SEE5201: AIR POLLUTION AND ATMOSPHERIC CHEMISTRY

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Air Pollution and Atmospheric Chemistry

Subject Code
SEE - School of Energy and Environment
Course Number
5201

Academic Unit
School of Energy and Environment (E2)

College/School
School of Energy and Environment (E2)

Course Duration
One Semester

Credit Units
3

Level
P5, P6 - Postgraduate Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
SEE8211 Air Pollution and Atmospheric Chemistry

Exclusive Courses
Nil

Part II Course Details

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.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the compositions and structure of the atmosphere and their relationships with air pollution and global atmospheric change	25	x		
2	Demonstrate an understanding of atmospheric chemistry	50		x	
3	Demonstrate critical thinking skills in current challenges of air pollution and global atmospheric change	25	x	x	x

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.

Learning and Teaching Activities (LTAs)

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

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Assignments	1, 2, 3	40	Summative Assessment	No
2	Midterm	1, 2	35	-	No

3	Term paper and presentation	1, 2, 3	25	-	Yes

Continuous Assessment (%)

100

Examination (%)

0

Minimum Continuous Assessment Passing Requirement (%)

30

Additional Information for ATs

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 in-class exercises, case study, oral presentation, 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.

Assessment Rubrics (AR)

Assessment Task

Assignments (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to solve problems related to lecture material

Excellent

(A+, A, A-) Excellent analysis and problem solving skills to demonstrate in-depth understanding of atmospheric chemistry and its relationship to air pollution and climate

Good

(B+, B, B-) Good analysis and problem solving skills to demonstrate in-depth understanding of atmospheric chemistry and its relationship to air pollution and climate

Fair

(C+, C, C-) Moderate analysis and problem solving skills to demonstrate in-depth understanding of atmospheric chemistry and its relationship to air pollution and climate

Marginal

(D) Acceptable analysis and problem solving skills to demonstrate in-depth understanding of atmospheric chemistry and its relationship to air pollution and climate

Failure

(F) Poor analysis and problem solving skills to demonstrate in-depth understanding of atmospheric chemistry and its relationship to air pollution and climate

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Assessment Task

Midterm (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to explain key concepts and solve problems related to air pollution

Excellent

(A+, A, A-) Excellent understanding of concepts and ability to analyze and solve problems related to air pollution

Good

(B+, B, B-) Good understanding of concepts and ability to analyze and solve problems related to air pollution

Fair

(C+, C, C-) Moderate understanding of concepts and ability to analyze and solve problems related to air pollution

Marginal

(D) Acceptable understanding of concepts and ability to analyze and solve problems related to air pollution

Failure

(F) Failure to demonstrate understanding of concepts and ability to analyze and solve problems related to air pollution

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Assessment Task

Term paper and presentation (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to propose and present an air pollution- or climate-related project

Excellent

(A+, A, A-) Excellent project design, writing, and presentation

Good

(B+, B, B-) Good project design, writing, and presentation

Fair

(C+, C, C-) Moderate project design, writing, and presentation

Marginal

(D) Be able to design, describe, and present the project

Failure

(F) Failure to design, describe, or present the project

Assessment Task

Assignments (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Ability to analyse and solve problems related to lecture material

Excellent

(A+, A, A-) Excellent analysis and problem solving skills to demonstrate in-depth understanding of air pollution chemistry

Good

(B+, B) Good analysis and problem solving skills to demonstrate good understanding of air pollution chemistry

Marginal

(B-, C+, C) Marginally acceptable analysis and problem solving skills to demonstrate limit understanding of air pollution chemistry

Failure

(F) Poor analysis and problem solving skills to demonstrate understanding of air pollution chemistry

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Assessment Task
Midterm (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Ability to explain key concepts and solve problems related to air pollution

Excellent
(A+, A, A-) Excellent understanding of concepts and ability to analyse real-world problems related to air quality

Good
(B+, B) Good understanding of concepts and ability to analyse real-world problems related to air quality

Marginal
(B-, C+, C) Marginally acceptable understanding of concepts and ability to analyse real-world problems related to air quality

Failure
(F) Failure to demonstrate understanding of concepts and ability to analyse real-world problems related to air quality

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Assessment Task
Term paper and presentation (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Ability to propose and present an air pollution-related project

Excellent
(A+, A, A-) Excellent project design, literature review, and writing in the term paper. Excellent, clear, and confident performance in the presentation.

Good
(B+, B) Good project design, literature review, and writing in the term paper. Good and clear performance in the presentation.

Marginal
(B-, C+, C) Marginally acceptable performance in project design, literature review, paper writing, and presentation.

Failure
(F) Failure to design the project and present it clearly.

Part III Other Information

Keyword Syllabus

- 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

Reading List

Compulsory Readings

	Title
1	Daniel Jacob, Introduction to Atmospheric Chemistry, Princeton University Press, 1999.

Additional Readings

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