

Course Syllabus

**offered by Department of Chemistry
with effect from Semester A 2020/21**

This form is for the completion by the Course Leader. The information provided on this form is the official record of the course. It will be used for the City University's database, various City University publications (including websites) and documentation for students and others as required.

Please refer to the Explanatory Notes on the various items of information required.

Prepared / Last Updated by:

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**City University of Hong Kong
Course Syllabus**

**offered by Department of Chemistry
with effect from Semester A 2020/21**

Part I Course Overview

Course Title:	Environmental Sampling and Risk Assessment
Course Code:	CHEM3038 (and CHEM3038A)
Course Duration:	1 semester
Credit Units:	4 (3) credits
Level:	B3
Proposed Area: <i>(for GE courses only)</i>	<input type="checkbox"/> Arts and Humanities <input type="checkbox"/> Study of Societies, Social and Business Organisations <input type="checkbox"/> Science and Technology
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: <i>(Course Code and Title)</i>	Nil
Precursors: <i>(Course Code and Title)</i>	Nil
Equivalent Courses: <i>(Course Code and Title)</i>	BCH3038 (and BCH3038A) Environmental Sampling and Risk Assessment
Exclusive Courses: <i>(Course Code and Title)</i>	Nil

Note: CHEM3038A does not contain any practical component, and has a credit unit value of three (3).

Part II Course Details

1. Abstract

(A 150-word description about the course)

This course aims to:

- introduce students to the principles and techniques in environmental sampling; and risk assessment.
- provide students with an appreciation of the complex relationships of environmental variables and the heterogeneity of environment.
- help students to apply the principles and techniques of experimental and sampling design and data analysis in environmental studies.
- provide experience in application of the principles and techniques in environmental risk assessment.

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.	Identify and articulate the principles in environmental sampling and analysis, and risk assessment, thus acquiring the ability to select the most appropriate approach under different ecological/environmental scenarios.		✓	✓	
2.	Apply sampling and chemical analytical techniques in environmental systems, including aquatic, terrestrial and atmospheric components by conducting relevant field-based studies to explore and discover the applicability and limitations of the said techniques and communicating the findings in laboratory report form.		✓	✓	✓
3.	Analyze and interpret environmental data using appropriate statistical techniques and presenting the major findings in a report form and/or oral presentation format, as appropriate.			✓	✓
4.	Undertake human health and ecological risk assessments, and communicate the major findings to environmental managers and other stakeholders.			✓	✓

* If weighting is assigned to CILOs, they should add up to 100%.

100%

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

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	
Lectures and tutorials	Teaching and learning activities will be primarily centred around lectures and tutorials in which students will discuss various principles in environmental sampling and analysis, and risk assessment. This will be supplemented with real-world examples.	✓				
Tutorials, discussion groups, and laboratory practical sessions	During tutorials, discussion groups, and laboratory practical sessions students will design sampling programmes and conduct relevant chemical analyses on field-collected samples and assess the applicability of the designed procedures. The results will be written up by individual students and submitted as reports.		✓			
Case studies	Students will work on case studies of environmental analysis and will work individually and in groups. They will collate and analyse environmental datasets from government reports or published literature using appropriate statistical techniques.			✓		
Lectures, tutorials, and small group projects	Students will learn to undertake human health and ecological risk assessments based on data collected and analysed using skills they have acquired during the course through lectures, tutorials, and small group projects during the laboratory practicals. They will be required to present their major findings to other students in the class (who will act as stakeholders).				✓	

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		
Continuous Assessment: <u>40%</u>						
Written Assignments	✓		✓		40%	
Presentations		✓	✓			
Laboratory Reports		✓	✓			not for CHEM3038A
Examination: <u>60%</u> (duration: 3 hours)						
* The weightings should add up to 100%.					100%	

Starting from Semester A, 2015-16, students must satisfy the following minimum passing requirement for courses offered by CHEM:

"A minimum of 40% in both coursework and examination components."

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. Written Assignments	Completeness and correctness of calculations/answers; adequate application and understanding of literature and class content; logic of argumentation	Strong evidence of original thinking; good organization capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base	Evidence of grasp of subject, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature.	Student who is profiting from the university experience; understanding of the subject; ability to develop solutions to simple problems in the material.	Sufficient familiarity with the subject matter to enable the student to progress without repeating the course.	Little evidence of familiarity with the subject matter; weakness in critical and analytic skills; limited, or irrelevant use of literature
2. Presentations	Understanding of the topic and material; completeness of the presentation; logic of the presentation structure; clarity of talk; ability to discuss the presented topic					
3. Laboratory Reports	Completeness and ability to introduce the research problem/topic and the description of methods used. Appropriate presentation of experimental results and supportive use of scientific literature for discussion					
4. Examination	Completeness and correctness of calculations/answers; logic of argumentation and intelligent use of course content/ original thinking					

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.)

- Introduction to integrated environmental management systems; cost-benefit considerations; sustainable development.
- Techniques and equipment in environmental sampling and field experiments.
- Collection and analysis of field data, extrapolation and limitation of data.
- Bio-statistics. Experimental and sampling design: controls, random sampling, stratified random sampling, hierarchical sampling, field manipulation. Optimal sample size. Factorial design, Latin square, Power analysis.
- Prospective, retrospective, and comparative risk assessment of environmental contaminants.
- Hazard identification, dose-response assessment, exposure assessment, and risk characterization.
- Uncertainty analysis and probabilistic risk assessment.

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.	Environmental risk assessment : a toxicological approach, Ted Simon (Boca Raton, FL, CRC Press, 2014)
2.	
3.	
...	

2.2 Additional Readings

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

1.	Principles of Environmental Sampling, Keith, L.H. (American Chemical Society, Washington D.C., 1998)
2.	Risks and Decisions for Conservation and Environmental Management, Burgman, M. (Cambridge University Press, 2005)
3.	Handbook of environmental risk assessment and management, edited by Calow, P. (Oxford: Blackwell Science, 1998)
4.	Online Resources: To be provided, as required, in lectures and tutorials.

A. Please specify the Gateway Education Programme Intended Learning Outcomes (PILOs) that the course is aligned to and relate them to the CILOs stated in Part II, Section 2 of this form:

GE PILO	Please indicate which CILO(s) is/are related to this PILO, if any (can be more than one CILOs in each PILO)
PILO 1: Demonstrate the capacity for self-directed learning	
PILO 2: Explain the basic methodologies and techniques of inquiry of the arts and humanities, social sciences, business, and science and technology	
PILO 3: Demonstrate critical thinking skills	
PILO 4: Interpret information and numerical data	
PILO 5: Produce structured, well-organised and fluent text	
PILO 6: Demonstrate effective oral communication skills	
PILO 7: Demonstrate an ability to work effectively in a team	
PILO 8: Recognise important characteristics of their own culture(s) and at least one other culture, and their impact on global issues	
PILO 9: Value ethical and socially responsible actions	
PILO 10: Demonstrate the attitude and/or ability to accomplish discovery and/or innovation	

GE course leaders should cover the mandatory PILOs for the GE area (Area 1: Arts and Humanities; Area 2: Study of Societies, Social and Business Organisations; Area 3: Science and Technology) for which they have classified their course; for quality assurance purposes, they are advised to carefully consider if it is beneficial to claim any coverage of additional PILOs. General advice would be to restrict PILOs to only the essential ones. (Please refer to the curricular mapping of GE programme: http://www.cityu.edu.hk/edge/ge/faculty/curricular_mapping.htm.)

B. Please select an assessment task for collecting evidence of student achievement for quality assurance purposes. Please retain at least one sample of student achievement across a period of three years.

Selected Assessment Task