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.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Four national Component Area definition above?

This is the 1-hour companion course for ASTR PHYS 109. It is designed to give more of a hands-on understanding of the concepts surrounding the Big Bang and Black Holes in an effort to de-mystify them for the non-scientist. In particular, students will work in teams to use critical thinking and quantitative data analysis to inform evidence-based decisions about the origin and evolution of the Cosmos and communicate their understanding using their own words to a lay audience. The emphasis will be on the interpretation of data with minimal data analysis techniques. The mathematics used will be straightforward and use only basic highschool algebra. The primary goal is for students to gain insight into the process of gathering and interpreting evidence for use in the field of Cosmology and to do so in a way that is communicable to a lay audience.

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.

The proposed course is required to contain each element of the Core Objective.

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

The primary objective of this course is to go through the process of taking data (done with sophisticated simulation) and then analysing and presenting the data in a scientific report format. The bulk of the grade for this course is in the lab report component. A premium is placed on the ability to understand, interpret and convey the data that provide evidence for our understanding of cosmology and the physical universe to the lay reader. In order to pass the course, all labs must have a passing grade.

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

Students communicate a number of ways throughout the course. In particular, they are required to write multiple laboratory reports in a way that they must communicate modern scientific information in lay language. They must interpret data through graph during the reading, and there are many times during the class time where they must discuss their thoughts with peers. Finally, within their reports they must report their results both in tabular and graphical format for the reader.
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Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

The students must bring in empirical data and observational facts to explain their evidence-based reasoning in their course in the context of established scientific theories such as Quantum Mechanics and General Relativity.

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 engage in pairs of question answering teams during the class period and engage in teamwork-like activities where they help each other analyze data and provide feedback on each other's reports using a Calibrated Rubric. In particular, they give and receive feedback from their peers on their writing assignments and use this feedback for revisions to improve their writing and communication skills.

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