

THE EDUCATION UNIVERSITY OF HONG KONG

Course Outline

Part I

Programme Title	: Bachelor of Education (Honours)
Programme QF Level	: 5
Course Title	: The Technology and Usage of Energy 能源的科技與使用
Course Code	: SCI2564
Department	: Science and Environmental Studies
Credit Points	: 3
Contact Hours	: 39
Pre-requisite(s)	: Nil
Medium of Instruction	: English
Course Level	: 2

Part II

The University's Graduate Attributes and seven Generic Intended Learning Outcomes (GILOs) represent the attributes of ideal EdUHK graduates and their expected qualities respectively. Learning outcomes work coherently at the University (GILOs), programme (Programme Intended Learning Outcomes) and course (Course Intended Learning Outcomes) levels to achieve the goal of nurturing students with important graduate attributes.

In gist, the Graduate Attributes for Undergraduate, Taught Postgraduate and Research Postgraduate students consist of the following three domains (i.e. in short "PEER & I"):

- Professional Excellence;
- Ethical Responsibility; &
- Innovation.

The descriptors under these three domains are different for the three groups of students in order to reflect the respective level of Graduate Attributes.

The seven GILOs are:

1. Problem Solving Skills
2. Critical Thinking Skills
3. Creative Thinking Skills
- 4a. Oral Communication Skills
- 4b. Written Communication Skills
5. Social Interaction Skills

6. Ethical Decision Making
7. Global Perspectives

1. Course Synopsis

This course provides programme participants with the subject matter knowledge on the scientific, technological, environmental and socioeconomic aspects of energy at the post-secondary level. The major themes of study include the principles and technologies of energy, energy sources and energy-induced environment impacts, energy usage and socioeconomic development which map directly onto the Science, Technology and the Environment domain of the new senior secondary Liberal Studies curriculum.

2. Course Intended Learning Outcomes (CILOs)

Upon completion of this course, students will be able to:

- CILO₁ Demonstrate an in-depth understanding of the principles and concepts in selected aspects of energy and their applications in everyday life.
- CILO₂ Relate and assess the impacts of energy usage on the socioeconomic development and the environment in Hong Kong, China and the world.
- CILO₃ Critically analyze energy-related issues as encountered in our daily life.

3. Content, CILOs and Teaching & Learning Activities

Course Content	CILOs	Suggested Teaching & Learning Activities
Principles and technologies of energy: <ol style="list-style-type: none"> i. basic scientific concepts of energy; ii. energy converters and their efficiency; iii. first and second laws of thermodynamics vs. energy crisis; and iv. emerging energy technologies (e.g. LED lighting, hydrogen fuel cells and clean coal). 	CILO _{1 & 2}	Mini-lectures, demonstration, experiments, group discussion and presentation
Energy sources and energy-	CILO ₂	Mini-lectures, case

<p>induced environmental impacts:</p> <ol style="list-style-type: none"> i. trends and future prospect of renewable and non-renewable energy (e.g. combustible ice, wind power and hydroelectricity), successful cases of using alternative energy sources; ii. cases of international conflicts and cooperation for energy acquisition (e.g. nuclear energy programs in North Korea and Iran, oil field disputes and ITER project); and iii. social issues and environmental problems induced by the exploitation, transmission and use of energy, facts and misconceptions on climate change and mitigation strategies. 		<p>studies, group discussion and presentation</p>
<p>Energy usage and socioeconomic development:</p> <ol style="list-style-type: none"> i. a historical review - ancient time and industrial age; ii. trends of demand by sectors and issues in Hong Kong, mainland China and the world; and iii. government policies and common misconceptions on effective ways of energy 	<p><i>CILO₃</i></p>	<p>Mini-lectures, workshop, group discussion and presentation</p>

saving (e.g. energy labeling programmes and lighting devices)		
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4. Assessment

Assessment Tasks	Weighting (%)	CILO
<p>Individual work</p> <ul style="list-style-type: none"> Laboratory worksheet (30%): Laboratory worksheet (15%) and a newspaper article (15%) (500 words + ONE diagram or photo) discussing “The Development of Photovoltaics in Hong Kong Field trip worksheet (10%) In class assignment (Amongst the exercise to be completed in each lecture, FIVE exercises with highest scores will be counted towards the final marks) (10%, @2%) 	50%	<i>CILO_{1,2,3}</i>
<p>A group project on investigating the socioeconomic, environmental, scientific, and technological aspects of using energy in a specific daily-life situation or scenario.</p> <ul style="list-style-type: none"> Proposal (10%) – Each group (5-6 students) must prepare 500 words outline (title, problem statement, objectives, literature review, references). Before you come to tutorial session, a suggested topic should be determined among your group members. Presentation (10%) – Each group (5-6 students) must prepare a 15-minute 	50%	<i>CILO_{1,2,3}</i>

<p>presentation to introduce the key ideas of their findings during the lesson. Sources of reference for ideas and other materials you used should be included in the presentation file.</p> <ul style="list-style-type: none"> • Essay (30%) – 4,500 words on investigating the socioeconomic, environmental, scientific, and technological aspects of using energy in a specific daily-life situation or scenario. 		
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5. Required Text(s)

Nil

6. Recommended Readings

Principles and technologies of energy:

Fanchi, J. R. (2004). *Energy: technology and directions for the future*. Amsterdam: Elsevier Academic Press.

Hazen, R.M., & Trefil, J. (1996). *The physical sciences: an integrated approach*. New York: John Wiley & Sons.

Fensham, P.J., Gunstone, R.F., & White, R.T. (Eds.) (1994). *The content of science: a constructive approach to its teaching and learning*. New York: Falmer Press.

Schwaller, A. E., & Gilberti, A. F. (1996). *Energy technology: sources of power*. Cincinnati: Thomson Learning Tools.

Walisiewicz, M. 著, 左濤主譯 (2003) : 《替代能源》, 香港, 三聯書店(香港)有限公司。

卓韋 (1995) : 《能量與能源》, 台北, 業強出版社。

Energy sources and energy-induced environmental impacts:

International Energy Agency (IEA). (2016). *Key World Energy Statistics 2016 (Key World Energy Statistics)*. Paris: IEA.

Ristinen, R., & Kraushaar, J. (2006). *Energy and the environment (2nd ed.)*. Hoboken, N.J.: John Wiley.

Elliot, D. (2003). *Energy, society and environment: technology for a sustainable future*. London: Routledge.

Bily, C. A. (Ed.). (2006). *Global warming: opposing viewpoints*. Detroit: Greenhaven Press.

Energy usage and socioeconomic development:

Solomon, J. (1992). *Getting to know about energy: in school and society*. London: Falmer Press.

Mozley, R. F. (1998). *The politics and technology of nuclear proliferation*. Seattle: University of Washington Press.

European Commission. (2007). *Fusion research: an energy option for Europe's future*. Brussels: European Commission.

Hinrichs, R., & Kleinbach, M. (2013). *Energy : Its use and the environment* (5th ed.). Boston, Mass.: Brooks/Cole Cengage Learning.

7. Related Web Resources

Nil

8. Related Journals

Nil

9. Academic Honesty

The University adopts a zero tolerance policy to plagiarism. For the University's policy on plagiarism, please refer to the *Policy on Academic Honesty, Responsibility and Integrity with Specific Reference to the Avoidance of Plagiarism by Students* (<https://www.eduhk.hk/re/modules/downloads/visit.php?cid=9&lid=89>). Students should familiarize themselves with the Policy.

10. Others

Nil

Last update: November 2020