Course Outline for: PHYS 1202 Physics 2 with Biomedical Applications

A. Course Description:

1. Number of credits: 4
2. Lecture hours per week: 3
   Lab hours per week: 2
3. Prerequisites: PHYS 1201 (C or higher)
4. Corequisites: None
5. MnTC Goals: Goal #3 - Natural Sciences

An inherent foundation of physics supports the biomedical sciences. Continue exploring physics and its connection to health and biology in the second half of this introductory physics series, with a laboratory component. Topics include waves, electricity, simple DC circuits, magnetism, atomic structure and spectra, and the physics of medical imaging. Problems are solved using the basic concepts of calculus such as the derivative and simple integration. Fundamental concepts of physics are related to biomedical applications of special interest to students majoring in the biological sciences and those who plan to enter the health professions.

B. Date last reviewed/updated: February 2025

C. Outline of Major Content Areas:

1. Electricity
2. Magnetism
3. Optics
4. Atomic structure and spectra
5. Nuclear physics

Applications will be drawn from biomedical fields and may include DNA structure and replication, the electrocardiogram, electrical conduction in the human nervous system, the human eye and corrective lenses, imaging technologies such as thermography, CT, PET, and MRI, radiation safety and nuclear medicine.

D. Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

1. Apply the fundamental laws relating to the course topics. (Goal 3a, 2a)
2. Identify which physical laws are appropriate for the solution of physics problems relating to human applications. (Goal 3a, 2c)
3. Solve calculus-based physics problems using the appropriate physical laws. (Goal 3a, 2a)
4. Explain the importance of physics to health sciences using appropriate terminology. (Goal 3a)
5. Test formulated hypotheses for experiments based on analyzed data, error, and uncertainties. (Goal 3b, 2c)

6. Communicate experimental laboratory findings and analysis using appropriate physics concepts and theories both orally and in writing. (Goal 3c)

E. Methods for Assessing Student Learning:

Methods for assessment may include, but are not limited to, the following:

1. Written and/or oral reports
2. Homework
3. Projects
4. Quizzes
5. Exams

F. Special Information:

None