JEFFERSON COLLEGE

COURSE SYLLABUS

PHY111

ELEMENTARY COLLEGE PHYSICS I

5 Credit Hours

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Revised by: Dr. Bob Brazzle
May 2016

Minor Revision or Update by: Fran Moore
Per Curriculum Committee Process Change: April 25, 2018

Ms. Constance Kuchar, Interim Division Chair, Math & Science
Ms. Shirley Davenport, Dean, Arts & Science Education

PHY111 Elementary College Physics I

I. CATALOG DESCRIPTION

A. Pre-requisites:
- Satisfactory completion of three units of high school mathematics, or MTH121, or MTH133 and MTH134/MTH134H, or MTH141
- Reading proficiency

B. 5 semester hours credit

C. Elementary College Physics I is a fundamental course dealing with mechanics, sound, electricity, magnetism, light, and the structure of matter. This course is required of agriculture, forestry, architecture, and science majors in fields other than physics and chemistry. The course is composed of four hours of lecture and two hours of laboratory per week. Elementary College Physics I partially meets the science requirement for the Associate of Arts degree (F)

D. Curricular alignment:
- Fulfills part of Natural Sciences (Physical Sciences) with lab CORE requirement for AA, AAT, AFA, and select AAS degrees: MOTR PHYS 150L Physics I with Lab.
- Elective course applies toward AA or AAT degree.

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Develop knowledge of the fundamental laws of physics	Classroom discussions, homework, and exams
Develop comprehension of the methods and techniques used by physicists in the analysis of physical problems	Classroom discussions, homework, exams, and laboratory write-ups
Become acquainted with the phenomenon that have had and are continuing to have a great impact on society	Classroom discussions, homework, exams, and laboratory write-ups
Comprehend the difference between science and pseudoscience	Classroom discussions, presentation of alternative theories, and exams

III. OUTLINE OF TOPICS

A. History and measurements
1. Understand the development of modern concepts in physics
2. Understand the development and basic assumptions involved in the world's major system of measurements
3. Convert from one system of measurements to another

B. Kinematics
   1. Develop the concept of vectors
   2. Use the basic equations of kinematics to determine the motion of objects in one and two dimensions

C. Dynamics
   1. Appreciate Newton's need to develop and codify the concept of force
   2. Understand Newton's three laws of motion
   3. Utilize free body diagrams

D. Work and energy
   1. Trace the outline of the development of the concept of energy
   2. Show the relationship between work and the potential and kinetic energies

E. Thermodynamics
   1. Develop the concept of internal energy
   2. Develop the concept of thermometry
   3. Understand the first law of thermodynamics and its implications for modern energy usage
   4. Understand the second law of thermodynamics and its limitations for energy conversion

F. Static electricity
   1. Develop the concept of electric charge
   2. Understand and apply Coulomb's Law
   3. Relate electric charge to the proton and electron
   4. Determine the need for the concept of electric field

G. Electric current
   1. Develop an understanding of electrical potential energy
   2. Relate electrical potential energy to the concept of potential difference
   3. Draw conclusions about the motion of electric charges using potential difference
   4. Identify the relationship of electric current to the motion of electrons
   5. Develop the concept of resistance
   6. Relate resistance, voltage, and electric current

H. Magnetism
   1. Develop a relationship between the behavior of electric charge and magnets
   2. Show Oersted's experiment
   3. Develop the relationship between electric currents and magnetic fields
   4. Use Faraday's Law to show how electricity is produced for modern technology

I. Nuclear physics
   1. Investigate the discovery of radiation
   2. Define nuclear decay modes
   3. Describe why atoms have different isotopes
   4. Utilize the biological effects of radiation

IV. METHODS OF INSTRUCTION

A. Lecture

B. Laboratory activities

C. Classroom discussion

D. Homework

V. REQUIRED TEXTBOOK

Serway, Raymond; *College Physics* (current edition). Boston: Cengage.

VI. REQUIRED MATERIALS

Calculator and flash drive

VII. SUPPLEMENTAL REFERENCES

None

VIII. METHODS OF EVALUATION

A. Graded homework

B. Formal lab write-ups

C. Examinations

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (TC 101; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu).

XI. ATTENDANCE STATEMENT

Regular and punctual attendance is expected of all students. Any one of these four options may result in the student being removed from the class and an administrative withdrawal being processed: (1) Student fails to begin class; (2) Student ceases participation for at least two consecutive weeks; (3) Student misses 15 percent or more of the coursework; and/or (4) Student misses 15 percent or more of the course as defined by the instructor. Students earn their financial aid by regularly attending and actively participating in their coursework. If a student does not actively participate, he/she may have to return financial aid funds. Consult the College Catalog or a Student Financial Services representative for more details.

XII. OUTSIDE OF CLASS ACADEMICALLY RELATED ACTIVITIES

The U.S. Department of Education mandates that students be made aware of expectations regarding coursework to be completed outside the classroom. Students are expected to spend substantial time outside of class meetings engaging in academically related activities such as reading, studying, and completing assignments. Specifically, time spent on academically related activities outside of class combined with time spent in class meetings is expected to be a minimum of 37.5 hours over the duration of the term for each credit hour.