

ENVR 2020 – Urban Air Pollution

School:	Academy of Interdisciplinary Studies
Subject Area:	Environment
Course Credit:	3
Instructor:	NING Zhi
Pre-requisite/co-requisite:	Nil

Notes:

- The syllabi provided here is for reference only and may be subject to changes and adjustments as determined by the course instructors.

ENVR 2020 Urban Air Pollution
Hong Kong University of Science and Technology
Course Syllabus

Date and Venue:

- Date: Tuesday, Thursday from 8 February to 10 May 2022
- Time: 09:00 to 10:20
- Venue: ZOOM meeting via canvas
- Join Zoom Meeting
- <https://hkust.zoom.us/j/91084331979?pwd=eWxuVnpsZHFERVkrMGRLclU5VUxjdz09>
- Meeting ID: 910 8433 1979
- Passcode: 951646

Instructor Contact Information:

- Name: Prof. Zhi Ning (Zhi)
- Email: zhining@ust.hk
- Office: Room 4356, Lift 17-18
- Office Hours: Thursdays, 13:00 -15:00

TA Contact Information:

- Name: Mr. Xiaoliang QIN and Mr. Mingyao SUN
- Venue: Online appointment by email

Course Description:

The student completing this course will be able to:

- (1) identify and describe the key pollutants in urban air that pose threat to public health;
- (2) identify and describe the main sources of emissions that lead to urban air pollution problems;
- (3) compare and contrast the most common methods for effectively preventing or controlling emissions of urban air pollution;
- (4) explain the key principles by which the transport and transformation of air pollution in the urban environment are analyzed;
- (5) define and discuss the principles of common air pollution measurement techniques;
- (6) define and explain the difference between air quality and human exposure to air pollution;
- (7) measure and discuss key human activity patterns and urban microenvironments that lead to human exposure to urban air pollution.

This course is intended to be a survey course for undergraduate students to provide an introduction to science and policy topics related to urban air pollution. Examples regarding urban air pollution emissions, air quality, and exposure will be based on recent data and research for Hong Kong and other cities. Students will be introduced to some qualitative concepts on urban air pollution and a few quantitative concepts such as emission factors calculation, a simple Gaussian plume dispersion modeling, a simplified exposure model, and a few basic statistical concepts for summarizing and analyzing. However, no prior knowledge in these topic areas is assumed.

Prerequisites:

This course is open to undergraduate students. There are no specific prerequisites. This is an introductory survey course.

Course Readings:

Course readings and other course content will be provided via the Canvas eLearning systems, which is accessible via this portal: <https://canvas.ust.hk/>.

Class Attendance:

Students are required to attend each class. If you are not able to attend a class, let the instructor know.

Course components:

The course will be comprised of the following components:

Components	Description	Note
Lectures	13 weeks	Invited lectures will be given by experts in the field and industrial leaders when available.
Homework assignments	3	Two weeks will be given for each homework.
Survey project	1	Students will use portable air pollution sensors to measure air quality during daily life in different indoor environments in dorms, homes and class rooms with special focus at places related to transportation during commuting and whiling waiting at bus stops. Students will be required to collect data, record time activities, individually analyze the measurement results to answer a few specific questions in the form of project report. Details of the course project and requirement on the report will be provided in a separate file.
Mid term exam	1	A4 size double side cheat sheet is allowed. The mid-term exam will include multiple choice, short answer, and problem questions and will count for 30 percent of the course grade.
Final exam	1	A4 size double side cheat sheet is allowed. The final exam will include multiple choice, short answer, and problem questions and will count for 30 percent of the course grade.

Course lecture arrangement:

No.	Class Date	Class Content
1	Tuesday, February 8, 2022	Course introduction and general background
2	Thursday, February 10, 2022	Composition of atmosphere and air pollution
3	Tuesday, February 15, 2022	Particle pollution properties I
4	Thursday, February 17, 2022	Particle pollution properties II
5	Tuesday, February 22, 2022	PM measurement methods
6	Thursday, February 24, 2022	Gas measurement methods
7	Tuesday, March 1, 2022	Indoor air quality
8	Thursday, March 3, 2022	Project introduction
9	Tuesday, March 8, 2022	Air pollution sensor I
10	Thursday, March 10, 2022	Air pollution sensor II
11	Tuesday, March 15, 2022	Air pollution sensor III
12	Thursday, March 17, 2022	Air Quality Standards
13	Tuesday, March 22, 2022	Tutorial Session
14	Thursday, March 24, 2022	Urban pollution dispersion model
15	Tuesday, March 29, 2022	Urban pollution dispersion model
16	Thursday, March 31, 2022	Pollution transport in box model
17	Thursday, April 7, 2022	Reaction of urban air pollution
18	Tuesday, April 12, 2022	Exposure assessment
19	Tuesday, April 19, 2022	Microenvironments and exposure
20	Thursday, April 21, 2022	Air pollution sources
21	Tuesday, April 26, 2022	Pollution control for industrial sources and mobile sources
22	Thursday, April 28, 2022	Final exam review
23	Tuesday, May 3, 2022	Formal project presentation and discussion
24	Thursday, May 5, 2022	Formal project presentation and discussion
25	Tuesday, May 10, 2022	Formal project presentation and discussion

Updated on 2022, Feb 1

Version 1

Initial arrangement

Course assessment:

Assessment criteria	Percentage
Homework assignment	30%
Project report	10%
Mid term exam	30%
Final exam	30%