PHYS-2018-001: Great Ideas in Science
Syllabus — Fall 2008

Course ID: PHYS-2018-001
Lecture Times: T R 12:45 p.m. – 2:05 p.m.
Lecture Location: Yoakley Hall, Room 109
Lecturers: Dr. Donald Luttermoser, Dept. of Physics & Astronomy
Dr. David Harker, Dept. of Philosophy
Dr. Robert Gardner, Dept. of Mathematics
Office Hours: by appointment
Textbook: *No Official Textbook is Required*
(Reading assignments will announced in class)

Course Theme: GLOBAL CHANGES (Part 1)

Course Outline

Days	Topics	Lecturer
August 26	Introduction	Luttermoser & Harker
	How is Science Done?	
August 28	The Real Scientific Method	Harker
September 2, 4	Science & Pseudoscience	Harker
September 9, 11	How to Think about Science	Harker
September 16, 18	Student Projects	—
	What is Meant by "Change?"	
September 23, 25	How Do Scientists Study/Explain Change?	Harker & Luttermoser
September 30, 2	Examples of Change: Global Warming	Harker
October 7, 9	Student Projects & Class Debate	—
October 14	**Fall Break, No Class**	—
	Change in the Universe	
October 16	Thermodynamics: Equilibrium vs. Nonequilibrium	Luttermoser & Harker
October 21, 23	Entropy and the Arrow of Time	Harker & Luttermoser
October 28	Special Lecture: Two Centuries of Darwin	Dr. Niall Shanks
October 30	Conservation Laws and Change	Luttermoser
November 4, 6	The Mathematics of Geometry	Gardner
November 11, 13	The Expansion of the Universe	Luttermoser
November 18, 20	Galactic & Stellar Evolution	Luttermoser
November 25	Galactic & Stellar Evolution (cont.)	Luttermoser
November 27	**Thanksgiving, No Class**	—
December 2, 4	Student Projects	—

For other university information, please consult the ETSU supplemental syllabus attachment at:
http://www.etsu.edu/reg/academics/syllabus.aspx
The web page for this course can be found at:
http://www.etsu.edu/physics/lutter/courses/phys2018/index.htm

Overview

Great Ideas in Science is the first semester of a one-year honors course. GIS endeavors to introduce the student to the interdisciplinary side of science. Every year the "theme" of the course changes and for this 2008/2009 academic year, the theme of this course will be about *global changes*. This topic is very broad since it can encompass a variety of different sciences, hence this is a good theme to show **interdisciplinary science**.

For this Fall 2008, we will discuss the concept of *change* is three broad areas or **modules**. First, we need to understand science's role in explaining change that is seen in nature. For that, we need to understand the working mechanism of science: the scientific method. From this, we can see what it actually means to be a science and differentiate this from *false* science or pseudoscience. Then we will delve into the actual meaning of the word *change*, both the definition as used in science and the public's perception of change. We will use a discussion of *global warming* as an example of change. The last module for this semester will focus on change on the grandest scale, change on the largest and slowest time scales, change in the Universe as a whole.

This theme of global change will then continue in the Spring 2009 semester in *Great Ideas in Science II* (PHYS-2028). In that semester, the course will be separated into two main modules: Biological Evolution and Planet Earth Evolution.

We are privileged to have an honored speaker in our class this Fall 2009 semester. **Dr. Niall Shanks** is the Curtis D. Gridley Distinguished Professor of History and Philosophy of Science in the Department of History at Wichita State University. Dr. Shanks was a faculty member in the Department of Philosophy here at ETSU and was heavily involved with the Honors Program while he was at ETSU. Dr. Shanks lecture topic, *Two Centuries of Darwin*, given on October 28th, will be very useful as preparation for the Biological Evolution module of PHYS-2028 in the Spring 2009 semester.

Student Projects

Besides the opening day Introduction, you will note there are three main areas (called **modules**) of learning on the Course Schedule indicated by the "boxed" topics. At the conclusion of each module, there will be Student Projects that will be performed by the class and your course grade will be determined by your performance in these projects. The Project Assignments will be outlined near the beginning of the corresponding module. Student Projects can include class debates, or oral and written reports. Dr. Luttermoser will be in charge of assigning course grades to each student, however Dr. Harker will have some input on the grades assigned to those modules for which he participates.

Note that there will be no exams given in this class **AND** there will be no "extra credit." Extra credit work is the same as "credit" work in this class. As honors students you will be expected to perform at levels above the standard undergraduate student.

The Course Web Page

As the semester progresses, I will be adding links for the lectures you will be attending on the Course Web Page listed on the first page of this syllabus. I will also post descriptions of what each Student Project will entail once the class decides on a Project. Other useful links will also be posted on this Web Page as well.

Textbooks

There will be no official textbook associated with this course. However, you will be asked to read (and purchase if necessary) supplemental books throughout the semester. For the first module, Dr. Harker would like you to purchase and read "The Republican War on Science" by Chris Mooney. The Course Web Page will have a link to Amazon where you can purchase this book. **All students will be required to read this book by September 4, 2008.**

Extracurricular Activities

From time to time, we may have to meet at times outside of class to watch an interesting video or movie, or perhaps go on a field trip. As the semester progresses, such activities will be announced a few weeks ahead of time. I'll keep you posted.

Grading

Each of the four Student Projects will be equally weighted in the calculation of your course grade. Dr. Luttermoser will be assigning a numeric score (100 points maximum) for each project for each student. The Final Course Score is based upon the following formula:

$$\textbf{Final Score} = 30\% * (\frac{\text{Project 1}}{100}) + 30\% * (\frac{\text{Project 2}}{100}) + 40\% * (\frac{\text{Project 3}}{100})$$

The Final Course Grades is based upon the Final Course Score with the following scale:

			A	=	92% or better	**A**–	=	90–91.9%
B+	=	88–89.9%	**B**	=	82–87.9%	**B**–	=	80–81.9%
C+	=	78–79.9%	**C**	=	72–77.9%	**C**–	=	70–71.9%
D+	=	68–69.9%	**D**	=	60–67.9%			
			F	=	Less than 60%			

Note that a failing grade also will be given if the student has engaged in any form of academic dishonesty. IMPORTANT NOTE: Turn your cell phones <u>off</u> before coming into class!