



# ***PS253 - Physics Lab for Engineers***

Academic Term: Fall 2018  
Credit Hours: # Credits 1  
Mode of Delivery: In Person  
Dates of Term: August 27 -- December 6, 2018  
Class Meetings: 9:10 -- 11:50 am Thursday  
Location: STEM 223  
Instructor: Dr. Darrel Smith

Office Hours: See my website: <http://physicsx.pr.erau.edu/>

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E-mail: smith@erau.edu

## **Course Description & Course Goals**

One three hour laboratory session per week, with experiments complementing the material of PS250. Primarily lab report writing workshop, error analysis, damped harmonic oscillations, spectrometers, optics, atomic physics, thermodynamics and circuit theory.

### **Course Goals:**

- This course is designed primarily for students in the Engineering or Engineering Technology Programs. The students will gain hands-on experience with physical principles through their work with devices such as linear and rotating accelerating systems, lasers, oscilloscopes and fiber optics.
- The novice student will be taught to use the computer for data analysis and control of experimental test work.
- The students will determine how to assess measurement accuracy and how to evaluate the effects of the accuracy of several independent measurements that are used to derive an experimental result.
- Some skills in technical report preparation will be developed.

### **Learning Outcomes:**

After completing this course, students should be able to:

1. Use various electrical and mechanical measuring devices and estimate their accuracy. Use proper significant figures. Properly compute and interpret the mean and standard deviation.
2. Use a computer spreadsheet program for data reduction, statistical analysis and the construction of tables and graphs for presentation of experimental test findings.
3. Use systems that are interfaced to a computer and their control software to conduct automated experiments and obtain data files for use in spreadsheet software.
4. Relate the principles of physics to hands-on experiences with rotating systems, linear motion, fiber optics, lasers, gases under adiabatic compression, DC circuits, diffraction grating spectrometers, gamma ray penetration and many other examples.
5. Present and interpret experimental test results and make inferences based on the quality of the data used to produce the results.
6. Prepare structured technical reports that efficiently and clearly inform the reader about the completed work.

### **Required Course Materials:**

- **Lab Manual, available in the bookstore.**
- **Two lab notebooks**, available in the bookstore. Must be hardbound with nonperforated, non-removable pages. Get the large kind with quad-ruled pages, not composition books.
- **Ink pens.** Data are not to be recorded in pencil.
- **Scientific calculator.**

**You should read the experiment before coming into the lab.** When you do, take notes of everything you do not understand, and be prepared to ask about it.

### **Suggested Supplemental Materials:**

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### **Grading:**

Each lab is worth 10 points, and the formal (technical) report will be worth 20 points. The total number of points you can earn for this lab is 120 points.

≥ 90%	A
80% < 90%	B
70% < 80%	C
60% < 70%	D
<60%	F

## **Course Policies**

You must attend and submit for grading all 10 labs. You must successfully complete 7 out of 10 of the ten-point labs with 70% or better or you will earn an "F" for the entire lab.

## **Access to Learning**

ERAU is committed to access for all students. It is University policy to provide reasonable accommodations to students with disabilities who qualify for services. If you would like to discuss and/or request accommodations, please contact Disability Support Services (DSS). DSS is located on the first floor of Hazy Library, at the end of the hall. You may stop by, call 928/777-6750, or email the director at: [marcee.keller@erau.edu](mailto:marcee.keller@erau.edu)

## **Academic Integrity/Conduct**

Embry-Riddle is committed to maintaining and upholding academic integrity. This includes carrying out one's own course of study within the parameters set by one's instructors, by academic administrators, and by University values. It includes avoiding cheating and plagiarism; maintaining the quest for excellence in study, written assignments, and other academic tasks;

and reinforcing honesty and rigor in all one's academic behavior. All students, faculty, and staff have obligations to reinforce the above and take corrective action when necessary. To report issues of academic integrity, contact (in appropriate order); the course Professor, the academic Department Chair and/or the Dean of the College. For more information about academic integrity, please refer to the academic catalog and your course syllabi.

For more information see the Student Handbook:

<https://prescott.erau.edu/-/media/files/prescott/campus-life/dean-of-students/prescott-student-handbook.pdf?la=en&hash=4A933D54C706D4A969DFFDD66AC05357E3D6820F>

## **Cheating**

On rare occasions, I'm confronted with a case of cheating (or excessive copying) on lab reports and formal lab writeups. If I determine that cheating (or excessive copying) has occurred, my recommendation (for the first offense) is that a student will earn a "zero" for the assignment. If cheating (or excessive copying) by the same person recurs, then my recommendation is that the student will earn a "zero" for their entire lab grade (i.e., for the course).

## **Quick Access to Institutional Policies and Services**

- Civil Rights Equity & Title IX <https://erau.edu/leadership/title-ix/>
- Disability Support Services <http://prescott.erau.edu/about/disability-support>
- Safety and Security <http://prescott.erau.edu/about/security>
  
- Student Handbook <https://prescott.erau.edu/-/media/files/prescott/campus-life/dean-of-students/prescott-student-handbook.pdf?la=en&hash=4A933D54C706D4A969DFFDD66AC05357E3D6820F>
  
- Academic Calendar <http://prescott.erau.edu/campus-life/academic-calendar>
- Institutional Review Board <https://erau.edu/research/resources/irb/>
- Vet Resources <https://prescott.erau.edu/veterans-resources/>

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