MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
PHYS 136 – UNIVERSITY PHYSICS LABORATORY II

Created by: Dr. Feng Hong
Updated by: Dr. Lawretta Ononye

Canino School of Engineering Technology

Department: Physics

Semester/Year: Fall 2018
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: 1 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 a laboratory course to accompany University Physics II (PHYS132). Experiments examine electricity, circuits, resistivity, capacitance and magnetism.

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

   PHYS 135, University Physics Laboratory I or Permission of instructor

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

   PHYS 132, University Physics II or permission of instructor
I. STUDENT LEARNING OUTCOMES: *(see key below)*

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

<table>
<thead>
<tr>
<th>Course Student Learning Outcome</th>
<th>Program Student Learning Outcome</th>
<th>GER [If Applicable]</th>
<th>ISLO &amp; SUBSETS</th>
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<tbody>
<tr>
<td>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</td>
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<td>b. Application of scientific data, concepts, and models in physics</td>
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<td>c. Use computer assisted data collection and analysis</td>
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**KEY**

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

K. TEXTS:

N/A

L. REFERENCES:


M. EQUIPMENT: None ☐ Needed: 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: None ☐ Yes ☒

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