City University of Hong Kong
Course Syllabus

offered by School of Energy and Environment
with effect from Semester 2022 /2023

Part I Course Overview

Course Title:	**Ecosystem and Environmental Toxicology**
Course Code:	**SEE8226**
Course Duration:	One semester
Credit Units:	3
Level:	P8
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites:	Nil
Precursors:	Nil
Equivalent Courses:	Nil
Exclusive Courses:	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)

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)

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)

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 assays and numerical calculations.

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

1) obtain at least 40% of total marks allocated towards coursework (combination of assignments, term paper, if applicable);
2) obtain at least 40% 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

Applicable to students admitted in Semester A 2022/23 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Assignments	Ability to analyse problems and synthesize knowledge in environmental toxicology	High	Significant	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	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	Basic	Not even reaching marginal levels

Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Excellent (A+, A)	Good (A-, B+)	Fair (B)	Marginal (B-, C+, C)	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

1. 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.

2. Reading List

2.1 Compulsory Readings

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
3	Campbell PGC et al. (2022) *Ecotoxicology*. Cambridge University Press

2.2 Additional Readings

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 https://doi.org/10.1201/b11677.