SEE4003: ENERGY AND ENVIRONMENTAL ENGINEERING LABORATORY

Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Energy and Environmental Engineering Laboratory

Subject Code
SEE - School of Energy and Environment
Course Number
4003

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

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
SEE1002 Introduction to Computing for Energy and Environment;
SEE1003 Introduction to Sustainable Energy and Environmental Engineering;
SEE2001 Electromagnetic Principles for Energy Engineers;
SEE2002 Chemical Sciences for Energy and Environmental Engineers;
SEE2003 Introduction to Energy and Environmental Data Analysis;
SEE2101 Engineering Thermofluids I;
SEE2201 Fundamentals of Environmental Engineering;
SEE3101 Engineering Thermofluids II;
SEE3102 Power Plant Engineering;
SEE3103 Energy Efficiency for Buildings;
SEE3104 Sustainable and Renewable Energy; AND
SEE4217 Waste and Wastewater Treatment Engineering

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

The course aims to impart practical skills to undergraduate students in bridging fundamental sciences and practical energy and environmental engineering. Students are trained to acquire data from energy and environmental engineering systems, analyze data, draw conclusions according to theoretical principles, and present their findings. Proficiency in data processing, interpretation and statistical analyses will be developed.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Demonstrate the ability to construct and apply basic scientific tools for measurements		x	x	
2	Apply fundamental knowledge of science and statistical analyses to interpret various measurements		x	x	
3	Analyze systems or infrastructure related to energy and environmental engineering based on the collected measurements			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.

Teaching and Learning Activities (TLAs)

	TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lab-based experiments	Students are required to perform hands-on experimentation and data collection and interpretation. Based on the collected data, students are also required to engineer energy and environmental system/ infrastructures	1, 2, 3	3

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Data analyses and report write-up	1, 2, 3	100	Student will be denied the right to submit report if he/she fails to take part in the hands-on experimentation

Continuous Assessment (%)

100

Examination (%)

0

Examination Duration (Hours)

N/A

Additional Information for ATs

Examination duration: N/A
Percentage of coursework, examination, etc.: 100% by coursework

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

1. Data analyses and report write-up

Criterion

1.1. Capacity to explain and analyse collected data

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Unsatisfactory

Assessment Task
1. Data analyses and report write-up

Criterion
1.2 Ability to analyze systems/infrastructure related to energy and environmental engineering

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Unsatisfactory

Part III Other Information

Keyword Syllabus
Energy engineering modules:
Heat and mass transfer, fluid mechanics, energy generation systems (renewable and non-renewable), energy efficient systems
Environmental engineering modules:
Aerosol measurements, air pollution, water quality analysis, wastewater treatment, solid waste treatment, noise
Data collection and statistical analysis, system engineering analysis

Reading List

Compulsory Readings

	Title
1	Teaching materials of all the prerequisite courses

Additional Readings

	Title
1	Consult reference readings of all the prerequisite courses