

## CEE/EAS 6790

### Air Pollution Physics and Chemistry

### Syllabus

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**Objective.** This course is a graduate level introduction to air pollutants, and in particular their atmospheric dynamics and impacts. The student, upon completion of this course should have a knowledge of which air pollutants are of concern, their source, fate, atmospheric transport and transformation and policies developed to help manage the problem. Topics include: air pollutants of interest, air pollution impacts, sources of air pollutants, atmospheric transport (including dispersion and deposition), atmospheric chemistry, aerosol dynamics, control strategy development and air pollution management.

**Textbooks:**

*Atmospheric Chemistry and Physics: from Air Pollution to Climate Change*, J.H. Seinfeld and S. Pandis (S&P), Wiley Interscience, (most recent edition) D.J. Jacob (PU Press) *Introduction to Atmospheric Chemistry*.

**CEE/EAS 6790 - Air Pollution Physics and Chemistry (note the order of topics can change year-to-year)**

Lecture	Instructor	Reading
Introduction,	AR/RW	
Pollutants of Interest Air pol. impacts	AR	S&P 1.1-1.7 <sup>2</sup> EPA Reports <sup>3</sup>
Pollutant sources	AR	EPA Reports <sup>3</sup>
Chem Intro, Photolysis, Radicals	RW	DJ 9; S&P parts of 3&4
Intro, Photo stationary state, OH	RW	DJ 11; S&P 6.1, 6.2
CO, HCHO chem	RW	DJ 11; S&P 6.3, 6.4
CH <sub>4</sub> , role of NO <sub>x</sub> ,	RW	DJ 11; S&P 6.3, 6.4
NO <sub>x</sub> Day/night, Trop O <sub>3</sub> budget	RW	DJ 11; S&P 6.5, 6.6
Smog, high/low NO <sub>x</sub>	RW	DJ 12
Smog, isopleth	RW	DJ 12
Smog, VOC reactivity, summary	RW	DJ 12; S&P 6.3, 6.4
Intro Strat O <sub>3</sub> , Chapman, radicals	RW	DJ 10; S&P 5.1- 5.4
O <sub>3</sub> hole, CFCs, PSC	RW	DJ 10; S&P 5.8-5.9
Intro, to aerosols, physical properties	RW	S&P 7.1-.3, 10.3-.4
Particle water, Aqueous phase chem	RW	S&P 7.4, 7.5
Complete unfinished topics/review	RW	
Trop & Strat Chemistry	RW	
Air pollution meteorology	AR	S&P 16.2
Atmospheric stability	AR	S&P 16.2
Atmospheric stability	AR	S&P 18
Micrometeorology: turbulence.	AR	S&P 18
Micrometeorology: turbulence.	AR	S&P 18.10
Pasquill Stability classes, etc.	AR	S&P 18
Atmospheric diffusion	AR	S&P 18.9-13
Gaussian plume equation & model	AR	S&P 25, 26
Air Quality Models	AR	S&P 25, 26
Air Quality Models		
Air Quality Management/ Regulations	AR	