SEE6101: ENERGY GENERATION AND STORAGE SYSTEMS

Effective Term
Semester B 2024/25

Part I Course Overview

Course Title
Energy Generation and Storage Systems

Subject Code
SEE - School of Energy and Environment
Course Number
6101

Academic Unit
School of Energy and Environment (E2)

College/School
School of Energy and Environment (E2)

Course Duration
One Semester

Credit Units
3

Level
P5, P6 - Postgraduate Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
SEE8111 Energy Generation and Storage Systems

Exclusive Courses
Nil

Part II Course Details

Abstract

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.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Analyze the supply and demand of fuel in the world.	10		x	
2	Describe the pros and cons of conventional energy sources	20	x	x	
3	Describe and compare the operation principle and environmental impacts of a coal-fired power plant with a nuclear power plant	20		x	
4	Identify the different sources of renewable energy and innovative technologies in harnessing energy from these renewable sources	40	x	x	
5	Describe and compare different energy storage technologies	10		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	Explain key concepts, such as theories related to energy generation and storage	1, 2, 3, 4, 5	2.5 hrs/wk
2	Tutorial, class demo	Solidify students' concepts with practice	1, 2, 3, 4, 5	0.5 hr/wk

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	In-class test	1, 2, 3, 4, 5	20	
2	Assignment	1, 2, 3, 4, 5	40	

Continuous Assessment (%)
60

Examination (%)

40

Examination Duration (Hours)

2

Additional Information for ATs

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 Assessment Rubrics.

Assessment Rubrics (AR)

Assessment Task

In-class test (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to analyse and solve practical problems related to energy supply and power plant

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

Assignment (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to analyse and solve questions related to energy generation and storage

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
Final exam (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion
Ability to analyse and solve practical problems related to energy generation and storage

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
In-class test (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Ability to analyse and solve practical problems related to energy supply and power plant

Excellent
(A+, A, A-) High

Good
(B+, B) Significant

Marginal
(B-, C+, C) Moderate

Failure
(F) Not even reaching marginal levels

Assessment Task
Assignment (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Ability to analyse and solve questions related to energy generation and storage

Excellent
(A+, A, A-) High

Good
(B+, B) Significant

Marginal
(B-, C+, C) Moderate

Failure
(F) Not even reaching marginal levels

Assessment Task
Final exam (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Ability to analyse and solve practical problems related to energy generation and storage

Excellent
(A+, A, A-) High

Good
(B+, B) Significant

Marginal
(B-, C+, C) Moderate

Failure
(F) Not even reaching marginal levels

Part III Other Information

Keyword Syllabus
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.

Reading List

Compulsory Readings

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

Additional Readings

	Title
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/
13	Renewable Energy Association - http://www.r-e-a.net/
14	National Hydrogen Association - http://www.hydrogenassociation.org/
15	EMSD website: http://www.emsd.gov.hk/