UIA

Survey
UIA Intro to ESS

44:003 Intro Earth Systems Science **Spring 1997**

1:05-2:20 TTh W10 PBAB

Instructor: George Malanson,
Office: 326 JH
Phone: 335-0158
Office hrs: 11-12 TTh, or by arrangement

This course introduces students to the processes and forms that structure the physical environment around us. In the environment, everything is connected to everything else. This course provides a foundation for environmental studies by examining major connections. Division of the course into sections on the atmosphere, hydrosphere, biosphere, and lithosphere allows comparison and connection, not compartmentalization. The focus ranges from the microscopic to the planetary. While the details of the workings of the air, water, and earth are presented, emphasis is placed on their interaction in systems that give geographical expression to, and exert spatial control on, the processes. Students learn how the earth's environments are structured and the importance of this structure for human use of the environment. The processes of observation, analysis, and inference that constitute science as a way of learning will be stressed throughout. This class is recognized and supported by NASA as an introductory course in earth systems science.

Reading and understanding basic concepts will be important in the course. The text, Physical Geography by Strahler & Strahler, introduces considerable detail on the topics that will be reviewed and explored in more detail in class. For the lab, in addition to the lab manual, you will also need graph paper (having a calculator that can handle exponents will help too).

Two midterm exams are worth 20% of the course grade each and a final exam is worth 30% of the course grade. Lab assignments, due each week, are required. The lab grade, based on written assignments and participation in class, is worth 30% of the course grade. The lab assignments are explained in more detail in a lab syllabus. You must pass the lab - with >50% of the points - in order to pass the class, regardless of scores on exams.

Additional information

Plus/minus grading will be used. Attendance in lecture is not monitored, but much of the evaluation will be based on material covered in class. You are responsible for any announcements made in class or lab regarding readings, exams, etc. Attendance in lab is monitored and is used in grading. Material about collegiate procedures for student conduct and complaints is available in: the *Schedule of Courses*, the *Classroom Manual*, and the *Liberal Arts Bulletin*; or call 335-2633.

Outline:

Week	Topic	Read Chapters
1	**Principles of physical geography**	**Intro & pp. 572-577**
	Form, pattern and process are related to systems; a systems approach to the environment is introduced.	
2	**Global and local energy balance**	**1 & 2**
	The fundamentals of climate are examined. The earth's energy balance is emphasized. A system with input, output, and storage is used as a model.	
3	**Global temperatures and circulation**	**3 & 5**
	The energy balance of the earth involves redistribution through winds and ocean currents. These patterns will be studied in relation to the energy budget model.	
4	**Precipitation and storms**	**4 & 6**
	Energy is distributed by, and drives the processes of, precipitation. The link between pattern and process is central to geographical differentiation.	
5	**Global climate and climatic change**	**7, 8 & 9**
	Climate is not constant and the patterns and mechanisms of change will be studied. Human activity and response will be highlighted. Also read pp. 482-484.	

***** Midterm Exam February 25 ******

6	**Biogeography, principles**	**20**
	Distribution of plant and animal species are examined in relation to resource and environmental gradients is presented. The connection to the climate system is stressed.	
7	**Biogeography, applications**	**21**
	The geographic pattern of biodiversity and how it can be affected by people is investigated. Responses to climatic change, land use patterns, and the management of natural areas are considered.	
8	**Soils**	**19**
	Soil forming processes and global distributions of soil types are examined. Relations with climate and vegetation are used as examples of interconnections.	

9 **Geology as a base for geography** **10 & 11**
The structure of the earth and plate tectonics are introduced.

10 SPRING BREAK

11 **Geological surface processes and landforms** **12 & 16**
The processes creating volcanic and tectonic landforms are studied. Types of volcanic features and faults are described.

12 **Surface and subsurface hydrology** **14**
The movement of water into streamflow and groundwater is examined. The connections between atmospheric, biospheric, and lithologic structures affect the hydrological processes at basin scale. Water resource questions are introduced.

*** **Midterm Exam April 3** ***

13 **Erosional processes and landforms I** **13 & 15**
The processes of weathering, mass wasting, and fluvial geomorphology are examined and resulting landforms described. The dependence of sediment budgets on hydrology and vegetation are stressed.

14 **Erosional processes and landforms II** **17**
Coastal and arid geomorphology are studied, with an emphasis on mechanisms of sediment transport and resulting landforms. Arid lands are used as an example of the specific links between climate, vegetation, and geomorphology.

15 **Erosional processes and landforms III** **18**
The processes that create glaciers and the mechanism and landforms of glacial erosion, transport, and deposition are studied. Climatic influence is examined. A mass budget is compared to other budgets studied.

16 **Review and summary of earth systems** **Appendix 2**
What techniques are available for research? Field observation, satellite remote sensing, computer simulations, and geographic information systems are described.

**** **Final Exam is scheduled for 7:00 pm, Thursday May 15** ****