

**PHYSICS 2 LAB SECTION 0779**

1 CREDIT

FALL 2017

**INSTRUCTOR:** Dr. Shawn Weatherford

**PHONE:** 352-392-8747

**OFFICE HOURS:** W: 7pm-8pm  
R: 2:00-3:00pm

Office hours will be held online using Canvas conferences or by phone. Appointments are available for additional office hours during regular business hours, using Canvas or via face-to-face in my office, NPB2142. Email Dr. Weatherford in Canvas for availability.

**COURSE WEBSITE:** <http://elearning.ufl.edu>

**Questions about lab materials or course content:** Please use the **discussion boards in Canvas** for all questions about class mechanics or content. If you have a question about the class or subject material, others probably share the same question and posting it to the discussion boards allows everyone to see the question and answer (This is just as if you had raised your hand in class and asked the question). If you use email to ask a general class related question, you will be asked to post your question on the appropriate board, and it will be answered there.

**Personal questions, problems, or appointments:** Please use the **email function in Canvas** to communicate with Dr. Weatherford during the semester, rather than regular university email, except in extreme emergencies. Email, discussion posts, and phone messages will generally receive a reply within 24 hours on the weekdays. Dr. Weatherford will post an announcement when there are times that he is out of reach.

**Technical support:** If you experience difficulties with accessing components of the site, including lectures, quizzes or tests, contact the UF help desk *immediately*. **(352) 392-HELP (4357) | [helpdesk@ufl.edu](mailto:helpdesk@ufl.edu)**

If they are not able to resolve your problem, contact Dr. Weatherford with your help desk ticket number and a description of the problem and steps taken to resolve it. Extensions for due dates will be granted for documented technical problems, as needed.

**REQUIRED TEXT:** There is no required text for this course. All necessary materials will be available through Canvas or purchased through the bookstore (see Lab Materials Kit below).

**LAB MATERIALS KIT AND IOLAB CART:** This course consists of hands-on lab experiments that complement PHY2054. You will be supplied with a Lab Materials Kit for free, mailed to your location. Please notify Dr. Weatherford of your address the first week of classes. You must

purchase an iOLab cart and have this in your possession in time to complete the third lab. There are two options you should consider. If you are using financial aid funds to purchase materials, then the bookstore is your best bet. However, if you are not using financial aid, then you may purchase directly from the retailer, MacMillan.

To purchase directly from MacMillan, go to  
<https://squareup.com/store/macmillanlearning-iolab/>

If you did not take physics 1 lab, there are a few additional items you will need to obtain that are not supplied in the lab materials kit for physics 2 (because they were included in the physics 1 kit). We ask that you obtain the following: 1) Metric tape measure, 2) Multitool, like this one (<http://bit.ly/2vyKZgm>).

Further, we ask that you procure a flashlight like the one found here. The flashlight should have a minimum of 1.5 inch lens: [https://www.amazon.com/dp/B01HZHASJS/ref=sr\\_ob\\_2?s=hardware&ie=UTF8&qid=1502733675&sr=1-2](https://www.amazon.com/dp/B01HZHASJS/ref=sr_ob_2?s=hardware&ie=UTF8&qid=1502733675&sr=1-2)

**COURSE DESCRIPTION:** Laboratory experience for PHY 2054 illustrating the practical applications of electric charge, fields and circuits; electromagnetism, applied electricity; geometrical optics, wave optics, applied optics; electrons and photons; atoms and nuclei. (P)

**PREREQUISITE KNOWLEDGE AND SKILLS:** *Coreq: PHY2054 or the equivalent.*; manual dexterity for performing experimental procedures. You should be familiar with Excel, including how to produce scatter plots from collected data, perform linear fit analysis, and program Excel equations into specific cells. These are skills which were practiced and developed in Physics 1 lab.

**PURPOSE OF COURSE:**

The purpose of the this lab course is to provide students with hands-on experiments that give them the opportunity to:

- observe and make measurements on simple systems studied in physics 2.
- practice performing quantitative analysis of those measurements in order to discover or confirm relationships among the variables involved.
- make predictions about similar systems and make measurements to check those predictions.
- relate the measurements to physical principles in order to determine material constants such as the magnetic dipole moment of a magnet.

**COURSE GOALS AND/OR OBJECTIVES:** *By the end of this course, students will:*

- Be able to identify quantitative and qualitative variables in an experimental investigation.
- Design procedures and carry them out to measure quantitative variables systematically.

- Graph and analyze those measurements via linearization and regression techniques.
- Interpret analysis relative to proposed theoretical principles to determine material and physical constants of the theory.

**INSTRUCTIONAL METHODS:** This course is completely unique! It will consist of 10 labs that give students the opportunity to apply physics 2 concepts. Labs center around data collection with the IOlab, a handheld data-gathering device that communicates wirelessly to its software. Background content will be presented as videos or readings in Canvas. Lab Procedures will be presented as videos or readings in Canvas.

#### **COURSE POLICIES:**

**ATTENDANCE POLICY:** This course is completely remote, but your “attendance” is still important! Because this course is an application course, collaboration with your peers and professor is integral to your success. Timely and engaged responses to discussions and lab work will make the experience easier for everyone. If you wait to the last minute, you may find that help is harder to find.

**MAKE-UP POLICY:** Generally, all lab work including, iOLab data collection and discussion, submission of Excel documents containing data and analysis, completed lab questions are due on Sundays at 11:59pm. Extenuating circumstances will be addressed on a case-by-case basis.

**COURSE TECHNOLOGY:** This course will be offered through the University of Florida’s LMS, Canvas. Students will also be required to install the [IOlab software](#). Students will be required to use Microsoft Excel to analyze data. Familiarity with Excel will be helpful, but not required. If you have not used Excel before, please explore tutorial videos provided by Microsoft on how to use Excel found [here](#).

**LAB DISCUSSION POLICY:** Students are expected to assist each other through the completion of each lab. Students may collaborate in the experimental setup by offering tips and suggestions, but each student must collect his or her own data using the materials found in the lab kit. The process of analyzing and making sense of the gathered data and the experiment are expected to be collaborative. Students will turn in individual assignments and use the discussion boards for all group communication about labs. Lab group communication is expected to be frequent throughout each week and it is graded.

#### **UF Policies:**

**UNIVERSITY POLICY ON ACCOMMODATING STUDENTS WITH DISABILITIES:** Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or

taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

**UNIVERSITY POLICY ON ACADEMIC MISCONDUCT:** Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at <http://www.dso.ufl.edu/students.php>.

**\*\*NETIQUETTE: COMMUNICATION COURTESY:** All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats.

Usually in a lab you have peers around you to collaborate with. For this course, to work and continue being offered, it is important for you to respond to your peers if they have a question.

<http://teach.ufl.edu/docs/NetiquetteGuideforOnlineCourses.pdf>

#### **GETTING HELP:**

For issues with technical difficulties for E-learning in Canvas, please contact the UF Help Desk at:

- [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu)
- (352) 392-HELP - select option 2
- <https://lss.at.ufl.edu/help.shtml>

**\*\*** Any requests for make-ups due to technical issues **MUST** be accompanied by the ticket number received from LSS when the problem was reported to them. The ticket number will document the time and date of the problem. You **MUST** e-mail your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

Other resources are available at <http://www.distance.ufl.edu/getting-help> for:

- Counseling and Wellness resources
- Disability resources
- Resources for handling student concerns and complaints
- Library Help Desk support

Should you have any complaints with your experience in this course please visit <http://www.distance.ufl.edu/student-complaints> to submit a complaint.

#### **GRADING POLICIES:**

Your overall course grade will be determined by your performance on each of the labs and on your participation within your lab group. There are no exams in this course.

## **LABS**

You will complete 10 labs, each worth a total of 10 points. You will have one week to perform the lab and to submit files containing lab data and/or analysis. **Lab files are due on Sundays at 11:59PM EST.** You will submit evidence of completing the lab in order to earn these points according to your performance and success on presenting the following laboratory elements:

**Setup and data acquisition:** Showing diligence in setting up apparatus, carrying out suggested procedures and measurements, and collecting raw data. This will be evaluated by the quality and completeness of raw data sets collected and by the display of this data in tables including their physical units, or plots displaying data collected with the IOlab cart. All data submitted must come from your investigations alone. Students may not use data from other classmates or sources without the explicit approval from Dr. Weatherford.

**Data analysis:** Showing how data is related to theory and its predictions. This will be evaluated from student's construction of properly-labeled spreadsheet tables of theoretically-motivated derived quantities based on raw data and including units, making graphs and doing regression analysis, or other tools as instructed by Dr. Weatherford.

**Conclusions:** Showing an understanding of the physical laws involved and how they are applied. This will be evaluated from interpretations of graphing and regression, from answers to comprehension questions and by making predictions and measurements to check those predictions. Practice academic honesty and attribute contributions of others (using names) when conclusions are informed by discussions involving other individuals.

## **LAB DISCUSSIONS**

High quality scientific discovery is often completed with colleagues, most of whom are located at different research labs across the world. This remote lab course provides students an authentic experience to collect their own data following a common procedure and use these data sets as a framework for making sense of the data and discussing scientific practice with colleagues. Usually, you will focus your discussions on three themes:

- determining if the data you've acquired is appropriate and valid for the experiment
- discussions of techniques or apparatus that will improve the quality and validity of your data, aiming to reduce systematic uncertainty.
- discussions aimed at making sense of the collected data and the interpretations of the instructional document/lesson player.

Weekly discussion questions will accompany most labs to mediate this desired outcome of thoughtful discourse based on your experience completing laboratory exercises.

To begin discussions, each student is required to post certain data sets as described in the lab instructions or indicated in weekly announcements to the discussion board. This posting of data is due no later than **11:59pm on the Thursday before the lab is due.**

**EXTRA CREDIT**

Students may earn extra credit for giving honest feedback on the laboratory experience. Your trailblazing through the remote data collection experience will help the physics faculty identify and assess this new approach to online physics education. Therefore, I will award up to 1 additional point on your course score for taking time to submit notices of bugs, impressions of lab instructions, and other details about the mechanics of the course experience. Future announcements in Canvas will inform you of these extra credit opportunities and the accompanying deadlines for submission for credit.

**EVALUATION SUMMARY**

Letter grades are assigned based on the total points awarded in the course. These points are indications of your achievement of the course-level learning objectives and are from the following experiences:

Completion of 10 labs (10 pts each)	<u>100 points</u>
<b>TOTAL</b>	<b>100 points</b>

Cutoffs for each letter grade are set below. There is no rounding.

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
≥94.0	≥90.0	≥87.0	≥84.0	≥80.0	≥77.0	≥74.0	≥70.0	≥67.0	≥64.0	≥60.0	<60.0

**LAB SCHEDULE**

Module	Release Date	Lab Name
0	8/20/17	Orientation and Introductions
1	8/27/17	Electrostatics: Magic Tape
2	9/3/17	Electrostatics: Pie Plate Demonstrator
3	9/10/17	Equipotential Lines Mapping
4	9/17/17	Resistance and Resistivity
5	9/24/17	Resistivity and Temperature
	10/1/17	Break

6	10/8/17	RC Circuits
7	10/15/17	Magnetic Field Mapping
8	10/22/17	Distance Dependence of Magnetic Field due to a Bar Magnet
9	10/29/17	Induced EMF and Lenz's Law
10	11/5/17	Image formation from Lens

Disclaimer: This syllabus represents current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. These changes will be communicated clearly via announcements on Canvas.