

PUBHEHS 5340 – Air Contaminants and Public Health
3 credit hours – Spring 2026
Tuesday and Thursday 3:55 pm to 5:15 pm (Live Online)

Course Instructors

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Instructor’s Office Hours

Dr. Mereb: 6-7 on Mondays (using the course Zoom link)
Dr. Adetona: 1-2 on Mondays

Faculty Feedback & Response Time

The following gives you an idea of my intended availability during the course:

- **Grading:** You can generally expect feedback within 7 days.
- **E-mail:** We will reply to e-mails within 24 hours on school days.
- **Discussion board:** Either the TA or the instructor will check and reply to messages in the discussion boards at least every 24 hours on school days and weekends, unless a different turnaround time (due to travel, etc.) is announced.

Graduate Teaching Assistant (GTA)

Anthony Akande, akande.16@buckeyemail.osu.edu, office hours 2-3 on Thursdays

GTA Responsibilities

The GTA assigned to the course will hold regular office hours and lead review sessions for any students who need help with class material. The TA may assist with scoring assignments; however, final grades will be assigned by the professor. **Any questions regarding grading should be directed to the professor and not the TA.**

Course Description

Air is essential for human survival, and the degradation of its quality has significant impacts on human health and the environment. Consequently, the regulation of air quality and the control of contaminant emissions into the atmosphere have become major components of efforts to maintain public health and protect the environment in the United States and many other countries. The “*Air Contaminant and Public Health*” course will introduce students to the concept of air quality and **will focus** on the relatedness between its pollution and morbidity, and its impact on public health. Specifically, students will learn about the categories and types of air contaminants, their natural and anthropogenic sources, and the respiratory and extra-pulmonary effects of air pollution. This knowledge will be reinforced by introducing the students to historical, current, and emerging air pollution issues in the United States and other parts of the world

from the public health perspective. Furthermore, students will learn about national (United States) and international frameworks for the management of specific air pollution problems, will be introduced to the implication of tools/approaches for monitoring air contaminants for environmental health and epidemiology, and will learn about the public health applications of federal resources for determining air quality.

The content of the course necessarily reinforces an Environmental Health Science (EHS) model (Figure 1). The concept of air quality is primarily motivated by its impact on human health, and its assessment is dependent on the accurate characterization of contaminant sources and concentration in the air matrix. Finally, the determination of the relationship between exposures to air contaminants and adverse health effects is an essential input to the regulation of air quality and the implementation of contaminant controls in order to maintain it (air quality) in a state good enough to sustain a healthy environment and healthy human living. The PUBHEHS 5340 *“Air Contaminant and Public Health”* course thus **focuses** on the interaction of air contaminants with and impact on biological receptors (humans) and it is **complementary** to CHEM 6550 *“Atmospheric Chemistry.”*

Prerequisites

There are no prerequisites for this course.

Course Learning Objectives

1. Describe the composition of the atmosphere and its relevance to ambient air quality and health
2. Describe the different categories and types of air contaminants, and their sources
3. Summarize major historical and current air pollution episodes and their public health impacts
4. Discuss the issue of disparities as they relate to the adverse health effects of air pollution
5. Identify and discuss appropriate regulatory and technological mechanisms for controlling exposure to air contaminants
6. Discuss approaches for monitoring air quality and exposure to air contaminants
7. Access and use available resources for the determination of ambient air quality
8. Identify and critically assess air pollution issues

Competencies

Applicable BSPH Environmental Public Health Specialization Competencies

Upon completion of the course, BSPH degree students with specialization in environmental public health sciences should also be able to:

1. Use the Environmental Science Health model to explain environmentally-related exposures and human diseases
4. Describe how the quality of environmental media (air/ water/soil/food) is adversely affected by contamination from chemical, biological and physical agents.
7. Summarize management, technical measures and approaches to reduce and prevent environmentally-related human disease
9. Identify regulations, policies, standards, and guidelines applicable to the quality of air, water, soil, and food; and explain how the prevention or control of environmentally related human exposures and diseases, including changes to the lived environment, are applied to improve environmental public health.

Applicable MPH EHS Specialization Competencies

Upon completion of the course, MPH degree students with specialization in environmental health sciences should also be able to:

1. Outline the health threat that natural and anthropogenic contaminants in the environment can pose to population health.
2. Explain the physiological factors that influence human exposure and the uptake of chemical and biological environmental agents.
3. Describe federal and state regulatory programs, guidelines and authorities relevant to environmental and occupational health.
4. 4. Access state, federal, and local resources for assessing the environmental and occupational health.
5. Determine the role of exposure assessment in environmental and occupational health.

A complete list of College of Public Health Competencies is located on the College of Public Health website: <https://cph.osu.edu/students/competencies>.

Text/Readings

The readings will come from the literature, please see the course outline for details.

Carmen

There is a Carmen site for this course: <https://carmen.osu.edu>. All course materials are available via Carmen.

You will need to use BuckeyePass (buckeyepass.osu.edu) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you take the following steps:

- Register multiple devices in case something happens to your primary device. Visit the BuckeyePass - Adding a Device help article for step-by-step instructions (<https://admin.resources.osu.edu/buckeyepass/adding-a-device>)
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- Download the Duo Mobile application (<https://admin.resources.osu.edu/buckeyepass/installing-the-duo-mobile-application>) to all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357(HELP) and IT support staff will work out a solution with you.

Class Format: How this course works

- **Mode of delivery:** This course is 100% live online delivery. There are two required sessions when we meet on Zoom at the class scheduled time.
- **Credit hours and work expectations:** This is a **3-credit-hour course**. According to Ohio State policy (go.osu.edu/credithours), students should expect around 3 hours per week of time spent on direct instruction in addition to 9 hours of homework/active learning activities to receive a grade of (C) average.

Course Technology

Technology skills needed for this course

- Basic computer and web-browsing skills
- Navigating Carmen (go.osu.edu/canvasstudent)
- CarmenZoom virtual meetings (go.osu.edu/zoom-meetings)

Required equipment

- **Computer:** current Mac (Mac OSX) or PC (Windows 10+) with high-speed internet connection
- **Calculator:** Students should have access to a scientific calculator that can perform basic arithmetic, square roots, logarithms, and exponentiation.
- **Other:** a mobile device (smartphone or tablet) to use for BuckeyePass authentication

Optional equipment (for participation in optional live office hours and/or review sessions)

- **Webcam:** built-in or external webcam, fully installed and tested
- **Microphone:** built-in laptop or tablet mic or external microphone

Required software

- **Microsoft 365 Copilot (formerly Office 365)**
All Ohio State students are now eligible for free Microsoft 365 Copilot (formerly Office 365). Full instructions can be found at go.osu.edu/office365help.

Technology support

For help with your password, university email, Carmen, or any other technology issues, questions, or requests, contact the Ohio State IT Service Desk. Standard support hours are available at and support for urgent issues is available 24/7.

- **Self-Service and Chat support:** <http://it.osu.edu/help>
- **Phone:** 614-688-4357(HELP)
- **Email:** servicedesk@osu.edu

Assignments/Assessments

Group Project

Students will work in groups of two to three to conduct a group project that will be **submitted as a complete report to the instructor/TA and presented to the class** at the end of the course at the due time specified in the course schedule. The report and presentation will be **due** on the dates specified in the class schedule accompanying the syllabus. The project will be designed around instructor-provided or student-selected current or emerging air pollution issues with the goal of examining how concepts learned in class may apply to specific exposure scenarios. Example air contamination/ pollution scenarios for group projects is given in Carmen Canvas.

The following items will be evaluated for the project (report and presentation):

- General content: correct framing/description of the exposure scenario and its potential health effect, how the exposure and/or the health effect might be quantified or studied, and applicable exposure controls and how they can be assessed – weighting for scoring is 6
- Clarity and organization – correct structure of report/presentation with correct section headings, the relevance of information and its sources to the sections, project topic, and environmental health – weighting for scoring is 3
- Proper formatting – correct format and citation/referencing as instructed in the Project Instruction and Guide document – weighting for scoring is 1

These items for both the report and oral presentation will be scored with the rubric outlined in the Grading section of the syllabus.

The sections for project presentation and report are below. Please do not exceed 18 pages (1.5 line spacing; 1" margins; allowed font types - Times New Roman with size 12) excluding reference. Use the American

Medical Association (AMA) referencing/citation style. The instruction for in-text citation and reference listing using this style can be found through OSU Libraries at this cite:

https://guides.osu.edu/ld.php?content_id=18577578. The sections are:

- Introduction (about pollutant of interest - provide a general description about the contaminant including appropriate physical, chemical, and/or biological characteristics; sources; exposure pathways including movement through environmental matrices and routes of exposure).
- Exposure Scenario (describe the exposure scenario that you are interested and state your exposure assessment objective).
- Exposure Assessment (describe how you will measure and quantify exposure to the contaminant in alignment with the exposure scenario and exposure assessment objective).
- Health Effects (discuss the adverse health effects that are associated with the contaminant especially within the context of the exposure scenario of interest).
- Health Outcome Assessment (describe how you will measure or obtain information about one of the adverse health outcomes and determine its association with air contaminant exposure within the context of the scenario that is chosen).
- Exposure Control (describe how exposure to the contaminant can be controlled and how the effectiveness of the control can be assessed).

Here is the rubric for the group project presentation for each of the item that will be evaluated:

Score	Criteria
10	Exceptional work. . . thorough, complete, and correct; beyond expectation. This is a rare and exceptional grade.
9	Outstanding work. . . thorough, complete, and correct; virtually no error. This is a rare and exceptional grade.
8	Excellent . . . thorough, complete and correct with only very few minor errors or omissions.
7	Very good . . . adequately covers the major facets of the item; has numerous minor errors or weaknesses.
6	Good. . . adequately covers most of the major facets of the item; has some moderate errors or weaknesses.
5	Satisfactory . . . covers correctly and completely some of the facets of the items. Item components are incomplete and carelessly put together; has a few major errors or weaknesses.
<5	Poor. . . incomplete and incorrect; item replete with major errors or weaknesses.

Final grades will be assigned according to the **OSU Standard Grade Scheme**.

Exams

The **mid-term and final exams** will be conducted online, closed book and will be accessible on the day indicated on the class schedule. **You must complete the exams yourself, without any external help or communication.** Questions will include multiple choice and short essays/problems. Students are required to take their exams on the date and time that it is given. Make-up exams will only be given in case of personal emergencies or *extenuating* circumstance (e.g. unforeseen medical issues, death in the family, etc.) that will preclude the student from informing the professor about the inability to take the exam on the scheduled date.

Five (short) online mini-quizzes will be given (via Carmen) after every fourth class (excluding periods around the exams) during the course as outlined in the course schedule. Each mini-quiz will include **10 to 15** multiple-choice questions. The quizzes will be open book and will be completed individually by each student outside of the classroom, without help from other individuals. The quizzes have to be completed once the test sessions have been started. Make-up quizzes will only be given based on the criteria set for the mid-term and final exams.

Assignments

Students will work in groups of two to three to conduct a group project that will be **submitted as a complete report to the instructor/TA and presented to the class** at the end of the course at the due time specified in the course schedule. Drafts of different sections of the report will also be **due for submission to the instructor/TA** for review during the semester on the dates specified in the class schedule accompanying the syllabus. The project will be designed around instructor-provided or student-selected current or emerging air pollution issues with the goal of examining how concepts learned in class may apply to specific exposure scenarios. An outline for writing the project report will be provided to students. The following items will be evaluated for the project (report and presentation):

- General content: framing of the exposure scenario and its potential health effect, how the exposure and/or the health effect might be quantified or studied, the applicable exposure controls, and the relevance of information and its sources to the topic and environmental health – weighting for scoring is 4
- Clarity and organization – weighting for scoring is 2
- Proper application of the concepts taught in the course – weighting for scoring is 4

These items for both the report and oral presentation will be scored with the rubric outlined in the Grading section of the syllabus.

Your written assignments, including discussion posts, should be your own original work. Cite any sources (including class articles & cases) you use for your written assignments and discussion points.

Late Exams and Assignments

To ensure fairness and consistency for all students, late submissions are generally not accepted. Please refer to the course schedule below for due dates and plan your schedule accordingly. Due dates are set to help you stay on pace and to allow timely feedback that will help you complete subsequent assignments. Make-up exams will only be given and without penalty in case of *justifiable and verifiable extenuating circumstances* (e.g., illness requiring medical attention, death in family). Students are required to notify the instructor in advance of any anticipated absence from an exam. Notification must be sent via email as soon as possible and prior to the start of the scheduled exam window. The indicated problem/emergency must be verifiable by the instructor. Unexcused, missed exams will be assigned a score of zero.

In the case of excused absences, students will be provided with an opportunity to make up missed course assignments as is feasible. Approval of an extension for an assignment is at the discretion of the instructor and will be based on the merit of the request.

Being absent for any reason does not excuse a student from completing an assigned work on time. It is the student's responsibility to initiate the request to make up missed exams.

Written assignments that are completed and submitted late will incur a 20% penalty for each day it is late. After the penalty period (i.e. when submitting the assignment will incur a score of zero – 5 days after it is due), the assignment will not be accepted. All assignments are due on Carmen, unless otherwise noted.

If you are struggling with the course load or facing ongoing challenges, please reach out to us early. We are here to support your success. By adhering to this policy, we can maintain a structured and fair learning environment while also showing compassion for individual circumstances.

Supplemental Activities for Graduate Students

In addition to the above exams and assignments, graduate students will be required to:

1. Use USEPA Air Quality System (AQS) Data Mart to download ambient air quality (air contaminant concentration) data. The student will be required to use the data to answer specific questions as directed by the instructor e.g. whether there were exceedances of the national ambient air quality standard for a pollutant based on the criteria set in the standard. The activity will be graded based on the correctness of the data used, the methodology of analysis applied, and the conclusion provided. Detailed instruction about the use of AQS and the data analyses required will be provided at the beginning of the course.

Summarize research methodology and the major findings of **four** of the (original research, meta-analysis or review) journal articles that will be part of the class reading. The summary should be submitted as a Microsoft Word single-spaced document, typed in New Times Roman font and be at least three quarters of a page long. The student will be required to submit a list of two questions about the research reported in each of the journal articles along with the summary. Some of the questions will be chosen as discussion points for the

Final grades will be assigned according to the **OSU Standard Grade Scheme**.

Grading

Grades will be assigned for class participation, short quizzes, group project report, mid-semester and final exams as follows:

Activity	Undergraduate Points Total (100%)	Graduate Points Total (100%)
Discussion Board (lowest will be dropped)	5	5
Participation/ Attendance	10	10
Short Quizzes	20	20
Group Project Report	15	15
Group Project Presentation	5	5
Mid-Term Exam	25	15
Final Exam	20	15
Supplemental Activity for Graduate Students – USEPA Publicly Available AQS Data Analysis and Interpretation	N/A	5
Supplemental Activity for Graduate Students – Journal Article Summaries	N/A	10
Extra Credit (completing the SEI)	1	1

Class attendance and participation will be monitored and contribute towards final grades as noted above. Full attendance (except for reasons noted in the attendance policy below) and meaningful participation will guarantee a full score for this assessment activity. Mid-semester and final exams will be graded according to the points allocated to each question in the exams. Students will be awarded the points for each question if it is answered correctly.

Grading Scheme

Grade	Percentage
A	100-93
A-	92.9-90
B+	89.9-87
B	86.9-83
B-	82.9-80
C+	79.9-77
C	76.9-73
C-	72.9-70
D+	69.9-67
D	66.9-60
E	<60

Class Policies

To achieve the objectives of this course and to become a public health professional, attendance is expected in all scheduled classes. If a student has an *extenuating* circumstance (e.g. unforeseen medical issues, death in the family, etc.) that prevents them from attending class, they should please notify the instructor *before* class

Copyright Statement

This syllabus and all course materials (e.g., homework assignments, solution keys, course materials) are under copyright by the instructor and cannot be posted elsewhere without written permission.

Generative AI Policy

The use of generative artificial intelligence (GenAI) tools is not permitted in this course. Any use of GenAI tools for work in this class may therefore be considered a violation of Ohio State’s [Academic Integrity\(opens in new window\)](#) policy and [Code of Student Conduct\(opens in new window\)](#) because the work is not your own. If we suspect that you have used GenAI on an assignment for this course, we will ask you to explain your process for completing the assignment in question. The unauthorized use of GenAI tools will result in referral to the [Committee on Academic Misconduct\(opens in new window\)](#).

Office of Student Life: Disability Services

The university strives to maintain a healthy and accessible environment to support student learning in and out of the classroom. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion.

If you are ill and need to miss class, including if you are staying home and away from others while experiencing symptoms of a viral infection or fever, please let me know immediately. In cases where illness interacts with an underlying medical condition, please consult with Student Life Disability Services to request reasonable accommodations. You can connect with them at slds@osu.edu; 614-292-3307; or slds.osu.edu.

Mental Health Services

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack

of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling [614-292-5766](tel:614-292-5766). CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at [614-292-5766](tel:614-292-5766) and 24 hour emergency help is also available 24/7 by dialing 988 to reach the Suicide and Crisis Lifeline.

Religious Beliefs or Practices Accommodations

Ohio State has had a longstanding practice of making reasonable academic accommodations for students' religious beliefs and practices in accordance with applicable law. In 2023, Ohio State updated its practice to align with new state legislation. Under this new provision, students must be in early communication with their instructors regarding any known accommodation requests for religious beliefs and practices, providing notice of specific dates for which they request alternative accommodations within 14 days after the first instructional day of the course. Instructors in turn shall not question the sincerity of a student's religious or spiritual belief system in reviewing such requests and shall keep requests for accommodations confidential.

With sufficient notice, instructors will provide students with reasonable alternative accommodations with regard to examinations and other academic requirements with respect to students' sincerely held religious beliefs and practices by allowing up to three absences each semester for the student to attend or participate in religious activities. Examples of religious accommodations can include, but are not limited to, rescheduling an exam, altering the time of a student's presentation, allowing make-up assignments to substitute for missed class work, or flexibility in due dates or research responsibilities. If concerns arise about a requested accommodation, instructors are to consult their tenure initiating unit head for assistance.

A student's request for time off shall be provided if the student's sincerely held religious belief or practice severely affects the student's ability to take an exam or meet an academic requirement and the student has notified their instructor, in writing during the first 14 days after the course begins, of the date of each absence. Although students are required to provide notice within the first 14 days after a course begins, instructors are strongly encouraged to work with the student to provide a reasonable accommodation if a request is made outside the notice period. A student may not be penalized for an absence approved under this policy.

If students have questions or disputes related to academic accommodations, they should contact their course instructor, and then their department or college office. For questions or to report discrimination or harassment based on religion, individuals should contact the [Civil Rights Compliance Office](#). (Policy: [Religious Holidays, Holy Days and Observances](#))

Academic Misconduct

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee ([Faculty Rule 3335-5-48.7 \(B\)](#)). For additional information, see the [Code of Student Conduct](#).

Intellectual Diversity

Ohio State is committed to fostering a culture of open inquiry and intellectual diversity within the classroom. This course will cover a range of information and may include discussions or debates about controversial issues, beliefs, or policies. Any such discussions and debates are intended to support understanding of the approved curriculum and relevant course objectives rather than promote any specific point of view. Students will be assessed on principles applicable to the field of study and the content covered in the course. Preparing students for citizenship includes helping them develop critical thinking skills that will allow them to reach their own conclusions regarding complex or controversial matters.

Grievances and Solving Problems

A student who encounters a problem related to his/her educational program has a variety of avenues available to seek resolution. According to University Policies, if you have a problem with this class, you should seek to resolve the grievance concerning a grade or academic practice by speaking first with the instructor or professor. Then, if necessary, you may take your case to the department chairperson. Specific procedures are outlined in [Faculty Rule 3335-8-23](#), the [CPH Graduate Student Handbook](#), and the [CPH Undergraduate Student Handbook](#). Grievances against graduate, research, and teaching assistants should be submitted first to the supervising instructor, then to the chairperson of the assistant's department.

Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Civil Rights Compliance Office:

Online reporting form at <http://civilrights.osu.edu/>,

Call 614-247-5838 or TTY 614-688-8605,

Or Email civilrights@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Civil Rights Compliance Office to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.
- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member.

Course Outline

Week	Class Dates	Topics	Learning Objective(s)	Reading Assignments	Assessment Activity Deadlines
1	A: (Date – 01/13)	Topic 01 - Introduction and Air Pollution History	1, 2, 8	<ul style="list-style-type: none"> Fundamentals of Air Pollution. Vallero D; Ch. 3 (The Science of Air Pollution) pp 43-51 and 74-80. Air Pollution and Health. Eds.: Holgate ST et al. Ch. 21 (Health Effects of Air Pollution Episodes) pp 461-480 Journal Article: Anderson HR. 2009. "Air Quality and Mortality: a History." <i>Atmospheric Environment</i> 43:142-152 [optional] Introduction to Air Pollution Science. Phalen RF and Phalen RN; Ch. 1 (Introduction to Air Pollution Science) 	<p>Article 1 Summary: Graduate student to submit a summary of and question about the journal article by Anderson (2009) due by 11:59 pm on Sunday 1/25</p> <p>Discussion 1 due by 11:59 pm on Sunday 1/25</p> <p>Form groups to work on the final project and group discussions, due Thursday 1/27</p>
	B: (Date – 01/15)	Topic 02 - Earth's Atmosphere and Meteorology	1	<ul style="list-style-type: none"> Fundamentals of Air Pollution. Vallero D; Ch. 1 (The State of the Atmosphere) pp 3-9 Fundamentals of Air Pollution. Vallero D; Ch. 2 (The Physics of the Atmosphere) pp 28-32 [pp 52-54 from Ch. 3 and 690 – 997 from Ch. 27] Air Pollution and Health. Eds.: Holgate ST et al. Ch. 3 (Basic Meteorology); pp 21-34 	
2	A: (Date – 01/20)	Topic 03 - Sources and Properties of Air Pollutants	1, 2	<p>Sources:</p> <ul style="list-style-type: none"> Fundamentals of Air Pollution. Vallero D; Ch. 24 (Source Sampling and Emission Measurement) pp 559-563 Air Pollution and Health. Eds.: Holgate ST et al. Ch. 8 (Sources of Air Pollution); pp 115-128 [optional] Introduction to Air Pollution Science. Phalen RF and Phalen RN; Ch.2 (Sources and Emissions of Air pollutants) [optional] Fundamentals of Air Pollution. Vallero D; Ch. 29 (Air Pollutant Emissions) pp 787-801 <p>Properties:</p> <ul style="list-style-type: none"> Fundamentals of Air Pollution. Vallero D; Ch. 6 (Inherent Properties of Air Pollutants) 167-174 Air Pollution and Health. Eds.: Holgate ST et al. Ch. 4 (Atmospheric Chemistry); pp 51-62 [optional] Introduction to Air Pollution Science. Phalen RF and Phalen RN; Ch.3 (Important properties of Air Pollutants) 	

Week	Class Dates	Topics	Learning Objective(s)	Reading Assignments	Assessment Activity Deadlines
	B: (Date – 01/22)	Topic 04 -Sampling and Analysis of Air Pollution	6	<ul style="list-style-type: none"> Fundamentals of Air Pollution. Vallero D; Ch. 24 (Source Sampling and Emission Measurement) pp 564-575 Fundamentals of Air Pollution. Vallero D; Ch. 25 (Methods for Measuring Air Pollutants) pp 579 - 611 Air Pollution and Health. Eds.: Holgate ST et al. Ch. 5 (Measurements of Concentrations of Air Pollutants); pp 63-80 [Optional] Introduction to Air Pollution Science. Phalen RF and Phalen RN; Ch.4 (Sampling and Analysis for Health Assessments) 	<p>Online quiz 1 (Topics 01-04) due by 11:59 pm on Thursday 1/29</p> <p>Graduate student to get data from USEPA AQS Data Mart. Analysis and interpretation of the AQS data is due 11:59 pm on Sunday 2/8</p>
3	A: (Date – 01/27)	Topic 05 - The Regulation of Ambient Air Quality	5, 7	<ul style="list-style-type: none"> Fundamentals of Air Pollution. Vallero D; Ch. 3 (The Science of Air Pollution) pp 58-68 Air Pollution and Health. Eds.: Holgate ST et al. Ch. 42 (United States and International Approaches to Establishing Air Standards and Guidelines) pp 947-964 [optional] Introduction to Air Pollution Science. Phalen RF and Phalen RN; Ch. 6 (Regulation and Abatement of Air Pollutants) Explore USEPA website “Air Topics”: https://www.epa.gov/environmental-topics/air-topics Students are also encouraged to explore the following USEPA web pages on Criteria Pollutant Regulation: https://www.epa.gov/clean-air-act-overview/clean-air-act-requirements-and-history https://www.epa.gov/criteria-air-pollutants https://www.epa.gov/criteria-air-pollutants/process-reviewing-national-ambient-air-quality-standards https://www.epa.gov/criteria-air-pollutants/naaqs-designations-process https://www.epa.gov/criteria-air-pollutants/naaqs-implementation-process https://www.epa.gov/haps/what-are-hazardous-air-pollutants 	Discussion 2 due by 11:59 pm on Sunday 2/8

Week	Class Dates	Topics	Learning Objective(s)	Reading Assignments	Assessment Activity Deadlines
				<p> https://www.epa.gov/haps/reducing-emissions-hazardous-air-pollutants https://www.epa.gov/airmarkets/acid-rain-program https://www.epa.gov/ozone-layer-protection/ozone-protection-under-title-vi-clean-air-act https://www.epa.gov/visibility/regional-haze-program https://www.epa.gov/clean-air-act-overview/setting-emissions-standards-based-technology-performance https://www.epa.gov/clean-air-act-overview/setting-emissions-standards-major-sources-toxic-air-pollutants https://www.epa.gov/fueleconomy/basic-information-fuel-economy-labeling https://www.epa.gov/vehicle-and-fuel-emissions-testing https://www.epa.gov/criteria-air-pollutants/naaqs-table https://airnow.gov/index.cfm?action=aqibasics.aqi <ul style="list-style-type: none"> • https://aqs.epa.gov/aqsweb/documents/data_mart_welcome.html#queries </p>	
	B: (Date – 01/29)	Topic 06 - The National Ambient Air Quality Standard (AQSS) and Criteria Pollutants and their Impact on Public Health	5, 7	<ul style="list-style-type: none"> • Air Pollution and Health. Eds.: Holgate ST et al. Ch. 43 (Air Quality Guidelines and Standards) 983-1015 • Air Pollution and Health Effects: Nadadur SS and Hollingsworth JW. Ch. 15 (Using Science to Shape Policy) 403-433 • Students are also encouraged to explore the following USEPA web pages, in addition to the ones from last session: <ul style="list-style-type: none"> • https://gispub.epa.gov/air/trendsreport/2020/#home • https://aqs.epa.gov/aqsweb/documents/data_mart_welcome.html#queries • https://www.epa.gov/criteria-air-pollutants • https://www.epa.gov/naaqs • https://hero.epa.gov/ • https://www.epa.gov/report-environment 	

Week	Class Dates	Topics	Learning Objective(s)	Reading Assignments	Assessment Activity Deadlines
				<ul style="list-style-type: none"> WHO Guidelines: https://www.who.int/airpollution/guidelines/en/ EHC documents: https://www.who.int/ipcs/publications/ehc/en/ 	
4	A: (Date – 02/03)	Topic 07 - Human Exposure to Air Pollution	2, 8	<ul style="list-style-type: none"> Fundamentals of Air Pollution. Vallero D; Ch. 8 (Air Pollutant Exposures) 215-244 Air Pollution and Health. Eds.: Holgate ST et al. Ch. 9 (Exposure Assessment); 149-160 [pp 438-442 from Ch. 20] [optional] Introduction to Air Pollution Science. Phalen RF and Phalen RN; Ch.7 (Human Exposures to Air Pollution) Students are also encouraged to explore the following USEPA web pages, in addition to the ones from last session: <ul style="list-style-type: none"> https://www.epa.gov/fera https://www.atsdr.cdc.gov/substances/index.asp https://www.epa.gov/iris 	
	B: (Date – 02/05)	Topic 08 – Toxicology and Air Pollution	4, 8	<ul style="list-style-type: none"> Fundamentals of Air Pollution. Vallero D; Ch. 7 (Air Pollutant Hazards) 197-212 Air Pollution and Health. Eds.: Holgate ST et al. Ch 10 (Animal Models to Study for Pollutant Effects) 165-175 Air Pollution and Health. Eds.: Holgate ST et al. Ch 19 (Biomarkers of Exposure) 417-422 [optional] Introduction to Air Pollution Science. Phalen RF and Phalen RN; Ch. 9 (Toxicology Studies) 	Online quiz 2 (Topics 05-08) due by 11:59 pm on Thursday 2/12
5	A: (Date – 02/10)	Topic 09 - Epidemiology and Air Pollution	3, 4, 8	<ul style="list-style-type: none"> Air Pollution and Health. Eds.: Holgate ST et al. Ch. 20 (The Epidemiologic Approach to Investigating Outdoor Air Pollution) 431-437 and 444-455 [optional] Introduction to Air Pollution Science. Phalen RF and Phalen RN; Ch. 10 (Epidemiology and Air Pollution) 	
	B: (Date – 02/12)	Topic 10- Risk Assessment and Air pollution	4, 5, 8	<ul style="list-style-type: none"> Fundamentals of Air Pollution. Vallero D; Ch. 7 (Air Pollutant Hazards) 197-212 [pp 10-16 from Ch.1] Air Pollution and Health. Eds.: Holgate ST et al. Ch. 38 (Risk Assessment and Air Pollution) 881-895 	Discussion 3 due by 11:59 pm on Sunday 2/22 Submit a topic for the final project, due 11:59 pm on Sunday 2/22

Week	Class Dates	Topics	Learning Objective(s)	Reading Assignments	Assessment Activity Deadlines
				<ul style="list-style-type: none"> [optional] Introduction to Air Pollution Science. Phalen RF and Phalen RN; Ch.11 (Risk Assessment) 	Article 2 Summary: Graduate student to submit a summary of and question about the journal article by Shi et al. (2012) due by 11:59 pm on Sunday 2/22
6	A: (Date – 02/17)	Topic 11 – Health Effects and Trends for Selected Air Contaminants	2, 5, 8	<ul style="list-style-type: none"> Fundamentals of Air Pollution. Vallero D; Ch. 28 (Air Quality Status and Trends) Air Pollution and Health. Eds.: Holgate ST et al. Ch. 6 (Patterns of Air Pollution in Developed Countries) Air Pollution and Health. Eds.: Holgate ST et al. Ch. 7 (Patterns of Air Pollution in Developing Countries) [optional] Introduction to Air Pollution Science. Phalen RF and Phalen RN; Ch. 8 (Effects on Human Health) [optional] Fundamentals of Air Pollution. Vallero D; Ch. 26 (Applying and Interpreting Air Quality Monitoring Data) Students are also encouraged to explore the following USEPA web pages, in addition to the ones from last session: <ul style="list-style-type: none"> https://gispub.epa.gov/air/trendsreport/2020/#home https://www.epa.gov/air-trends WHO: <ul style="list-style-type: none"> https://www.who.int/publications/i/item/WHO-SDE-PHE-OEH-06.02 https://whoairquality.shinyapps.io/AirQualityStandards/ https://www.who.int/health-topics/air-pollution#tab=tab_1 https://www.who.int/publications/i/item/9789240034228 https://www.who.int/data/gho/data/themes/air-pollution Our World in Data: <ul style="list-style-type: none"> https://ourworldindata.org/outdoor-air-pollution 	

Week	Class Dates	Topics	Learning Objective(s)	Reading Assignments	Assessment Activity Deadlines
				<ul style="list-style-type: none"> State of Global Air: https://www.stateofglobalair.org/data/#/air/plot Journal Article: E W Butt et al 2017. "Global and regional trends in particulate air pollution and attributable health burden over the past 50 years." Environ. Res. Lett. 12 104017 	
	B: (Date – 02/19)	Topic 12 - Monitoring Ambient Air Quality and Application to Environmental Health and Epidemiology: GIS and Remote Sensing	6, 8	<ul style="list-style-type: none"> Journal Article: van Donkelaar A et al. 2006. "Estimating Ground-Level PM_{2.5} Using Aerosol Optical Depth Determined from Satellite Remote Sensing." <i>Journal of Geophysical Research</i> 111:D21201 Journal Article: Vienneau D et al. 2009. "A GIS-Based Method for Modelling Air Pollution Exposures across Europe." <i>Science of the Total Environment</i> 408:255-266 Journal Article: Shi W et al. 2012. "Analysis of Airborne Particulate Matter (PM_{2.5}) over Hong Kong Using Remote Sensing and GIS." <i>Sensors</i> 12(6):6825-6836 Journal Article: Steinle S et al. 2012. "Quantifying Human Exposure to Air Pollution: Moving from Static to Spatio-Temporally Resolved Personal Exposure Assessment." <i>Science of the Total Environment</i> 211:367-377 Remote Sensing Information Gateway (RSIG) https://www.epa.gov/hesc/remote-sensing-information-gateway NASA: https://appliedsciences.nasa.gov/mission/training/english/arset-fundamentals-remote-sensing NASA: https://appliedsciences.nasa.gov/mission/training/english/introduction-satellite-remote-sensing-air-quality-applications NASA: https://appliedsciences.nasa.gov/what-we-do/health-air-quality NASA: https://appliedsciences.nasa.gov/mission/training/english/arset-accessing-and-analyzing-air-quality-data-geostationary Earth Data: https://www.earthdata.nasa.gov/learn/backgrounders/remote-sensing 	Online quiz 3 (Topics 09-12) due by 11:59 pm on Thursday 2/26

Week	Class Dates	Topics	Learning Objective(s)	Reading Assignments	Assessment Activity Deadlines
				<ul style="list-style-type: none"> • AQAST: http://acmg.seas.harvard.edu/aqast/ • TROPOMI: http://www.tropomi.eu/ • HIMAWARI8: https://himawari8.nict.go.jp/ • ESRI: https://storymaps.arcgis.com/stories/a3d0b0835b9e45b69f55e5ce94d84ddf • SEDAC: https://sedac.ciesin.columbia.edu/data/set/sdei-global-annual-gwr-pm2-5-modis-misr-seawifs-aod 	
7	A: (Date – 02/24)	Topic 13 - Indoor Air Quality, Chemical Pollutants, and Exposure Control	2, 5, 8	<ul style="list-style-type: none"> • National Academies - Emerging Science on Indoor Chemistry https://www.nationalacademies.org/our-work/emerging-science-on-indoor-chemistry#sectionPastEvents • Available Text Online: Chapter 6: Health Effects of Indoor Air Pollutants in Air Pollution and Health by Hester, R. E.; Harrison, R. M, 1998. Royal Society of Chemistry https://app-knovel-com.proxy.lib.ohio-state.edu/web/toc.v/cid:kpAPH00002/viewerType:toc//root_slug:air-pollution-and?kpromoter=marc • Available text Online: Chapter 3 – Indoor Air Quality and health. Air Pollution Science for the 21st Century. Edited by Austin J et al. 2002. https://www.sciencedirect-com.proxy.lib.ohio-state.edu/science/article/pii/S1474817702800067 • Available Text Online: WHO Guidelines for Indoor Air Quality for Selected Pollutants. 2010. World Health Organization, Copenhagen, Denmark. Pp 1-170, 347-366: http://wedocs.unep.org/bitstream/handle/20.500.11822/8676/Select_pollutants_guidelines.pdf?sequence=2&isAllowed=y • Journal Article: Gonzalez-Martin J et al. 2021. “A state-of-the-art review on indoor air pollution and strategies for indoor air pollution control” <i>Chemosphere</i>, 262, 128376 • Journal Article: Perez-Padilla R et al. 2010. “Respiratory Effects of Indoor Air Pollution.” <i>International Journal of Tuberculosis and Lung Diseases</i> 14(9):1079-1086 	

Week	Class Dates	Topics	Learning Objective(s)	Reading Assignments	Assessment Activity Deadlines
				<ul style="list-style-type: none"> • US EPA: https://www.epa.gov/indoor-air-quality-iaq/indoor-pollutants-and-sources • CPSC: https://www.cpsc.gov/Safety-Education/Safety-Guides/Home/The-Inside-Story-A-Guide-to-Indoor-Air-Quality • Emerging Science on Indoor Chemistry https://www.nationalacademies.org/our-work/emerging-science-on-indoor-chemistry • Health Risks of Indoor Exposure to Fine Particulate Matter and Practical Mitigation Solutions https://nap.nationalacademies.org/catalog/27341/health-risks-of-indoor-exposure-to-fine-particulate-matter-and-practical-mitigation-solutions • 	
	B: (Date – 2/26)	Topic 14 –Pollutants of Biological Origin, including Coronavirus	2, 6, 8	<p>Microorganisms</p> <ul style="list-style-type: none"> • Available Text online: Chapter 2: Microorganisms in Built Environments. National Academies of Sciences, Engineering, and Medicine. 2017. Microbiomes of the Built Environment: A Research Agenda for Indoor Microbiology, Human Health, and Buildings. Washington, DC: The National Academies Press. https://doi.org/10.17226/23647 • Available Text Online: National Academies of Sciences, Engineering, and Medicine. 2023. Management of Indoor Air and Airborne Pathogens: Proceedings of a Workshop Series–in Brief. Washington, DC: The National Academies Press. https://doi.org/10.17226/27316 • Available Text online: Chapter 6 – Indoor and Outdoor Air Sampling. Sampling for Biological Agents in the Environment by Emanuel P. et al. 2008. https://app-knovel-com.proxy.lib.ohio-state.edu/web/toc.v/cid:kpSBAE0001/viewerType:toc//root_slug:sampling-for-biological?kpromoter=marc <p>Indoor Fungi</p> <ul style="list-style-type: none"> • Journal Article: Nevalainen A. et al. 2015. “Indoor Fungi: companions and contaminants”. <i>Indoor Air</i>, 25: 125-156. 	

Week	Class Dates	Topics	Learning Objective(s)	Reading Assignments	Assessment Activity Deadlines
				<ul style="list-style-type: none"> • Journal Article: Miller J and McMullin D. 2014. "Fungal secondary metabolites as harmful indoor air contaminants: 10 years on." <i>Appl Microbiol Biotechnol.</i> 98:9953–9966. • Journal Article: Journal Article: Jarvis and Miller J. 2005. "Mycotoxins as harmful indoor air contaminants." <i>Appl Microbiol Biotechnol.</i> 66: 367-372. • Journal Article: Nasir ZA and Colbeck I. 2010. "Assessment of Bacterial and Fungal Aerosol in Different Residential Settings." <i>Water, Air and Soil Pollution</i> 12(6):6825-6836 <p>COVID-19</p> <ul style="list-style-type: none"> • Journal Article: Yates M et al. 2022. "A review on the biological, epidemiological, and statistical relevance of COVID-19 paired with air pollution" <i>Environmental Advances</i>, 8, 100250 • Journal Article: Maleki M et al. 2021. "An updated systematic review on the association between atmospheric particulate matter pollution and prevalence of SARS-CoV-2." <i>Environmental Research</i>, 195: 110898 • Journal Article: Jayaweera, M., Perera, H., Gunawardana, B., & Manatunge, J. (2020). "Transmission of COVID-19 virus by droplets and aerosols: A critical review on the unresolved dichotomy". <i>Environmental Research</i>, 188, 109819. • US EPA: https://www.epa.gov/coronavirus/indoor-air-and-coronavirus-covid-19 	
8	A: (Date – 03/03)	Topic 15 - Occupational Air Quality and Regulation	2, 5, 8	<ul style="list-style-type: none"> • NIOSH: https://www.cdc.gov/niosh/ • OSHA: https://www.osha.gov/ • ACGIH: https://www.acgih.org/ • ATSDR: https://www.atsdr.cdc.gov/ • Permissible Exposure Limits (PELs): https://www.osha.gov/annotated-pels/table-z-1 • Threshold Limit Valus (TLVs): https://www.acgih.org/data-hub/ https://www.acgih.org/science/tlv-bei-guidelines/tlv-chemical-substances-introduction/ 	<p>Meeting with the TA to discuss final project on 3/3 at 4:45 pm (end of class)</p> <p>Article 3 Summary: Graduate student to submit a summary of and question about the journal article by Tsigonia et al. (2010) due by 11:59 pm on Sunday 3/8</p>

Week	Class Dates	Topics	Learning Objective(s)	Reading Assignments	Assessment Activity Deadlines
				<ul style="list-style-type: none"> Respiratory Disease Research at NIOSH: https://nap.nationalacademies.org/catalog/12171/respiratory-diseases-research-at-niosh-reviews-of-research-programs-of Alston F and Millikin E (2025). Industrial Hygiene: Improving Worker Health through an Operational Risk Approach (2nd ed.). CRC Press. Journal Article: Laney SA and Attfield MD. 2010. "Coal Workers' Pneumoconiosis and Progressive Massive Fibrosis Are Increasingly More Prevalent among Workers in Small Underground Coal Mines in the United States." <i>Occupational and Environmental Medicine</i> 67(6):428-431 Journal Article: Tsigonia A et al. 2010. "Indoor Air in Beauty Salons and Occupational Health Exposure of Cosmetologists to Chemical Substances." <i>International Journal of Environmental Research and Public Health</i> 7:314-324 OSHA, 2011, Indoor Air Quality in Commercial and Institutional Buildings https://permanent.fdlp.gov/gpo9905/3430indoor-air-quality-sm.pdf Toxicological Profile for Radon https://www.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=407&tid=71 Toxicological Profile for Vinyl Chloride https://www.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=282&tid=51 EPA Air Research: <ul style="list-style-type: none"> https://www.epa.gov/air-research https://www.epa.gov/research/epa-research-webinar-series 	
	B: (Date – 03/05)	Mid-Term Exam <u>Respondus LockDown Browser is required for this exam.</u> (LockDown Browser enabled)			Midterm (Topics 01-15) at 4:00 pm on Thursday 03/05
9	A: (Date – 03/10)	Topic 16A - Respiratory Effects of Air Pollutants	3, 4, 8	<ul style="list-style-type: none"> Fundamentals of Air Pollution. Vallero D; Ch. 9 (Respiratory Effects of Air Pollutants) Air Pollution and Health. Eds.: Holgate ST et al. Ch. 13 (Structure-Function Relationships); pp 269-294 [pp 176-186 from Ch 10] 	Discussion 4 due by 11:59 pm on Sunday 3/22

Week	Class Dates	Topics	Learning Objective(s)	Reading Assignments	Assessment Activity Deadlines
				Air Pollution and Health Effects: Nadadur SS and Hollingsworth JW. Ch. 4 (Air Pollution and Asthma)	
	B: (Date – 03/12)	Topic 16B - Respiratory Effects of Air Pollutants	3, 4, 8	<ul style="list-style-type: none"> Air Pollution and Health Effects: Nadadur SS and Hollingsworth JW. Ch. 5 (Air Pollution and Chronic Obstructive Airway Disease) [optional] Air Pollution and Health. Eds.: Holgate ST et al. Ch. 37 (Controlled Exposures of Asthmatics to Air Pollutants) 	
10	A: (Date – 03/17)	Spring Break			
	B: (Date – 03/19)	Spring Break			
11	A: (Date – 03/24)	Topic 17A - Cancer and Air Pollution	3, 4, 8	<ul style="list-style-type: none"> Fundamentals of Air Pollution. Vallero D; Ch. 11 (Cancer and Air Pollutants) Air Pollution and Health. Eds.: Holgate ST et al. Ch. 18 (Carcinogenic Responses to Air Pollutants) [optional] Air Pollution and Health. Eds.: Holgate ST et al. Ch. 36 (Air Pollution and Lung Cancer) 	Discussion 5 due by 11:59 pm on Sunday 4/5
	B: (Date – 03/26)	Topic 17B - Cancer and Air Pollution	3, 4, 8	<ul style="list-style-type: none"> Air Pollution and Health Effects: Nadadur SS and Hollingsworth JW. Ch. 6 (Airborne Carcinogens: Mechanisms of Cancer) Air Pollution and Health Effects: Nadadur SS and Hollingsworth JW. Ch. 7 (Molecular Epidemiology Focused on Airborne Carcinogens) 	
12	A: (Date – 03/31)	Topic 18 - Cardiovascular Effects of Air Pollutants	3, 4, 8	<ul style="list-style-type: none"> Fundamentals of Air Pollution. Vallero D; Ch. 10 (Cardiovascular Effects of Air Pollutants) Air Pollution and Health Effects: Nadadur SS and Hollingsworth JW. Ch. 9 (Air Pollution, Lipids and Atherosclerosis); pp 241-268 Journal Article: Rajagopalan S et al. 2018. "Air Pollution and Cardiovascular Disease" <i>Journal of the American College of Cardiology</i> 72/(17) 2054-70. [Optional] Journal Article: Franklin B et al. 2015. "Air Pollution and Cardiovascular Disease" <i>Current problems in cardiology</i> 40(5): 207-38. 	
	B: (Date – 04/02)	Topic 19 - Effects of Air Pollution on Reproductive Health and Pregnancy	3, 4, 8	<ul style="list-style-type: none"> Air Pollution and Health Effects: Nadadur SS and Hollingsworth JW. Ch. 2 (Impacts of Air Pollution on Reproductive Health) 	Online quiz 4 (Topics 16 – 18) due by 11:59 pm on Thursday 4/9

Week	Class Dates	Topics	Learning Objective(s)	Reading Assignments	Assessment Activity Deadlines
				<ul style="list-style-type: none"> Air Pollution and Health Effects: Nadadur SS and Hollingsworth JW. Ch. 3 (Air Pollution and Pregnancy Outcomes) 	
13	A: (Date – 04/7)	Topic 20 - Neurological and other Effects of Air Pollution	3, 4, 8	<ul style="list-style-type: none"> Fundamentals of Air Pollution. Vallero D; Ch. 13 (Neurological Effects of Air Pollutants) Air Pollution and Health Effects: Nadadur SS and Hollingsworth JW. Ch. 10 (Particulate Air Pollution and CNS Health) [Optional] Air Pollution and Health Effects: Nadadur SS and Hollingsworth JW. Ch. 8 (Diabetes and Metabolic Syndrome) [Optional] Air Pollution and Health Effects: Nadadur SS and Hollingsworth JW. Ch. 11 (Air Pollution and Immune Function) 	Discussion 6 due by 11:59 pm on Sunday 4/19
	B: (Date – 04/09)	Topic 21 – Air Quality Disparities: Distribution, Susceptibility and Vulnerability Issues	4, 8	<ul style="list-style-type: none"> Journal Article: Makri A and Stilianakis N. 2008. "Vulnerability to Air Pollution Health Effects." <i>International Journal of Hygiene and Environmental Health</i> 211:326-336 Journal Article. 2013. Bell ML et al. "Evidence of Vulnerability and Susceptibility to Health Risks Associated with Short-Term Exposure to Particulate Matter: a Systematic Review and Meta-Analysis." <i>American Journal of Epidemiology</i> 178(6):865-876 	
14	A: (Date – 04/14)	Topic 22 – Historical and Contemporary Air Pollution Issues: Visibility, Climate, Acid Rain, and the Ozone Layer	2, 3, 5, 8	<ul style="list-style-type: none"> Read the following USEPA web pages: https://www.epa.gov/ghgemissions/overview-greenhouse-gases https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data https://www.epa.gov/climate-indicators/greenhouse-gases https://www.epa.gov/environmental-economics/economics-climate-change https://www.epa.gov/acidrain/what-acid-rain https://www.epa.gov/acidrain/effects-acid-rain 	

Week	Class Dates	Topics	Learning Objective(s)	Reading Assignments	Assessment Activity Deadlines
				<ul style="list-style-type: none"> • https://www3.epa.gov/airmarkets/progress/reports/index.html • https://www.epa.gov/ozone-layer-protection/basic-ozone-layer-science • https://ozonewatch.gsfc.nasa.gov/facts/holes.html • https://www.epa.gov/ozone-layer-protection/international-treaties-and-cooperation <ul style="list-style-type: none"> • [Optional] Introduction to Air Pollution Science. Phalen RF and Phalen RN; (Ch.5 Visibility, Climate, and the Ozone Layer) 	
	B: (Date – 04/16)	Topic 23 - A Public Health Perspective to Current Air Pollution Issues: The Multi-Pollutant Problem	2, 3, 5, 8	<ul style="list-style-type: none"> • Journal Article: Dominici F et al. 2012. "Protecting Human Health from Air Pollution: Shifting from a Single-Pollutant to a Multi-Pollutant Approach." <i>Epidemiology</i> 21(2):187-194 	Online quiz 5 (Topics 19 – 22) due by 11:59 pm on Thursday 4/23
15	A: (Date – 04/21)	Topic 24 - A Public Health Perspective to Current Air Pollution Issues: Particulate Matter and How Low is Low Enough	2, 3, 5, 8	<ul style="list-style-type: none"> • Journal Article: Pope et al. 2009. "Cardiovascular Mortality and Exposure to Airborne Fine Particulate Matter and Cigarette Smoke." <i>Circulation</i> 120:941-948 • Journal Article. Smith KR and Peel JL.2010. "Mind the Gap." <i>Environmental Health Perspectives</i> 118:1643-1645 	<p>Project Presentation in class on Thursday 4/23</p> <p>Project Report due by 11:59 pm on Thursday 4/23</p> <p>Article 4 Summary: Graduate student to submit a summary of and question about the journal article by Pope et al (2009) due by 11:59 pm on Sunday 4/26</p>
	B: (Date – 04/23)	Class Presentations			
16	A: (Date – 05/04)	Final Exam <u>Respondus LockDown Browser is required for this exam.</u>			Final Exam (topics 16 – 24, with focus on topics 23 -24) at 6:00 pm on Monday 5/4

Alignment of Competencies with Assessments

Topics	Course Objectives	BSPH EPH	MPH EHS	Student Evaluation Activity
Introduction	1, 2, 8	4	2	Class participation tailored towards student's understanding of the topic from assigned reading and other materials or experience – discussion will be guided by the application of the EHS model (Figure 1) to the issue of air pollution
Earth's Atmosphere and Meteorology	1	1	3,4	Quiz, Exams - questions will probe the understanding of the students about the atmosphere's role as both a matrix and a modifier of air contaminants that are detrimental to environmental health
Sources and Properties of Air Pollutants	1, 2	1, 4	2	
Sampling and Analysis of Air Pollution	6	1	3,4	
The Regulation of Ambient Air Quality	5, 7	4, 7	1,2	Quiz, Exams – questions will probe the knowledge of regulation as an EHS component and one of the public health policy approaches for intervening to control and resolve air pollution.
The National Ambient Air Quality Standard (AQSs) and Criteria Pollutants and their Impact on Public Health	5, 7	4, 7	1,3	
Human Exposure to Air Pollution	2, 8	4	1, 2, 4	Quiz, Exams - questions will probe the understanding of the students about human exposure, toxicology, epidemiology, and risk assessment
Toxicology and Air Pollution	4, 8	1	3, 4	
Epidemiology and Air Pollution	3, 4, 8	1	3, 4	
Risk Assessment and Air pollution	4, 5, 8	1, 4	2	
Health Effects and Trends for Selected Air Contaminants	2, 5, 8	1, 7	2, 4	
Monitoring Ambient Air Quality and Application to Environmental Health and Epidemiology: GIS and Remote Sensing	6, 8	7	2	Quiz, Exams – questions will test on knowledge about the role of the data collection method to monitor and enforce compliance with air pollution regulation Supplemental for Graduate Students: USEPA Publicly Available AQS Data Analysis and Interpretation – activity will involve data collection and analysis to answer compliance related questions
Indoor Air Quality, Chemical Pollutants, and Exposure Control	2, 6, 8	4	1, 2	Quiz, Exams - questions will probe the knowledge of indoor air as an exposure pathway that is important for environmental health and the contributory biological factors to their health effects
Pollutants of Biological Origin, including Coronavirus	2, 5, 8	4	1, 2	
				Group Projects – students will be expected to identify the importance of this pathway as an environmental health component where applicable in their group projects

Topics	Course Objectives	BSPH EPH	MPH EHS	Student Evaluation Activity
Occupational Air Quality and Regulation	2, 5, 8	4, 7	1, 2	<p>Quiz, Exams – questions will probe the knowledge of regulation as an EHS component and one of the public health policy approaches for intervening to control and resolve air pollution; questions will test on knowledge about the role of the data collection method to monitor and enforce compliance with air pollution regulation; questions will also test the occupational environment as an exposure pathway that is important for environmental health in relation to air pollution</p> <p>Group Projects – students will be expected to identify the importance of this pathway as an environmental health component where applicable in their group projects</p> <p>Supplemental for Graduate Student: Journal Article Summary – the journal article relates to the contribution of the occupation as an important exposure pathway for air contaminants and an integral component of environmental health</p>
Respiratory Effects of Air Pollutants	3, 4, 8	1, 4	2, 3	<p>Quiz, Exams - questions will evaluate knowledge about the environmental health impacts of major air pollution exposures in the United States and internationally, the major contributing biological factors to exposure and health effects, and the application of these to control of air pollution</p> <p>Group Projects – students will be expected to address expected health effects of the exposure scenario that is assigned and how this information might inform control of exposure in the scenario</p>
Cancer and Air Pollution	3, 4, 8	1, 4	2, 3	
Cardiovascular Effects of Air Pollutants	3, 4, 8	1, 4	2, 3	
Effects of Air Pollution on Reproductive Health and Pregnancy	3, 4, 8	1, 4	2, 3	
Neurological and other Effects of Air Pollution	3, 4, 8	1, 4	2, 3	
Air Quality Disparities: Distribution, Susceptibility and Vulnerability Issues	4, 8	1, 4	4	<p>Quiz, Exams – questions will be tailored towards the identification of smoking as an important behavioral factor and a pathway of exposure to air pollution</p> <p>Group Projects – students will be expected to identify the importance of this pathway as an environmental health component where applicable in their group projects</p>
Historical and Contemporary Air Pollution Issues: Visibility, Climate, Acid Rain, and the Ozone Layer	2, 3, 5, 8	7, 9	2	<p>Quiz, Exams – questions will evaluate knowledge of historical and current environmental public health air pollution issues both domestically and internationally; the approaches being used to identify, respond and resolve them</p> <p>In-class Discussion: based on reading materials – the reading materials that are assigned address domestic and international environmental public health air pollution issues and approaches to address them</p>
A Public Health Perspective to Current Air Pollution Issues: The Multi-Pollutant Problem	2, 3, 5, 8	7, 9	2	

Topics	Course Objectives	BSPH EPH	MPH EHS	Student Evaluation Activity
<p>A Public Health Perspective to Current Air Pollution Issues: Particulate Matter and How Low is Low Enough</p>	<p>2, 3, 5, 8</p>	<p>1, 4</p>	<p>2</p>	<p>Quiz, Exams – questions will evaluate knowledge of historical and current environmental public health air pollution issues both domestically and internationally; the approaches being used to identify, respond and resolve them</p> <p>In-class Discussion: based on reading materials – the reading materials that are assigned address domestic and international environmental public health air pollution issues and approaches to address them</p> <p>Supplemental for Graduate Student: Journal Article Summary – the journal article address domestic and international environmental public health air pollution issues and approaches to address them; the summary will be graded based on the rubric outlined in Table 2</p>