

ATS 606 Introduction to Climate - Spring 2017

Instructor:

David Thompson, ATS 430
davet@atmos.colostate.edu

TA:

Rick Schulte, ACRC 111
rschulte@atmos.colostate.edu

Department programming TA:

Steven Brey, ATS 222
sjbrey@rams.colostate.edu

Office Hours:

Rick: Tuesday 2-4 pm
Steven: Tuesday 3-4 pm
Dave: Monday 11-12:30 pm

Web:

Class materials are available via: www.atmos.colostate.edu/~davet/AT606

Class Schedule:

Monday/Wednesday 10:00-10:50 ATS 101

Student Learning Goals and Objectives:

The successful student will gain a broad graduate level process-oriented understanding of the Earth's climate system. The material will provide a strong foundation for further specialized study on the climate system.

Text:

- 1) *Global Physical Climatology*, by D.L. Hartmann, Academic Press, 2016, 2nd edition. (*required*)
- 2) *Atmospheric Science: An Introductory Survey*, by J. M. Wallace and P. V. Hobbs, Second Edition, Academic Press, 483pp. (*strongly recommended*)

Format:

The format of the class is lecture/discussion. The preponderance of the course will focus on the fundamentals of climate dynamics. The latter part of the course will focus on current themes or problems in climate research.

Grading: The course requirements and grading will be approximately as follows:

Homework: 20%

Exam on first half of course: 25%

Exam on second half of course: 25%

Term Project: 25%

Class Participation: 5%

Course Outline (subject to change):

- *Weeks 1-3*

The Sun.

Radiative transfer.

Radiative-convective equilibrium

Gradients in heating.

Global-mean energy budget.

- *Weeks 4-5*

Role of clouds in atmospheric energy.

Surface heat fluxes.

Surface energy balance models.

The hydrologic cycle.

- *Weeks 6-8*

Overview of the atmospheric general circulation.

Exam 1.

- *Weeks 9-11*

The ocean in climate.

The ocean mixed-layer, stability, and the thermocline.

The wind-driven circulation.

The thermohaline circulation.

Ocean-atmosphere coupling.

- *Week 12*

Paleoclimate

- *Week 13*

Natural climate forcing and change.

- *Week 14*

Climate sensitivity and feedbacks.

- *Week 15*

Anthropogenic climate change.

- *Finals week*

Exam 2