

**SIO 217a Atmospheric and Climate Sciences I:
2015 Fall Atmospheric Thermodynamics**
Course Syllabus and Lecture Schedule

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Text: *Thermodynamics of Atmospheres and Oceans*, J. A. Curry & P. J. Webster (1999)

Date	Dy	Ch	Skip:	Hmwk	Title and Topics
28-Sep	M	1	1.2, 1.8-9		Composition, Structure, and State (Composition and Vertical Structure. Kinetic-Molecular Model of the Ideal Gas. Equation of State. Hydrostatic Equilibrium.)
30-Sep	W	1			More on Ch. 1.
2-Oct	F				Office Hour: Homework 1
5-Oct	M	2	2.11		First and Second Laws of Thermodynamics (Work, Heat, First Law, Second Law, Heat Capacity, Adiabatic Processes)
7-Oct	W	2			More on Ch. 2.
9-Oct	F				Office Hour: Hurricane Example (Emmanuel) + Homework 2
12-Oct	M	3	3.4-6	1+2 due!	Transfer Processes (Time-dependent Thermodynamics. Radiant Energy. Radiative Transfer. Transport.)
14-Oct	W	12			Podcast. Energy Balance Example (Ch12).
16-Oct	F				Office Hour: Topic of your choice, by appointment
19-Oct	M	4	4.5-6		Thermodynamics of Water (Molecular Structure, Properties of Water. Phase Equilibria. Atmospheric Humidity Variables.)
21-Oct	W	4			More on Ch. 4.
23-Oct	F				Office Hour: Homework 3+4
26-Oct	M	5	5.5-7	3+4 due!	Nucleation (Surface Tension. Droplet Nucleation. Droplet Growth. Ice Formation.) Project Assignments.
28-Oct	W	5			More on Ch. 5, Cloud Nucleation Demo, Midterm Review.
30-Oct	F				Midterm Review
2-Nov	M	8			Guest Lecture: Amato Evan. Cloud Characteristics and Processes (Cloud Classification and Characteristics. Precipitation Processes. Radiative Transfer in Cloudy Atmosphere. Fogs and Stratocumulus Clouds. Cumuliform Clouds.)
4-Nov	W	8			Guest Lecture: Amato Evan. More on Ch. 8
6-Nov	F			EXAM	Midterm (Ch. 1-4 plus Energy Balance from Ch. 12)
9-Nov	M	6			Moist Thermodynamic Processes in the Atmosphere (Isobaric Cooling. Evaporation of Water. Adiabatic, Isobaric Mixing. Saturated Adiabatic Cooling.)
11-Nov	W				Holiday: Veteran's Day
13-Nov	F				Office Hour: Homework 5+8
16-Nov	M	6		5+8 due!	More on Ch. 6.
18-Nov	W	7		Draft	Introduction to Stability: Application and Limitations of Dry Theory (pp. 191-194 ONLY)
20-Nov	F				Office Hour: Homework 6+7
23-Nov	M	12		6+7 due!	Global Energy and Entropy Balances (Planetary Radiation Balance. Global Heat Engine. Entropy and Climate. Global Hydrologic Cycle. Water Vapor Feedback. Cloud-Radiation Feedback. Snow/Ice-Albedo Feedback.)
25-Nov	W	13	13.6-7		Thermodynamic Feedbacks in the Climate System
27-Nov	F				Holiday: Thanksgiving
30-Nov	M				Project Presentations (submit presentations by noon)
2-Dec	W				Project Presentations (submit presentations by noon)
4-Dec	F				Office Hour: Optional Final Exam Review (by podcast and skype)
10-Dec	Th			EXAM	Final Exam (Ch. 1-8, 12, 13, ROAST) at 11:30-2:30, Location TBA (likely Spiess330).