# CA4679: ADVANCED ENVIRONMENTAL ENGINEERING

**Effective Term** Semester A 2024/25

## Part I Course Overview

**Course Title** Advanced Environmental Engineering

Subject Code CA - Civil and Architectural Engineering Course Number 4679

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** CA2169 Environmental Engineering , or SEE2201 Fundamentals of Environmental Engineering

Students must have attempted (including class attendance, coursework submission, and examination) the precursor course(s) so identified.

**Equivalent Courses** BC4679 Environmental Engineering & Management

**Exclusive Courses** Nil

## Part II Course Details

## Abstract

The course focuses not only on the science and engineering principles in minimizing the adverse effects of human activities on the environment, but also on the social, cultural and managerial aspects. Furthermore, the course aims in providing basic knowledge in the area of physics, chemistry, and biology for students to understand current environmental issues, such as solid waste management, air quality and control, and noise pollution problem and management.

## Course Intended Learning Outcomes (CILOs)

|   | CILOs  | Weighting (if DEC-A1 app.) | DEC-A2 | DEC-A3 |
|---|--|----------------------------|--------|--------|
| 1 | Design simple unit for physical, chemical and biological treatment processes |                            | x      |        |
| 2 | Design simple solid waste management system                                  |                            | Х      |        |
| 3 | Measure and control of air quality   |                            | Х      |        |
| 4 | Measure and manage noise 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.

|   | LTAs       | Brief Description   | CILO No.   | Hours/week (if<br>applicable) |
|---|------------|---|------------|-------------------------------|
| 1 | Lecture    | Fundamental principles<br>on solid waste<br>management, air<br>pollution and control,<br>and noise pollution and<br>control | 1, 2, 3, 4 |                               |
| 2 | Tutorial   | Reinforcement on<br>fundamental design<br>principles covered by the<br>lectures   | 1, 2, 3, 4 |                               |
| 3 | Case Study | Explorative sessions on<br>specific engineering or<br>design scenarios  | 3, 4       |                               |

## Learning and Teaching Activities (LTAs)

Assessment Tasks / Activities (ATs)

|   | ATs        | CILO No.   | Weighting (%) | Remarks (e.g. Parameter<br>for GenAI use) |
|---|------------|------------|---------------|---|
| 1 | 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

Assignment

## Criterion

CAPACITY to UNDERSTAND fundamental principles pertaining to solid waste management, air pollution and control, and noise pollution and control. ABILITY to DESIGN basic processing units required for solid waste management.

## 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

CAPACITY to UNDERSTAND fundamental principles pertaining to solid waste management, air pollution and control, and noise pollution and control. ABILITY to DESIGN basic processing units required for solid waste management.

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

CAPACITY to UNDERSTAND fundamental principles pertaining to solid waste management, air pollution and control, and noise pollution and control. ABILITY to DESIGN basic processing units required for solid waste management.

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**

Chemical disinfection; water coagulation; kinetics and population dynamics; trickling filters; activated sludge process; waste generation, minimization, collection, treatment and disposal; air quality standard; air pollution control, noise pollution and management. Sustainable development.

## **Reading List**

#### **Compulsory Readings**

|   | Title |
|---|-------|
| 1 | Nil   |

#### **Additional Readings**

|   | Title   |
|---|---|
| 1 | Baldasano JM and Power H, Environmental Engineering and Management, Boston, Southampton: WIP Press. |
| 2 | Peavy, Rowe and Tchobanoglous, Environmental Engineering, McGraw-Hill, 1985.                        |

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| 3 | Vesilind, Worrel and Reinhart, Solid Waste Engineering, Brooks/Cole, 2002.                   |
|---|--|
| 4 | Viessman and Hammer, Water Supply and Pollution Control, 7th Edition, Pearson Prentice Hall. |