Course # PHYS 2426

TRINITY VALLEY COMMUNITY COLLEGE
ADMINISTRATIVE-MASTER SYLLABUS

The Administrative- Master Syllabus is an administrative tool; it is **not intended to be distributed to students.** It is the intention of this Administrative-Master Syllabus to provide a general description of the course, outline the required elements of the course and to lay the foundation for course assessment for the improvement of student learning, as specified by the faculty of TVCC, regardless of who teaches the course, the timeframe by which it is instructed, or the instructional method by which the course is delivered. It is not intended to restrict the manner by which an individual faculty member teaches the course but to be an administrative tool to aid in the improvement of instruction. The Administrative-Master Syllabus will demonstrate that there is consistency and comparability in course offerings.

Course Title

University Physics II

Course Prefix and Number

PHYS 2426

Department – Division

Mathematics & Science

Course Type – select from one of the following categories.

☐ - **Academic General Education Course** (from ACGM – but not in TVCC Core)

☒ - **Academic TVCC Core Course**

☐ - **WECM Courses**

Semester Credit Hours: Lecture Hours: Lab/other hours

Semester Credit Hours	Lecture Hours	Lab/Other* Hours
4	3	3

Other hours include practicum, clinical or other types of non-lecture instruction. *If other, please specify: _____

Course Catalog Description

A calculus based study of electricity, magnetism, waves, and optics for science or mathematics majors and pre-engineering students.

Prerequisites/co requisites

Physics 2425 of consent of instructor.

Topical Outline

A. Electromagnetism
   1. Static Electricity
      a. The student will be able to describe the basic structure of the atom and its electrical characteristics.
      b. The student will be able to state and use Coulomb's law for calculating the electrical force between charges.
      c. The student will be able to state and use Gauss's law to determine the electric fields around charges.
      d. The student will be able to define and calculate electrical potential energy and voltage.
   2. Electrical Circuits
      a. The student will be able to describe the basic characteristics of electromotive forces, resistors, capacitors, and inductors in electrical circuits.
      b. The student will be able to state and use Ohm's law and Kirchhoff's rules to calculate current and voltage relationships in circuits.
      c. The student will be able to describe and recognize the differences between series and parallel circuits.
      d. The student will be able to describe the differences between DC and AC circuits.
      e. The student will be able to describe the current and voltage relationships in AC circuits and draw phasor diagrams for such circuits.
   3. Electromagnetism
      a. The student will be able to discuss the basic cause of magnetic fields.
      b. The student will be able to state and use Faraday's Law and Ampere's law for solving problems.
      c. The student will be able to state Maxwell's Equations.

B. Waves
   1. Mechanical Waves
      a. The student will be able to describe and give examples of transverse and longitudinal waves.

b. The student will be able to calculate wave speed, frequency, and wave length.
c. The student will be able to describe standing waves and calculate standing wave frequencies and wavelengths.

2. Electromagnetic Waves
   a. The student will be able to describe and electromagnetic wave and its cause.
   b. The student will be able to calculate wave speed, frequency, wavelength, and the Poynting Vector.
   c. The student will be able to use the law of reflection to solve problems.
   d. The student will be able to use the law of refraction to solve problems.
   e. The student will be able to use the principles of interference and diffraction gratings to solve problems.

C. Laboratory
1. The student will demonstrate his ability to follow written and oral instructions in setting up and using simple scientific equipment in order to obtain date in the laboratory.
2. The student will use his knowledge of physical theory gained in lecture in order to analyze the data taken in laboratory, and report his results in written form.

Course Learning Outcomes

Physics 2426 is designed to help the student learn both factual scientific information related to electromagnetism and wave theory, and learn how to use the principles of scientific investigation. In order to achieve these goals the student will be expected to meet these basic objectives:

1. Be able to state the basic laws and theorems of physics that pertain to electricity, magnetism, mechanical, and electromagnetic wave theory and optics.
2. Demonstrate ability to solve problems by analyzing physical situations in terms of basic scientific principles and applying the necessary mathematical techniques of algebra, trigonometry and calculus.
3. Be able to obtain appropriately accurate experimental data using simple scientific apparatus and relate this data to the appropriate scientific theory by performing calculations that confirm the predictions of the theory.

Relationship to General Education Outcomes – In addition to the core competencies, Trinity Valley Community College has established ten general education goals which specify knowledge and skills that students should gain from completing courses in the various component areas of the core curriculum. Information regarding curriculum and assessment as a means for the improvement of student learning through the general education component. (Select all that apply.)

Mark with an "X"	General Education Outcome

	A. To communicate clearly and effectively in both oral and written English.
	B. To improve reading skills focused on comprehending, analyzing, interpreting, and evaluating printed materials.
	C. To understand mathematical information and utilize mathematical skills.
X	D. To demonstrate qualitative and quantitative critical thinking skills.
	E. To understand and appreciate cultural and ethnic diversity.
	F. To utilize computer based technology in accessing information, solving problems, and communicating.
	G. To recognize and evaluate artistic achievements in the visual and performing arts.
	H. To improve basic understanding of political, economic, and social systems.
X	I. To demonstrate knowledge of the physical universe and living systems.
X	J. To develop skills and strategies to become an engaged learner.

Required Text(s)

Serway and Jewett, "Principles of Physics, Fourth Edition". Thomson, Brooks/Cole, 2006.

Optional Text(s)

Material/Technology to be supplied by the student.

Course Requirements/Grading System – describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course; not intended to restrict the individual nature by which each faculty member who teaches the course determines course requirements and final student performance, but should offer consistency within reason for all sections taught for those departments without a standardized format.

Methods of Evaluation:

1. There will be regular homework assignments which will be collected and graded.
2. There will be a laboratory report written for each experiment performed.

3. There will be at least one test given over each major area of study: physics and chemistry.
4. There will be a comprehensive final exam.

The final grade will be computed on the following basis:
Major tests: approximately 50%
Laboratory Reports: approximately 25%
Homework and Final Exam: approximately 25%

Methods of Instruction:

Several teaching methods will be used in this course including:

1. There will be three hours per week used for lectures and demonstrations. These will parallel the presentation of material in the textbook. Lectures will include mathematical descriptions of theories and solution of example problems. Demonstrations will illustrate physical principles as appropriate.
2. Homework reading assignments and problem assignments will be given from the textbook on a daily basis and student questions over this material will be discussed in lecture.
3. There will be a three hour weekly laboratory session. The students will work in small groups to perform demonstration experiments which will illustrate or will write a laboratory report concerning each experiment.
4. There will be regular tests given in lecture (approximately 3 to 5 per semester) to reinforce the student's comprehension of the material discussed in the lecture session.

Approvals – the contents of this document have been reviewed and are found to be accurate.

Prepared by	Signature	Date
Department Head	Signature	Date
Division Chair	Signature	Date
Vice President	Signature	Date