

# ES 460: Introduction to Air Pollution

Fall 2020

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

**Course Description:** This hybrid/online 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.

## 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	

**Graded Requirements:** There will be short weekly quizzes, a project, several lab sessions, and science communication using social 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 meeting, keep up with the reading and homework assignments.

Occasionally I may record lectures and ask you to come prepared to discuss the lectures before class. I will warn you when I do this.

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. 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 to labs in Skeen Hall or 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 send me readable

electronic scans or images of your homework assignments. Make sure you show your work and identify units in your answers. 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 the 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:

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

Based on:

25% - Homework

25% - Quizzes (drop lowest)

15% - Attendance and class participation

25% - Project

10% - Social media assignments

A **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.

**Code of Conduct:** Please see the Student Code of Conduct in The Student Handbook: <http://deanofstudents.nmsu.edu/student-handbook/1-student-code-of-conduct/> Pay particular attention to "III.B. Academic Misconduct." Academic misconduct will not be tolerated and will result in severe penalties including an F in the class.

**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.

**Students with Disabilities:** If you have, or believe you have, a disability and would benefit from accommodations, you may wish to self-identify. You can do so by providing documentation to the Services for Students with Disabilities (SSD) Office located at Garcia Annex (phone: voice 646-6840, TTY 646-1918). If you are already registered with the SSD office and need accommodations please provide your "Accommodation Memo" from the SSD within the first two weeks of class. If you have a condition that may affect your ability to exit safely from the premises in an emergency or that may cause an emergency during class, you

are encouraged to discuss this in confidence with the instructor and/or the Coordinator for SSD. All information will be held in strict confidence.

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act Amendments Act (ADAAA) 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:

Trudy Luken, Director

Student Accessibility Services (SAS) - Corbett Center, Rm. 244

Phone: (575) 646-6840 E-mail: [sas@nmsu.edu](mailto:sas@nmsu.edu)

Website: <http://sas.nmsu.edu/>

**University policy on discrimination and sexual harassment:** NMSU policy prohibits discrimination on the basis of age, ancestry, color, disability, gender identity, genetic information, national origin, race, religion, retaliation, serious medical condition, sex, sexual orientation, spousal affiliation and protected veterans status.

Furthermore, Title IX prohibits sex discrimination to include sexual misconduct: sexual violence (sexual assault, rape), sexual harassment and retaliation.

For more information on discrimination issues, Title IX, Campus SaVE Act, NMSU Policy Chapter 3.25, NMSU's complaint process, or to file a complaint contact:

Gerard Nevarez, Title IX Coordinator

Agustin Diaz, Title IX Deputy Coordinator

Office of Institutional Equity (OIE) - O'Loughlin House, 1130 University Avenue

Phone: (575) 646-3635 E-mail: [equity@nmsu.edu](mailto:equity@nmsu.edu)

Website: <http://eeo.nmsu.edu/>

**Other NMSU Resources:**

NMSU Police Department: (575) 646-3311 [www.nmsupolice.com](http://www.nmsupolice.com)

NMSU Police Victim Services: (575) 646-3424

NMSU Counseling Center: (575) 646-2731

NMSU Dean of Students: (575) 646-1722

For Any On-campus Emergencies: 911