Course ID: PHYS R102L
Curriculum Committee Approval Date: 05/10/2017
Catalog Start Date: Fall 2018

COURSE OUTLINE

OXNARD COLLEGE

I. Course Identification and Justification:

A. Proposed course id: PHYS R102L
Banner title: College Physics 2 Laboratory
Full title: College Physics 2 Laboratory

Previous course id: PHYS R102L
Banner title: College Physics 2 Laboratory
Full title: College Physics 2 Laboratory

B. Reason(s) course is offered:
This course satisfies lower division degree and/or transfer requirements for students in science and allied majors such as biology, pre-physical therapy, and architecture. It is the laboratory complement of the PHYS R102 lecture course, and satisfies the CSU GE and UC (IGETC) Lab Experience requirements.

C. Reason(s) for current outline revision:
5 Year Review

D. C-ID:
1. C-ID Descriptor: PHYS 110 (w/ PHYS R102)
2. C-ID Status: Approved

E. Co-listed as:
Current: None
Previous:

II. Catalog Information:

A. Units:
Current: 1.00
Previous: 1.00

B. Course Hours:
1. In-Class Contact Hours:
Lecture: 0 Activity: 0 Lab: 52.5
2. Total In-Class Contact Hours: 52.5
3. Total Outside-of-Class Hours: 0
4. Total Student Learning Hours: 52.5

C. Prerequisites, Corequisites, Advisories, and Limitations on Enrollment:
1. Prerequisites
Current:
PHYS R102: College Physics 2
Previous:
PHYS R102: College Physics 2 or

2. Corequisites
   Current:
   Previous:
   PHYS R102: College Physics 2

3. Advisories:
   Current:
   Previous:

4. Limitations on Enrollment:
   Current:
   Previous:

D. Catalog description:
Current:
This course provides students with opportunities to learn and apply the scientific method through investigations of the phenomena discussed in a college physics lecture. It also introduces students to methods of computer-assisted data analysis.
Previous, if different:

E. Fees:
Current: $ None
Previous, if different: $

F. Field trips:
Current:
Will be required: [ ]
May be required: [ ]
Will not be required: [X]

Previous, if different:
Will be required: [ ]
May be required: [ ]
Will not be required: [ ]

G. Repeatability:
Current:
A - Not designed as repeatable
Previous:
1 -

H. Credit basis:
Current:
Letter Graded Only [X]
Pass/No Pass [ ]
Student Option [ ]

Previous, if different:
Letter Graded Only [ ]
Pass/No Pass [ ]
Student Option [ ]

I. Credit by exam:
Current:
Petitions may be granted: [ ]

Petitions will not be granted: [X]

Previous, if different:
Petitions may be granted: [ ]
Petitions will not be granted: [ ]

III. Course Objectives:
Upon successful completion of this course, the student should be able to:
- A. Design, construct, execute, record, analyze, and interpret the results of a simple scientific experiment intended to measure the value of a fundamental physical quantity or to verify a basic physical principle.
- B. Detect, classify, analyze, quantify, and report sources or causes of random and systematic errors.
- C. Prepare well-designed tables, charts, graphs, or other visual aids to clarify the presentation of experimental results.
- D. Record, tabulate, and graph experimental data using a computer in conjunction with special-purpose laboratory or mathematical software as well as general-purpose programs such as electronic spreadsheets.

IV. Student Learning Outcomes:
- A. Construct a graph of current versus the inverse of resistance to verify ohm's law.
- B. Students will determine the index of refraction of a prism used to disperse white light into the visible spectrum.
- C. Write a detailed report on the particular conditions regarding images formed by converging lenses.

V. Course Content:
Topics to be covered include, but are not limited to:
- A. Electrical and materials safety
- B. Electrostatics investigations
- C. Electric fields and equipotentials
- D. Introduction to the oscilloscope
- E. Ohm’s law
- F. Resistances in series and parallel
- G. Multiloop circuits: Kirchhoff’s rules
- H. Electromagnetic induction
- I. Reflection and refraction
- J. Spherical mirrors and lenses
- K. Polarized light
- L. Optical instruments: The microscope and the telescope
- M. The transmission diffraction grating: Measuring the wavelengths of light
- N. Line spectra and the Rydberg constant
- O. The mass of an electron: e/m measurement
- P. Detection of nuclear radiation: The Geiger counter
- Q. Radioactive half-life

VI. Lab Content:
- A. Electrical and materials safety
- B. Electrostatics investigations

C. Electric fields and equipotentials
D. Introduction to the oscilloscope
E. Ohm's law
F. Resistances in series and parallel
G. Multiloop circuits: Kirchhoff's rules
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VII. Methods of Instruction:
Methods may include, but are not limited to:
A. Briefly discussing basic physical principles and theory applicable to the experiment to be conducted.
B. Demonstrating the assembly, calibration, and safe and proper use of the experimental apparatus.
C. Discussing sources of experimental error and techniques that may be used to minimize error.
D. Helping students to plan data collection and analysis.
E. Supervising students as they operate their apparatus, answering questions as they naturally arise during the course of the experiment or its aftermath.

VIII. Methods of Evaluation and Assignments:
A. Methods of evaluation for degree-applicable courses:
Essays [X]
Problem-Solving Assignments (Examples: Math-like problems, diagnosis & repair) [X]
Physical Skills Demonstrations (Examples: Performing arts, equipment operation) [ ]

For any course, if "Essays" above is not checked, explain why.

B. Typical graded assignments (methods of evaluation):
1. Lab assignments will include detailed investigations of typical physical systems. The students will generally submit the following to be graded:
    a. An outline on what the experiment entailed including the theory, general procedure, and expectations.
    b. A compilation of the data/observations obtained during the experiment. This will include data tables, graphical data, and direct observations.
    c. An analysis of the data obtained. This will include calculations based on the student's data and a comparison to theory.
    d. Answers to essay type questions regarding particular aspects of the experiment.

C. Typical outside of classroom assignments:
1. Reading

a. Before each experiment, students will read about the investigation to be performed, including the underlying theory (principles and likely sources of error) and the experimental procedure itself.

2. Writing
   a. Most lab reports require students to answer short essay-style pre-lab and post-lab questions that require students to anticipate or reflect on conceptual or practical issues that arise during the course of experimentation, and/or to discuss sources and likely magnitudes of experimental error.
3. Other
   a. Students will compile and analyze experimental data using tabular, graphical or computational methods; the results of this process are an integral part of the lab reports that students will submit each week.

IX. Textbooks and Instructional Materials:

A. Textbooks/Resources:
   1. Miller, J.W.. Physics Lab Experiments. Justin Miller , 01-01-2017.
   2. Supplemental handouts for selected experiments prepared by the instructor.

B. Other instructional materials:

X. Minimum Qualifications and Additional Certifications:

A. Minimum qualifications:
   1. Physics/Astronomy (Masters Required)

B. Additional certifications:
   1. Description of certification requirement:
   2. Name of statute, regulation, or licensing/certification organization requiring this certification:

XI. Approval Dates

Curriculum Committee Approval Date: 05/10/2017
Board of Trustees Approval Date: 05/10/2017
State Approval Date:
Catalog Start Date: Fall 2018

XII. Distance Learning Appendix

A. Methods of Instruction
Methods may include, but are not limited to:

B. Information Transfer
Methods may include, but are not limited to: