

SIO 209: Radiation the Atmosphere

Spring Quarter 2015

10:00-11:20, Tuesday and Thursday

Sea Cave

<http://evan.ucsd.edu/class/SIO-209/>

Instructor

Amato Evan

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Office hours

Tuesday & Thursday immediately after class.

Course description

This graduate level core course in radiation provides an introduction to basic laws, radiative transfer under clear sky conditions, scattering by individual particles, multiple scattering, radiative properties of clouds and aerosols, the global energy budget, and applications to satellite meteorology.

Required textbook

A First Course in Atmospheric Radiation (2nd Ed.)

Grant W. Petty

Sundog Publishing, LLC

You can purchase the textbook via Amazon (<http://tinyurl.com/ofhgh3g>) and directly from the publisher (<http://tinyurl.com/c9kuoy7>), or you can purchase the e-book version via the Apple Store, (<http://tinyurl.com/nptx2jk>).

A brief summary of much of what we will cover here can be found in chapter 4 of *Atmospheric Science: An Introductory Survey* (2nd edition, by J. Wallace & P. Hobbs, Academic Press). A PDF copy of this chapter can be emailed upon request.

Coursework and Evaluation

The coursework consists of four homework sets that center on development of a simple RT model and a final project, for which you will give two talks (a proposal “defense” and a final presentation) and hand in a write-up at the end of the course. There are no exams.

Assignment	Weight	Due Date
Homework:	60%	See schedule
Project White Paper:	10%	Tuesday, May 5
Final Project Presentation:	15%	Tue/Thurs, June 2/4
Final Project Write-up:	15%	Friday, June 12

The final grade will be determined according to the following scale:

A: 100-93 A-: 92-90
B+: 89-87 B: 86-83 B-: 82-80
C+: 79-77 C: 76-73 C-: 72-70
D: 69-60
F: Less than 60

Course Schedule

Class	Topic	Date	Reading
1	Syllabus, introductions, languages & Streamer	3/31 Tu	Petty 1
2	Properties of Radiation	4/2 Th	Petty 2
3	Blackbody Radiation & Emissivity	4/7 Tu	Petty 6.1–6.2
4	Brightness Temperature & Heating Rates Streamer Hwk #1 due	4/9 Th	Petty 6.4
6	No Class. Meetings to discuss projects	4/14 Tu	
7	No Class. Meetings to discuss projects	4/16 Th	
8	Atmospheric Extinction Monte Carlo Hwk #1 due	4/21 Tu	Petty 7.1–7.2
9	Plane Parallel & Weighting Function	4/23 Th	Petty 7.3–7.4.3
10	RT in a cloud	4/28 Tu	Petty 7.4.4
11	Schwarzschild's Equation Streamer Hwk #2 due	4/30 Th	Petty 8.1–8.3.1
12	Gaseous Absorption & WV Continuum	5/5 Tu	Petty 9
13	RTE with Scattering & Phase Function White Papers due	5/7 Th	Petty 11.1–11.4
14	Scattering & Absorption by Aerosols	5/12 Tu	Petty 12.1–12.4
15	Multiple Scattering	5/14 Th	Petty 13.1–13.4
16	No Class. Meetings to discuss projects Monte Carlo Hwk #2 due	5/19 Tu	
17	No Class. Meetings to discuss projects	5/21 Th	
18	Two Stream RT for Clouds	5/26 Tu	Petty 13.5–13.8
19	Course Review	5/28 Th	
20	Final Presentations	6/2 Tu	
21	Final Presentations	6/4 Th	