



UES204 January 3:0

Fundamentals of Climate Science

Instructor

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Teaching Assistant

Email:

Department: UG

Course Time: MWF 10-11AM

Lecture venue:

Detailed Course Page:

Announcements

Brief description of the course

This is a core course for the UG Environmental Science majors, and elective for others. Students who has background in differential calculus and basic physics will be able to credit this course.

Prerequisites

None

Syllabus

Atmospheric structure and composition, Observations and theory of the general circulation of the atmosphere, Global energy balance, Radiative processes in the atmosphere, the greenhouse effect, natural and anthropogenic climate change, waves in the atmosphere, clouds, weather systems, tropical dynamics and monsoons, ocean circulation.

Course outcomes

Students learn the basic thermodynamic processes of the atmosphere like formation mechanism of fog and clouds. The static stability of the atmosphere is taught to understand the state of the climate. Radiative transfers in the atmosphere gives fundamentals of energy balance at the top of the atmosphere, and at the

surface of the earth, and thus provides a conceptual background for understanding the climate variations of the earth including global warming. The general circulation basics provide the mean circulation pattern and energy exchange between north and south through atmospheric winds and ocean currents. These are relevant to understanding climate change scenario with differential heating across latitudes. Finally, the carbon cycle concepts are introduced to enable students understand the carbon budget of the earth.

Grading policy

About 50% for midterm and assignments, and 50% for final.

Assignments

Resources

Hartmann, D. L. 1994. Global Physical Climatology, Academic Press

Wallace, J. M. and Hobbs, P. V. Atmospheric Sciences: An Introductory Survey, Academic Press

Peixoto, J. P. and Oort, A. H. Physics of Climate. American Institute of Physics, New York