MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
PHYS 126 - PHYSICS LABORATORY II

Created by: Feng Hong
Updated by: Feng Hong

Canino School of Engineering Technology

Department: PHYSICS

Semester/Year: FALL/2018
A. **TITLE:** Physics Laboratory II

B. **COURSE NUMBER:** PHYS 126

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 ☒ 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 College Physics 2, PHYS122. Experiments examine electricity, DC circuits, and optics.

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

   PHYS 122, College Physics II or permission of instructor

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

   PHYS 122, College Physics II
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 [SLO]</th>
<th>Program Student Learning Outcome [PSLO]</th>
<th>GER [If Applicable]</th>
<th>ISLO &amp; SUBSETS</th>
</tr>
</thead>
<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>
<td>N/A</td>
<td>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>
<td>1-Comm Skills 2-Crit Think 4-Soc Respons W CA T Subsets</td>
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<tr>
<td>b. Application of scientific data, concepts, and models in physics</td>
<td>N/A</td>
<td>Application of scientific data, concepts, and models in one of the natural sciences</td>
<td>1-Comm Skills 2-Crit Think ISLO W PS Subsets Subsets</td>
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<tr>
<td>c. Use computer assisted data collection and analysis.</td>
<td>N/A</td>
<td>Application of scientific data, concepts, and models in one of the natural sciences</td>
<td>1-Comm Skills 2-Crit Think ISLO W PS Subsets Subsets</td>
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**KEY**

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

*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:**

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. RC circuits: Measure the charging and discharging behavior of a resistor capacitor circuit.

10. Reflection & Refraction: Rays will be traced for a plane mirror, a cylindrical mirror and a glass rectangular solid.

11. Lenses: Images and object positions are located on an optical bench and used to find the focal lengths of different optical lenses.

12. Diffraction: Diffraction gratings will be used to find the wavelength of spectral lines from gaseous discharge tubes.