2 Additional Readings

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

1.	Energy: Its Use and the Environment, Fourth Edition, Hinrichs & Kleinbach, Thomson (TJ163.9 .H55 2013)
2.	**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:

GE PILO	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	CILO 1
PILO 2: Explain the basic methodologies and techniques of inquiry of the arts and humanities, social sciences, business, and science and technology	CILO 2
PILO 3: Demonstrate critical thinking skills	CILO 3
PILO 4: Interpret information and numerical data	CILO 4
PILO 5: Produce structured, well-organised and fluent text	
PILO 6: Demonstrate effective oral communication skills	
PILO 7: Demonstrate an ability to work effectively in a team	CILO 5
PILO 8: Recognise important characteristics of their own culture(s) and at least one other culture, and their impact on global issues	
PILO 9: Value ethical and socially responsible actions	
PILO 10: Demonstrate the attitude and/or ability to accomplish discovery and/or innovation	Both field trip and group project are activities that will provide the attitude towards discovery and innovation.

GE course leaders should cover the mandatory PILOs for the GE area (Area 1: Arts and Humanities; Area 2: Study of Societies, Social and Business Organisations; Area 3: Science and Technology) for which they have classified their course; for quality assurance purposes, they are advised to carefully consider if it is beneficial to claim any coverage of additional PILOs. General advice would be to restrict PILOs to only the essential ones. (Please refer to the curricular mapping of GE programme: http://www.cityu.edu.hk/edge/ge/faculty/curricular_mapping.htm.)

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