CLARK ATLANTA UNIVERSITY DEPARTMENT OF PHYSICS
PHYSICS 104: INTRODUCTION TO EARTH SYSTEM SCIENCE
FALL 2004

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Course Level: Introductory Undergraduate
Credit Hours: 4 Semester Hours (3 hours lecture, 2 hours laboratory)
Meeting Info: Sections 1, 2, 3 (Dr. Mandock): MWF 8-8:50, 9-9:50, 10-10:50, McPheeters Dennis Rm. 117

Sections 4 and 5 (Dr. Grams): MWF 1-1:50 pm, 2-2:50pm, Trevor-Arnett Room 121

Laboratories: Sections 1-5: M-F: 11:00-12:50, McPheeters Dennis Room 117

Purpose

To introduce the student to introductory topics in the earth sciences. Emphasis will be placed on introductory mineralogy, petrology, hydrology, geomorphology, geodynamics, geochronology, oceanography, atmospheric science, and astronomy. ***This course meets the general education requirement in the physical sciences for the College of Liberal Arts and Sciences.***

Course Goals

(1) To enhance the student's analytical and synthetic thinking skills. (2) To challenge the student's preconceptions of science.

Expected Results

Upon successful completion of the course, the student will know: (1) common landforms, (2) how to identify hand specimens of common minerals and rocks, (3) major types of earth movements, (4) relative age dating of rock strata, (5) fundamentals of the hydrologic cycle, (6) fundamentals of oceanography, (7) processes and properties of the earth's atmosphere, and (8) elementary concepts of astronomy.

Mathematical Skills the Student Will Use or Learn to Use

Common logarithms, exponentials, elementary dimensional analysis, proportions/ratios, linear relationships, algebra, and elements of trigonometry.

Course Structure/Workload

Two graded take-home projects will be assigned. The first project due date is 1 October and the second is 1 November 2004. Occasional field trips may be scheduled. These trips usually generate extra-credit points that can enhance the final course grade. Homework problems will be assigned but not graded. The first 10 minutes of each class will be used to answer questions about the homework problems. Completion of homework problems is important because some of the examination questions are based on them. An unscheduled graded quiz will occasionally be administered to encourage reading of the textbook. These

quizzes will consist of about 5 of the *Review Questions* at the end of the chapter under study or material taught in the previous class, and will not exceed 12 minutes in duration. The quizzes are intended to promote teamwork and will teach important analytical concepts. Subject examinations are scheduled to take place at the end of chapters 2, 5, 8, 11, 14, 16, 18, and 23. The final examination will be comprehensive. ***Laboratory enrollment is mandatory and determines 25% of the overall grade.***

Course Prerequisites/Requirements/Policy Summary

i. There are no prerequisites for the course.
ii. Cheating will result in a grade of zero for the test or assignment.
iii. Attendance influences 15% of the course grade, so take the matter seriously. The best way to prepare for a given class is to study the *Review Questions* at the end of each chapter. Take good notes because they will help you with the quizzes and examinations.
iv. Late assignments will be assigned a score of zero unless a valid excuse is accepted by the instructor. Missed examinations are scored as a zero. One make-up examination will be given at the end of the semester to serve as replacement for a missed examination or a low score on any examination, except the final. The make-up examination will serve as the final examination for graduating seniors. Students are in competition with each other. This means that grades will be based on the highest overall score in the class and on the distribution of scores.

Required/Prohibited Materials and Resources

Lecture textbook: *Earth Science*, 2003, 10th ed., Prentice Hall, by Edward J. Tarbuck and Frederick K. Lutgens, 686 pp.
Laboratory textbook: *Laboratory Manual in Physical Geology*, 2003, 6th ed., Prentice Hall, R. M. Busch and D. Tasa, 288 pp.

A ruler and scientific calculator will be needed at each class. Be sure the ruler measures in inches and millimeters. I recommend the Casio fx-260 calculator. ***Cellular telephones must be turned off while in class. You may not use a cellular-phone calculator.***

Course Outline/Supplemental Reading

1. Chapters in sequence: 1-23. See attached "Lecture Schedule." This schedule is subject to change.
2. *Laboratories are scheduled to begin on 7 September 2004.* We anticipate 10 laboratory sessions.
3. A useful online study resource is http://www.prenhall.com/tarbuck.

Course Evaluation/Grading Policy

The grade is determined by class and lab participation, satisfactory completion of projects, and test scores.

Percentage Contribution to Final Course Grade

Quizzes	15%
Projects	15%
Subject Examinations	35%
Final Examination	10%
Laboratory	25%

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TENATIVE LECTURE SCHEDULE

25 Aug.	Review syllabus, complete preliminary examination and survey.
27 Aug.	Review tentative lecture schedule. Discuss "Introduction to Earth Science" chapter in textbook.
30 Aug.	Chapter 1: Minerals: Building Blocks of Rocks.
1 Sep.	Finish Chapter 1. Begin Chapter 2: Rocks: Materials of the Solid Earth.
3 Sep.	Finish Chapter 2.
6 Sep.	**LABOR DAY HOLIDAY. NO CLASS.**
7 Sep.	First day of laboratory. We anticipate 10 laboratory sessions this semester.
8 Sep.	Chapter 3: Weathering, Soil, and Mass Wasting.
10 Sep.	Finish Chapter 3.
13 Sep.	Chapter 4: Running Water and Groundwater.
15 Sep.	Finish Chapter 4. Review Chapters 1-2.
17 Sep.	**Examination 1: Chapters 1-2.**
20 Sep.	Chapter 5: Glaciers, deserts, wind.
22 Sep.	Finish Chapter 5. Review Chapters 3-5.
24 Sep.	**Examination 2: Chapters 3-5.**
27 Sep.	Chapter 6: Earthquakes and Earth's Interior.
29 Sep.	Finish Chapter 6. Begin Chapter 7: Plate tectonics. **Project 1 due today.**
1 Oct.	Chapter 7.
4 Oct.	Finish Chapter 7. Begin Chapter 8: Volcanoes and Other Igneous Activity.
6 Oct.	Finish Chapter 8.
8 Oct.	Chapter 9: Mountain Building.
11 Oct.	Finish Chapter 9. Review Chapters 6-9.
13 Oct.	**Examination 3: Chapters 6-9.**
15 Oct.	Chapter 10: Geologic Time.
18 Oct.	Finish Chapter 10. Chapter 11: Earth's History: A Brief Study (Only pp. 310-314, 317, 325, and Figs. 11.7, 11.9, 11.12. Students read remainder of chapter.).
20 Oct.	Review Chapters 10-11. Begin Chapter 12: The Ocean Floor. Handout "Distribution of Land and Water" Assign.
22 Oct.	**Examination 4: Chapters 10-11.**
25 Oct.	Finish Chapter 12. Chapter 13: Ocean Water and Ocean Life (Only pp. 356-361. Students read remainder of chap.).
27 Oct.	Chapter 14: The Dynamic Ocean.
29 Oct.	Finish Chapter 14. Review Chapters 12-14.
1 Nov.	**Examination 5: Chapters 12-14. Project 2 due today.**
3 Nov.	Chapter 15: The Atmosphere: Composition, Structure, and Temperature.
5 Nov.	Finish Chapter 15. Begin Chapter 16: Moisture, Clouds, and Precipitation.
8 Nov.	Finish Chapter 16. Review Chapters 15-16.
10 Nov.	**Examination 6: Chapters 15-16.**
12 Nov.	Chapter 17: Air Pressure and Wind.
15 Nov.	Finish Chapter 17. Begin Chapter 18: Weather Patterns and Severe Storms.
17 Nov.	Finish Chapter 18.
19 Nov.	Chapter 19: Climate. Review Chapters 17-19.
22 Nov.	**Examination 7: Chapters 17-19.**
24 Nov.	Chapter 20: Origin of Modern Astronomy.
25-28 Nov.	**THANKSGIVING BREAK. NO CLASS.**
29 Nov.	Chapter 21: Touring Our Solar System. Chapter 22: Light, Astronomical Observations, and the Sun.
1 Dec.	Chapter 23: Beyond Our Solar System.
2 Dec.	**Review for final examination. Room and time to be announced.**
3 Dec.	**Optional make-up examination: Chapters 20-23. In MD 117 at the normal class meeting time.**
6 Dec.	Final examination for PHY104-04: 8:00-10:00.
7 Dec.	Final examination for PHY104-05: 8:00-10:00.
7 Dec.	Final examination for PHY104-03: 1:00-3:00.

8 Dec. Final examination for PHY104-01: 8:00-10:00.
8 Dec. Final examination for PHY104-02: 10:30-12:30.