

# HOMIE PLANET

A new course for fall 1992

*How much do you really know about your home?  
Want to know more about global change?  
Concerned about ozone depletion and global warming?*

HERE'S A NEW COURSE TO MAKE YOUR COLLEGE MAJOR MORE ENVIRONMENTALLY-RELEVANT.

GEOS 191E / FNR 498E

*SURVEY OF EARTH SYSTEM SCIENCE*

3 credits. MWF 2:30. No Prerequisites. Especially for Freshmen & Sophomores. Overview of Earth System Science including astronomic influences; properties and structure of earth; the atmosphere and oceans and their influences on the ecosphere; transport processes and biogeochemical cycles. Emphasis on natural and human-induced global change. Ecological, economic, political, and social implications of global change. Introduction to techniques to monitor and model the earth system.

Prof. John Snow (Earth & Atmospheric Sciences) & Dr. Fred Montague (Forestry & Natural Resources). (Contact either instructor for more information.)

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Lecture 1

Revised: 19 August 1993

**GEOS 191E/FNR 498E**  
**SURVEY OF EARTH SYSTEM SCIENCE**  
*ROOM 2118 CIVL*  
**COURSE OUTLINE AND READINGS**

Fall 1993

**Instructors:** C = Coles  
H = Harshvardhan  
S = Snow

Day/Date    Period    Instr                    Subject

**COURSE INTRODUCTION**

M 23 AUG	1	S,C	<b>Course Administration. Course Outline And Readings. Guidance And Instructions For Short Paper Preparation. Course Goals. Review Notes On The Philosophy Of Science. Read p. 9-20 in course text.</b>
W 25	2	S	<b>Overview Of Earth Systems Science - I. The structure of the Earth System - earth, water, air, life. Read p. 31-56 in course text. + space scales</b>
F 27	3	C	<b>Overview Of Earth Systems Science - II. The constantly changing Earth: time and space scales; the geologic and fossil records. Continue reading p. 31-56 in course text.</b>
M 30	4	S	<b>Overview Of Earth Systems Science - III. Cycles and feedbacks; residence times. Example: The Hydrologic Cycle. Read p. 57-62 in course text.</b>
W 1 SEP	5	S,C	<b>Observing The Earth System. Satellites -- polar and geosynchronous; GOES, TIROS-N, LANDSAT, EOS; the "Earth Observing System". Video: Frank Eden of Martin Marietta on satellite design.</b>

<u>Day/Date</u>	<u>Period</u>	<u>Instr</u>	<u>Subject</u>
<b>THE EARTH SYSTEM</b>			
F 3 SEP	6	S	<b>Formation And Evolution of the Earth System - I.</b> Solar and planetary formation and evolution; differentiation, outgassing. Read Chap. 4.
M 6			Labor Day -- University Holiday
W 8	7	C	<b>Formation And Evolution of the Earth System - II.</b> Formation of Earth's atmosphere and oceans; the appearance of life and its role in atmospheric formation -- stromatolites, photosynthesis, and free oxygen.
F 10	8	<del>S</del> C	<b>Practical Astronomy I - The Earth In Space.</b> The solar system; Earth's present orbit around the Sun; seasons; sunlight received at the top of the atmosphere as a function of latitude and time of year; the habitable zone. <b>External Forcing: Short- and Long-Wave Radiation.</b> Global energy balance; excess at the equator/deficit at the poles; water vapor - <u>the</u> greenhouse gas; other greenhouse gases.
M 13	9	S	<b>Practical Astronomy II - Variations In Earth's Orbit Over Long Time Scales.</b> The cyrosphere - present and past; long term modulation of the radiation budget; changes in eccentricity; precession and nutation; Milankovitch cycles and the ice ages. Final day for selecting topic for <b>First Short Paper</b> .
W 15	10	C	<b>Internal Forcing: The Interior of the Earth System.</b> Core and mantle processes; heat generation; convection.
F 17	11	C	<b>A Very Long Time Scale, Planet-wide Process: Plate Tectonics I.</b> Drifting continents and wandering poles - glacial and fossil evidence; Pangea and its breakup; evolution of the continents and the ocean basins; the plated structure of the Earth's surface.
M 20 SEP	12	C	<b>Plate Tectonics II.</b> Seafloor spreading, mountain building; the "Ring of Fire"; earthquakes, faults, and volcanoes; ties between plate tectonics and climate.