

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**

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Part I Course Overview

Course Title:	Environmental Pollution
Course Code:	CHEM4021 (and CHEM4021A)
Course Duration:	1 semester
Credit Units:	4 (3) credits
Level:	B4
Proposed Area: (for GE courses only)	<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: (Course Code and Title)	Nil
Precursors: (Course Code and Title)	For CHEM4021/BCH4021 only: CHEM2067/BCH2067 Diversity of Life and Evolution For CHEM4021A/BCH4021A only : CHEM2067/BCH2067 Diversity of Life and Evolution or BMS1801 Biosphere: Diversity, Functions and Interactions or CHEM1807/BCH1807 Foundations of Environmental Science
Equivalent Courses: (Course Code and Title)	BCH4021 (and BCH4021A) Environmental Pollution
Exclusive Courses: (Course Code and Title)	Nil

Note: CHEM4021A 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)

In this course, students will:

- examine problems caused by air, water, waste and land pollution;
- discuss the effects of pollutants on ecosystems and human health;
- be provided with practical experience in the analysis and interpretation of pollutants in the environment;
- develop knowledge and techniques in the monitoring, assessment and control of air, land and water pollution.

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 and evaluate the fates and effects of air, water, waste and land-based pollution on ecosystem and human health.	NA	NA	NA	NA
2.	Compare and contrast the various laboratory- and field-based techniques used in pollution monitoring for the assessment and control of air, land and water pollution.	NA	NA	NA	NA
3.	Critically evaluate, using case studies and via group presentations, environmental and socio-economic issues, including soil erosion, farm animal wastes, pesticides, persistent organic contaminants, fertilizers and acid rain.	NA	NA	NA	NA
4.	Critically evaluate, using case studies and group presentations, various methods of chemical and biological monitoring, including the use of soils, dust, micro-organisms, bioindicators, plants, animals and human tissues, in the assessment of rivers, coastal waters, groundwater, surface runoff, leachate and air-borne contaminants.	NA	NA	NA	NA
		100%			

* If weighting is assigned to CILOs, they should add up to 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	
Group activities	Teaching and learning will be primarily based around large and small group activities examining various pollutants, emission sources, and contaminant transport and sequestration within environmental compartments.	✓				
Group activities and practical sessions	Teaching and learning will be based on a combination of large and small group activities laying the basis for common techniques in environmental monitoring, along with complementary practical sessions where students will be able to experience these techniques themselves under guidance.		✓			
Group activities, written assignments and video presentations	Teaching and learning will be primarily by large and small group activities, written assignments, and complementary video presentations related to particular environmental problems.			✓		
Group-based assessments	Teaching and learning will be primarily by large and small group activities, and students will be involved in group-based assessments of real world pollution problems which they will present to other members of the class.				✓	

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	CHEM4021	CHEM4021A	
Continuous Assessment: <u>50%</u>							
Tutorial Assignments and Quizzes	✓		✓	✓	NA	NA	
Group Presentations				✓	NA	NA	
Practicals		✓			NA	--	(for CHEM4021 only)
Examination: <u>50%</u> (duration: 3 hours)							
* The weightings should add up to 100%.					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. Tutorial Assignments and Quizzes	understanding of the topic and reading materials; correctness of interpretation and analysis of experimental data	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Group Presentations	Understanding of the topic and material; completeness of the presentation; logic of the presentation structure; clarity of talk; appropriate use of photos and figures in the illustration of concepts; ability to discuss the presented topic	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Practicals	Correctness of interpretation and analysis of experimental data; understanding of the topic and reading materials; application of knowledge in solving real life problems	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. Examination	Completeness and correctness of	High	Significant	Moderate	Basic	Not even reaching marginal levels

	calculations/answers; correctness of interpretation and analysis of experimental data; application of knowledge in solving real life problems; logic of argumentation and intelligent use of course content/ original thinking					
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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.)

Air Pollution

The structure and properties of the lower atmosphere; air pollution - causes, scales and characteristics; types of atmospheric pollutants. Stationary and mobile sources. Factors important in the removal of atmospheric pollutants. Ozone production in urban air. Acid deposition. Greenhouse effect. Air and water quality: standards, objectives and monitoring. Air pollution in Hong Kong: general features; composition, sources, transformation and removal.

Water Pollution

Water quality parameters, classification of water pollutants. Industrial water pollution. Environmental chemistry of industrial pollutants, particularly in the Hong Kong context.

Sources, Fates, Effects of Pollutants

Environmental pollutants: their emission, transport and fate. Biological and socio-economic effects of major environmental pollutants. Damage to plants, animals and ecosystems. Problems of soil erosion, farm animal wastes, pesticides and excess fertilizers. Features of contaminated, disturbed and derelict land. Sewage and other pollution related to human/urban activity.

Chemical and Biological Monitoring of Pollution

Chemical and biological monitoring. Bioindicators. Uses of soil, dust, microorganisms, plants, animal and human tissues in air monitoring. Establishment of monitoring systems. Sampling and analysis of soil and water. Monitoring of groundwater, surface runoff, leachate and gases from contaminated and disturbed sites.

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.	
2.	
3.	
...	

2.2 Additional Readings

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

1.	Connell, D.W., Lam, P.K.S., Richardson, B.J. & Wu, R.S.S. (1999). <i>Introduction to Ecotoxicology</i> . Blackwell Science Ltd., Oxford. 170pp. (Library call number: QH545.A1 I5745 1999).
2.	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