

Clark Atlanta

SU/197  
CAU Intro to ESS

**ATTACHMENT A**

**CLARK ATLANTA UNIVERSITY  
PHY 104:-INTRODUCTION TO EARTH SYSTEM SCIENCE**

**INSTRUCTION: DR. DENISE STEPHENSON-HAWK  
Spring 1997**

**Course Title:** Introduction to Earth Systems Science

**Instructors:** Denise Stephenson-Hawk, Ph.D.  
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**Department:** Physics

**Course Code:** Phy 104- Clement Hall Room 207

**Level:** /x/ Basic // Intermediate // Advanced

**Prerequisite:** /x/ None

**Credit Hours:** 4 Semester Hours (3 hours lecture/ 2 hours laboratory)

**Days/ Time:** Monday/ Wednesday/ Friday 2:00-2:50 P.M.

**Audience:** Targets Non-Science majors

**Office Hours:** M/W/F Noon- 2P.M.  
T-TH 11-12A.M.  
Other by Appointments

**Duration:** 14 Weeks

**Textbook:** **Earth Science: A Holistic Approach**  
Conte, D.J.; Thompson, D.J.; and Moses, L.L.

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### GENERAL REMARKS

1. Students are expected to attend class regularly and on time. **It is the students' responsibility to obtain class lecture notes and assignments when absent.** Frequent absence will adversely affect your grade, particularly, recitation absences.
2. Students should expect to spend approximately 2 hours studying outside of class for each hour spent in class. Homework will be assigned regularly. Late assignments will adversely affect your grade.
3. **If quizzes or exams are missed, make-ups will not be given.** Students that desire to make-up missed assignments must take a cumulative examination at the end of the semester.
4. Cheating on quizzes or exams will be dealt with in accordance to the policy provided in the college catalog.
5. Group study is encouraged, however, exams are individual efforts.

### COURSE SYLLABUS

**Course Objective:** An overview of the Earth Sciences from a systems perspective will be provided. Students will learn to view the Earth as a complex system of interacting components including the geosphere, biosphere, hydrosphere, atmosphere, and cryosphere. Course content will emphasize the mass and energy transfers between subsystems, including discussion of the social, economic, and ecological implications of global climate change. Relevant issues include global warming, stratospheric ozone depletion, deforestation, desertification, acid rain biodiversity, human population growth and food-water-energy resources. This course will meet general education requirement in the physical sciences in the College of Liberal Arts and Sciences.

#### Introduction      Overview of Earth System Sciences

1. Origins of the Universe
2. What is a system? Feedback stability, regulation, and homeostasis
3. The Earth's Vital Statistics: Shape, size, rotation, position in space.
4. Viewing the Earth From Space: How we can study global change from remote sensing. NASA's mission to Planet Earth.

#### Components of the Earth's Systems

##### 5). The Atmosphere

Origin, composition, and structure of the atmosphere  
Solar energy and the Earth's heat engine.  
Atmospheric circulation and winds  
Clouds, moisture, and precipitation  
Weather and Climate  
Global Warming and Ozone depletion  
Desertification

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- 6). Chemistry of Atmosphere and Oceans
  - Origin of Life
  - Acid Rain
  - Ozone Hole
  - Sources and sinks/pollution
  
- 7). The Biosphere
  - Primary Production and the Food Chain .The photosynthesis-respiration cycle
  - Cycles of Carbon, Nitrogen, and Phosphorous
  - Soil and Vegetation Classification
  - Deforestation
  - Geological Evolution of Life, the Oceans, and Atmosphere
  - Loss of Biodiversity - Health Effects of Air Pollution
  
- 8). The Geosphere
  - Igneous, Metamorphic, and Sedimentary Rocks
  - The Rock Cycle
  - Weathering and the Geochemical Cycling of Elements
  - The Earth's Interior and Plate Tectonics
  - Geologic Perspectives on Climate Change
  - Geologic Evolution of Life, the Oceans, and Atmosphere
  
- 9). The Hydrosphere
  - The Hydrologic Cycle
  - Mechanical and Chemical loads of Streams
  - Groundwater, Aquifers, Water supply and quality
  - The Cryosphere: Glaciers and Ice Ages
  - The Ocean-Atmosphere Connection
  - Marine Geochemical Cycle
  - El Nino and the Southern Oscillation
  
- 10). The Integrated Earth System: A Miracle of Design
  - An overview of systems interactions
  - Understanding the Earth's system diagram
  - Introduction to modeling the Earth's system's
  - Geoengineering
  
- 11). Policy and Socio-Economic Implication of Global Change
  - Human Population Growth
  - Food, water, and energy resources in the future
  - A Global Marshall Plan: Can it Work?

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### GRADING POLICY

Class Participation/Attendance	10%
Quizzes (10)	40%
Exams (3)	30%
Reports	15%
Homework Notebooks	5%

A	90-100
B	80-89
C	70-79
D	60-69
F	below 60

#### Homework Assignments

Homework assignments, in the form of applied problems in physics, will be given throughout the semester to assist in developing your skills of interdisciplinary critical thinking. Some of the problems are not designed with the intent of your providing a numerical solution, but rather to see how well you can assimilate the concepts that you have learned in physics, mathematics, computer science, English, etc. The assignment is also intended to assist you in developing your technical writing style. Keep in mind that great ideas are only as good as your ability to communicate them either orally or verbally.

#### FOR EACH HOMEWORK ASSIGNMENT YOU SHOULD:

1. Clearly delineate all assumptions
2. State and define all laws of physics you believe to be applicable to the assignment.
3. Convey your logical thought process in words.
4. Outline, if possible, a method to solve the problem to ascertain a numeric solution.
5. Seek assistance from your fellow classmates.

“...Minds grow through academic challenge. Challenge comes from teachers, curriculum, peers, and from within individual students as they have learned to strive for excellence. Much of the emphasis in our American culture is on how to get by easily and how to avoid hard work. Too often shoddy performance and products are considered acceptable. However, for those who will become leaders in the sciences, arts, literature, medicine, research, business and the disciplines, and early inculcation of the pursuit of excellence, and a willingness to work very hard and to persist, seem to be essential ingredients of personal achievement...”

Paraphrased from GSG Newsletter  
Summer 1992