PHYS 2100

Division: Natural Science and Mathematics
Department: Physics
Course: PHYS 2100
Title: Honors Physics: History of Physical Science
Catalog Description:

PHYS 2100 is a study of how modern physical science has evolved, including Newton's laws, cosmology, relativity, and quantum mechanics. The course looks at science from an historical perspective; science as a process is emphasized over science as a body of facts. This class is for students in the Honors Program and physics majors. It is taught in a seminar format with class discussions, presentations, and term papers.

General Education Requirements: Physical Science
Semesters Offered: Fall
Credit/Time Requirement: Credit: 2; Lecture: 2; Lab: 0
Clock/Hour Requirements: 0
Offered for Non-Credit: No
Prerequisites: MATH 1010 or equivalent

Corequisites: Students expecting PS GE credit must be enrolled in the Honors Program.

Justification:

This course is offered to provide honors students with an opportunity for an in-depth look at the physical sciences, emphasizing physics. It will include historical, personal, and philosophical perspectives on science. It is an important part of the Honors Program and helps honors students fulfill the Physical Science GE requirement.

Student Learning Outcomes:

Students will know important scientific laws and principles, such as those that govern matter and energy, and space and time. Students will also understand that science is a process to gain knowledge. They will also understand the historical context of many important scientific discoveries.
Students will be able to solve very simple paper-and-pencil physics problems and apply them to real life. They will also be able to carry on intelligent conversations about physics.

Students will feel that the physical world is interesting, beautiful, and that science is a valuable way to understand it. Students will also appreciate the sacrifices and dedication of important historical physicists.

Content:

The course gives an historical look at the development of modern science, from ancient Greece to current theories. The approach is philosophical and discussion-oriented. The lives of major participants in the history of science are also examined.

Newton's Laws will be an early foundation, followed by the two pillars of 20th century physics: relativity and quantum mechanics. Astronomy and cosmology are also major threads, and there are brief excursions into geology, symmetry, and particle physics.

General Education Outcomes:

1) Read effectively, constructively, and critically.
Students read two well-written and engaging textbooks. They respond critically to one by e-mail journal; they are quizzed on each chapter of the other.

2) Write clearly, informatively, and persuasively.
Students write a journal entry regarding each chapter in the main textbook and send it to the class e-mail list. Other students then respond or critique. A major term paper is undertaken during the semester as well. They receive feedback from peers and the teacher on their term paper.

3) Speak effectively in a variety of contexts.
Students are expected to ask and answer many questions during the semester. Each student is in charge of guiding the discussion for one chapter in the textbook. Students also present their term paper research to the class during the last few days of the semester. Classmates and the teacher fill out critiques of the presentation.

4) Retrieve, evaluate, interpret, and deliver information through a variety of traditional and electronic media.
Web assignments and e-mail assignments are an important part of the class. Students must visit approximately ten specific web sites and report on the information there. Students also submit by e-mail to the class list a journal entry for each chapter (approximately 20) in the main text. Students are also required to have at least one traditional (paper) source for their term paper.

7) Apply scientific reasoning to a variety of contexts.
Students frequently answer questions in front of the class. The tests also have a significant portion dedicated to conceptual questions where students must apply scientific reasoning. The homework also requires scientific reasoning to solve the problems, such as an acceleration problem using Newton s Second Law.

Key Performance Indicators:

Homework problems: 15%-30% of the final grade
Term Paper: 15%-35% of the final grade

Quizzes: 5%-20% of the final grade

Tests: 10%-30% of the final grade

Final exam: 15%-35% of the final grade

Representative Text and/or Supplies:
Coming of Age in the Milky Way by Timothy Ferris, Anchor Books, current edition, and *Physics for Poets* by Robert March, McGraw-Hill, current edition.

Optimum Class Size: 15

Maximum Class Size: 18

Signatures:

I hereby submit this course syllabus:

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

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Ted Olson, , Professor, Chair

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

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Dan Black, EdD, Associate Professor, Dean

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

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

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Michelle Olsen, MLS, Campus Librarian (Richfield Campus)