GE1355: SUSTAINABLE ENERGY AND ENVIRONMENTAL ENGINEERING

Effective Term
Semester A 2024/25

Part I Course Overview

Course Title
Sustainable Energy and Environmental Engineering

Subject Code
GE - Gateway Education
Course Number
1355

Academic Unit
School of Energy and Environment (E2)

College/School
School of Energy and Environment (E2)

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
SEE1003 Introduction to Sustainable Energy and Environmental Engineering

Part II Course Details

Abstract

Students will learn concepts related to energy and environmental science and engineering. Current and future energy resources, energy systems, and conversion technologies as well as energy conservation and management systems will be discussed. Key principles related to air, water, and waste management, and environmental systems and ecosystems will be addressed. Sustainable development will be emphasized throughout the course, and the role of policy and economic strategies will be analyzed through interactive discussion. A quantitative framework will be adopted to aid the analysis of energy and environmental systems and technologies.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Demonstrate an understanding on key energy and environmental issues in the 21st century and the importance of sustainable development	10		x	
2	Apply fundamental principles in energy and environmental science and engineering	40		x	
3	Analyze the current and future energy and environmental technologies	40	x	x	
4	Appreciate the role of policy and economic strategies in the energy and environmental sectors	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	Students will develop an understanding of key concepts and principles related to energy and environmental science and engineering	1, 2, 3, 4	2
2	Tutorial	Students will apply the knowledge gained in solving problems related to sustainable energy and environmental engineering	1, 2, 3, 4	1

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	In-class Quiz Students will demonstrate their understanding of basic concepts of the sustainable development in the context of energy and environmental engineering.	1, 2, 3, 4	20	
2	Assignment Several assignments will be given throughout the semester. Through the assignments, students will demonstrate their understanding of the underlying concepts of sustainable energy and environmental issues and the importance of sustainable development.	1, 2, 3, 4	30	

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Additional Information for ATs

Final exam will test students' ability to integrate knowledge learned throughout the course to analyze and solve problems related to sustainable energy and environmental engineering.

Examination duration: 2 hrs

Percentage of continuous assessment, examination, etc.: 50% by continuous assessment; 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 continuous assessment (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

1. In-class quiz

Criterion

Ability to explain concepts, analyze and solve problems related to energy and environmental science and engineering

Excellent (A+, A, A-)

Excellent analysis and problem solving skills to demonstrate in-depth understanding of sustainable energy and environmental engineering

Good (B+, B, B-)

Good analysis and problem solving skills to demonstrate in-depth understanding of sustainable energy and environmental engineering

Fair (C+, C, C-)

Acceptable analysis and problem solving skills to demonstrate in-depth understanding of sustainable energy and environmental engineering

Marginal (D)

Marginal analysis and problem solving skills to demonstrate in-depth understanding of sustainable energy and environmental engineering

Failure (F)

Poor analysis and problem solving skills to demonstrate in-depth understanding of sustainable energy and environmental engineering

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Assessment Task

2. Assignment

Criterion

Ability to explain concepts, analyze and solve problems related to energy and environmental science and engineering

Excellent (A+, A, A-)

Excellent understanding and problem solving skills to demonstrate in-depth understanding of energy engineering and sustainability

Good (B+, B, B-)

Good understanding and problem solving skills to demonstrate in-depth understanding of energy engineering and sustainability

Fair (C+, C, C-)

Acceptable understanding and problem solving skills to demonstrate in-depth understanding of energy engineering and sustainability

Marginal (D)

Marginal understanding and problem solving skills to demonstrate in-depth understanding of energy engineering and sustainability

Failure (F)

Poor understanding and problem solving skills to demonstrate in-depth understanding of energy engineering and sustainability

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Assessment Task

3. Final exam

Criterion

Ability to explain concepts, analyze and solve problems related to energy and environmental science and engineering

Excellent (A+, A, A-)

Excellent analysis and problem solving skills to demonstrate in-depth understanding of sustainable energy and environmental engineering

Good (B+, B, B-)

Good analysis and problem solving skills to demonstrate in-depth understanding of sustainable energy and environmental engineering

Fair (C+, C, C-)

Acceptable analysis and problem solving skills to demonstrate in-depth understanding of sustainable energy and environmental engineering

Marginal (D)

Marginal analysis and problem solving skills to demonstrate in-depth understanding of sustainable energy and environmental engineering

Failure (F)

Poor analysis and problem solving skills to demonstrate in-depth understanding of sustainable energy and environmental engineering

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Part III Other Information

Keyword Syllabus

- Local and global energy and environmental issues (e.g. Climate change, clean water)
- Sustainable development
- Basic energy and environmental science and engineering concepts and principles (e.g. conservation laws, unit operations)
- Basic policy and economic strategies in the energy and environmental sectors
- Fossil fuels processes
- Renewable energy technologies
- Energy conservation and management technologies
- Water and air quality
- Noise and waste management
- Environmental technologies
- Ecosystem and environmental management

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	Current and important scientific articles will be provided to supplement lecture materials
2	Principles of environmental science : inquiry and applications, Cunningham, William P., Cunningham, Mary Ann, Edition Ninth, international student edition, Published New York, New York : McGraw-Hill Education, [2020] ©2020, Identifier ISBN : 9781260568660 (ebk) ISBN : 1-260-56866-0, Available as an on-line resource at CityU Library
3	Ecology of a changing planet, Bush, Mark B, Edition 3rd ed., Published, Upper Saddle River, N.J. : Prentice Hall, [2002], c2003, Identifier ISBN : 0130662577, Hardcopies are available at 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

2

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

1

PILO 3: Demonstrate critical thinking skills

3

PILO 4: Interpret information and numerical data

2, 3

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

2

PILO 10: Demonstrate the attitude and/or ability to accomplish discovery and/or innovation

3

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 project