

Introduction to Earth Systems and Physical Geography

GEOG/ENVR 250



Instructors:

Dr. Todd Lookingbill
Phone: 804.289.8265
Email: tlooking@richmond.edu
Office: 311 International Center
Office hours: Mon noon-1:00; Thurs noon-1:00

The web site for the class can be found on Blackboard:

<http://blackboard.richmond.edu/>

Course Schedule:

Lecture: Tues/Thur, 10:30-11:45, Location TBD

Lab: Tues, 3:00-5:30; Fri 1:30-4:00 300 Carole Weinstein International Center

Course Description and Objectives:

Physical geography is the spatial analysis of environmental systems. It is an interdisciplinary science that brings together elements of climatology, hydrology, oceanography, geology, geomorphology, and ecology to understand (1) the spatial aspects of the environment and (2) the processes responsible for creating these spatial patterns.

This course introduces the characteristics and interrelationships of the Earth's climates, landforms, soils, and natural vegetation, with special emphasis on human relationships with their environment. A geographic approach emphasizes interconnectedness and spatial components of these relationships. The subject matter is particularly relevant to current scientific interest in global climate change. The course is divided into five units: (1) concepts and tools of physical geography, (2) the atmosphere, (3) the hydrosphere, (4) the lithosphere and pedosphere, and (5) the biosphere. We will take a systems perspective and sequentially study each of these systems. However, we also will emphasize linkages between the Earth's systems. Human and other components of the biosphere will be discussed throughout the semester. The material is global in scale, though we will illustrate many of the concepts using examples from National Parks of the United States.

Field of Study Natural Science Biological Sciences (FSNB)

The field of natural science is concerned with the physical universe from subatomic to cosmic levels of organization, including inanimate as well as living systems, their structure, diversity, interaction, and evolution. Based upon the generation and testing of hypotheses, scientific inquiry is restricted to the study of repeatable, measurable, and verifiable phenomena. Within this field, knowledge may be gained either by controlled experiment or diligent observation, depending upon the phenomena being studied. Similarly, some of the field's methodologies rely upon quantitative analysis, while others are primarily qualitative. The natural science requirement is designed to enhance your appreciation of the beauty of science as well as your understanding of the challenges of doing science. Students gain experience in the formulation and testing of hypotheses and are introduced to scientific methodology.

Course Materials:

The required textbook for the course is *Geosystems: An Introduction to Physical Geography*. 8th ed. 2012. Robert W. Christopherson. Prentice-Hall. A useful companion web site for the text that contains, among other things, example test questions is: http://wps.prenhall.com/esm_christopherson_geosystems_6/

Additional readings from other sources will be assigned during the semester. These readings will be accessible through the course web page.

Lab material also will be available on Blackboard. Some labs require additional material and you will be notified of these requirements ahead of time.

Student Evaluation:**550pts Exams**

The course grade will be based in part on two mid-terms and the final exam. Mid-term exams will combine short answer, fill-in, multiple choice, and three to four half-page essay questions. Each mid-term will be worth 15% of the final grade. If you must miss an exam for a legitimate, documented reason you must inform the instructor ahead of time to schedule a make-up. Students missing a mid-term exam for a non-legitimate reason will be assigned a zero.

The final exam will be cumulative but will emphasize the biosphere section of the course. The format of the final exam will be similar to the two mid-term exams.

The final exam is worth 25% of your grade. No make-up final exams will be given. Labs are intended to reinforce lecture material and provide a deeper understanding of geographic principles. The material from lab exercises therefore may also be included in the exams, though the majority of questions will come directly from the lecture portion of the class. Questions from In-the-News and National Park presentations will appear on the final exam.

250pts Laboratory exercises

Labs are intended to be inquiry driven exercises that focus on scientific methods including the development of testable hypotheses. This is an interactive course and students are expected to fully engage in the learning process by working out each laboratory exercise with the help of the lab material, textbook and lecture notes.

There will be a short introduction preceding each lab; this is an excellent opportunity to ask any questions or ask for clarification. Many of the labs require write-ups to be handed in at the conclusion of the lab period. There will also be homework components to many of the labs and three larger lab write-ups that will be completed as homework assignments. Most of the labs will involve working in pairs or groups. Groups of students may submit one write-up for in-class assignments. However, each student must submit their own write-up with the names of other group members listed at the top of the page for all homework assignments.

100pts Class participation

Class attendance and participation is absolutely essential to keeping up with the material, and is worth 10% of your grade. The class participation grade is made up of equal parts (1) engaged participation in class, (2) completion of class exercises and homeworks, and (3) “In the News” reporting. Class exercises may occur at any time during the scheduled lectures. Absence from these class exercises will reflect negatively on your participation grade.

In the News: As part of the participation grade, you must find and review 3 different physical geography stories from different media sources:

1. One from a newspaper, magazine (National Geographic), radio or television.
2. One from a peer-reviewed journal (a list of acceptable peer-reviewed journals is available at <http://libguides.richmond.edu/content.php?pid=56049&sid=410096>).

Overviews for these first two articles should be provided orally at the beginning of class. Written summaries should clearly describe how our course content relates to the issue being described in the article, and should be no more than 1 page in length. Written summaries must be submitted on the Blackboard In-the-News Group page before the story can be presented in class. Each student will be allotted class time for a maximum of 1 review per week, so do not wait until the end of the semester to begin.

3. One geography related website. This summary should be posted to our course blog <http://blog.richmond.edu/geog250/> instead of handing in a write-up. Please categorize your entry into one or more of the following categories: Atmosphere, Biosphere, Hydrosphere, Lithosphere, and Tools of the Geographer. Instead of presenting this description orally to the class, you must review and post comments on at least 2 additional sites posted by your classmates by the last day of class. The blog entries receiving the top three highest number of comments will receive extra credit on the final exam.

100pts National park presentations

National Parks will be used to explore many of the concepts in class. Once we have finished the first unit, you will have the opportunity to select one of the 59 National Parks of the United States for a 15-minute group presentation. A 250-word abstract with 3 scientific references should be submitted to the Blackboard NPS Groups page 24-hours before the presentation. The presentation should clearly document linkages between the park’s geography and at least one of the Earth’s systems studied in class.

Final grades will therefore be calculated as follows:

(150 pts each) Two in-class mid-terms

(250 pts) Cumulative final exam (emphasizing biosphere unit)

(100 pts) Class participation

(100 pts) National Park presentation

(250 pts) Laboratory assignments

1000 pts

- The grading scheme will follow standard University of Richmond guidelines (<http://registrar.richmond.edu/services/policies/grading.html>).

A > 93 pts	B 87-83	C 77-73	D 67-63
A- 93-90	B- 83-80	C- 73-70	D- 63-60
B+ 90-87	C+ 80-77	D+ 70-67	F < 60 pts

Academic Honesty:

The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition. Report any violations you witness to the instructor.

Time-on-Task Expectations:

To be successful in this course, you should expect to devote an average of 10-14 hours each week to preparing for class, participating in class and lab sessions, studying course related materials, and completing course assignments.

Spring 2015 Schedule

This schedule will be followed approximately. Some changes may be made as the class proceeds but the exam dates will not change. Time permitting, we will conclude each major section with an in-class review. Chapter readings in *Geosystems* textbook provided in parentheses.

Unit:	Week of:	Topics covered:
INTRODUCTORY MATERIAL - Concepts and Tools of Physical Geography		
Week 1:	Jan 13	Introduction to course. Definitions. Spheres. Scientific method.
Week 2:	Jan 20	The Earth in the Solar System. Earth geometry. Map projections. Contour Maps. Observation. Remote sensing. GIS. GPS. Scale and scale interaction. (Ch. 1)

Wednesday, January 21, 4:30-5:45 p.m., Joel Dunn, Executive Director, Chesapeake Conservancy, "Conserving the landscapes and special places that sustain the Chesapeake" Gottwald Auditorium (attendance required)

THE ATMOSPHERE

Week 3:	Jan 27	Energy. The Sun. Radiation Balance. Seasons. Surface energy balance and temperature. (Ch. 2, 5) Atmospheric composition and structure. (Ch. 3)
Week 4:	Feb 3	General circulation of the atmosphere and oceans. (Ch. 6) Precipitation processes. (Ch. 8)
Week 5:	Feb 10	Weather continued. (Ch. 8)
Week 6:	Feb 17	FIRST EXAM (on Tues)

* Tuesday, February 10, 4:30-5:30 p.m., Alison Rockwell, National Center for Atmospheric Research (NCAR) airborne science mission, "Wintertime INvestigation of Transport, Emissions, and Reactivity (WINTER)", Gottwald Auditorium

THE HYDROSPHERE

Week 7:	Feb 24	Hydrologic Cycle. Distribution of Earth's water. (Ch. 7) Watersheds. Water supply and demand. Soil-Water Balance. (Ch. 9)
Week 8:	March 3	Floods, hurricanes and extreme weather systems. (Ch. 10)

Spring Break March 10

* Monday, February 23, 5:00-6:00 p.m., Tundi Spring Agardi, "Ocean Commons: The Last Great Frontier for Civic Engagement in Stewardship," Tyler Haynes Commons, Alice Haynes Room

THE LITHOSPHERE AND PEDOSPHERE

Week 10:	March 17	Introduction to the Lithosphere. Geologic structure of the Earth. Geologic cycles. Plate tectonics. (Ch. 11)
Week 11:	March 24	Endogenic Processes. Crustal formation/deformation processes. Volcanism. Earthquakes. Mountain building. (Ch. 12)

Week 12: **March 31** **Exogenic Processes. Soils, weathering and mass movement. Erosion, transport, and deposition. (Ch. 13-18)**

Week 13: **April 7** **SECOND EXAM (on Thurs)**

* Tuesday, March 24, 5:00-6:00 p.m., Tim Hamilton, Robins School of Business, University of Richmond, "Valuation of Environmental Goods in U.S. Policy" Gottwald Auditorium

THE BIOSPHERE AND EARTH LINKAGES

Week 14: **April 14** **Ecosystem Essentials. Biogeography. Biological gradients. Biomes and biodiversity. (Ch. 19, 20)**

Week 15: **April 21** **Biotic processes and disturbance. Movement and migrations. Protected areas management.**

FINAL EXAM **Friday, May 1, 2:00-5:00 p.m.**

* Extra Credit Lectures. One-page write-up similar in style to In-the-News write-ups to be submitted to Blackboard EC Lectures Group page (5 pts each).

If you experience difficulties in this course, do not hesitate to consult with me. There are also other resources that can support you in your efforts to meet course requirements.

Academic Skills Center (<http://asc.richmond.edu> or 289-8626) helps students assess their academic strengths and weaknesses; hone their academic skills through teaching effective test preparation, critical reading and thinking, information processing, concentration, and related techniques; work on specific subject areas (e.g., calculus, chemistry, accounting, etc.); and encourage campus and community involvement.

Career Development Center (<http://cdc.richmond.edu/> or 289-8547) can assist you in exploring your interests and abilities, choosing a major, connecting with internships and learning experiences, investigating graduate and professional school options, and landing your first job. We encourage you to schedule an appointment with a career advisor during your first year.

Counseling and Psychological Services (<http://caps.richmond.edu> or 289-8119) assists students in meeting academic, personal, or emotional challenges. Services include assessment, short-term counseling and psychotherapy, crisis intervention and related services.

Speech Center (<http://speech.richmond.edu> or 289-6409): Assists with preparation and practice in the pursuit of excellence in public expression. Recording, playback, coaching and critique sessions offered by teams of student consultants trained to assist in developing ideas, arranging key points for more effective organization, improving style and delivery, and handling multimedia aids for individual and group presentations.

Writing Center assists writers at all levels of experience, across all majors. Students can schedule appointments with trained writing consultants who offer friendly critiques of written work: <http://writing.richmond.edu>

Boatwright Library Research Librarians assist students with identifying and locating the best resources for class assignments, research papers and other course projects. Librarians also assist students with questions about citing sources correctly. Students can schedule a personal research appointment, meet with librarians at the library's main service desk, email, text or IM. Link to <http://library.richmond.edu/help/ask.html> or call 289-8669.

Note: Students having special needs that require an accommodation or an academic adjustment, please arrange a meeting with Dr. Lookingbill within the first two weeks of the semester.