COURSE SYLLABUS

Tunxis Community College

Education That Works For a Lifetime

Course Title:	Calculus-Based Physics II	**Date submitted:**	November 2017 (AAC:17-61)
Department:	Mathematics and Science		
Curriculum:	Physics		

Course Descriptors: Make certain that the course descriptors are consistent with college and Board of Trustees policies, and the current course numbering system.

Course Code: (eg. ACC 101)	PHY*222
Course Type:	X

A: Clinical B: Lab D: Distance Learning
I: Individual/Independent L: Lecture N: M: Seminar Internship
P: Practicum U: Studio
X: Combined Lecture/Lab Y: Combined Lecture/ Clinical/Lab Z: Combined Lecture/Studio

Elective Type:	G/LAS/S

AH: Art History E: English FA: Fine Arts FL: Foreign Language
G: General HI: History HU: Humanities LAS: Liberal Arts & Sciences M: Math S: Science SS: Social Science

Credit Hours:	4
Developmental: (yes/no)	No
Contact Hours: Lecture:	3
Clinical:	0
Lab:	3
Studio	0
Other:	0
TOTAL:	6
Class Maximum:	20
Semesters Offered:	Sp

Prerequisites:

C- or better in Calculus-Based Physics I (PHY*221)

Corequisites:

None

Other Requirements:

Scientific calculator, technology skills

Catalog Course Description:

Continuation of Calculus-Based Physics I. Topics include: principles of electricity and magnetism, including electric and magnetic fields, electric currents in magnetic fields, and electromagnetic radiation, light, optics, and selected topics in modern physics. Intended for science and engineering majors. Lecture and laboratory.

Topical Outline: List course content in outline format.

Lecture:

1. Electricity
   a. Electric charge and field
   b. Gauss's Law
   c. Electrical potential
   d. Capacitance, electric energy storage
   e. Currents and resistance
   f. DC circuits
2. Magnetism
   a. Magnetism and magnetic fields
   b. Electromagnet induction and Faraday's Law

c. AC Circuits
d. Maxwell's Equations

3. Light
   a. Reflection and refraction
   b Lenses and optical instruments
   c. Light waves, interference, diffraction and polarization
4. Modern Physics
   a. Relativity, time dilation, length contraction, four-dimensional space-time, relation of mass and energy
   b. Quantum theory and atomic models, including work by Planck, Bohr, Schrödinger and de Brogle

Laboratory:

1. Measurement of Resistance
2. Ohm's Law: Resistances in Series and Parallel
3. DC Currents
4. RC Time Constant
5. Introduction to the Oscilloscope
6. Multiloop Circuits: Kirchhoff's Rules
7. Electromagnetic Induction
8. Reflection and Refraction
9. Mirrors and Lenses
10. Polarized Light
11. Prism Spectrophotometer
12. Line Spectra Rydberg Constant
13. Detection of Nuclear Radiation: Geiger Counter
14. Radioactive Half-Life
15. Absorption of Nuclear Radiation

Outcomes:
Describe measurable skills or knowledge that students should be able to demonstrate as evidence that they have mastered the course content.

Upon course completion, the student will be able to:

COURSE:

1. solve elementary problems dealing with Coulomb's Law for electrostatic charges and for magnetic properties of materials
2. calculate electric field distributions via Gauss' Law and magnetic field distributions via Ampere's Law
3. given information on the current, voltage, and resistance of electrical circuits, compute the circuital parameters of elements in a DC circuit, and to carry out controlled experiments verifying the results of the calculations
4. discuss the properties of electromagnetic radiation with regard to type, wavelength, and velocity of propagation
5. explain, with examples, the relationship between the properties of waves, such as, wavelength, frequency and velocity of propagation
6. solve elementary problems and perform controlled experiments involving diffraction and interference of light
7. apply the properties of reflection and refraction of light to the analysis of optical systems involving lenses and mirror
8. distinguish between the major periods of the development of physics referred to as the periods of Classical Physics, Modern Physics, and Contemporary Physics
9. describe the general tenets of Einstein's special theory of relativity, time dilation and the relationship between energy and mass
10. explain the Bohr-Rutherford model of the atom as it applied to the atomic spectra emitted by the hydrogen atom and subsequent quantum models developed by Schrödinger

PROGRAM: *(Numbering reflects Program Outcomes as they appear in the college catalog)*

	N/A
	COMPETENCY FULFILLED: Scientific Knowledge & Understanding (SCKX) OR Scientific Reasoning (SCRX)
Evaluation: List how the above outcomes will be assessed.	**Assessment will be based on some or all of the following criteria:** Quizzes Examinations – definitions, concepts, and quantitative problem solving Laboratory reports. Laboratory experiments - observation of work Laboratory reports
Instructional Resources: List library (e.g. books, journals, on-line resources), technological (e.g. Smartboard, software), and other resources (e.g. equipment, supplies, facilities) required and desired to teach this course.	**Required:** Scientific calculator, physics laboratory **Desired:** Physics software
Textbook(s)	Giancoli, *Physics for Scientists & Engineers*, 4th ed.; Pearson Education Wilson, *Physics Laboratory Experiments*, 6th ed.; Houghton Mifflin