

# SEE6226: ECOSYSTEM AND ENVIRONMENTAL TOXICOLOGY

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## Effective Term

Semester A 2025/26

## Part I Course Overview

### Course Title

Ecosystem and Environmental Toxicology

### Subject Code

SEE - School of Energy and Environment

### Course Number

6226

### Academic Unit

School of Energy and Environment (E2)

### College/School

School of Energy and Environment (E2)

### Course Duration

One Semester

### Credit Units

3

### Level

P5, P6 - Postgraduate Degree

### Medium of Instruction

English

### Medium of Assessment

English

### Prerequisites

Nil

### Precursors

Nil

### Equivalent Courses

SEE8226 Ecosystem and Environmental Toxicology

### Exclusive Courses

Nil

## Part II Course Details

### Abstract

This course will cover the general aspects of ecosystems and environmental toxicology of different contaminants. Environmental toxicology studies the interaction between different contaminants and organisms (including humans), and thus the integration of biology and chemistry is a must. In this course, the general principles of ecosystem dynamics and different classes of contaminants (such as metals, organic contaminants, radionuclides, and emerging chemicals of concerns) will be first introduced. The environmental transport, bioaccumulation and bioavailability, and toxicological assessments of these contaminants will then be thoroughly evaluated and compared. Emphasis will be placed on the 'interface' of different environmental (or biological) matrixes. Different mathematical or empirical models used to study the transport, bioaccumulation, and toxicity of contaminants will be introduced. Finally, the more applied aspects of environmental toxicology will be discussed using real case examples in Hong Kong or elsewhere. The course will also provide basic framework to conduct realistic environmental risk assessments of different contaminants in the environments.

### Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the scope of environmental toxicology study and recognize the major classes of pollutants;	10	x		
2	Synthesize the major concepts in environmental toxicology study, such as the entry and fate, bioaccumulation and bioavailability and toxicity assessment;	30		x	
3	Evaluate the ecological and biological responses of pollutants at different levels;	30	x	x	x
4	Assess methods in conducting ecotoxicology research, such as the kinetic modelling, biomonitoring, toxicity testing, biomarkers and toxicity mechanisms study.	20		x	x
5	Critically evaluate and synthesize the current literature	10	x	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.

### Learning and Teaching Activities (LTAs)

LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Lectures are used to describe and illustrate the basic concepts principles and methods of environmental toxicology.	1, 2, 3, 4, 5 3 hrs per wk

**Assessment Tasks / Activities (ATs)**

	ATs	CILO No.	Weighting (%)	Remarks ("- for nil entry)	Allow Use of GenAI?
1	Assignments	1, 2, 3, 4, 5	20	Summative Assessment	No
2	Mid-term Test	1, 2, 3, 5	40	-	No

**Continuous Assessment (%)**

60

**Examination (%)**

40

**Examination Duration (Hours)**

2

**Minimum Continuous Assessment Passing Requirement (%)**

30

**Minimum Examination Passing Requirement (%)**

30

**Additional Information for ATs**

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**

Assignments (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

**Criterion**

Ability to analyse problems and synthesize knowledge in environmental toxicology

**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**

Mid-term test (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

**Criterion**

Ability to apply knowledge and skills to analyse, calculate, and solve problems in environmental toxicology

**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**

Final exam (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

**Criterion**

Ability to apply knowledge and skills to analyse, calculate, and solve problems in environmental toxicology

**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**

Assignments (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

Ability to analyse problems and synthesize knowledge in environmental toxicology

**Excellent**

(A+, A, A-) High

**Good**

(B+, B) Significant

**Marginal**

(B-, C+, C) Basic

**Failure**

(F) Not even reaching marginal levels

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**Assessment Task**

Mid-term test (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

Ability to apply knowledge and skills to analyse, calculate, and solve problems in environmental toxicology

**Excellent**

(A+, A, A-) High

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**Assessment Task**

Final exam (for students admitted from Semester A 2022/23 to Summer Term 2024)

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Ability to apply knowledge and skills to analyse, calculate, and solve problems in environmental toxicology

**Excellent**

(A+, A, A-) High

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## Part III Other Information

**Keyword Syllabus**

Ecosystems, toxicology, ecotoxicology, metals, pesticides, organic contaminants, emerging chemicals of concerns, radionuclides, nanomaterials, microplastics, pollutants, bioavailability, bioaccumulation, kinetic modelling, equilibrium, toxicity, molecular biomarkers, population, bioassays, interface, marine biology, speciation, fugacity, biomonitoring, environmental risk assessments, water quality.

**Reading List****Compulsory Readings**

Title	
1	Blasco J, Chapman PM, Campana O, Hampel M (2016) Marine Ecotoxicology: Current Knowledge and Future Issues. Elsevier.
2	Newman MC, Clements WH (2008) Ecotoxicology: A Comprehensive Treatment. CRC Press

**Additional Readings**

Title	
1	Landis WG, Sofield RM, Yu MH (2011) Introduction to Environmental Toxicology: Molecular Substructures to Ecological Landscapes 5th Edition. CRC Press.
2	Yu MH, Tsunoda H, Tsunoda M (2011) Environmental Toxicology: Biological and Health Effects of Pollutants 3rd edition. eBook published in 2016. Taylor and Francis <a href="https://doi.org/10.1201/b11677">https://doi.org/10.1201/b11677</a> .