

**Technical Elective: Air Pollution Engineering and Management**  
**Course 312224030**  
**Syllabus**

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**Office:** Zone 3, Room 322A

**Office hour:** Wednesday, 1:30pm-4:00pm, or by appointment

**Lecture Time:** Wednesday, 8:15am-11:00am

**Lecture Location:** Zone 3, Room 103, Liberal Arts Building

**Note:** This syllabus is subject to change.

### **Course Description**

This is a comprehensive course on air pollution. The course contains three modules. The first module is an introduction to air pollution, which will cover the fundamentals of air pollution such as the chemical reactions and aerodynamics. The second module will be on the history and the current state of air pollution research, with a focus on monitoring and modelling. The third module will build on the first and second modules by connecting the basics of air pollution to climate change, global health, and China's "Double Carbon" goal.

### **Course Objectives**

The main objective of this course is to advance students' previous learning by connecting engineering concepts to real world applications. Students should be able to 1) develop comprehensive understanding of air pollution in the rapidly changing global environment, 2) form evidence-based thinking about key concepts such as aerodynamics and air pollution exposure, and 3) become familiar with models and tools that are used for assessing and conducting research on air pollution.

**Course credit hours:** Three (3)

**Course prerequisite:** None

### **Grading**

Class participation:	10%
Weekly report:	10%
In-class quiz:	10%
Group project:	20%
Midterm exam:	20%
Final exam:	30%

### **Audio-Video Recording Policy**

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion, and activities without the advance written permission of the instructor, and any such recording properly approved in advance should be used solely for the student's private use.

## **Tentative Topics & Schedule**

### Module I:

Lecture 1 Introduction to air pollution science

Lecture 2 Fundamentals of air pollution I: particles, aerosols

Lecture 3 Fundamentals of air pollution II: gases

Lecture 4 Fundamentals of air pollution III: organic matters

Lecture 5 Evaluating air quality: science and myth

### Module II:

Lecture 6 Indoor air pollution I: Fundamentals

Lecture 7 Indoor air pollution II: Monitoring and modelling

Lecture 8 Introduction to air pollution research

Lecture 9 Air pollution emission and modelling (MEIC, CMAQ) Guest: Prof. Zhou, Li

Lecture 10 Midterm exam

Lecture 11 Urban air pollution and its Joint Effect with Weather and Green Space

### Module III:

Lecture 12 Carbon, energy and global climate change in the context of air pollution

Lecture 13 Calculating the burden of air pollution

Lecture 14 Air pollution mitigation: policies and technology

Lecture 15 Group project presentation

Lecture 16 Group project presentation

Lecture 17 Challenges and prospects in air pollution management; course review

Lecture 18 Final Exam