

College of Engineering

Department of Civil Engineering



CE 444 Environmental Engineering

Credit and Contact hours

3 / 3 (Lectures), 1 (Tutorials), 0 (Laboratory)

Required, or Elective

Elective for a BSCE degree

Course Description

Natural Water Systems: self purification mechanisms, BOD exertion, DO modeling. Air Pollution: lapse rate, stability, dispersion of pollutants, control technology. Solid Waste Management: types, properties, integrated management, collection, reuse & recycle, sanitary landfills. Noise Pollution: sources, effects, measurements, standards, control. Environmental Impact Assessment: definition, importance, main features.

Prerequisites or Co-requisites

CE 448 (Water and Wastewater Treatment) , Prerequisite by Topics:

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 sludge.

Course Learning Outcomes

Students completing this course successfully will be able to

Course Learning Outcomes	Related Student Outcomes (SO)
CLO1. Identify the nature of environmental pollution and its environmental impact on development	SO4
CLO2. Explain the characteristics of liquid waste, its quality criteria and purification mechanisms, and its impact on the environment	SO4
CLO3. Recognize the effects of air pollution and its related quality standards and control technologies, and its impact on the environment	SO4
CLO4. Recognize the effects of Solid waste and its related management standards and control technologies, and its impact on the environment	SO4
CLO5. Recognize the effects of Noise pollution and its related quality standards and control technologies, and its impact on the environment	SO4
CLO6. Apply new engineering procedures for the control of air and noise pollution as well as solid waste management for existing sites. (through a project)	SO7

Student Outcomes related to this Course	<p>SO 4. an ability to recognize ethical and professional responsibilities in engineering situations and make <u>informed judgments</u>, which must consider the <u>impact of engineering solutions in global, economic, environmental, and societal contexts.</u>[ABET 4]</p> <p>SO 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. [ABET 7]</p>															
Topics Covered	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">List of Topics</th> <th style="text-align: center;">Related CLOs</th> </tr> </thead> <tbody> <tr> <td>1. Pollution problems: sources of pollution, major pollutants, environmental impact, development and its impact on the environment.</td> <td style="text-align: center;">CLO 1</td> </tr> <tr> <td>2. Liquid waste and disposal: types of wastewater and characteristics, major aquatic pollutants and impact, wastewater quality criteria and parameters, self-water purification mechanisms.</td> <td style="text-align: center;">CLO 2</td> </tr> <tr> <td>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</td> <td style="text-align: center;">CLO 3</td> </tr> <tr> <td>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</td> <td style="text-align: center;">CLO 4</td> </tr> <tr> <td>5. Noise pollution and control: sound pressure, power, and intensity, noise sources and measurement, noise impact, noise criteria and standards, and noise control).</td> <td style="text-align: center;">CLO 5</td> </tr> <tr> <td>6. Term project – Pollution Control and Management</td> <td style="text-align: center;">CLO 6</td> </tr> </tbody> </table>	List of Topics	Related CLOs	1. Pollution problems: sources of pollution, major pollutants, environmental impact, development and its impact on the environment.	CLO 1	2. Liquid waste and disposal: types of wastewater and characteristics, major aquatic pollutants and impact, wastewater quality criteria and parameters, self-water purification mechanisms.	CLO 2	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	CLO 3	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	CLO 4	5. Noise pollution and control: sound pressure, power, and intensity, noise sources and measurement, noise impact, noise criteria and standards, and noise control).	CLO 5	6. Term project – Pollution Control and Management	CLO 6	
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Textbook(s) and Other Required Material	<ol style="list-style-type: none"> 1. Principles of Environmental Engineering and Science, 3rd edition by Mackenzie Davis, and Susan Masten, McGraw Hill. 2. Kiely, G, “Environmental Engineering”, Irwin/McGraw-Hill Book Co. 3. Henry, J. G. and G. W. Heinke, “Environmental Science and Engineering”, 3rd edition, Prentice Hall, Inc., 															
Grading System	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;">Quizzes and Home Works</td> <td style="text-align: right;">15%</td> </tr> <tr> <td>Mid-term exams</td> <td style="text-align: right;">40%</td> </tr> <tr> <td>Group project oral test</td> <td style="text-align: right;">5%</td> </tr> <tr> <td>Final Exam</td> <td style="text-align: right;">40%</td> </tr> </table>		Quizzes and Home Works	15%	Mid-term exams	40%	Group project oral test	5%	Final Exam	40%						
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Instructors	Prof. Ashraf M.I. Refaat (Room 2A4), email; refaat@ksu.edu.sa															
Date of Review	September 2020															