SECTION HEADING

PHYS 2122: General Physics II

Description

General Physics II continues Physics 2121. Calculus and vectors are used throughout. Uses laboratory-based instruction. Topics include heat and thermodynamics, heat engines, electric charges and forces, electric potential, electric fields, Gauss' Law, direct and alternating current circuits, capacitors and RC circuits, electronics, magnetism and magnetic fields, modern physics, and radioactivity. This course includes a lab.

Credits

5

Prerequisite

PHYS 2121 and MATH 1121, with MATH 1122 being taken concurrently or before

Corequisite

None

Topics to be Covered

1. Introduction to Heat and Temperature (Optional)

2. Heat Energy Transfer (Optional)

3. Phase and Phase Changes (Optional)

4. The Laws of Thermodynamics (Optional)

5. The Ideal Gas Law (Optional)

6. Heat Engines (Optional)

7. Electric Charges, Forces, and Fields

8. Electric Potential and Electric Potential Energy

9. Electric Current and Direct Current Circuits, Kirchhoff's Circuits Rules

10. Magnetism

11. Magnetic Flux and Faraday's Law of Induction

12. Alternating-Current Circuits

13. Electromagnetic Waves

14. Geometrical Optics

15. Optical Instruments

16. Interference and Diffraction

17. Introduction to Quantum Physics and Atomic Physics

18. Nuclear Physics and Nuclear Radiation

Learning Outcomes

1. Define physics concepts and their applications.

2. Model physical behavior by performing hands-on activities and experiments.

3. Develop problem solving techniques using mathematical models describing physical concepts.

4. Analyze and interpret data collected in a variety of methods.

5. Describe and interpret physical properties in action with real-world situations encountered in their everyday environment.

Credit Details

Lecture: 4

Lab: 1

OJT: 0

MnTC Goal Area(s): Goal Area 03 - Natural Sciences

Minnesota Transfer Curriculum Goal Area(s) and Competencies

Goal Area 03: Natural Sciences

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.