

**COURSE SYLLABUS FOR
MECH 436, AIR POLLUTION CONTROL - 3 UNITS**

**California State University, Chico
Fall Semester 2011**

- Instructor:** Dr. G.A. Kallio, OCNL 417, 898-4959, gkallio@csuchico.edu
- Office hours:** M 2:00-3:50pm, TR 11:00-11:50am, W 12:00-12:50pm
- Class hours:** MWF 11:00-11:50am, OCNL 121
- Prerequisites:** CHEM 111, General Chemistry
CIVL 321, Fluid Mechanics
MECH 332, Thermodynamics
- Textbook:** *Air Pollution Control: A Design Approach*
C. David Cooper and F. C. Alley
4th Edition, Waveland Press, 2011
ISBN 978-1-57766-678-3
- Internet:** Lecture slides, supplemental reading, homework problems and solutions, and other course material will be posted on Blackboard (WebCT) Vista.
- Grading:**
- | | |
|----------------|------|
| Homework | 35 % |
| Midterm Exam 1 | 20 % |
| Midterm Exam 2 | 20 % |
| Final Exam | 25 % |
- Homework:** There will be approximately 6-7 homework problem sets assigned during the semester. Some problems may be open-ended and require design decisions. Problem solutions must be neat, legible, numbered, arranged in assigned order, written on only one side of the paper, and stapled.
- Homework is due at the beginning of class on the due date. **Late homework is not accepted.**
- Software:** Equation-solving software such as *Engineering Equation Solver (EES)* or *TK Solver* will be very useful for solving some homework problems. Students are expected to learn one of these software programs. Some software instruction will be given during lectures. It is also expected that students have a solid, working knowledge of *Microsoft Excel*.

Examinations: There will be two, 50-min midterm exams and a 1-hour, 50-min final exam. The Final Exam is comprehensive but with strong emphasis on those topics covered after the last midterm exam. Use of the textbook and one, 8½" x 11" page of notes are allowed during the exams. The Final Exam will be given on Monday, December 12, 12:00-1:50pm in OCNL 121.

If you know you are going to miss an exam due to illness or other legitimate reason, you must contact me before the exam. (You can call me at home on such occasions: 342-8640.) Make-up exams are only allowed for pre-arranged, legitimate absences.

Email: If you need to contact me outside of class or office hours, please use email. It is expected that all students will monitor their Wildcat email accounts as I will use this system to make important announcements from time to time. You can set up automatic forwarding of your Wildcat email to your preferred email provider at <http://www.csuchico.edu/itss/email/students/index.shtml>.

Cell Phones: All alert sounds on your cell phone must be turned off during class. Cell phone use during class will not be tolerated, except for emergency situations (911).

Academic Integrity: Students are expected to be familiar with the University's Academic Integrity Policy. Your own commitment to learning, as evidenced by your enrollment at California State University, Chico, and the University's Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Student Judicial Affairs. The policy on academic integrity and other resources related to student conduct can be found at: <http://www.csuchico.edu/sjd/integrity.shtml>.

Disability Services: If you need course adaptations or accommodations because of a disability or chronic illness, or if you need to make special arrangements in case the building must be evacuated, please see me during office hours soon as possible. Students with disabilities requesting accommodations must register with Disability Support Services (DSS) to establish a record of their disability. DSS will help you understand your rights and responsibilities under the Americans with Disabilities Act and provide you further assistance with requesting and arranging accommodations. Special accommodations for exams require ample notice to the testing office and must be submitted to the instructor well in advance of the exam date. The Disability Support Services website is <http://www.csuchico.edu/dss>.

- Learning Outcomes:**
- i) to be able to design and/or select equipment for controlling particulate and gaseous air pollution;
 - ii) to understand the regulatory and economic aspects of air pollution control.

COURSE OUTLINE

<u>Topics</u>	<u>Reading</u>	
	Text	Supplemental
Introduction to Air Pollution (Week 1)	Ch 1	
<ul style="list-style-type: none"> • Types of air pollutants • Federal and State legislation and regulation • Gas flow measurement and pollutant concentration • Sources and effects of air pollutants 		
Process Design (Week 2)	Ch 2	
<ul style="list-style-type: none"> • Material and energy balances • Engineering economics and cost estimation 		
Particulate Matter (Week 3)	Ch 3	
<ul style="list-style-type: none"> • Particle characterization • Particle dynamics • Overview of control equipment 		x x
Particulate Control Methods (Weeks 4-8)		
<ul style="list-style-type: none"> • Gravity settlers • Cyclones • Electrostatic precipitators • Fabric filters • Particulate scrubbers • Auxiliary equipment • Design problem example 	Ch 4 Ch 5 Ch 6 Ch 7 Ch 8 Ch 9	x x x x x
Properties of Gases and Vapors (Week 9)	Ch 10	
Gaseous Control Methods (Weeks 9-13)		
<ul style="list-style-type: none"> • VOC incinerators • Gas adsorption • Gas absorption • Control of sulfur oxides • Control of nitrogen oxides • Design problem example 	Ch 11 Ch 12 Ch 13 Ch 15 Ch 16 Ch 17	
Special Topics (Weeks 14-15)		
<ul style="list-style-type: none"> • Vehicle Emission (Mobile Sources) Control • Indoor air quality • Control of carbon dioxide 	Ch 18 Ch 21 Ch 22	x