

City University of Hong Kong
Course Syllabus

offered by School of Energy and Environment
with effect from Semester A 2020/21

Part I Course Overview

Course Title: Ecosystem and Environmental Toxicology

Course Code: SEE6226

Course Duration: One semester

Credit Units: 3

Level: P6

Medium of Instruction: English

Medium of Assessment: English

Prerequisites:
(Course Code and Title) Nil

Precursors:
(Course Code and Title) Nil

Equivalent Courses:
(Course Code and Title) Nil

Exclusive Courses:
(Course Code and Title) Nil

Part II Course Details

1. 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.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Describe the scope of environmental toxicology study and recognize the major classes of pollutants;	10%	✓		
2.	Synthesize the major concepts in environmental toxicology study, such as the entry and fate, bioaccumulation and bioavailability, and toxicity assessment;	30%		✓	
3.	Evaluate the ecological and biological responses of pollutants at different levels;	30%	✓	✓	✓
4.	Assess methods in conducting ecotoxicology research, such as the kinetic modelling, biomonitoring, toxicity testing, biomarkers, and toxicity mechanisms study.	20%		✓	✓
5.	Critically evaluate and synthesize the current literature	10%	✓	✓	✓
		100%			

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 self-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.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

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

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.					Weighting	Remarks
	1	2	3	4	5		
	Continuous Assessment:					60%	
Assignments	✓	✓	✓	✓	✓	20%	
Mid-term Test	✓	✓	✓		✓	40%	
	Examination:					40% (duration: 2 hours, if applicable)	
						100%	

1. **Assignments** are in the form of discussions and technical writing on project cases.

2. A **Test** may consist of short essays and numerical calculations.

To pass a course, a student must do ALL of the following:

- 1) obtain at least 30% of total marks allocated towards coursework (combination of assignments, term paper, 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.

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Assignments	Ability to analyse problems and synthesize knowledge in environmental toxicology	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Mid-term test	Ability to apply knowledge and skills to analyse, calculate, and solve problems in environmental toxicology	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Final exam	Ability to apply knowledge and skills to analyse, calculate, and solve problems in environmental toxicology	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

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.

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

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

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

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