

CE 5390 AEROSOL SCIENCE AND TECHNOLOGY

Fall 2018

Class Reference Number: 14032
Class Meeting: 4:30 PM - 5:50 p.m., MW
Class Room: C 304

Textbook: **Aerosol Science and Technology, 2nd edition**
by William C. Hinds

References: **Aerosol Measurement, 2nd edition**
Edited by P.A. Baron and K. Willeke

Instructor: Wen-Whai Li, Ph.D., P.E., Q.E.P.
Professor of Civil Engineering
Office: A211
Phone: 747-8755
Office Hours: 1:00 p.m. - 2:20 p.m., MW

Course Description

The primary objective of this course is to provide the students an overview of the science and measurements of aerosols. Fundamental knowledge relevant to the properties, behavior, and transport of aerosols will be discussed. Measurements techniques for aerosols will be reviewed and evaluated with a focus on atmospheric aerosols. The operating principles of different types of aerosol measurement instruments available at UTEP will be discussed.

Instructor's notes and excerpts from several reference books will be distributed in the class to supplement the topics discussed in the textbooks. Students are required to read the assigned chapters, classnotes, and excerpts prior to the class meeting. Two reference books are listed in this syllabus and additional references will be given in the class during the semester. Final grade will be determined based on the student's performance in homework, quizzes, exams, and the final exam.

Grades

Your grade for this course will be assessed based on your performance in the quizzes (15 %), three mid-term exams (40 %), homework (25 %), and a final project (20 %). Several quizzes will be given throughout the semester. The content of a quiz could be the materials covered in previous sessions or to be covered that day. Your lowest quiz will not be counted toward your final grade. There will be no make-up quizzes.

Your final grade will be calculated based on the points you have accumulated as follows:

A ≥ 90

B	≥80 but <90
C	≥70 but <80
D	≥50 but <70
F	<50

Attendance of the class is mandatory. **Your final grade will be downgraded one notch (i.e., from “A” to “B” or from “B” to “C”) for every two absences from the class without the instructor’s consent.**

The instructor reserves the right to revise this grading plan. However, students will be informed of any changes during the semester.

Homework

Regular homework assignments will be used to reinforce the concepts and problem-solving techniques covered in the textbooks and class. Homework will be assigned in class. All homework will be graded. Homework should be neatly presented on engineering paper or equivalent. You may be asked to present your homework solutions in class. Late homework will only be accepted in the event of illness or an emergency and must be approved by the instructor.

Instructor’s Office Hour

During the specified office hours, you can drop in my office for any questions regarding the subjects discussed in the class without making an appointment. Of course, you are always welcomed to visit me at any other times, but I may not be available for discussion because of other commitments. Leave me a note, call for an appointment, or send me an email will be the most effective way to catch me for your questions. Remember, do not pile up questions and expect me to answer all your questions the day before an exam.

Tentative Class Schedule

Week	Date	Topic	Reading Assignments and Homework
1	8/27 8/29	<u>Introduction to Aerosols.</u> Fundamental, history, measurements, and general properties of aerosols	Chap. 1, Chap. 14 HW #1: 1.1; 1.3; 1.5; 1.7; 1.8; 1.9
2	9/3 9/5	<u>Labor Day Holiday (No Class)</u> <u>Introduction to Aerosols.</u> <u>Properties of Gases</u>	Chap. 2 HW #2: 2.3; 2.5; 2.7; 2.9; 2.11; 2.13
3	9/10 9/12	<u>Available Tools for Aerosol Sciences (Aerosol Calculator) Theory of Particle Movements</u> <u>(No Class, Class will be rescheduled)</u>	Chap. 2, 3 HW #3: 3.8; 3.10; 3.16; 3.18; 3.20; 3.22

4	9/17 9/19	<u>Theory of Particle Movements</u> <u>Particle Size Statistics</u>	Chap. 3 Chap. 4 HW #4: 4: 4:2, 4:4, 4:6, 4:8, 4:10
5	9/24 9/26	<u>Particle Size Statistics</u>	Chap. 4
6	10/1 10/3	EXAM #1 <u>Curvilinear Particle Motion and Applications</u>	Chap. 5 HW #5: 5.1; 5.3; 5.5; 5.7; 5.9 (Due 10/5)
7	10/8 10/10	Principles of Particle Collection: Adhesion	Chap. 6 HW #6: 6.1; 6.2; 6.3; 6.4 (Due 10/12)
8	10/15 10/17	Principles of Particle Collection: Diffusion, Thermal and Radiometric Forces	Chap. 7, 8 HW #7: 7.1; 7.3; 7.5; 7.7; 7.8 (Due 10/26)
9	10/22 10/24	Principles of Particle Collection: Diffusion, Thermal and Radiometric Forces, Filtration	Chap. 8, 9 HW #8: 8.1; 8.2; 8.3; 8.4
10	10/29 10/31	Principles of Particle Collection: Diffusion, Thermal and Radiometric Forces, Filtration	HW #9: 9.1; 9.3; 9.4; 9.5
11	11/5 11/7	<u>Principles of Particle Collection: Diffusion, Thermal and Radiometric Forces, Filtration</u>	
12	11/12 11/14	EXAM #2 <u>Aerosol Measurement</u>	Chap. 10 HW #10: 10.2; 10.4; 10.6; 10.8 (Due 11/9)
13	11/19 11/21	<u>Atmospheric Aerosol Measurement and Instrumentation</u>	Chap. 11 HW #11: 11.2; 11.4; 11.5; 11.6 (Due 11/16)
14	11/26 11/28	<u>Atmospheric Aerosol Measurement and Instrumentation</u>	Chap. 14 HW #12: 14.1; 14.2 (Due 11/23)
15	12/3 12/5	<u>Respiratory Deposition of Aerosols</u> EXAM #3	Turn in your power point file before presentation Paper due Monday,
16	12/10	<u>Final Presentation(4:00 – 6:45 pm)</u>	