

CBEMS106 POLLUTION CONTROL

- Catalog Data:** **CBEMS106 Pollution Control (Credit Units: 3).** Application of basic pollution control principles to the chemical industry. Selection of environmentally compatible materials, prioritization of pollutants, analysis of material life cycles, design of unit operations to minimize waste, and economics of pollution control. Prerequisite: CBEMS40A or consent of instructor. (Design units: 1)
- Textbook:** Nazaroff, William W. and Alvaraz-Cohen, Lisa, *Environmental Engineering Science*, John-Wiley, 2000.
- References:**
- Coordinator:** Stanley B. Grant
- Course Objectives:** This course is an introduction to Environmental Engineering Science. Students will learn how their engineering profession will affect the environment and how to minimize this impact. An emphasis will be made on water quality.
- Course Outcomes:** Students will be able to:
Apply basic mass and energy balance calculations to the analysis of environmental problems.
Describe how chemical concepts of stoichiometry, enthalpy, and chemical equilibria influence the environmental fate and transport of chemical contaminants.
Apply basic kinetic theory to environmental problems such as contaminant decay, human population growth.
Describe basic concepts in risk analysis, and the use of dose-response curves for evaluating the potential danger posed by specific chemical contaminants.
Describe the hydrologic cycle, and how chemical contaminants affect the quality of surface waters, ground water, and the coastal ocean.
Describe basic water quality control technology, such as water and wastewater treatment systems, and the basic legal framework (e.g., the safe drinking water Act) within which the technology is implemented.
- Prerequisites By Topic:** Differential Equations.
- Lecture Topics:** Cardiac anatomy (2 classes)
Mechanical analysis of heart chambers, pressure-flow relations (3 classes)
Electrophysiological analysis of conduction in heart (4 classes)
Circulatory anatomy (1 classes)
Pressure-flow relationships in arterial and venous trees (2 classes)
Blood and blood substitutes (2 classes)
Anatomy of the lungs (2 classes)
Gas exchange properties of the lungs, quantitative description (4 classes)
Mechanical properties of the lungs (3 classes)
Respiratory Control (2 classes)
Midterm and Final (2 classes)

Class Schedule: Each class meets 3 hours per week for 10 weeks.

Computer Usage: Microsoft Excel.

Laboratory Projects: None.

Professional Component: Contributes toward the Chemical Engineering Topics Courses and Major Design experience.

Relationship to Program Outcomes: This course relates to Program Outcomes 5, 8, 9, 10, 11, and 12 as stated at: http://www.eng.uci.edu/dept/objective_chemical

Design Content Description

Approach: Two lectures on design projects: designing a water treatment and assessing whether the photosynthesis in the ocean can be engineered to reduce I increases in atmospheric CO₂.

Lectures: 100%

Laboratory Portion: 0%

Grading Criteria:

Homework:	20%
Exam #1:	20%
Design project:	30%
Exam #2:	<u>30%</u>
	100%

Estimated ABET Category Content:

Mathematics and Basic Science: 0 credit units or 0%

Engineering Science: 2 credit units or 66%

Engineering Design: 1 credit units or 25%

Prepared by: Stanley B. Grant _____ **Date:** July 2005

CEP Approved: Fall 2001