STATE UNIVERSITY OF NEW YORK !
COLLEGE OF TECHNOLOGY !
CANTON, NEW YORK !

MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
PHYS 122 - COLLEGE PHYSICS II

Created by: Feng Hong

Updated by: Feng Hong

Canino School of Engineering Technology !

Department: PHYSICS !

Semester/Year: FALL/2018 !

A. **TITLE**: College Physics II

B. **COURSE NUMBER:** PHYS 122

C. **CREDIT HOURS: (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)**

 # Credit Hours: 3
 # Lecture Hours: 3 **per week**
 # Lab Hours: **per week**
Other: **per week**

Course Length: 15 **Weeks**

D. **WRITING INTENSIVE COURSE**: Yes ☐ No ☒

E. **GER CATEGORY: None:** ☐ **Yes:** GER 2 Natural Sciences !
***If course satisfies more than one*:** GER !

F. **SEMESTER(S) OFFERED: Fall** ☐ **Spring** ☒ **Fall & Spring** ☐

G. **COURSE DESCRIPTION:**

This is the second semester of an introductory college physics course which uses algebra and trigonometry in developing some of the fundamental concepts of classical physics. Topics covered are electrical forces and fields, electrical energy, capacitance and resistance, direct current circuits, reflection and refraction of light, wave optics.

H. **PRE-REQUISITES: None** ☐ **Yes** ☒ **If yes, list below:**

PHYS 121, College Physics I or permission of instructor

CO-REQUISITES: None ☒ **Yes** ☐ **If yes, list below:**

I. STUDENT LEARNING OUTCOMES: (*see key below*)

By the end of this course, the student will be able to:

Course Student Learning Outcome [SLO]	***Program Student Learning Outcome [PSLO]***	***GER*** *[If Applicable]*	***ISLO & SUBSETS***	
a. Understand the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement, and data collection, experimentation, evaluation of evidence, and employment of mathematical analysis	N/A	Understanding of the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of mathematical analysis	2-Crit Think ISLO ISLO	CA Subsets Subsets Subsets
b. Apply scientific data, concepts, and models in physics	N/A	Application of scientific data, concepts, and models in one of the natural sciences	2-Crit Think ISLO ISLO	PS Subsets Subsets Subsets
c. Demonstrate an understanding of the fundamental concepts of electricity and magnetism	N/A	Application of scientific data, concepts, and models in one of the natural sciences	2-Crit Think 1-Comm Skills ISLO	PS W Subsets Subsets
d. Give examples of specific electromagnetic phenomena/applications in nature and in technology that illustrate the basic laws	N/A	Application of scientific data, concepts, and models in one of the natural sciences	2-Crit Think 1-Comm Skills ISLO	W PS Subsets Subsets
e. Understand the fundamentals of optics	N/A	Application of scientific data, concepts, and models in one of the natural sciences	2-Crit Think ISLO ISLO	CA PS Subsets Subsets

KEY	**Institutional Student Learning Outcomes [ISLO 1 – 5]**
ISLO #	**ISLO & Subsets**
1	**Communication Skills** Oral [O], Written [W]
2	**Critical Thinking** *Critical Analysis [CA] , Inquiry & Analysis [IA] , Problem Solving [PS]*
3	**Foundational Skills** *Information Management [IM], Quantitative Lit,/Reasoning [QTR]*
4	**Social Responsibility** *Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]*
5	**Industry, Professional, Discipline Specific Knowledge and Skills**

*Include program objectives if applicable. Please consult with Program Coordinator !

J. APPLIED LEARNING COMPONENT: Yes ☒ No ☐

If YES, select one or more of the following categories:

☒ Classroom/Lab
☐ Internship
☐ Clinical Placement
☐ Practicum
☐ Service Learning
☐ Community Service
☐ Civic Engagement
☐ Creative Works/Senior Project
☐ Research
☐ Entrepreneurship (program, class, project)

K. TEXTS:

Douglas C. Giancoli. Physics curriculum: Physics Principles with Applications. Upper Saddle River, NJ: Pearson Education.

L. REFERENCES:

None

M. EQUIPMENT: None ☒ Needed:

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

- **Exams**
- **Homework**
- **Quizzes**
- **Projects**

P. DETAILED COURSE OUTLINE:

I.Electric Forces and Electric Fields
- **A. Properties of Electric Charges**
- **B. Insulators and Conductors**
- **C. Coulomb's Law**
- **D. Experimental Verification of Coulomb's Force Law**
- **E. The Electric Field**
- **F. Electric Field Lines**
- **G. Conductors in Electrostatic Equilibrium**

II. Electrical Energy and Capacitance
- **A. Potential Difference and Electric Potential**
- **B. Electric Potential and Potential Energy Due to Point Charges**
- **C. Potentials and Charged Conductors**
- **D. Equipotential Surfaces**
- **E. The Definition of Capacitance**
- **F. The Parallel-Plate Capacitor**
- **G. Combinations of Capacitors**

H. Energy Stored in a Charged Capacitor

III. Current and Resistance

A. Electric Current
B. Current and Drift Speed
C. Resistance and Ohm's Law
D. Resistivity
E. Temperature Variation of Resistance
F. Superconductors
G. Electrical Energy and Power
H. Energy Conversion in Household Circuits

IV. Direct Current Circuits

A. Sources of emf
B. Resistors in Series
C. Resistors in Parallel
D. Kirchhoff's Rules and Complex dc Circuits

V. Reflection and Refraction of Light

A. The Nature of Light
B. Measurements of the Speed of Light
C. Huygens' Principle
D. Reflection and Refraction
E. The Law of Refraction
F. Dispersion and Prisms
G. The Rainbow
H. Huygens' Principle Applied to Reflection and Refraction
I. Total I nternal Reflection

VI. Mirrors and Lenses

A. Plane Mirrors
B. Images Formed by Spherical Mirrors
C. Convex Mirrors and Sign Conventions
D. Images Formed by Refraction
E. Atmospheric Refraction
F. Thin Lenses
G. Lens Aberrations

VII. Wave Optics

A. Conditions for Interference
B. Young's Double-Slit Interference
C. Change of Phase Due to Reflection
D. Interference in Thin Films
E. Diffraction
F. Single-Slit Diffraction
G. Polarization of Light Waves

Q. <u>LABORATORY OUTLINE</u>: None ☒ Yes ☐