**Executive Summary**

Over 70% of astronomy students were able to demonstrate their ability to meet the GELOs. This is significant. There are major changes being made to both the astronomy lecture course (Astronomy 160) and the astronomy lab course (Astronomy 151). The lecture course is becoming more engaging with the student, in terms of displaying their understandings of important physical concepts in the curriculum. While the foundation of the course is centered on physical law and our knowledge of the Universe, the course has an ancillary point to be made: how to humans know what we know about the Universe. How is it that physical laws can explain so much?

The laboratory course has become a hands-on experience for the student, where knowing the night-sky and being able to find objects is as important as being able to correctly use lab equipment. The planetarium and the observatory are becoming important tools in demonstrating various aspects of the physical universe in both the lecture course and the laboratory course.

The action plan is to continue to make changes to best meet the growing need for a scientifically literate society. The laboratory course continues to implement new technologies for observation and measurement. The lecture course continues to evolve to challenge students to think and be active in their course and to understand and apply physical concepts.

**Faculty Included in the Preparation and Sharing of this Report:**

Kenneth Meidl

**Please provide a brief and cogent narrative in response to each of the following questions.**

1. Provide a quantitative analysis for each GELO your CLOs inform. Provide the total number of students who passed/total number of students assessed in each GELO column *and* the corresponding GELO passing rate as an aggregated percentage.

**GENERAL EDUCATION LEARNING OUTCOMES Students Passed/Assessed TOTAL RATE**

Natural Science

Demonstrate Proficiency in Natural Science by:

*1. Explaining how the scientific method is used to solve problems.* 157/204 77%

*2. Describing how scientific discoveries and theories affect human activities.* 112/152 74%

1. Reflect on, consider and analyze the data you have. ***What does your CLO data tell you about how your students are achieving GELOs?*** *Be detailed, descriptive and analytical* in this qualitative assessment of each GELO in relation to your CLO data. **Are your results satisfactory?**

A large percentage of students were able to meet the GELOs in Astronomy 160 and Astronomy 151. Utilizing the scientific method and understanding major scientific discoveries is integrated nicely into the astronomy CLOs. The foundation of the astronomy curriculum is the understanding of physical concepts and how humans have come to understand those truths about the Universe. Students have a solid foundation to meet the GELOs.

The results are satisfactory. In particular, the newest textbook used for Astronomy 160 is centered on the question: “How do we know that?” This is a question that should constantly be asked by students when taught new physical concepts and theories. By using such a text, the students are becoming more aware of the scientific process, and how one becomes scientifically literate. The GELOs are a good match for the current text.

1. Your department and the college should be making improvements based on student learning outcomes assessment, and we need to continue to document and share the improvements and progress you have already made. Did you make any changes in your CLO statements or analysis during the last 4-year cycle? Did you receive funding for resources requests that were aimed to improve assessment results? Did you make any improvements in the areas of teaching and instruction processes, your courses, or your program? *Please explain your accomplishments and provide details about your efforts.*

The CLOs for astronomy have not changed in the four year cycle, and are well suited to address the learning of a student taking an astronomy survey course. The method of analysis has not changed. Significant changes have been made to the delivery of instruction. Power Point presentations were the norm 5 years ago. Since then new textbooks, on-line reading and homework assignments, and projects have all been implemented at one time. The latest textbook is broken into small units, in lieu of longer chapters. This has proven to be effective in the short term, as quiz scores have improved; quiz scores are not reflected in the CLO assessment directly, however.

The astronomy lab course was previously a paper-lab experience for the student. With the planetarium and student telescopes the current experience is a much more “hand-on” environment. This has helped retain students and increased demand for Astronomy 151, where it was taught occasionally before, but not it is routinely offered.

No funding was requested to make any changes.

1. **Action Plan.** Based on the assessments and analysis you have provided, please consider what changes or improvements you would like to make, which might include updating your CLO statements, modifying course outlines, rethinking instruction efforts, using different assessment instruments, asking for additional resources to improve assessment results, etc. ***Based on the analysis, provide an action plan for improvement that draws on your assessment results and efforts.***

Restructuring the class room lectures into something more than Power Point presentations has led to short-term improvements, where student are now engaged with critical thinking questions and asked to make predictions based on their understanding of physical concepts. Physical demonstrations with equipment and the usage of the planetarium are becoming more evident in the classroom. These changes have not led to changes in assessment tools, but may lead to better assessment scores.

With a new faculty member just joining the ranks of the physics/astronomy area, there will most likely be more changes made in rethinking instruction efforts and using different assessment instruments.