GE1308: ENERGY: TODAY AND TOMORROW

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Energy: Today and Tomorrow

Subject Code
GE - Gateway Education
Course Number
1308

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
Nil

Part II Course Details

Abstract

The world energy demand continues to grow at an increasing rate, especially in developing countries, such as China. However, available fossil fuel resources are decreasing. It is predicted that world oil production will reach its peak in a few years. The energy crisis problems will escalate seriously then. Moreover, burning fossil fuels is the main source of greenhouse gases and air pollutants, which are detrimental to the environment. Therefore, our present fossil fuel-based energy supply is indeed not sustainable.

Recently, research and development on clean energy and renewable energy have been very active. New government policies, commitments, and regulations are set to promote green energy. The energy industry is entering a new era of sustainability.

This course is designed to enable students to develop a broader perspective and critical understanding of current energy issues. The students after taking the course will have a basic comprehension of the science and technologies related to energy supply and utilization. The students will understand the environmental impacts and political conflicts arising from the world's heavy reliance on fossil fuel-based energy supply. The students will also be able to apply the knowledge learned to assess innovative alternative energy technologies and policies in different contexts, such as economy, environment, social and political matters. The major learning activities such as lectures, tutorials, assignments, quizzes, reports, and group presentations.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain the basic physics of energy conversion and the working of power plants.	20		x	
2	Assess environmental impacts arising from energy production.	20		x	
3	Describe global energy consumption trends and discuss the issues with various energy resources in the wider economic, social, and environmental contexts.	20		x	x
4	Evaluate energy options from a holistic perspective and reflect on trade-offs between access, availability, affordability, and acceptability.	20		x	
5	Describe the significance of sustainability (economic, environmental & social factors) in the power industry.	20		x	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	Lectures	Students will learn science, engineering principles, practical systems, and strategies of energy supply and demand.	1, 2, 3, 4, 5	2
2	Tutorials	Students will practice problem-solving; questions and answers; group discussion.	1, 2, 3, 4, 5	1
3	Reading; Self-study; Project	Students will collect data and information; learn problem-solving, practice critical and creative thinking, write an individual report.	1, 2, 3, 4, 5	5

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Quizzes: There will be two quizzes to assess students' knowledge and understanding of energy	1, 2, 3, 4, 5	40	-	No
2	Assignments: Individual homework assignments on problem-solving and analysis in energy sciences, policy and supply strategies.	1, 3, 4, 5	25	-	Yes
3	Project: Group exercise where students work together to comprehensively analyze an innovative and novel energy technology	2, 3, 4	35	-	Yes

Continuous Assessment (%)

100

Examination (%)

0

Minimum Continuous Assessment Passing Requirement (%)

30

Additional Information for ATs

Examination duration: N/A

Percentage of continuous assessment, examination, etc.: 100% by continuous assessment

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. Quizzes

Criterion

Capacity for self-directed learning to understand the principles of energy science, engineering, and basic energy economics.

Excellent (A+, A, A-)

Excellent conceptual understanding of energy science, engineering, and basic energy economics.

Good (B+, B, B-)

Good conceptual understanding of energy science, engineering, and basic energy economics.

Fair (C+, C, C-)

Acceptable conceptual understanding of energy science, engineering, and basic energy economics.

Marginal (D)

Marginally acceptable conceptual understanding of energy science, engineering, and basic energy economics.

Failure (F)

Poor conceptual understanding of energy science, engineering, and basic energy economics.

Assessment Task

2. Assignments

Criterion

Ability to explain concepts, analyse and solve problems related to energy science, engineering, and basic energy economics.

Excellent (A+, A, A-)

Excellent understanding of concepts and ability to analyze and solve problems related to energy science, engineering, and basic energy economics.

Good (B+, B, B-)

Good understanding of concepts and ability to analyze and solve problems related to energy science, engineering, and basic energy economics.

Fair (C+, C, C-)

Acceptable understanding of concepts and ability to analyze and solve problems related to energy science, engineering, and basic energy economics.

Marginal (D)

Marginally acceptable understanding of concepts and ability to analyze and solve problems related to energy science, engineering, and basic energy economics.

Failure (F)

Poor understanding of concepts and ability to analyze and solve problems related to energy science, engineering, and basic energy economics.

Assessment Task

3. Project

Criterion

Ability to identify problems and research gaps from literature and apply the concepts of energy science and engineering in proposing potential solutions.

Excellent (A+, A, A-)

Excellent ability to identify and understand contemporary energy challenges and apply concepts learned in proposing solutions.

Good (B+, B, B-)

Good ability to identify and understand contemporary energy challenges and apply concepts learned in proposing solutions.

Fair (C+, C, C-)

Moderate ability to identify and understand contemporary energy challenges and apply concepts learned in proposing solutions.

Marginal (D)

Marginally acceptable ability to identify and understand contemporary energy challenges and apply concepts learned in proposing solutions.

Failure (F)

Poor ability to identify and understand contemporary energy challenges and apply concepts learned in proposing solutions.

Part III Other Information

Keyword Syllabus

1. Introduction to energy sciences and energy resources
2. Fossil-fuel-based power plants and nuclear power plants
3. Environmental impacts of energy use
4. Demand side management and energy for transportation
5. Renewable energy and energy storage
6. Economics and policies related to energy

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	Nature Catalysis, 2019, 2,387-399
2	Energy Environ. Sci., 2019, 12, 463-491
3	Nature Energy, 2018, 3, 279-289
4	Nature Energy, 2019, 4, 80-186

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

1, 2, 3, 4, 5

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

1, 2, 3, 4

PILO 3: Demonstrate critical thinking skills

5

PILO 4: Interpret information and numerical data

1, 3, 4

PILO 5: Produce structured, well-organised and fluent text

1, 2, 3, 4, 5

PILO 6: Demonstrate effective oral communication skills

1, 2, 3, 4, 5

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

1, 2, 3, 4, 5

PILO 9: Value ethical and socially responsible actions

5

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

1, 2, 3, 4, 5

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: Through group projects, students are required to analyze innovative technologies related to energy generation and/or conservation.

Related CILO(s): CILO 1-5
Related GE PILO(s): PILO 1-10 (except 8)