SYLLABUS FOR PHYSICS 103 - GLOBAL CHANGE

Fall Semester, 1998

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Textbook: "Energy and Problems of a Technical Society" by J. Kraushaar and R. Ristinen

In this study of global environmental change, we will emphasize the concept of energy and how energy obtained from fossil fuels is limited and often damaging to the environment. We will look at various measures that may be taken to increase the time span available for use of this type of energy, while making its use less harmful to the environment, and will study the development and implementation of sustainable, alternative energy sources. Along the way there will be separate lectures on such topics as the greenhouse effect, stratospheric ozone depletion, acid rain and El Niño.

In the Course Schedule and Reading Assignments below, you will notice that the chapters will **not** be covered in order, so be sure to check this schedule regularly. You will find additional readings and material on my homepage (address above) under Course Syllabi, Global Change. The sources may be accessed by clicking on the underlined addresses. Some of this material is required reading or exercises for the course, and all should be helpful to you along the way.

The Wednesday and Friday lectures will be held in FJA, and except for our field trip, we will meet Mondays in the computer lab in Buckman 212. Also note that the lab will begin at 1:00.

The lab periods will last for approximately two hours. One of the goals of the course is learning to use system-modeling software to investigate various physical and social systems. This modeling will be done on the Macintosh computer with software called Stella II™. You should be able to learn Stella II fairly quickly, but might expect to experience some degree of frustration as you begin using this software. Don't be discouraged!

Although the course is designed for non-science majors, it does provide Natural Science credit and, therefore, mathematics at the level of introductory algebra will be used. You will be required to develop several computer models during the semester. These will be graded and the weight of the grades given your models is shown below.

In addition, working with a group of your classmates, you will carry out an experiment to measure solar insolation at Memphis, an important parameter in climate change and

sustainable energy. We will discuss solar insolation in the course. A description of the experiment will be handed out in class and materials for doing the experiment will be provided. A data sheet is included at the end of the discussion. The completed form will be turned in and the results discussed in a short report. Each member of the group will participate in collecting data and in writing the report.

Your overall grade for the course will be based on the results of two one-hour tests, your system models, the solar constant experiment, and the comprehensive final examination. In determining your final grade, weights will be assigned to each of the course components as follows:

Test 1 - 15%	Models - 20%	Final Examination - 30%
Test 2 - 15%	Experiment - 20%	

Course Schedule and Reading Assignments

MONDAY	WEDNESDAY	FRIDAY
	Aug. 26 FJA **Introduction to Course**	Aug. 28 FJA **Chapter 1 – Energy Fundamentals**
Aug. 31 212B **The Macintosh Computer, Academic Volume , Netscape and Stella II**	Sept. 2 FJA **Chapter 1 – Energy Fundamentals**	Sept. 4 FJA **Chapter 1 – Energy Fundamentals**
Sept. 7 - Labor Day No Classes	Sept. 9 FJA **Chapter 1 – Energy Fundamentals**	Sept. 11 FJA **Chapter 2 - Chapter 2 - Energy from Fossil Fuels** **Prof. Carol Ekstrom, Geology**
Sept. 14 212B **Read: Stella II Instructions** **Model: Electric Light Bulb**	Sept. 16 FJA **Chapter 2 - Chapter 2 - Energy from Fossil Fuels** **Prof. Carol Ekstrom, Geology**	Sept. 18 FJA **Chapter 2 - Energy from Fossil Fuels**
Sept. 21 212B **Model: Population Growth**	Sept. 23 FJA **Chapter 6 – The Uses of Solar Energy**	Sept. 25 FJA **Chapter 6 – The Uses of Solar Energy**
Sept. 28 212B **Model: Energy Conservation - House A/C with Thermostat**	Sept. 30 FJA **Chapter 6 – The Uses of Solar Energy**	Oct. 2 FJA **Chapter 6 – The Uses of Solar Energy**
Oct. 5 212B **Model: House with A/C, Thermostat , Switch and Meter**	Oct. 7 – **Test 1** FJA **Material Through Friday, Oct. 2**	Oct. 9 FJA **Discussion of Solar Constant Experiment and Special Topic: The Greenhouse Effect** **Note: the experiment must be finished and final report**

		submitted by end of lab period on Nov. 30.

Oct. 12 212B **Model: Measurement of Solar Insolation**	Oct. 14 FJA **Chapter 7 – Alternative Sources of Energy**	Oct. 16 FJA **Chapter 7 – Alternative Sources of Energy**
Oct.19 - Fall break	Oct. 21 FJA **Chapter 7 – Alternative Sources of Energy**	Oct. 23 FJA **Chapter 9 - Energy Conservation**
Oct. 26 212B **Model: Earth, Venus, Mars: Temperature with no Atmosphere**	Oct. 28 FJA **Chapter 9 - Energy Conservation**	Oct. 30 FJA **Chapter 9 - Energy Conservation**
Nov. 2 212B **Field Trip - Memphis Earth Complex**	Nov. 4 FJA **Chapter 14 – Water – The Resource and its Pollution Prof. Carol Ekstrom, Geology**	Nov. 6 FJA **Chapter 14 – Water – The Resource and its Pollution Prof. Carol Ekstrom, Geology**
Nov. 9 212B **Model: Earth Temperature with Atmosphere**	Nov. 11 FJA Review for Test	Nov. 13 **Test** FJA Material from Oct. 9 through Nov. 6
Nov. 16 212B **Model: Earth Temperature with Atmosphere (continuation)**	Nov. 18 FHA **Chapter 13 – Pollution of the Atmosphere**	Nov. 20 FJA **Chapter 13 – Pollution of the Atmosphere** **Special Topic: Acid Rain**
Nov. 23 212B Work with group to finish Solar Constant Experiment Report - Due at end of Lab period on Nov. 30.	Nov. 25 Thanksgiving Break	Nov. 27 Thanksgiving Break
Nov. 30 - Streete 212B **Model: Temperature Effect of**	Dec. 2 FJA **Chapter 13 – Pollution of the**	Dec. 4 FJA **Chapter 13 – Pollution of the**

Increasing Greenhouse Gases	**Atmosphere** **Special Topic: Ozone Depletion**	**Atmosphere**
Dec. 7 FJA **Model: The Effect of CO2 Doubling**	Dec. 9 **Special Topic: El Niño**	**Saturday, Dec. 12- Final Exam** 1:00 - 3:30 in FJA