

5.11.11
HCSB 2011/11/11

Geography 1

Earth from Space

Instructor: Catherine Gautier

Winter 1992

The objective of this class is to familiarize you with new types of observations that are made from satellites in space to study physical geography and the earth in general. This class will not have the comprehensive coverage of GEO 3: Physical Geography, but will contain some similar material, in addition to the necessary background to understand and interpret satellite images. A minimum level of understanding of physical geography is necessary to interpret satellite images. This understanding will be acquired through a combination of presentations in class and readings to be done individually. There is no specific book that address the content of the class and therefore the reading material will be taken from a reader (containing articles) and a series of chapters in books that will be put in reserve in the library. Because of the necessity of understanding the content of the reading assignments in order to acquire the new material, there will be a short (10 min) quiz each Monday to check your level of understanding of the material that you will be learning by yourselves. Weekly homeworks will address the more quantitative aspects of the class. The labs will be spent discussing the homeworks for their content and their corrections. The midterm exam will test you on the first half of the class, including reading material. The final exam will test you on the entire class material, including reading material and will include some quiz, as well as homework, questions.

Grades will be awarded on the following basis:

Quizzes	25 %
Homeworks	25 %
Midterm Exam	25 %
Final Exam	25 %

Honor students will be required to write a 5-page term paper which will test their understanding of the material taught in this class.

**Earth From Space
Geography 1
Prof. C. Gautier**

Lectures: Monday, Wednesday, Friday 10:00 -10:50
Text: *Watching the World's Weather*. W. J. Burroughs

Date	Lecture	Lab Due
1/3	1. Introduction to Earth from Space Text: Chapter 1 Reader: Planet Earth and its atmosphere (p 3-13) Powers of ten (Suppl.)	
1/5	2. Remote Sensing and Electromagnetic Radiation Text: Chapter 2 (p 6-10) Reader: Remote Sensing coming of age (p 30-35, Suppl. p 35-52)	
1/7	Quiz, Video and Group Work	
1/10	3. Radiation Matter and Gases Interactions Text: Chapter 2 Reader: Energy interactions with earth and surface features	HW # 1 (1,2)
1/12	4. Satellites, Orbits, Coverage and Repetitivy Text: Chapter 4 (p 41-43) Reader: How remote sensing works (p 13-25) A guide to earth observing satellites (section 1 B)	
1/14	Quiz, Video and Group Work	
1/19 2 (3)	5. Sensors, data transmission and collection Text: Chapter 4 (p 44-64), Chapter 5 (p 65-67) Reader: How remote sensing works (p 25-46) A guide to earth observing satellites (section 1 A)	HW #
1/21	Extended Quiz and Video	
1/24 (4,5)	6. Radiative Energy Balance Text: Chapter 2 (p 11-13) Reader: Energy balance and climate (p 154-166)	HW #3
1/26	7. Gases and Clouds Reader: Atmospheric absorption (p 167 - 174) Clouds	
1/28	Quiz, Video and Group Work	

- 3/7 **17. El Nino overview** HW # 9 (15,16)
Text: Chapter 10
Reader: **El Nino**
- 3/9 **18. Synthesis: Basic Principles, Appl. Comparison**
- 3/11 **General Review**

COURSE DESCRIPTION

Geography 1: The Earth from Space

Physical and human geography at global scales through remote sensing from Earth-orbiting satellites. Examination of contemporary problems and global change, over both land and ocean: climate and hydrologic systems, biogeochemical dynamics, ecological systems, human interactions, and solid Earth processes.

Content

1. Introduction -

Jan 6 - A global view of the earth and the concept of remote sensing
Jan 8 - Use of electromagnetic spectrum in remote sensing
Jan 10 - Observations of the earth from space - Data and Information Systems - Models

2. Global Earth from space

Jan 13 - Earth-sun radiative equilibrium concept and consequences
Jan 15 - Earth radiation budget- role of atmospheric gases and clouds
Jan 17 - Surface temperature: A proxy for climate

3. Observations of the Atmosphere from space

Jan 22 - Clouds, wind and Precipitation
Jan 24 - Temperature, humidity profiles and weather forecasting
Jan 27 - Ozone

4. Observations of the ocean from space

Jan 29 - Sea surface temperature and surface winds
Jan 31 - Surface topography, ocean currents, surface waves and Global oceanography
Feb 3 - Ocean color and fisheries

5. Mid-term Feb 5

6. Observations of the land surface from space

Feb 7 - Geology
Feb 10 - Vegetation and land classification
Feb 12 - Global land surface processes

7. Observations of the cryosphere

Feb 14 - Ice extent and age
~~Feb 19 - Glacier dynamics~~

8. Sensors

Feb 21 - Visible and Infrared

Feb 24 - Passive microwave

Feb 26 - Radars

9. Platforms

Feb 28 - Satellite orbits, coverage and repetitivity

10. Data and information system

Mar 2 - Image processing and analysis

Mar 4 - GIS

Mar 6 - Models

11. Global changes and system interactions

Mar 9 - Global warming and consequences

Mar 11 - Antarctic Ozone hole and consequences

12. Mar 13 - Review of class

READING MATERIAL

- Planet Earth - The View From Space - D. James baker - Frontiers of Space
- Watching the World's Weather - W. J. Burroughs - Cambridge