

ENVR 541, Air Pollution Meteorology, Winter, 2000, Th 6 – 9 pm, Rm 909 Disque
Instructor: Dr. Kreitzberg, Carl.Kreitzberg@drexel.edu, 215-895-2726, Room 909 Disque
Office Hours: Tu., Th., 1000 – 10:45 and 12:30 – 1:15; Th 5:00 – 6:00

Text: Air Pollution Meteorology and Dispersion, S. Pal Arya, 1999

Goal

The goal of this course is to introduce at a mature level the current status of meteorology as it pertains to air pollution.

Scope

Attention is focused on airflow and turbulence in the atmospheric boundary layer, ABL.

Topics include:

1. Atmospheric Structure
2. Atmospheric Dynamics
3. Atmospheric Circulation Systems
4. Pollutant Transport
5. Micrometeorology
6. Planetary Boundary Layer
7. Similarity theory of the surface layer
8. Matching the surface layer to the transition layer

Requirements

Students are expected to use email, understand physical concepts in terms of differential equations and use spreadsheet software to compute solutions to difference equations. There will generally be weekly assignments. Two one-hour midterm exams and one two-hour final exam will determine the bulk of the grade. These exams will be open book and will require calculators; notebook computers can be used during exams but will not be necessary.

Schedule: Air Pollution Meteorology, Winter, 2000

1. January 6
Ideal gases; Hydrostatics; Horizontal Forces; Balanced Flows
p. 30 - 36
2. January 13
Viscous Flows; Turbulence: Surface Fluxes
p. 37 - 40
3. January 20
Global and Regional Circulations
p. 42 - 59
4. January 27
First quiz
Local Circulations
p. 59 - 75
5. February 3
Surface energy budget and boundary layer evolution
p. 77 - 90
6. February 10
Boundary Layer Similarity
p. 91 - 103
7. February 17
Gradient Transport Theories
p. 127 - 153
8. February 24
Review
Second quiz
9. March 2
Matching the surface layer to the transition layer
10. March 9
Use of numerical prediction in air pollution modeling
p. 239 - 256
11. March 16
Final exam