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

MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
PHYS 132 – UNIVERSITY PHYSICS II

Created by: Dr. Feng Hong

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Canino School of Engineering Technology !

Department: Physics !

Semester/Year: Fall 2018 !

A. **TITLE**: University Physics II

B. **COURSE NUMBER:** PHYS 132

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 calculus based course covers topics in the area or electricity, magnetism and optics. Topics include electric fields, electric potential, conductivity, capacitance, magnetic fields, inductance, DC circuits, EM waves, and optics.

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

PHYS 131 (University Physics I) or 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		2	2-Crit Think ISLO ISLO	CA Subsets Subsets Subsets
b. Apply scientific data, concepts, and models in physics		2	2-Crit Think ISLO ISLO	CA Subsets Subsets Subsets
c. Demonstrate an understanding of the fundamental concepts of electricity and magnetism		2	2-Crit Think ISLO ISLO	CA Subsets Subsets Subsets
d. Give examples of specific electromagnetic phenomena/applications in nature and in technology that illustrate the basic laws		2	2-Crit Think 1-Comm Skills ISLO	W CA Subsets Subsets
e. Understand the fundamentals of optics		2	2-Crit Think ISLO ISLO	CA Subsets 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:

Raymond A. Serway and John W. Jewett (2011). Physics for Scientists and Engineers, 9th Edition. Belmont, CA: Brooks/Cole.

L. REFERENCES:

None

M. EQUIPMENT: None ☐ **Needed:** Technology Enhanced Classroom

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

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

P. DETAILED COURSE OUTLINE:

I. Coulomb's Law and Basic Ideas
A. Inverse square law
B. Electric charge
C. Coulomb's law
D. Electric Field and Potential for Point Charges

II. Conduction and DC Circuits
A. Electric current
B. Current density
C. Conductivity models
D. Ohm's law
E. Thermal coefficient of resistivity
F. Terminal voltage
G. Parallel and series circuits
H. Kirchoff's rules
I. Loop currents

III Electric Fields
A. Vector fields
B. Superposition of electric fields
C. Electric fields for continuous charge distributions

IV. Electric Potential and Capacitance
A. Scalar fields
B. Relative and absolute potential
C. Superposition of potential fields
D. Vector gradient function
E. Electric fields calculated from potential fields
F. Capacitance
G. Energy stored in a capacitor
H. Parallel and series capacitors
I. RC circuits

V. Magnetic Fields
A. Magnetodynamic equation
B. Motion of charges in electric and magnetic fields
C. Boit-Savart law
D. Torques on current carrying loops
E. Magnetic flux
F. Ampere's Law with applications

VI. Magnetic Materials
A. Magnetic susceptibility
B. Ferromagnetism
C. Paramagnetism
D. Diamagnetism

VII. Induction
A. Faraday's law
B. Lenz's law
C. Induced EMF's
D. Self Induction
E. RL circuits
F. Mutual induction
G. RLC circuits
H. AC power

VIII. EM Waves
A. Maxwell's equations
B. Poynting vector
C. Energy and momentum of EM waves
D. EM spectrum

IX. Geometric Optics
A. Reflection
B. Refraction
C. Internal reflection
D. Dispersion

X Physical Optics
A. Polarization
B. Wave interference
C. Diffraction
D. Scattering
E. Resolution

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

N/A