Bemidji State University

PHYS 1200: Time, Matter, and Energy

A. COURSE DESCRIPTION

Credits: 3
Lecture Hours/Week: 0
Lab Hours/Week: 0
OJT Hours/Week: *.*
Prerequisites: None
Corequisites: None

MnTC Goals: Goal 03 - Natural Science

An introduction to modern physics concepts at a level suitable for non-science majors. Topics of discussion may include interstellar travel, lasers, quantum computers, nuclear power, black holes, dark matter, and dark energy. The course will be mostly descriptive, with trace amounts of algebra employed as needed. Prerequisites: None. [**Core Curriculum Goal Area 3 (LL)]

B. COURSE EFFECTIVE DATES: 12/15/2022 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Time
2. Matter
3. Energy
4. Relativity
5. Quantum Mechanics
6. Atoms
7. Nuclear Physics
8. Elementary Particles
9. Cosmology
D. LEARNING OUTCOMES (General)

1. explain where scientific knowledge comes from. (G3D, G3E)
2. identify the basic physical laws of nature. (G3A, G3B, G3D, G3E)
3. describe what physics is and what natural phenomena are explained by the science of physics. (G3D, G3E)
4. apply the fundamental laws and principles of physics to solve simple problems.
5. describe Newton's laws of motion and gravitation. (G3A, G3B, G3D)
6. explain the nature of energy. (G3A, G3D, G3E)
7. explain the atomic theory of matter. (G3A, G3D)
8. describe the relationship between light, electricity and magnetism. (G3A, G3B, G3D)
9. compare and contrast the theory of relativity with quantum theory. (G3A, G3D)
10. categorize the fundamental building blocks of matter. (G3A, G3B, G3D)
11. summarize current topics in particle physics and cosmology and the experimental devices used to study them. (G3A, G3D)
12. demonstrate understanding of scientific theories.
13. formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, students' laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.
14. communicate experimental findings, analyses, and interpretations both orally and in writing.
15. evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

Goal 03 - Natural Science

1. Demonstrate understanding of scientific theories.
2. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, students' laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.
3. Communicate their experimental findings, analyses, and interpretations both orally and in writing.
4. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted