

**City University of Hong Kong
Course Syllabus**

**offered by School of Energy and Environment
with effect from Semester A 2024/25**

Part I Course Overview

Course Title: Air Pollution and Atmospheric Chemistry

Course Code: SEE5201

Course Duration: One semester

Credit Units: 3 credits

Level: P5

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) SEE8211 Air Pollution and Atmospheric Chemistry

Exclusive Courses:
(Course Code and Title) Nil

Part II Course Details

1. Abstract

This course aims to provide a working knowledge of air quality issues. It will emphasize on a multidisciplinary approach to investigating the emission sources, atmospheric chemistry and removal processes, meteorological phenomena and their impact on pollution at local to global scales. Regional and global issues such as acid rain, ozone depletion and air quality connections to climate change will also be discussed.

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 compositions and structure of the atmosphere and their relationships with air pollution and global atmospheric change	25%	✓		
2.	Demonstrate an understanding of atmospheric chemistry	50%		✓	
3.	Demonstrate critical thinking skills in current challenges of air pollution and global atmospheric change	25%	✓	✓	✓
		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 real-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. Learning and Teaching Activities (LTAs)

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

LTA	Brief Description	CILO No.			Hours/week (if applicable)
		1	2	3	
Lectures	Explain key concepts of atmospheric chemistry	✓	✓	✓	
Tutorials	Solidify students' and understandings with practical examples, real cases, class assignments and discussions.	✓	✓	✓	
Presentation	Express students' own opinions on air quality and climate change issues			✓	

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		
Continuous Assessment: 100%					
Assignments	✓	✓	✓	40%	
Midterm	✓	✓		35%	
Term paper and presentation	✓	✓	✓	25%	
Examination: 0% (duration: _____, if applicable)				100%	

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.)

Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Assignments	Ability to solve problems related to lecture material	Excellent analysis and problem solving skills to demonstrate in-depth understanding of atmospheric chemistry and its relationship to air pollution and climate	Good analysis and problem solving skills to demonstrate in-depth understanding of atmospheric chemistry and its relationship to air pollution and climate	Moderate analysis and problem solving skills to demonstrate in-depth understanding of atmospheric chemistry and its relationship to air pollution and climate	Acceptable analysis and problem solving skills to demonstrate in-depth understanding of atmospheric chemistry and its relationship to air pollution and climate	Poor analysis and problem solving skills to demonstrate in-depth understanding of atmospheric chemistry and its relationship to air pollution and climate
2. Midterm	Ability to explain key concepts and solve problems related to air pollution	Excellent understanding of concepts and ability to analyze and solve problems related to air pollution	Good understanding of concepts and ability to analyze and solve problems related to air pollution	Moderate understanding of concepts and ability to analyze and solve problems related to air pollution	Acceptable understanding of concepts and ability to analyze and solve problems related to air pollution	Failure to demonstrate understanding of concepts and ability to analyze and solve problems related to air pollution
3. Term paper and presentation	Ability to propose and present an air pollution- or climate-related project	Excellent project design, writing, and presentation	Good project design, writing, and presentation	Moderate project design, writing, and presentation	Be able to design, describe, and present the project	Failure to design, describe, or present the project

Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
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1. Assignments	Ability to analyse and solve problems related to lecture material	Excellent analysis and problem solving skills to demonstrate in-depth understanding of air pollution chemistry	Good analysis and problem solving skills to demonstrate good understanding of air pollution chemistry	Marginally acceptable analysis and problem solving skills to demonstrate limit understanding of air pollution chemistry	Poor analysis and problem solving skills to demonstrate understanding of air pollution chemistry
2. Midterm	Ability to explain key concepts and solve problems related to air pollution	Excellent understanding of concepts and ability to analyse real-world problems related to air quality	Good understanding of concepts and ability to analyse real-world problems related to air quality	Marginally acceptable understanding of concepts and ability to analyse real-world problems related to air quality	Failure to demonstrate understanding of concepts and ability to analyse real-world problems related to air quality
3. Term paper and presentation	Ability to propose and present an air pollution-related project	Excellent project design, literature review, and writing in the term paper. Excellent, clear, and confident performance in the presentation.	Good project design, literature review, and writing in the term paper. Good and clear performance in the presentation.	Marginally acceptable performance in project design, literature review, paper writing, and presentation.	Failure to design the project and present it clearly.

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.)

- Chemistry concepts
- Air pollution regulations and health effects
- Atmospheric composition, meteorology, pressure, and transport
- Biogeochemical cycles
- Radiation, greenhouse effects, and climate forcing
- Stratospheric chemistry and pole ozone hole
- Tropospheric chemistry, ozone smog, and urban air quality
- Aerosols, clouds, aqueous phase chemistry, and acid rain
- Air Pollution control and indoor air 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.)

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| 1. | Daniel Jacob, Introduction to Atmospheric Chemistry, Princeton University Press, 1999. |
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2.2 Additional Readings

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

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| 1. | John H. Seinfeld and Spyros N. Pandis: Atmospheric Chemistry and Physics: From Air Pollution to Climate Change, 3rd Edition, Wiley, 2016. |
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