Course Syllabus

offered by School of Energy and Environment with effect from Semester A 2015 /16

Part I Course Overview

Course Title:	Energy Generation and Storage Systems
Course Code:	SEE8111
Course Duration:	One semester
Credit Units:	3
Level:	R8
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)*	SEE6101 Energy Generation and Storage Systems
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

(A 150-word description about the course)

This course is mainly related to energy supply and storage system that are commonly used in our society. Operation principles of basic energy generation and storage systems, their advantages, and major drawbacks will be taught in the course. Non-conventional energy and renewable energy will be introduced as means of sustainable development.

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.	Analyze the supply and demand of fuel in the world.	10		√	
2.	Discover the pros and cons of conventional energy sources	20	√	√	
3.	Describe and compare the operation principle and environmental impacts of a coal-fired power plant with a nuclear power plant	20		√	
4.	Identify the different sources of renewable energy and innovative technologies in harnessing energy from these renewable sources	40	√	√	
5.	Describe and compare different energy storage technologies	10		√	
** 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	Explain key concepts, such as theories related to energy generation and storage	√	√	√	√	√	2.5 hrs/wk
Tutorial, class demo	Solidify students' concepts with practice	√	√	√	√	√	0.5 hr/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: _50___%							
In-class test	√	√	√	√		25%	
Assignment	√	√	√	√	√	25%	
Examination: _50___% (duration: 2 hours , if applicable)							
** The weightings should add up to 100%.*						100%	

Examination duration: 2 hrs
Percentage of coursework, examination, etc.: 50% by coursework; 50% by exam

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 Grading of Student Achievement.

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-)	Adequate (C+, C, C-)	Marginal (D)	Failure (F)
1. In-class test	Ability to analyse and solve practical problems related to energy supply and power plant	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Assignment	Ability to evaluate and analyse questions related to energy generation and storage	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Final exam	Ability to analyse and solve practical problems related to energy generation and storage	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.)

Fuel availability; Fossil fuels; conventional and non-conventional energy systems; biomass; combustion; steam cycle; pulverized coal fired power plant, nuclear power plant; generator; emission control; principles of renewable energy such as solar, wind, hydro, tidal and wave; energy storage systems.

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 Science, Principles, Technologies, and Impacts, John Andrews and Nick Jelley, Oxford University Press, 2nd edition, 2013,

2.2 Additional Readings

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

1.	Alternative Energy Systems and Applications, B. K. Hodge, John Wiley and Sons, 2010.
2.	Energy and Climate: How to achieve a successful energy transition, Alexandre Rojey, Wiley, 2009.
3.	Renewable Energy. Boyle G. Oxford University Press, 2012.
4.	Energy for a Sustainable World, Nicola Armaroli, Vincenzo Balzani, Wiley-VCH, 2011.
5.	The World Scientific Handbook of Energy, Gerard M. Crawley, World Scientific, 2013.
6.	Principles of Sustainable Energy, Frank Kreith, Jan F. Kreider, CRC Press, 2011.
7.	Nuclear Energy: what everyone needs to know, Charles D. Ferguson. Oxford University Press, 2011.
8.	Introduction to Wind Energy Systems. Basics, technology and operation. Hermann-Josef Wagner, Jyotirmay Mathur, Springer 2013.
9.	Geothermal Energy: renewable energy and the environment, William E. Glassley, CRC Press, 2010.
10.	Solar Energy Fundamentals. Robert K. McMordie, Fairmont Press, 2012.
11.	Electrochemical Technologies for Energy Storage and Conversion, Ru-Shi Liu et al. Wiley-VCH, 2012.
12.	US Department of Energy - http://www.energy.gov/ Renewable Energy Association - http://www.r-e-a.net/ National Hydrogen Association - http://www.hydrogenassociation.org/ EMSD website: http://www.emsd.gov.hk/