

CE 444 Environmental Engineering

Department of Civil Engineering King Saud University

Course Description: CE 444: Environmental Engineering (an elective course for a BScE degree)	Introduction to pollution problems and impact on the environment. Types of liquid wastes, and major pollutants and their effects. Air pollutants and their effects, air quality and emission standards, air pollution meteorology, and control technology. Integrated solid waste management, reuse and recycling of municipal waste, and ultimate disposal. Sources and effects of noise pollution, measurements, standards and control. 3(3,1,0)
Prerequisite	CE 442 (Water and Wastewater Treatment) Topics: <ol style="list-style-type: none"> 1- Water chemistry. 2- Water quality parameters and standards, and wastewater disposal and reuse criteria. 3- Water and wastewater treatment processes. 4- Characteristics and treatment of water and wastewater sludges.
Course learning Objectives	Students completing this course successfully will be able to <ol style="list-style-type: none"> 1- Understand the nature of environmental pollution and its effects on the environment, health and well being of human, and relation to development, 2- Identify sources of pollutants and their environmental pathways, 3- Understand engineering procedures for the control and management of environmental pollution, 4- Communicate skillfully through reading, writing and oral presentation.
Topics Covered	<ol style="list-style-type: none"> 1- Introduction to pollution problems: sources of pollution, major pollutants, environmental impact, development and its impact on the environment (10 hours) 2- Liquid waste and disposal: types of wastewater and characteristics, major aquatic pollutants and impact, wastewater quality criteria and parameters, self water-purification mechanisms (7 hours) 3- Introduction to air pollution and its control: air pollutants and effects, ambient air quality standards, emission standards, air pollution meteorology, atmospheric dispersion, control technology (10 hours) 4- Solid waste management: sources, classification and composition of municipal solid waste (MSW), MSW management, waste minimization of MSW, reuse and recycling of MSW, MSW landfills, integrated waste management (10 hours) 5- Noise pollution and control: sound pressure, power, and intensity, noise sources and measurement, noise impact, noise criteria and standards, and noise control (5 hours)
Class/ tutorial Schedule	Three lecture sessions and one tutorial session per week (50 minutes each session).
Field Trips	At least three field trips are made to some facilities related to environmental pollution control and possible pollution sources (e.g. a cement factory, a wastewater treatment plant, a sanitary landfill, industrial areas) A written report is required for each visit.
Term Paper	Each student is required to select a topic related to environmental pollution and control, write a term paper, and orally present his topic.
Contribution of Course to Meeting the Professional	<ol style="list-style-type: none"> 1- Students recognize the significance of their profession in controlling and managing environmental pollution.

Component	<p>2- The course enables students to assess the impact of pollution on the environment and human health.</p> <p>3- The course enables students to develop alternative engineered solutions for environmental problems.</p> <p>4- The course augments student ability to express their ideas clearly, and prepare and make oral and written presentations.</p>
Relationship of Course to Program Outcomes	<p>Upon completion of this course, students will:</p> <p>1- Apply knowledge of mathematics, physics, and chemistry to analyze and understand environmental problems and the principles of pollution control and management.</p> <p>2- Know current local and global environmental pollution problems and their impact in the global and societal context.</p> <p>3- Understand basic and modern issues related to environmental criteria and standards.</p> <p>4- Be able to articulate ideas and issues related to pollution and its control.</p>
Textbook(s) : Other Supported Material:	<p>1. Mackenzie Davis, and Susan Masten, "Principles of Environmental Engineering & Science" ,McGraw Hill ,2nd edition, 2008.</p> <p>2. Henry, J. G. and G. W. Heinke, "Environmental Science and Engineering", 2nd edition, Prentice Hall, Inc., Upper Saddle River, NJ, 1996.</p> <p>3. Kiely, G, "Environmental Engineering", Irwin/McGraw-Hill Book Co., Singapore, 1998.</p>
Prepared by	<p>D. Waleed M. K. Zahid, <i>Ph D, Environmental Engineering.</i> wmzahid@ksu.edu.sa Professor Abdullaha Al-Rehali, <i>Ph D, Environmental Engineering.</i></p>
Date of Preparation	November 2006
Date of Update	May, 2009, Dr. Waleed Zahid

Grade Distribution

Mid-term Exam	20%
Reports on field visits	20%
Homework	10%
Term paper	10%
Final Exam	40%

Homework and Reports

Homework, visit reports, and term paper must be done independently and submitted on time. Late submission will be penalized. Submission must be neat and clean on A4 paper.