

# SEE2201: FUNDAMENTALS OF ENVIRONMENTAL ENGINEERING

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## Effective Term

Semester A 2022/23

## Part I Course Overview

### Course Title

Fundamentals of Environmental Engineering

### Subject Code

SEE - School of Energy and Environment

### Course Number

2201

### 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

PHY1201 General Physics I;  
BCH1100 Chemistry OR CHEM1300 Principles of General Chemistry;  
BCH1200 OR CHEM1200 Discovery in Biology;  
MA1200 Calculus and Basic Linear Algebra I or  
MA1300 Enhanced Calculus and Linear Algebra I; AND  
MA1201 Calculus and Basic Linear Algebra II or  
MA1301 Enhanced Calculus and Linear Algebra II

### Precursors

Nil

### Equivalent Courses

Nil

**Exclusive Courses**

Nil

**Part II Course Details****Abstract**

This course aims to systematically introduce students to the fundamental principles in the field of environmental engineering. Building upon the fundamental principles, students will be introduced to the science and engineering analysis methods used to study water and air quality, noise and waste management and their engineering control. This course will lay the groundwork for students to receive further training in more specialized areas of environmental engineering and understand the latest innovative development in the discipline.

**Course Intended Learning Outcomes (CILOs)**

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the properties of air, water and their contaminants	20		x	
2	Describe the transformation and transport processes of contaminants	20		x	
3	Analyze environmental models	10		x	
4	Practice water and waste engineering and understand the latest innovative technology	25		x	
5	Practice air quality engineering and understand the latest innovative technology	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.

**Teaching and Learning Activities (TLAs)**

TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures	Explain theories and concepts	1, 2, 3, 4, 5
2	Tutorials	Apply theories and concepts on practical examples	1, 2, 3, 4, 5
3	Field trip	Visit an engineering facility	4, 5

**Assessment Tasks / Activities (ATs)**

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Assignments	1, 2, 3, 4, 5	30	
2	Quiz	1, 2, 3, 4, 5	30	

**Continuous Assessment (%)**

60

**Examination (%)**

40

**Examination Duration (Hours)**

2

**Additional Information for ATs**

Examination duration: 2 hrs

Percentage of coursework, examination, etc.: 60% by coursework; 40% by exam

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. Assignments

**Criterion**

Ability to analyse and solve problems related to application in environmental engineering

**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. Quiz

**Criterion**

Ability to analyse and solve problems related to application in environmental engineering

**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

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**Assessment Task**

3. Examination

**Criterion**

Ability to analyse and solve problems related to application in environmental engineering

**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

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## Part III Other Information

**Keyword Syllabus**

Composition and physiochemical properties of contaminants; physical, chemical and biological transformation mechanisms of contaminants; contaminant transport phenomena; reactor models; material-balance models; water and wastewater treatment engineering and design; air pollutant emissions and controls

**Reading List**

**Compulsory Readings**

Title	
1	Nazaroff, W.W. and L. Alvarez-Cohen. 2000. Environmental Engineering Science. John Wiley & Sons, Inc.
2	Masters, G.M. and W.P. Ela. 2007. Introduction to Environmental Engineering and Science, 3rd ed. Prentice-Hall, Inc.

3	Wark, K., C.F. Warner, and W.T. Davis. 1998. Air Pollution: Its Origin and Control, 3rd ed. Addison Wesley Longman, Inc.
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**Additional Readings**

Title	
1	Nil