

CA2169: ENVIRONMENTAL ENGINEERING

Effective Term

Semester A 2023/24

Part I Course Overview

Course Title

Environmental Engineering

Subject Code

CA - Civil and Architectural Engineering

Course Number

2169

Academic Unit

Architecture and Civil Engineering (CA)

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

Nil

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

The course provides the student with entry level knowledge on environmental engineering, with a focus on the basic concepts of material and energy balances, reactions and reactors, process and flow analysis, environmental risk analyses, water quality, air quality, fate and transport of contaminants, and basic chemical and biological aspects of pollution.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if DEC-A1 app.)		
		DEC-A1	DEC-A2	DEC-A3
1	Design simple unit for physical, chemical and biological treatment processes		x	
2	Design simple solid waste management system		x	
3	Explain the basic concepts of water quality and air quality		x	
4	Explain the fate and transport of contaminants, and the basic chemical and biological aspects of pollution		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	Lectures on topics listed	1, 2, 3, 4	2
2	Tutorial/Project	In-class demonstrations or exercises on solving environmental engineering problems	1, 2, 3, 4	1

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Project/Assignment	1, 2, 3, 4	20	
2	Quiz	1, 2, 3, 4	30	

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Additional Information for ATs

To pass a course, a student must obtain minimum marks of 30% in both coursework and examination components, and an overall mark of at least 40%

Assessment Rubrics (AR)

Assessment Task

Project/Assignment

Criterion

ABILITY to INVESTIGATE and APPLY acquired skills for problems or topics related to environmental quality

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

Quiz

Criterion

ABILITY to SOLVE environmental engineering problems and CAPACITY to EXPLAIN key concepts and knowledge in the subject

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

ABILITY to SOLVE environmental engineering problems and CAPACITY to EXPLAIN key concepts and knowledge in the subject

Excellent (A+, A, A-)

High

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Significant

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Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information**Keyword Syllabus**

Material balance, energy balance, reaction kinetics, reactor design, process and flow analysis, environmental risk analyses, diffusion, dispersion, fate and transport of contaminants, aquatic chemistry, atmospheric chemistry.

Reading List**Compulsory Readings**

Title	
1	Nil

Additional Readings

Title	
1	Masters and Ela, "Introduction to Environmental Engineering and Science", 3rd edition, Prentice Hall, 2008.
2	Riffat, "Fundamentals of Wastewater Treatment and Engineering" , 1st edition, CRC Press, 2012
3	Davis, "Principles of Environmental Engineering and Science" , 3rd Edition, McGraw Hill, 2013