

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: Atmospheric Chemistry

Course Code: SEE4202

Course Duration: One semester

Credit Units: 3

Level: B4

Arts and Humanities

Proposed Area: Study of Societies, Social and Business Organisations

(for GE courses only)

Science and Technology

Medium of Instruction: English

Medium of Assessment: English

Prerequisites: SEE2002 Chemical Sciences for Energy and Environmental Engineers
(Course Code and Title)

Precursors: BCH2004 OR CHEM2004 Principles of Analytical Chemistry; AND
SEE3203 Air Pollution
(Course Code and Title)

Equivalent Courses: Nil
(Course Code and Title)

Exclusive Courses: Nil
(Course Code and Title)

Part II Course Details

1. Abstract

(A 150-word description about the course)

The course is designed for the students who want to learn the atmospheric chemistry processes of inorganic and organic chemical species in the tropospheric atmosphere. After this course, the students should have a working knowledge of chemistry and some knowledge on some areas of current interest in environmental science.

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.	Understand the structure and composition of stratosphere and troposphere and sources of trace components	20%	✓		
2.	Understand the photochemical reactions of organic and inorganic compounds and discover the relation with atmospheric processes	30%		✓	
3.	Understand the ozone formation and discover the impact on the environment	20%	✓	✓	
4.	Understand the acid deposition and aerosol chemistry and discover their impact on the environment	30%		✓	
		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	
Lectures	Powerpoint backed by reading/references	✓	✓	✓	✓	2.15 hours
Tutorials	In class exercises and problem solving	✓	✓	✓	✓	0.85 hours

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> %						
In-class test	√	√	√		20%	
Assignments	√	√	√		20%	
Examination: <u>60</u> % (duration: 2 hours, if applicable)						
* The weightings should add up to 100%.					100%	

Examination duration: 2 hrs

Percentage of coursework, examination, etc.: 40% by coursework; 60% by exam

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.

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. In-class test	Ability to analyse and solve problems related to atmospheric chemistry and its interface with air pollution	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Assignments	Assessing the ability to solving problems, but especially in imaginative ways of and expands on class materials.	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Examination	Showing a depth of understanding of the chemistry, but also able to integrate the answer across the material from lectures and reading. Seeing the socio-political context of air pollution chemistry and understands the relevance of scientific discoveries about atmospheric chemistry to key scientific questions.	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.)

1. The structure and composition of atmosphere, the stratosphere and troposphere;
2. Natural and anthropogenic sources of atmospheric gases;
3. The origin of air pollution problems and their control;
4. Atmospheric oxidants and radicals, their formation and relevant reactions;
5. Atmospheric fate of organic air pollutants compounds, sources, reactions and sinks;
6. Photochemistry of atmospheric inorganic compounds, NO_x chemistry, secondary air pollutants;
7. Ozone formation in the stratosphere and troposphere;
8. Acid deposition and cloud formation
9. Aerosol chemistry and physics

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.	Elements of this book will be mounted on CANVAS: Finlayson-Pitts, B.J. and Pitts, Jr. J.N. 2000, Chemistry of the Upper and Lower Atmosphere, Academic Press, San Diego, CA.
2.	Elements of this book will be mounted on CANVAS: Brimblecombe, P. 1996 Air composition & chemistry, Cambridge University Press.
3.	
4.	

2.2 Additional Readings

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

1.	Powerpoint listing of references to journal literature given in class if students need this
2.	Mounted on CANVAS: ELECTIVE READINGS these are optional, but give the social, historical and literary context to the course
3.	
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