College of Engineering

Department of Civil Engineering

CE 544 Environmental Air Pollution

Credit and Contact hours	3/ 3 (Lectures), 0 (Tutorials), 0 (Laboratory)
Required, or Elective	Required for a MSCE degree
Course Description	Air pollutants causes, sources, and effect; air emission standards; design of equipment and system for removal of particulate and gaseous pollutants emitted from stationary source; air pollution and meteorology, emission dispersion equations and modeling.
Prerequisites or Co-requisites	CE 506 Environmental Chemistry
Course Learning Outcomes	Students completing this course successfully will be able to

Course Learning Outcomes	***Related Program Outcomes***
CLO1: Identify and recognize regulatory requirement for air emission from different sources.	**K1**
CLO2: Use engineering modeling techniques to predict air emission depression.	**S1**
CLO3: Review and discuss treatment options for air emission to meet regulatory requirements.	**C1**
CLO4: Review literature related to air pollution for current issues, summarize and discuss the finding.	**C1**
CLO5: Design air pollution control devices and systems subjected to a regulatory framework and evaluate its effectiveness.	**C2**

Student Outcomes related to this Course	**K1**. Recognize advanced engineering knowledge, concepts and techniques to identify, interpret and analyze complex and real-life engineering problems.

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<tr><td></td><td>S1. Provide solution for complex and real-life engineering problems through critical thinking and using modern engineering tools and identify its impact on social and ethical issues.

C1. Criticize and discuss scientific research reports /papers related to Civil Engineering issues with high level of ethics and proficiency, independently, or as a team work.

C2. Design novel advanced Civil Engineering systems and evaluate its performance and effectiveness for engineering practice and its impact on society.</td></tr>
<tr><td>Topics Covered</td><td>
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<tr><th>List of Topics</th><th>Related CLOs</th></tr>
<tr><td>1. Introduction, types of pollutants, air emission standards, legislation and regulation</td><td>CLO1</td></tr>
<tr><td>2. Causes, sources, and effect of Particulate matter on air quality</td><td>CLO1</td></tr>
<tr><td>3. Design of equipment and system for removal of Particulate matter namely; Cyclones, electrostatic precipitators, fabric filters, and particulate scrubbers</td><td>CLO5</td></tr>
<tr><td>4. Properties of Gases and vapors pollutants in air</td><td>CLO1</td></tr>
<tr><td>5. Design of equipment and system for removal of gaseous pollutants Gas adsorption and gas absorption</td><td>CLO5</td></tr>
<tr><td>6. Biological control of VOCs and odors</td><td>CLO5</td></tr>
<tr><td>7. VOCs’ incinerators, control of sulfur oxides and nitrogen oxides</td><td></td></tr>
<tr><td>8. Air pollution and meteorology</td><td>CLO3</td></tr>
<tr><td>9. Atmospheric dispersion modeling</td><td>CLO2</td></tr>
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<tr><td>Textbook(s) and Other Required Material</td><td>1. C. David Cooper and F. C. Alley (2011) Air Pollution Control: A Design Approach, 4th edition: Waveland Press.</td></tr>
<tr><td>Grading System</td><td>Assignments 20%
Air Pollution Control Design Project 20%
Midterm Exam 20%
Final Exam 40%</td></tr>
<tr><td>Instructors</td><td>Prof. Anwar Khursheed Ahmad
Office No:2 A 22/3, aahmad4@ksu.edu.sa</td></tr>
<tr><td>Date of Review</td><td>February, 2021</td></tr>
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