

MNE4046: GREEN INDUSTRIAL SYSTEMS

Effective Term

Semester A 2022/23

Part I Course Overview

Course Title

Green Industrial Systems

Subject Code

MNE - Mechanical Engineering

Course Number

4046

Academic Unit

Mechanical Engineering (MNE)

College/School

College of Engineering (EG)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Students must complete a minimum of 45 CUs to be eligible

Precursors

Nil

Equivalent Courses

MBE4046/SEEM4046/JC4046 Green Industrial Systems

Exclusive Courses

Nil

Part II Course Details

Abstract

The course covers a broad appreciation of the responsibility, obligation and practices on environmental issues in an industrial organization. The objective is to provide an overview of various techniques, skills and strategies for environmental conscious industry.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Discuss and argue the impacts of industrial pollution on ecosystem and human health.		x		
2	Familiarize with local and international industrial pollution regulations and policies.			x	
3	Develop, implement and audit an environmental management system according to the international standard ISO14000.			x	x
4	Apply the principles and practices of design for environment in consumer products to reduce their total environmental impact.			x	x
5	Quantify environmental impact of industrial processes with different types of environmental performance indices.			x	
6	Explain the processes and techniques of environmental impact assessment and monitoring in relation to industries and green product design.			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.

Teaching and Learning Activities (TLAs)

TLAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Learning through teaching is primarily based on lectures. Emphasis in lectures is placed on the understanding of environmental management principles and their practical applications in various green industrial systems.	1, 2, 3, 4, 5, 6	3 hrs/week
2	Problem Solving Project	Exercises/projects are given to students to learn the compilation of environmental management system documentations and its audits through industrial cases / projects.explore and identify problems and the design of consumer products in view of design for environment.	1, 2, 3, 4, 5	
3	Presentations and Essay	Explain the processes and techniques of environmental impact assessment and monitoring in relation to industries and green product design.	6	

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Problem Solving Project	1, 2, 3, 4, 5	20	
2	Presentations and Essay	6	20	2-3 presentations and one essay

Continuous Assessment (%)

40

Examination (%)

60

Examination Duration (Hours)

2

Additional Information for ATs

For a student to pass the course, at least 30% of the maximum mark for both coursework and examination should be obtained.

Assessment Rubrics (AR)

Assessment Task

Problem Solving Project

Criterion

Ability to explain in detail and with accuracy methods of inquiry useful in analysing for the design of high-value-added, user-friendly and eco-friendly products.

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

Presentations and Essay

Criterion

Capacity for self-directed learning to understand the principles of green industrial systems.

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

Examination

Criterion

3.1 Ability to explain in detail the implementation & audit of an environmental management system.

3.2 Ability to apply the principles of design for environment in consumer products.

3.3 Capacity for applying accuracy measures of environmental impact assessment for an industrial project.

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

Additional Information for AR

Note: For a student to pass the course, at least 30% of the maximum mark for both coursework and examination should be obtained.

Part III Other Information**Keyword Syllabus**

- Industrial pollution and ecosystem.
- Sustainable Engineering.
- Environmental regulations.
- ISO14000 environmental management system and audit.
- Environmental performance indices.
- Green Product Design.
- Life cycle assessment.
- Environmental impact assessment.

Reading List**Compulsory Readings**

Title	
1	Nil

Additional Readings

Title	
1	Graedel T. E. and Allenby B.R., Industrial Ecology and Sustainable Engineering, Pearson, 2010.
2	Graedel T. E. and Allenby B.R., Industrial Ecology (Second Edition), Prentice Hall, 2003.
3	Myer K., Environmentally Conscious Manufacturing, Wiley, 2007.
4	Ritchie, I. and Hayes, W., A guide to the implementation of the ISO 14000 series on environmental management, Upper Saddle River, N.J.: Prentice Hall, 1998.
5	Fiksel, J. (Ed.), Design for environment: creating eco-efficient products and processes, New York: McGraw-Hill, 1996.
6	ISO14000 Environmental Management Series, International Organization for Standardization (ISO).
7	Technical Memorandum on Environmental Impact Assessment Process, Hong Kong Environmental Protection Department.

8	Online Resources Course Website available on the Canvas throughout the semester. Websites of the Environmental Protection Department of the SAR, and companies adopting green industrial practices.
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