GE2306: ENERGY AND TECHNOLOGY

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Energy and Technology

Subject Code
GE - Gateway Education
Course Number
2306

Academic Unit
Materials Science and Engineering (MSE)

College/School
College of Engineering (EG)

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

Energy has become a large societal issue due to the current reliance on non-renewable energy resources and their negative impact on the environment. A growing interest in clean and renewable energy resources makes researchers around the globe to discover new materials. This course aims to introduce the conventional fossil fuels and their utilizations, renewable solar/wind/water energies, as well as energy generation and storage that revolutionize the current world with various energy options.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the conventional fossil fuels.	25		x	
2	Describe the fossil fuel utilizations.	25		x	
3	Describe the renewable solar/wind/water energies.	25		x	
4	Describe the energy generation and storage.	25		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	Explain key concepts on energy materials.	1, 2, 3, 4	10 weeks
2	Presentations	Take the role to communicate the skills.	1, 2, 3, 4	2 weeks
3	Assignments	Summarize the presentation topics.	1, 2, 3, 4	1 week

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Presentations	1, 2, 3, 4	40	-	No
2	Assignments	1, 2, 3, 4	20	-	No

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)
2

Minimum Examination Passing Requirement (%)
30

Additional Information for ATs
For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.

Assessment Rubrics (AR)

Assessment Task
1. Presentations

Criterion
Understanding and explaining fundamental problem. Ability to identify new materials to solve such problems. Ability to explain prospects to solve the problem occurred.

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
2. Assignments

Criterion
Understanding the concepts of new energy materials, and their applications.

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
3. Examination

Criterion
Provide new materials design with well-designed concepts.

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

Part III Other Information

Keyword Syllabus
Conventional fossil fuels
- Coal, oil, natural gas

Fossil fuel utilizations
- Thermodynamics, engines

Renewable energies
- Solar, wind, water energies

Energy generation and storage
- Electricity generation, batteries

Reading List

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
3, 4

PILO 2: Explain the basic methodologies and techniques of inquiry of the arts and humanities, social sciences, business, and science and technology
3, 4

PILO 3: Demonstrate critical thinking skills
1, 2, 3, 4

PILO 4: Interpret information and numerical data

3, 4

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

1, 2, 3, 4

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 report