

ChE 476
Spring 2012

Pollution Prevention

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Office: 417 ESB
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Class: 1500-1650 M W – for the first 11 weeks of the semester (until 3/21/12)

Course Objectives:

1. Students will understand environmental issues affecting society and the chemical process industry.
2. Students will understand environmental regulations affecting the chemical process industry.
3. Students will understand the environmental risks associated with chemical plants.
4. Students will understand and appreciate the role of chemical engineers in pollution prevention.
5. Students will be able to evaluate the environmental risks of chemicals involved in a chemical process.
6. Students will be able to estimate potential chemical releases and exposures in a chemical process.
7. Students will understand the concept of and recognize opportunities for applications of green chemistry.
8. Students will be able to evaluate the environmental performance of unit operations and of a process flowsheet.
9. Students will be able to suggest strategies for pollution prevention in unit operations.
10. Students will be able to analyze process flowsheets to suggest strategies for process-wide pollution prevention.
11. Students will be able to evaluate the economic consequences of pollution prevention.
12. Students will understand and be able to perform a rudimentary life-cycle analysis.
13. Students will understand the concept and be able to suggest examples of industrial ecology.

Course Policies (exceptions at discretion of instructor):

1. Any classes canceled due to inclement weather (or for any other reason, such as fire alarms) will be rescheduled.
2. Your cellular phone/smart phone/PDA should be turned off during class. If your cellular phone/smart phone/PDA rings/beeps/chimes/etc. during class, if you are observed texting during class, or if you are observed using the internet during class, your final grade will be reduced by one percentage point, and you will be asked to leave the class and not return on that day. You will still be responsible for all material covered in class. If the cellular phone/smart phone/PDA rings/beeps/chimes/etc., during an exam, you will be evaluated on the portion of the exam completed before being asked to leave. If you are observed texting or using the internet during an exam, you will automatically receive a zero for that exam.

- Interim work submitted for evaluation should be neat and easy to follow. Credit will be deducted for sloppy work that is hard to follow.
- If you do not participate in the design project as part of your assigned group, your grade for the entire course will automatically be an F, since the project is 90% of the final grade.
- You must be in the audience for all of the design presentations. This means in the classroom, not in the hall or in the computer room. Failure to do so will result in reduction by one full letter on your design project grade.

Grading: Project 90% due March 19, 2012
 Other (instructor discretion or extra credit) 10%

Grades: The nominal grading scale is

≥90%	A
≥80%	B
≥70%	C
≥60%	D
<60%	F

At the instructor's discretion, this scale may be lowered, but not raised.

Text: Allen, D. T. and D. R. Shonnard, *Green Engineering. Environmentally Conscious Design of Chemical Processes*, Prentice Hall PTR, 2002.

Related Books (on reserve in Evansdale Library):

Allen, D. T. and K. S. Rosselot, *Pollution Prevention for Chemical Processes*, Wiley-Interscience, 1997.

Austin, G. T., *Shreve's Chemical Process Industries (5th ed.)* McGraw Hill, 1984.

Bishop, P. L., *Pollution Prevention: Fundamentals and Practice*, McGraw Hill, 2000.

El-Halwagi, M. M., *Pollution Prevention through Process Integration*, Academic Press, 1997.

El-Halwagi, M. M., *Pollution Prevention via Process and Product Modifications*, AIChE, 1994.

Mackay, D., W-Y Shiu and K.-C. Ma, *Illustrated Handbook of Physical-Chemical Properties and Environmental Fate for Organic Chemicals*, Vols I-V, Lewis, 1992 (Vols. I-IV), 1997 (Vol. V).

Sikdar, S. K. and M. El-Halwagi, *Process Design Tools for the Environment*, Taylor and Francis, 2001.

Syllabus: There is no syllabus. The only requirement is to complete the project. Material needed to complete the project will be taught on demand.