

Syllabus

Air Pollution

ENV 6105.901 (ref# 90504)

Fall 2011

- Course Description:** A study of air pollution. Emphasis is given to principles underlying our understanding of ambient air pollution, its sources, its effects, and mechanisms for its management.
- Credit Hours and Work Expectations:** 3 units
As a 3 unit course, students should plan to spend 3 hours in class each week and approximately three times that amount of time on course activities outside of class (this is a general rule of thumb and is applicable to this class). Students who do not genuinely have at least 10 hours per week to devote to this class alone, should not take this class.
- Prerequisites:** Pre-calculus algebra (college-level calculus is recommended); College-level general chemistry

This is a science-based course that requires comfort with mathematical calculations and chemistry. Students who do not feel comfortable with the prerequisite material will need to do outside self-study or obtain tutoring to be comfortable in the class. I am available to help students with this material during my office hours (see below).
- Classroom Location:** COPH, Room 2016
- Dates and Times:** Tuesdays, 5:15 – 8:00 pm. August 23 – November 29
Final Exam: December 6, 5:30 – 7:30 pm
- Delivery Format:** In-person weekly classroom instruction, including lectures, discussions, audio-visual presentations, and group learning activities.
- Instructor Information:**
Instructor Name: Amy Stuart, PhD
Associate Professor
Office: COPH 1117
Office Hours: M 4:30 – 5:30 PM (drop-in), W 3 – 4 PM (drop-in)
(tentative) Past students have found that coming to office hours is very helpful and sometimes necessary for understanding and completing course activities

Phone: 974-6632
Email address: astuart@hsc.usf.edu
Preferred method of contact: My preferred method of contact is in-person during office hours. I will also respond to email and phone messages when possible. Reply times may vary up to several days.

Course Content Outline:
(Tentative)

The earth's atmosphere: structure and composition
 Air pollution sources and emissions
 Atmospheric motion and pollutant transport
 Gas phase chemistry and photochemical smog
 Aerosols and particulate matter
 Aqueous chemistry and pollutant deposition
 Exposure and health effects
 Visibility; stratospheric ozone
 Climate change
 Management and regulations
 Measurement and monitoring
 Air pollution modeling

Calendar of Major Course Deadlines:	<u>Date</u>	<u>Deadlines</u>
	Aug 23	Pre-assessment exam (in-class)
	Sept 13	Project topic abstract due
	Oct 4	Content Quiz 1
	Oct 11	Detailed outline of paper due
	Nov 1	Content Quiz 2
	Nov 15	Refined paper drafts due
	Nov 22	Paper peer reviews due
	Nov 29	Project presentations
	Dec 2	Final papers due by 5pm (to CPH 1117)
	Dec 6	Final exam

Reading Materials: Required readings for each week will be listed on the Blackboard course website. Readings will be drawn from multiple sources, including those listed below:

- Atmospheric Pollution: History, Science, and Regulation*, by Mark Z. Jacobson, Cambridge University Press, Cambridge, 2002. (Available through the USF main and HSC bookstores. Also on course reserve at the main USF library.)
- Air Quality*, by Thad Godish, 4th Edition, Lewis Publishers, 2003. (Available through the USF main and HSC bookstores. Also on course reserve at the main USF library.)
- Fundamentals of Air Pollution*. 4th Edition, by Daniel Vallero. Academic Press, Burlington, MA, 2008. (On course reserve at the main USF library.)
- Air Pollution and Health*, S.H. Holgate, J.M. Samet, H.S. Koren, and R.L. Maynard, Eds., Academic Press, 1999. (On course reserve at the main USF library.)
- Atmospheric Chemistry and Physics*, by John Seinfeld and Spyros Pandis, John Wiley & Sons, 1997. (A USF electronic resource)

Students are encouraged to use whatever legal mechanisms work for their personal situation (e.g. financial) to access the required reading materials. For example, mechanisms include physical or electronic book purchase or rental, physical and electronic libraries, book sharing, and book borrowing.

Learning Objectives / Competencies

Upon completion of this course, the student should be able to:

1. Discuss several types of air pollution problems and the chemistry and physics affecting them.
2. Discuss (physical, chemical, biological, and social) mechanisms leading to impacts of air pollution on human health, welfare, and the environment.
3. Discuss air pollution management practices (regulations, strategies, technologies).
4. Analyze (quantitatively and qualitatively) impacts of air pollution management decisions on air quality, human health, and the environment.
5. Select methods for measurement, control, and prevention of air pollution.
6. Synthesize and evaluate knowledge on air pollution topics in written and oral form.

The course will make contributions to several Environmental Engineering Body of Knowledge Outcomes at Master's performance level.¹ Some specific outcomes with substantial contributions from the course include:

1. *Basic Environmental Math and Science (BEMS) Knowledge for Environmental Engineering:* Analyze a complex problem to determine relevant BEMS knowledge domains; Apply knowledge domains of the BEMS, as necessary, to analyze and solve a predictable problem appropriate to environmental engineering.
3. *Use of Modern Engineering Tools:* Apply modern engineering tools to multidisciplinary environmental engineering projects.
4. *In-depth Competence:* Analyze a predictable environmental process or system in a traditional or emerging area.
5. *Risk, Reliability, and Uncertainty:* Analyze the potential exposure and risk to the environment and exposed populations for multiple chemical and biological exposure routes and hazards.
6. *Problem Formulation and Conceptual Analysis:* Apply advanced level technical knowledge and problem analysis/solving skills to complex multidisciplinary problems; Analyze problems appropriate to environmental engineering having unpredictable or incomplete parameters to determine their root causes; Analyze feasibility and appropriateness of predictable solutions as alternatives to conventional solutions to problems.
9. *Multimedia Breadth and Interactions:* Analyze a system that incorporates inter-media transport and fate of pollutants.
10. *Societal Impact and Environmental Policy:* Describe and explain environmental policy in some detail in some area of environmental practice; Apply knowledge of societal structure and dynamics when seeking solutions to environmental problems; Participate as a citizen stakeholder in the development of public environmental policy.
11. *Globalization and other Contemporary Issues:* Participate in discussion and debate focused on globalization and contemporary issues and their relationship with and potential impact on public health and the environment; Synthesize information on contemporary issues to provide perspective on relevance to environmental engineering problems.
12. *Multi-Disciplinary Teamwork to Solve Environmental Problems:* Identify disciplines necessary to solve a complex environmental engineering problem (a baccalaureate performance level); Function effectively in multi-disciplinary team activities (a professional performance level).
13. *Professional and Ethical Responsibilities:* Analyze an environmental engineering situation involving conflicting ethical and professional interests to determine an appropriate course of action.
14. *Effective Communication:* Make effective presentations to technical audiences; Plan, compose, and integrate the verbal, written, virtual and graphical communication of a concept or project to technical and non-technical audiences; Communicate the concept of uncertainty and risk to technical and non-technical audiences; Develop conclusions that logically follow from data results and discussion.
15. *Lifelong Learning:* Identify additional knowledge, skills and attitudes appropriate for continued practice at the professional level; Integrate self-directed learning of issues that apply to environmental engineering.
16. *Project Management:* Apply project management to a project.
17. *Business and Public Administration:* Analyze problems involving business and public administration as they relate to environmental problems.
18. *Leadership:* Apply leadership skills to direct the efforts of a small group (a baccalaureate performance level); Organize and direct the efforts of a group to achieve a goal (a professional performance level).

¹ AAEE Environmental Engineering Body of Knowledge Working Group, 2008. Environmental Engineering Body of Knowledge Summary Report. *Environmental Engineer: Applied Research and Practice*, Summer, pp. 21-33.

Assessments:

Description of Strategies:

Final Exam: The final exam will occur in-class during the USF scheduled final exam time. Questions will include quantitative calculations, quantitative and qualitative diagrams, short answers, and essays.

Project: Each student team (or student, depending on the number of students enrolled) will prepare a report and give a presentation on an air quality topic of interest. A one-page topic abstract (with references) and a detailed outline are due early in the semester. Refined drafts will also be submitted for peer review. Safe-Assignment and other plagiarism checking methods may be used.

Content Quizzes: There will be two content quizzes during the semester. Quiz questions will primarily deal with concepts, descriptions, diagrams, and short calculations.

Class Participation: All students are expected to participate in class by regularly attending class, by preparing adequately for class (through assigned readings and deliberate practice work), and by actively participating in class discussions and activities (including presentation of deliberate practice solution methodology to the class). Class participation assignments will also include preparation of materials for presentation, discussion, and other in-class activities. Class participation credit can also be gained by cutting out, discussing with the class, and handing in news articles and comics on air quality issues. All students are expected to bring in and discuss at least one article during the course. (Additional articles will earn extra credit.)

Deliberate Practice Self-Assessments: Research indicates that high-level learning requires deliberate practice. Deliberate practice involves mentally demanding (i.e., challenging, requiring full mental focus) and repeated work, followed by self-observation and reflection on performance. Practice work problems related to the course topics, including quantitative calculations and written short answer problems will be provided on a regular basis for student practice through the course Blackboard site. Brief answers to the quantitative problems will be provided approximately one week later for student self-assessment. Answers provided will not include the methods used to obtain the answer (just the answer itself); if you do not do the work yourself, the answers will not be useful to learning or exam preparation. Hence, you are strongly encouraged to do all practice problems before the answers are made available, so that you can do the self assessments and actually learn. Additionally, students will regularly be required to present their solution methodology or solution attempts to the class as a part of class participation (discussed above). Additional instructor assistance with solution methods can be obtained by attending office hours.

Grading Scale:

The course will be graded on a curve, with natural divisions in the earned scores leading to divisions in the letter grades. + and – grades will be used in this course. The percentage contribution of each assessment category to the numerical course grade are:

Project	30%	Quizzes	25%
Final Exam	30%	Class Participation	15%

Deliberate practice problems will not be graded; they are a learning tool.

Late and Make-up Policies: Students are expected to turn in assignments on time and to be present to take the quizzes and final exam. If you cannot be present for the scheduled exam dates, you should inform me of the conflict by the second class meeting, so that alternate arrangements can be made. Such arrangements will only be made if your reasons are compelling. Some university-regulated excuses include disability-related conditions, observance of major religious holidays, and official participation in university-sponsored athletic events. Students who anticipate missing an exam for these reasons should provide the official paperwork or written notice (for religious observance) to me by the second class meeting. No late assignments will be accepted. Students are always welcome to turn in assignments early. If you miss a class or anticipate missing a class, you should contact a fellow student to get any needed information or announcements.

Other Course Policies:

Attendance / Participation: Students are expected to regularly participate in the class through asking and answering questions, and presenting and discussing content. If you do not attend, it is not possible to participate.

Permission to Use Lectures: Lectures may not be recorded without prior permission of the instructor. All unauthorized recordings of class are prohibited. Recordings that accommodate individual student needs must be approved in advance and may be used for personal use during the semester only; redistribution is prohibited.

Materials generated for this class may be copyrighted. You may make single copies for your personal scholastic use in accordance with U.S. copyright law. Any other reproduction or dissemination is not allowed without prior express permission from the copyright holder.

Electronic Equipment Usage: Electronic equipment, including cell phones, personal digital assistants, computers, etc. must be turned off prior to entering the classroom. Computer use is only allowed when specifically assigned by the instructor. This equipment is disruptive to the class and distracting to students and the instructor.

University Policies:

Policy References: USF Academic Policies for Students are provided in the USF Tampa Graduate Catalog at http://www.grad.usf.edu/inc/linked-files/USF_Grad_Catalog_2010_2011.pdf and in the USF Student Planner at <http://www.sa.usf.edu/handbook/>

Some specifics are discussed below with a few additional references.

Student Conduct USF Student Rights/Responsibilities: <http://www.sa.usf.edu/srr/page.asp?id=81>
USF Student Code of Conduct: <http://www.sa.usf.edu/srr/page.asp?id=88>

Disruption of the Academic Process: Disruption of the academic process will not be tolerated. See Section 7 of the USF Tampa Graduate Catalog.

Academic Dishonesty / Plagiarism: Academic dishonesty, including plagiarism, will not be tolerated and is grounds for failure. See Section 7 of the USF Tampa Graduate Catalog. SafeAssign and other plagiarism checking methods may also be used.

The University of South Florida has an account with an automated plagiarism detection service (*SafeAssign*), which allows instructors and students to submit student assignments to be checked for plagiarism. I (the instructor) reserve the right to 1) request that assignments be submitted as electronic files and 2) submit students' assignments to *SafeAssign*, or 3) request students to submit their

assignments to *SafeAssign* through myUSF. Assignments are compared automatically with a database of journal articles, web articles, the internet and previously submitted papers. The instructor receives a report showing exactly how a student's paper was plagiarized.

For more information about Plagiarism and *SafeAssign*, visit:

Plagiarism tutorial: <http://www.cte.usf.edu/plagiarism/plag.html>

SafeAssign: http://media.c21te.usf.edu/pdf/student/bbstud_subsafeassgn.pdf

Special
Accommodations:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. If you have a disability requiring an accommodation, you should contact the USF Office of Services for Students with Disabilities to apply for services. Services offered are discussed at <http://www.asasd.usf.edu/index.htm>

Emergency closure
procedures:

In the event of an emergency, it may be necessary for USF to suspend normal operations. During this time, USF may opt to continue delivery of instruction through methods that include but are not limited to: Blackboard, Elluminate, Skype, and email messaging and/or an alternate schedule. It's the responsibility of the student to monitor Blackboard site for each class for course specific communication, and the main USF, College, and department websites, emails, and MoBull messages for important general information.

Student Grievance
Procedure:

Review USF Academic Grievance Policy in Section 7 of the USF Graduate Catalog. Student assistance is provided by Division of Student Affairs, Office of the Student Ombudsman.

<http://www.sa.usf.edu/ombudsman>

Resources for Students:

Library Resources

USF Library Resources and Services: <http://www.lib.usf.edu/>

Shimberg Health Sciences Library: <http://health.usf.edu/library/>

Shimberg Health Sciences Library Tutorials: <http://library.hsc.usf.edu/> (follow links under 'Instructional Services' section)

Creating Citations &
Using Refworks:

<http://guides.lib.usf.edu/CitingSources>

Plagiarism & Safe
Assign:

See Academic Dishonesty/Plagiarism Section

USF Email Accounts:

http://health.usf.edu/publichealth/eta/pdf/MyUSF_Email.pdf

Blackboard Tutorials:

<http://media.c21te.usf.edu/bbstudents.html>