Course Information

Textbook:

There is no official textbook for the class. Class notes will be distributed.

References:


Selected Journal Publications
**Prerequisites:**

Department approval

**Computer Usage**

Computers such as IBMPC, Macintosh or equivalent with graphic capabilities are preferred for preparation of assignments and reports for case studies.

**Grading Criteria:**

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tr>
<td>Class participation</td>
<td>10%</td>
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<tr>
<td>Midterm</td>
<td>30%</td>
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<tr>
<td>Final</td>
<td>30%</td>
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<td>Homework</td>
<td>30%</td>
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<td><strong>Total</strong></td>
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**Course Lecturer:**

Constantinos Sioutas, Sc.D.,
Fred Champion Professor of Civil and Environmental Engineering
Co- Director, Southern California Particle Center and Supersite ([www.scpcs.ucla.edu](http://www.scpcs.ucla.edu))
Director, USC Aerosol Lab ([www.usc.edu/aerosol](http://www.usc.edu/aerosol))

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Week 1: Introduction; Primary and Secondary Pollutants and Air Quality Standards

- Description of primary and secondary air pollutants
- Effects on human health and the environment.
- Introduction to the concept of source, transformation, exposure, dose and risk to air pollutants
- The scientific basis for air quality control and management.
- Air pollution standards and regulation.

Weeks 2 - 7: Sources and Measurement Strategies for Air Pollutants

- Sources, Diurnal and Seasonal Trends of PM and Co-pollutants
- Overview of instruments for gas and particulate pollutants. Distinction between direct and time-integrated samplers. Discussion on cost of air pollution instrumentation.
- Sampling artifacts
- Approaches for Conducting Air Sampling in the Community Environment
- Case study: The Southern California Particle Center And Supersite
- Indoor air pollution and control.
- Personal Exposure
Week 8: Midterm (open book)

Weeks 9-10: Introduction to Receptor Modeling

- Non-normal distributions important to air quality
- Principal component analysis, factor analysis,
- Multiple regression, regression diagnostics, multi-collinearity in regression, minimum distance regression, partial least-squares regression
- Receptor models
- Chemical Mass Balance (CMB) models, and multivariate receptor models.
- EPA’s CMB 8 software and UNMIX analysis software. Students will work with recent particle and gas composition data. Also covered will be hybrid source – receptor models that use wind data as well as compositional data to estimate source emission rates.
- PM Emissions Characterization

Weeks 11-15: Health Aspects of Air Pollutants

- Pharmakokinetic models to describe the fate of air pollutants inside the human body. Introduction to the concept of dose and dose evaluation.
- Exposure vs Dose and Dosimetry
- Introduction to Environmental Epidemiology

Week 16:

Final exam (open book)