

AT622 - Atmospheric Radiation
Christopher O'Dell
Spring 2015

Week 1 (1/21, 1/23)

1/21: Intro, logistics, the story of light.
1/23: Nature of radiation (Petty Ch. 2)
Maxwell's equations
Description of radiation
Polarization

Week 2 (1/26, 1/28, 1/30)

1/26: Continue nature of radiation
1/28 - 1/30: Spherical cords, flux, intensity (Petty chapter 2)

Week 3 (2/2, 2/4, 2/6)

Flux & Intensity. (Skip end of chap 2 on solar insolation)
EM-Spectrum (Petty chapter 3)
Absorption by bulk media, reflection & Refraction (Petty Ch. 4)
2/6 : HW1 due

Week 4 (2/9, 2/11, 2/13)

Interaction with surfaces (Petty Ch. 5)
Planck's law / Blackbody Radiation (Petty Ch 6)

Week 5 (2/16, 2/18, 2/20)

Kirchoff's law / Earth's energy balance
The Sun / Solar Insolation / Time
2/20: HW 2 Due

Week 6 (2/23, 2/25*, 2/27)

Transmission/Extinction, ie Beer's Law (Petty Ch 7)
2/25: GUEST LECTURE
2/27: Midterm 1 (through Beer's Law)

Week 7 (3/2, 3/4, 3/6)

Emission (Petty ch 8)
RT with emission continued

Week 8 (3/9, 3/11, 3/13)

Radiative equilibrium
Scharzschild flux equations
Gray-gas & pure radiative equilibrium
3/13 Project 1 due

----- **SPRING BREAK (3/16- 3/20) No Class** -----

Week 9 (3/23, 3/25, 3/27) Make-ups if necessary

Cloud Radiative Forcing
Absorption by gases. (Petty Ch 9)

3/27: HW3 Due

Week 10 (3/30, 4/1, 4/3)

Finish Absorption by Gases (Petty Ch 9)
Broadband Fluxes & Heating Rates (Petty Ch 10)

Week 11 (4/6, 4/8, 4/10)

4/6: Midterm 2

Introduction to Scattering (Petty Ch. 11)

Week 12 (4/13, 4/15, 4/17)

Scattering by particles (Petty Ch 12)
Phase Functions / Phase Matrices
Scattering by small particles: Rayleigh limit
Atmospheric Rayleigh scattering

Week 13 (4/20, 4/22, 4/24)

Scattering by spheres: Mie Theory
Begin Petty Ch 13 (multiple Scattering)

Week 14 (4/27, 4/29, 5/1)

More RT with scattering: Multiple scattering
Help w/Project 2
Extra topics (if necessary) TBD

5/1 Project 2 Due

Week 15 (5/4, 5/6, 5/8)

Current problems in radiation
Review for final

5/8 HW 4 Due

Final Exam

5/14 11:30am - 1:30pm