PHYS 1060

Division: Natural Science and Mathematics
Department: Physics
Course: PHYS 1060
Title: Astronomy: Stars and Galaxies
Catalog Description:

This is an introductory course designed to acquaint students with the night sky and the laws of science that govern heavenly bodies. The question "How do we know?" will lead students to learn more about stars, galaxies, and the universe itself. Application of physical laws and mathematical solutions to a variety of problems will lead to an understanding of "How do we know?" Regularly scheduled night observations will be held each week. Naked eye observation and binocular observation will be emphasized with some use of telescopes.

General Education Requirements: Physical Science
Semesters Offered: Fall
Credit/Time Requirement: Credit: 3; Lecture: 4; Lab: 0
Clock/Hour Requirements: 0
Offered for Non-Credit: No
Prerequisites: MATH 1010 or equivalent

Justification:

Physics 1060 is a fundamental astronomy course traditionally taught in a Physics curriculum. This course is an option to satisfy the physical science component of the general education requirements. Almost everyone has looked at the sky during the day and night and has noticed some of the phenomena that occur there. However, few understand the principles behind what they are seeing. This course is meant to help students relate what they see to the laws that govern what they see. This course is similar to PHYS 1060 at the University of Utah, PHYS 1000 at Utah State University, PHYS 1030 at Weber State University, and PHYS 1080 at Southern Utah University.

Student Learning Outcomes:

Upon successful completion of this course, students will know the following:

- important scientific laws and principles
    - Kepler's three laws
    - Newton's laws of motion
    - universal law of gravity
- that science is a process to gain knowledge

- paper-and-pencil solutions to astronomy problems by using critical thinking and scientific reasoning.
- Students will feel that the universe is interesting and that science is a valuable way to understand it.

Content:

Units will include:

- exploring the sky
- understanding the birth, life, and deaths of stars
- the strange beasts
    - white dwarfs
    - neutron stars
    - black holes
- the universe of galaxies
- life in the universe
- weekly observations of the evening sky

Students will participate in class lecture sessions, small group activities, small study groups, and have daily homework assignments. Each student will be expected to keep a journal of their own nightly observations through the semester. Exams will be given on each unit and pop quizzes will be given on reading, observations, and previous lectures.

General Education Outcomes:

6) Apply computational skills to a variety of contexts.

Students answer and solve 20-30 questions per chapter; most of which require computation. They receive scores and feedback on their assignments to help them improve their skills.

7) Apply scientific reasoning to a variety of contexts.

The tests have a significant portion dedicated to conceptual questions where students must apply scientific reasoning. The homework also requires scientific reasoning to solve the problems.

Key Performance Indicators:

In Class

- 10-30 quizzes (short answers): 10%-15% of the final grade
- 5 examinations: 35%-55% of the final grade
- 1 short paper (5-7 pages): 15%-30% of the final grade

Representative Text and/or Supplies:

Universe, Freedman, current edition.

Optimum Class Size: 20
Maximum Class Size: 25

Signatures:

I hereby submit this course syllabus:

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Ted Olson, , Professor

I hereby find this course consistent with the goals and resources of the Physics Department:

_____

Ted Olson, , Professor, Chair

I hereby find this course consistent with the goals and resources of the Natural Science and Mathematics Division:

_____

Dan Black, EdD, Associate Professor, Dean

I have discussed the need for library resources related to this class with the person submitting the syllabus:

_____

Lynn Anderson, MLIS, Technical Services Librarian (Main Campus)

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Michelle Olsen, MLS, Campus Librarian (Richfield Campus)