

# **LIFE AND PHYSICAL SCIENCES**

## **FOUNDATIONAL COMPONENT AREA JUSTIFICATION FORM**

Rationale: Please provide a rationale for the course which explains how the course being proposed fits into this component based on the component's description. For your convenience, the overall description and rationale for this component are included below.

Life and Physical Sciences (from THECB Chapter 4: 4.28)

- 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 following four Core Objectives must be addressed in each course approved to fulfill this category requirement: Critical Thinking Skills, Communication Skills, Empirical and Quantitative Skills, and Teamwork.

- Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information;
- Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication;
- Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions;
- Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.

### **Rationale for Inclusion in this Category:**

***Physics 113*** is a survey course on stellar astronomy and cosmology. Students will learn about new instrumentation, observations and advances in technology that has led to our increased knowledge. The core topics are stellar populations, the life cycles of stars, models of the universe and how the scientific model is used in astronomy.

**STUDENT LEARNING OUTCOME ALIGNMENT FORM**  
**Life and Physical Sciences**

**Course Prefix/Number: PHYS113**

**Course Title:Stellar Astronomy**

**Core Objective: Critical Thinking** CT1: Students will evaluate evidence in analysis, interpretation or arguments

Course SLO(s): Students will use observational data, and basic physical principles to interpret the physical phenomenons that are observed in the universe.

Learning Activities: Students will use class time, laboratory activities, and outside resources, to develop skills to analyze how observations are obtained, and how observations and premises are used to formulate a scientific theory and how these are used to prove or disprove a theory.

Means of Assessment: Selected questions on major exam, laboratory or the final exam.

**Core Objective: Critical Thinking** CT2: Students will synthesize varied components of information to form a rational conclusion.

Course SLO(s): Students will use observations and physical laws are used to identify deficiencies and successes of various competing models of the universe.

Learning Activities: Students will use class time, laboratory activities and outside resources to learn how the current models explain natural phenomenon, and identify where there are unanswered questions in our current knowledge.

Means of Assessment: Selected questions and problems on major exams, laboratory and the final exam.

**Core Objective: Communication** C1: Students will express ideas in written, visual or oral forms to a range of diverse audiences in multiple settings.

Course SLO(s): Students will discuss current observations, basic physical principles and the related discoveries and outstanding questions in modern cosmology

Learning Activities– Students, through what they have learned in class, laboratory activities and literature research will present a Power Point presentation of new findings and research or explanations of currently understood physical phenomena

Means of Assessment: The Power Point presentation will be graded using a rubric and will evaluate presentation mechanics as well as content.

**Core Objective: Empirical and Quantitative:** EQS1: Students will gather, interpret or use numerical data/observable facts to arrive at an informed conclusion.

Course SLO(s): Students will conduct experiments, collect data and present their conclusions.

Learning Activities: Student will perform several experiments in the laboratory during the course of a semester. They will submit laboratory reports and show what they have learned by writing lab reports which will be graded for content, clarity and correctness

Means of Assessment: Assessment will be based on graded laboratory reports and selection exam and/or final exam questions associated with the lab.

**Core Objective: Teamwork** TW1: Students will work in coordination to complete specific tasks.

Course SLO(s): Students will work in small team to research, collect information and form general conclusions

Learning Activities: This will be done by assigning projects to each small group of students. Each group will then make a PowerPoint presentation of their work in class.

Means of Assessment: A percentage of the total class grade will be assigned to this project. Each team will demonstrate their team work by participating in the research and presentation. The presentations will be graded by the instructor and the class as a whole. In addition, each student will be asked to provide evaluation on their team member participation for the project and answer one written question related to the project. This data will be used by the instructor to evaluate the contribution of each student to the project and the performance of each team.

We, the undersigned faculty, support the proposed changes to this course and agree to incorporate them into our section of the above referenced course. This action is taken so that Tarleton State University will be in compliance with Texas Higher Education Coordinating Board foundational component area and core objective requirements for the General Education Core Curriculum.

*(Signed document should be kept in department office, listing names below on the electronic document implies acceptance)*

Dr. Jim McCoy

Dr. Shukat Goderya

Dr. Michael Hibbs