Texas A&M University
Core Curriculum
Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

How does the proposed course specifically address the Foundational Component Area definition above?

Climate change is one of the most important problems presently facing our society. As a result, it is imperative that students understand and be able to evaluate the competing claims made in the public debate over climate change. Specific objectives of the class include: develop an understanding of the physics of climate change, understand how the scientific method has been used to construct our current understanding of the problem, evaluate the ethical, economic, and environmental implications of climate change to our society, and understand the major policy options available to us.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

Climate change fundamentally requires critical thinking. The climate problem involves physics, biology, economics, philosophy, and other fields. Understanding climate therefore requires integrating, evaluating, and synthesizing ideas and concepts from diverse intellectual areas. These skills will be tested by the exams, which feature short answer questions that require students to demonstrate these skills.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

Oral: At the end of every class, a group of 3-4 students will summarize the important messages from that day’s lecture. This requires the students to understand, synthesize, and summarize a huge body of complex information. Using a rubric, the rest of the class will then grade that group’s summary (and transmit the grades to me via clickers). Visual: Students will be required to work in groups (4-6 students) to create a youtube video explaining some aspect of climate science (e.g., how does the greenhouse effect work). The rest of the class will grade the group’s video using a rubric. Written: Several times during the semester, students will turn in written analyses of climate-change-related events in the news.

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

Mathematical calculations are an important component of the class. The first half of the class focuses on understanding how the greenhouse effect works and other aspects of the climate system. In studying this, the students learn and apply fundamental physical laws such as the Stefan-Boltzmann equation and work problems using it requiring algebra. During the discussions of policy options, the students learn about exponential discounting and use algebra to do simple cost-benefit analysis.
Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

Role-playing exercises are an important component of the instruction about the policy options. For example, when studying the “tragedy of the commons”, the students engage in an exercise in which they must work together to manage a hypothetical resource. In this exercise, the students learn that their individual incentives may not always align with society’s best interests. In addition, the end-of-class summaries and youtube project (both described above) require teamwork to complete.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.