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?

The atmosphere is a complex and fascinating physical system, and its behavior can have important impacts on both societies and individuals. In ATMO 202, students explore atmospheric processes by working hands-on with real-world weather and climate data. By the end of the course, students should be able to:

- Analyze data on pressure, temperature, humidity, and winds, and use this data to infer the state of the atmosphere.
- Use upper-air and surface meteorological charts to interpret and explain the evolution of weather systems.
- Identify cloud types, and explain how certain types are associated with specific weather patterns.
- Summarize the operation, accuracy and precision of the various instruments used to take meteorological data.
- Apply these skills to make informed decisions about weather forecasting, prediction of extreme events, and implications of weather and climate on human safety and security and understand how the scientific method underpins research and discovery in atmospheric sciences.

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):

The atmosphere is a complex system, requiring contributions from a number of physical and chemical disciplines. In the course students are introduced to the basic discipline-based principles and then they apply their understanding to interpret real-world weather events. Weekly exercises are given in which students must analyze and interpret data from actual, observed weather systems and/or climate trends. These exercises will be evaluated to provide evidence of improved critical thinking skills in the context of atmospheric sciences.

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

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Students are asked to make at least one brief, in-class oral presentation on a current or historical weather event of their choice. Weekly exercises and exams are given including numerous short-answer questions, asking students to explain in writing the reasoning behind their responses. These oral and written presentations, illustrated by appropriate visuals including maps and graphs, will be evaluated to measure student achievement.

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

Students are introduced to a variety of quantitative physical and chemical relationships, and then use these relationships to make inferences and predictions. Data is presented in a variety of formats, including tables, line graphs, contour and gradient plots, vector plots, meteograms, and isosurfaces. Student fluency in interpretation and ability to apply data-driven conclusions will be assessed by lab reports.

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

Students will work together in small groups to prepare short in-class oral presentations on weather events. Students are also encouraged to develop teamwork skills by working together on weekly lab assignments. Weekly laboratory assignments feature using the scientific method in atmospheric sciences and include exercises requiring consensus answers from small groups of students and discussions of sources of uncertainties in analysis techniques. Student participation will be assessed by a teamwork rubric.

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