

ME 790 - (#7691)
Transport Processes in Atmospheric Pollution Control – Fall 2006

Location: Stocker 190 1:10 pm – 2:00pm MT and possibly Th
1:10 pm – 3:00 pm W

Prerequisites: ME 546 or ChemE 642 (Transport)

Instructor: Prof. Bayless, Ph.D., P.E. (593-0264) 248 Stocker Center
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Office Hours: By appointment or if the door is open

Text: No official text for the class. However, several texts will be used as spot references

Grading:	Final Exam	20%
	Mid-Term Exam	15%
	Homework	50%
	Project	15%

Schedule:

1. Policies, definitions, legislation and regulation, methods of control
2. Greenhouse gas control and bioreactors
3. NO_x formation and control
4. SO_x formation and control
5. CO and PICs
6. Problems regarding pollution transport (particulates and gaseous species)
7. Aerosol mechanics
8. Midterm Exam
9. Particle motion in external force fields, diffusion, size distribution
10. Separation and removal of particulates: gravity settling and cyclones
11. Inertial separation, filtration, electrostatic precipitation, scrubbers
12. Buoyancy and natural convection
13. Stack gas dispersion
14. Gaussian Models
15. Weather dispersion
16. Final Exam

Objectives

1. Account for the effect of chemical equilibrium and dissociation on reaction thermodynamics and combustion kinetics
2. Explore how engineering principles are used to control air pollution
3. Understand numerical models and principles pertinent to air pollution control
4. Develop skills to impact the changing field of air pollution engineering
5. Understand mechanics of air pollution transport

Policies

- Attendance: You are responsible for all work assigned and notes distributed in this course. Make up work may be possible, given a very compelling reason. However, due to the nature of the course, it will be very difficult for you to make up work missed.
- Honesty: Each student will submit his or her work **only**. While I encourage you to work with others in working homework, any such work submitted that indicates plagiarism of any form will be given a grade of zero (0) and further prosecution may be warranted as outlined in your student handbook.
- Due dates: Due dates will be explicitly posted with the homework assignment. All work is due at the start of class. No extensions will be given for plant trips or job interviews. Late homework will be penalized 10% per calendar day without exception.
- References: Flagan, R. and Seinfeld, J., *Air Pollution Engineering*, 1988
Arya, S., *Air Pollution Meteorology and Dispersion*, 1999
Beychok, M., *Fundamentals of Stack Gas Dispersion*, 1979.
Crawford, M., *Air Pollution Control Theory*, 1976.
Licht, W., *Air Pollution Control Engineering, 2nd ed.*, 1988.
Bird, Stewart and Lightfoot, *Transport Phenomena*, 1960.
Strauss, W., *Air Pollution Control, Part 1*, 1971.
Theodore, L.; and A.J. Buonicore, *Air Pollution Control Equipment, Vol. 2*, CRC Press, Boca Raton, FL, 1988.
Wark, K., and Warner, C.F., *Air Pollution: Its Origin and Control*, Prentice Hall, Englewood Cliffs, CA, 1992.
- Final Exam: The final exam will be given
- Grade Policy: Final grades are final. The grade sheet will be posted 24 hours before the final exam and grades for the final exam will be e-mailed and posted 24 hours before final grades will be submitted. **Once the final exam grades are posted, no other grades will be revised, even if there is an error in scoring.** In other words, if it was not important enough to warrant concern during the quarter, it is not important enough to warrant concern after the quarter. It is **your** responsibility to correct errors in scoring **before** grades are posted.
- If you believe there is an error in scoring, you must submit a signed paper stating the suspected error along with a copy of the material to be regraded or readded.
- Web Page: There will be expanded use of the web page this quarter. All communications sent by e-mail will also be posted on the web page. A copy of this syllabus is also available on the web page at <http://www.ent.ohiou.edu/~bayless/me790>