



PHSC 1440

Division: Natural Science and Mathematics

Department: Physics

Course: PHSC 1440

Title: Cosmos

Catalog Description:

Cosmos is a general physical science course which presents the journey of discovery and the forces and individuals who helped to shape modern science. The course is based on the Cosmos video series and book by Carl Sagan. The scope of Cosmos is much broader than astronomy alone. Mathematics is not emphasized.

General Education Requirements: Physical Science

Semesters Offered: TBA

Credit/Time Requirement: Credit: 2; Lecture: 2; Lab: 0

Clock/Hour Requirements: 0

Offered for Non-Credit: No

Justification:

This course introduces students thinking in a non-threatening way to scientific history, philosophy, and way of. This course can be a building block in increasing scientific literacy for non-science majors. The course works reasonably well as a distance course (correspondence, independent study, EdNet, etc.)

Student Learning Outcomes:

Students will know some important scientific laws and principles, such as Kepler's laws of planetary motion, Newton's laws of motion, Einstein's theory of relativity, and the life cycle of stars. Students will also understand that science is a process to gain knowledge.

Students will be able to discuss scientific topics and principles in intelligent company. They will also be better able to understand ballot initiatives, etc., that have scientific aspects to them (waste, pollution, etc.).

Students will believe that the physical world is interesting, and that science is a valuable way to understand it. Students will be more likely to read articles in newspapers and magazines describing physical phenomena or discoveries because of the vocabulary and basic understanding they have acquired in this class.

Content:

- Science is possible because nature is predictable.
- The scale of the solar system and the universe.
- Organic evolution; how does it occur on earth, and could it occur elsewhere?
- How can astronomy be distinguished from the false pseudoscience of astrology?
- How were early conflicts between astronomy and the religious beliefs of the time resolved?
- What lessons for the earth's environment can be learned by studying other planets?
- What are the objects, such as comets, meteors, quasars, black holes, etc., that we find in space?

- How did our understanding of the earth, the other planets, and the stars change over time?
- How have science and civilization grown up together?
- How does Einstein's theory of relativity relate to time and space, and what are the possibilities for interstellar travel?
- How are chemical elements created?
- Stars go through a life cycle of birth, middle age, and death.
- What is the Doppler effect and how does it relate to the Big Bang theory?
- What is the chemistry of DNA and memory?
- How are we attempting to search for and communicate with alien intelligences and what are our chances of success?
- Science is a creative, self-correcting process.
- Science gives us hope for the future.

General Education Outcomes:

1) Read effectively, constructively, and critically.

Students read the book *Cosmos* chapter by chapter and answer homework questions about the reading or write a journal entry that demonstrates mastery of chapter concepts.

7) Apply scientific reasoning to a variety of contexts.

Class discussions are centered on expanding and developing the reading material, with an emphasis on how scientists know things. Students also apply scientific reasoning in writing their term paper.

Key Performance Indicators:

Homework: 10%-25% of the final grade

Quizzes: 15%-30% of the final grade

Group Presentation: 0%-30% of the final grade

Term Paper: 15%-25% of the final grade

Comprehensive final exam: 15%-30% of the final grade

Representative Text and/or Supplies:

Cosmos by Carl Sagan, Random House

Optimum Class Size: 18

Maximum Class Size: 24

Signatures:

I hereby submit this course syllabus:

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)

Michelle Olsen, MLS, Campus Librarian (Richfield Campus)