

<p>Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
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CE 677 Environmental Air Pollution

College: Engineering

Department: Civil

First: Course Definition

1- Course Code: CE 677

2- Units: 3

3- Semester:

4- Prerequisite:

5- Co-requisite:

6- Location (if not on main Campus):

Second: Course Objectives

- 1- To develop a basic understanding of the impacts of air pollution on human health, human welfare, living organisms, materials, and the ecosystem.
- 2- To develop a basic understanding of the mechanism that lead to the formation and emissions of air pollutants.
- 3- To develop a basic understanding of the mechanism that lead to the formation and emissions of air pollutants.

1- Topics to be covered		
Subject	No of Weeks	Units
Introduction, Definitions and units, Typical concentrations of air contaminants in ambient air and stack gases	1	3
Aerosol particle size distributions, Aerosol mechanics	1	3
Air quality regulations, Sources of industrial air pollution	1	3
General methods to control the generation and emission of contaminants into the atmosphere	1	3
Definition of collection efficiency	1	3
Particulate contaminant control	1	3

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Mechanisms to remove particulate contaminants from gas streams	1	3
Gravitational settling chambers	1	3
Centrifugal separators, Wet scrubbers	1	3
Fabric filters, Electrostatic precipitators	1	3
Mechanisms to remove gaseous contaminants from gas streams	1	3
Combustion stoichiometry	1	3
Adsorption, Absorption	1	3
Meteorological Considerations	1	3

2- Course components (Total hrs in the Semester: 42)

Lecture	Exercise	Other
42	-	0

3- Intended Learning Outcomes of the Course (ILO's)

a. Knowledge

i) Description of the knowledge to be acquired:

- Sources, characteristics and environmental impacts of air pollutants.
- Air quality criteria and standards.
- General control methods for particulate matter and gaseous air pollutant emissions.
- The relationship between meteorological and topographical conditions and air pollutants dispersion.

ii) Teaching strategies to be used to develop that knowledge

- Class lectures.
- Term projects.
- Students' presentations.
- Group discussion.

iii) Methods of assessment of knowledge acquired

- Exams.

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- Quizzes.
- Homework assignments.
- Term projects.
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b- Cognitive (Intellectual) Skills

- i) Cognitive skills to be developed***
- Concepts of air pollution analysis and control.
 - Modeling of air pollution control.
 - Investigation of alternatives for air pollutants removal.

- ii) Teaching strategies to be used to develop these cognitive skills***
- Class lectures.
 - Case studies analysis.
 - Term projects.
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- iii) Methods of assessment of students' cognitive skills***
- Students' seminars and presentations.
 - Term projects.
 - Written reports.
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c. Interpersonal Skills and Responsibility

- i) Description of the interpersonal skills and capacity to carry responsibility to be developed***
- Decision making based on engineering analysis.
 - Communication skills.
 - Team work.
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- ii) Teaching strategies to be used to develop these skills***
- Class lectures.
 - Term projects.

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- Case studies analysis.
- iii) Methods of assessment of students' interpersonal skills and capacity to carry responsibility**
- Term project.
- Written reports.
- Students' seminars and presentations.

d. Communication, Information Technology and Numerical Skills

- i) Description of the skills to be developed in this domain**
- Literature research.
 - Problems modeling.
 - Utilization of computer applications in analysis and design.

- ii) Teaching strategies to be used to develop these skills**
- Class lectures.
 - Case studies analysis.
 - Computer lab sessions.
 - Term projects.
- iii) Methods of assessment of students numerical and communication skills**
- Term projects.
 - Written reports.
 - Students' seminars and presentations.
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e. Psychomotor (if applicable) & Other Non-cognitive Skills

- i) Description of the psychomotor or other skills to be developed and the level of performance required**
- NA

- ii) Teaching strategies to be used to develop these skills-**
- NA

- iii) Methods of assessment of student's psychomotor skills**
- NA

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4- Student Assessment Schedule

<i>Serial</i>	<i>Assessment tool (test, group project, examination etc.)</i>	<i>Week due</i>	<i>Weight</i>
1	Term Project – 1	3 rd	15 %
2	Mid Term Exam -1	7 th	15 %
3	Term Project – 2	10 th	15 %
4	Term Project – 3	13 th	15 %
5	Final Exam	16 th	40 %

5- Student Support

- Providing electronic library of textbooks and scientific periodicals.
- Providing the necessary computer applications for the course.

6- Learning Resources

i) Essential Books (References)

- Nevers, N. D. "Air Pollution Control Engineering," Waveland Pr Inc, 2010. ISBN: 978-1577666745.
- Wang, L. K., Pereira, N. C. and Hung, Y. T. "Air Pollution Control Engineering," Handbook of Environmental Engineering, Humana Press, 2010. ISBN: 978-1617373978.
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ii) Course Notes

- NA
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iii) Recommended Books

- Cooper, C. D. and Alley "Air Pollution Control: A Design Approach," Waveland Pr Inc, 2010. ISBN: 978-1577666783.
- Wark, K., Warner, C.F., and Davis W. " Air Pollution: Its Origin and Control," Addison Wesley, Longman Publishing Company, Inc. Menlo Park, CA, 3rd edition, 1998.

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- iv) Electronic Books & Web Sites:**
- Scientific journals and forums.
 - Instructor's instruction.
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- v) Periodicals**
- ASCE scientific journals.
 - EPA and IWA publications
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7- Course Evaluation and Improvement Processes

- i) Strategies for Obtaining Student Feedback on Effectiveness of Teaching**
- Students' questioners.
 - Students' evaluation of course and instructor.
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- ii) Other Strategies for Evaluation of Teaching by the Instructor or by the Department**
- Public faculty seminars.
 - Assessment by external evaluators of students achievements.
 - **Instructor (Course) Report**
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- iii) Processes for Improvement of Teaching**
- Assessment of students' work by external examiners.
 - Analysis of students' evaluation of course and instructor.
 - Seminars by industry professionals.
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- iv) Processes for verifying standards of student achievement**
- Check marking by an independent faculty member of a sample of student work.
 - Periodic exchange and remarking of a sample of assignments/exams with a external evaluator.
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- v) Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.**

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- Assessment and evaluation of the level of achieving the course outcomes through a continuous improvement process (part of a quality assurance system established by the university),
- Consequently, actions are to be taken to improve the course delivery when necessary.
- Review of the course objectives, outcomes and curriculum every 2 years.