

# ENVS 460: Introduction to Air Pollution

Fall 2021

**Course Description:** This course is an introduction to air pollution science. Classical physics, chemistry, and mathematics are applied to atmospheric processes. Additional topics will include climate change, agricultural air quality and greenhouse gases. Our meeting place is Gerald Thomas room 360 on Tuesdays and Thursdays from 1:30 to 2:45 pm.

Instructor: Dr. David DuBois (575-646-2974, [dwdubois@nmsu.edu](mailto:dwdubois@nmsu.edu))

## Lecture topics

Topic	Issues	Book chapter
Structure, Composition, Units	Overview, background, atmospheric components and structure, units, basic equations	Ch 2.2, 3.1-3.6, handouts
Effects	Vegetative, material, human, aquatic, effects. History & Air quality standards.	Ch 3.6, handouts
Sources	Stationary, area, mobile, biogenic sources	Ch 3.6, handouts
Urban Air Quality	Gas/aqueous processes in the urban environment	Ch 1.3-1.5, Ch 4
Aerosols	Properties, dynamics, nucleation	Ch 5
Climate Change	Causes and sources of greenhouse gases	Ch 12, handouts
Meteorology	Circulation patterns and forces, transport, inversions, instrumentation, effects	Ch 6
Sampling	Methods, measurements, QA	handouts
Controls	Controls for gaseous and particulate pollutants	handouts
Modeling	Transport and dispersion of pollution	Ch 9, handouts
Project presentations	No final exam; students present findings of their semester projects	

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**Graded Requirements:** There will be short weekly online quizzes, a semester project, several lab sessions, and science communication using social or traditional media. You will have homework assignments to reinforce what we talk about in class.

**General Expectations:** Since we will have weekly quizzes, it is to your best interest to attend every class, keep up with the reading and homework assignments.

I like when you ask questions, so please don't be shy. Others will likely have the same question. If you are not comfortable in asking in class, use the office hours. This is your education. Take advantage of it.

I try to make the course relevant and bring my past experience in working in the field to augment the text. I will try to bring in at least one special topics speaker who is currently working in the field.

**Prerequisites or Corequisites:** PHYS 215, CHEM 112, MATH 191

**Office Hours:** immediately after class or by appointment. In-person or online. Send me an email to schedule a time.

**Required Text:** Jacobson: Atmospheric Pollution and Modern Climate Change Cambridge University Press; 2nd Edition (2012)  
ISBN 978-1-107-69115-5 (paperback)

**Labs:** We will have several laboratory sessions during this class to give you practical experience in operating instrumentation and sample collection. Since the labs are a group activity, there will be no make-ups if you miss one. Some of the activities may require walking short distances outside of the building to take measurements. Please let me know if you are not able to do so and I will make accommodations for you.

**Supplemental Texts:** I will pull information from several books now and then but I don't expect you to buy them. Most of them are available used on Amazon at low cost. They are good books to have in your reference shelf if you are going into the field of air quality, environmental science or environmental management.

- Vellero, Boubel, Fox, Turner, and Stern: Fundamentals of Air Pollution, Fourth Edition (very good introduction text)
- Seinfeld and Pandis: Atmospheric Chemistry and Physics (great text for chemists and those going on to grad school)
- Godish: Air Quality (simple but good text)
- Jacobs: Introduction to Atmospheric Chemistry (good atmospheric chemistry text, less information than Seinfeld & Pandis)
- Cooper and Alley: Air Pollution Control: A Design Approach, Fourth Edition (one of the best text books on air pollution control and engineering; a must if you are going on to study environmental engineering)

**Homework assignments** will primarily include solving problems, with some manipulation of equations required. The objective of the homework assignments is for you to obtain an understanding of air pollution issues, develop new skills for approaching air quality problems, and become proficient using equations to make

calculations needed for air quality data analysis. Please hand in hard copies of neatly hand-written or typed solutions to your homework. Make sure you show your work and identify units in your answers. Identify what equations you used before plugging in numbers. I will mark off points for answers without units.

**Late Homework** will automatically receive a 50% loss of points. Homework is due during the class time. It will not be accepted after the solutions are posted. If you can't get it done on time, then please turn in a partially completed homework for partial credit. If you are sick and can't come to class, you may email an electronic scan (e.g. PDF) of your homework to me no later than the end of class when the homework was due.

**Missed quizzes** will be assigned a zero. However, I will throw out the lowest quiz score. Missed quizzes are only granted if given prior permission from me. The only exception will be a medical emergency with a doctor's note.

**Grading Criteria:** Letter grades will be assigned according to the following:

A=90-100%; B=80-89%; C=70-79%; D=60-69%; <60% = F

Based on:

25% - Homework

25% - Quizzes (drop lowest)

15% - Attendance and class participation

25% - Project

10% - Social or regular media assignments

A **semester project** will be required for each student. The objective of this assignment is to give you experience in critical thinking and assessment and presenting the results in a clear and concise manner.

**Email Communication:** Please use your NMSU email for communicating with the instructor. Communication regarding any university matters should be to and from NMSU e-mail only. This is to protect confidentiality.

### **Ethics Statement**

As members of the NMSU community, we are all bound by the ethical guidelines established by the college. This includes policies regarding sexual and ethnic harassment; discrimination based on race, color, religion, national origin, gender, age, handicap, sexual orientation, and veteran status; academic honesty and plagiarism; and other guidelines for appropriate professional and student behavior. Many of these policies are outlined in the Student Handbook (<https://studenthandbook.nmsu.edu/>).

If you have any questions or concerns regarding these policies, please consult with any faculty member, including the department head.

## **Plagiarism Statement**

Plagiarism is using another person's work without acknowledgment, making it appear to be one's own. Any ideas, words, pictures, or other intellectual content, taken from another source must be acknowledged in a citation that gives credit to the source. This is true no matter where the material comes from, including the Internet, other students' work, unpublished materials, or oral sources. Intentional and unintentional instances of plagiarism are considered cases of academic misconduct. It is the responsibility of the student submitting the work in question to know, understand, and comply with this policy." It is the policy of the School of Teacher Preparation, Administration and Leadership that students found to have committed an act of plagiarism, one or more of the following consequences will occur; and, a written statement outlining the offense and consequences will be placed in the student's permanent file by the Department Head/Hearing Officer.

- Failure of the course assignment;
- Failure of the course;
- Academic suspension for one or two semesters;
- Dismissal or expulsion from the program.

There is no statute of limitations for an act of plagiarism. Once committed, a student can be held accountable at any time even after the semester has ended. All students and instructors are obliged to follow the procedures for documenting the offense as described in the Student Handbook (<https://studenthandbook.nmsu.edu/>) under Section II: Academic Misconduct.

## **Academic Misconduct**

Academic and non-academic misconduct: The Student Code of Conduct defines academic misconduct, non-academic misconduct and the consequences or penalties for each. The Student Code of Conduct is available in the NMSU Student Handbook online:

- Student Handbook (<http://studenthandbook.nmsu.edu/>)
- Academic Misconduct (<http://studenthandbook.nmsu.edu/student-code-of-conduct/academic-misconduct/>)

## **Discrimination and Disability Accommodation**

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act Amendments Act (ADA) covers issues relating to disability and accommodations. If a student has questions or needs an accommodation in the classroom (all medical information is treated confidentially), contact:

### **Main Campus**

Disability Access Services  
Corbett Center Student Union Room 208  
Aaron Salas, Director  
575-646-6840  
[das@nmsu.edu](mailto:das@nmsu.edu)

New Mexico State University, in compliance with applicable laws and in furtherance of its commitment to fostering an environment that welcomes and embraces diversity, does not discriminate on the basis of age, ancestry, color, disability, gender identity, genetic information, national origin, race, religion, retaliation, serious medical condition, sex (including pregnancy), sexual orientation, spousal affiliation, or protected veteran status in its programs and activities, including employment, admissions, and educational programs and activities. Inquiries may be directed to the Laura Castille, Executive Director, Title IX and ADA/Section 504 Coordinator, Office of Institutional Equity, P.O. Box 30001, E. 1130 University Avenue, Las Cruces, NM 88003; 575.646.3635; 575-646-7802 (TTY); equity@nmsu.edu

**Title IX prohibits sex harassment, sexual assault, intimate partner violence, stalking and retaliation. For more information on discrimination or Title IX, or to file a complaint contact:**

Laura Castille, Executive Director and Title IX Coordinator  
Office of Institutional Equity (OIE) - O'Loughlin House, 1130 University Avenue  
Phone: (575) 646-3635  
E-mail: equity@nmsu.edu  
Office of Institutional Equity Website

**Other NMSU Resources:**

Resource	Phone	Web
NMSU Police Department:	(575) 646-3311	<a href="http://www.nmsupolice.com">www.nmsupolice.com</a> (Links to an external site.)
NMSU Police Victim Services:	(575) 646-3424	
NMSU Aggie Health & Wellness Center	(575) 646-1512	<a href="https://wellness.nmsu.edu/">https://wellness.nmsu.edu/</a> (Links to an external site.)
NMSU Dean of Students:	(575) 646-1722	
For Any On-campus Emergencies:	911	