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

MASTER SYLLABUS

PHYS 136 – UNIVERSITY PHYSICS LABORATORY II
CIP Code: 40.0801

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Canino School of Engineering Technology

Physics

Fall 2023

A. **TITLE**: University Physics Laboratory II

B. **COURSE NUMBER:** PHYS 136

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

 # Credit Hours: 1
 # Lecture Hours: per week
 # Lab Hours: 2 **per week**
Other: per week

Course Length: 15 **Weeks**

D. **WRITING INTENSIVE COURSE**: Yes

E. **GER CATEGORY:** GER 2 Natural Sciences
Does course satisfy more than one GER category? If so, which one?

F. **SEMESTER(S) OFFERED:** (*Fall, Spring, or Fall and Spring*) **Spring**

G. **COURSE DESCRIPTION:**

This is a laboratory course to accompany University Physics II (PHYS132). Experiments examine electricity, circuits, resistivity, capacitance and magnitism.

H. **PRE-REQUISITES:**
PHYS 135, University Physics Laboratory I or Permission of instructor

CO-REQUISITES:
PHYS 132, University Physics II or permission of instructor

I. STUDENT LEARNING OUTCOMES:

Course Student Learning Outcome [SLO]	***PSLO***	***GER***	***ISLO***
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	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	1-Comm Skills 2-Crit Think 4-Soc Respons
b. Application of scientific data, concepts, and models in physics	N/A	Application of scientific data, concepts, and models in one of the natural sciences	1-Comm Skills 2-Crit Think

c. Use computer assisted data collection and analysis.	N/A	Application of scientific data, concepts, and models in one of the natural sciences	1-Comm Skills 2-Crit Think

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**

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: N/A

L. REFERENCES:

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

M. EQUIPMENT: Existing physics laboratory equipment will be used.

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

- Lab reports
- Projects
- Participation

P. DETAILED COURSE OUTLINE: N/A

Q. LABORATORY OUTLINE:

1. Ohm's Law
The current voltage characteristic will be obtained for different kinds of devices.

2. Resistivity
The geometric and physical properties of electrical conduction will be found by exploring the IV properties of different conducting wires.

3. Thermal coefficient of resistivity
The resistance of conductors and semi-conducting diodes as a function of temperature will be compared to predictions of the band theory.

4. Oscilloscope
Oscilloscopes will be used to measure voltage, frequency, half peak width and phase shifts.

5. Terminal voltage
The IV power curve will be obtained for the output of a power source with a large

internal resistance.

6. **Potentiometer**
   The characteristics of a voltage divider will be examined. The divider will then be converted into a potentiometer to measure the electric potential of a fruit cell.

7. **Capacitance**
   Time constants will be used to measure the capacitance of series and parallel connected capacitors.

8. **Self Inductance (2 week lab)**
   The self inductance of a coil will be determined using an LC circuit. The result will be compared to theoretical calculations.

9. **RLC circuits**
   Impedance of an RLC circuit is examined as a function of frequency. Resonant conditions are identified.

10. **Optics**
    Reflection & Refraction
    Lenses and Diffraction