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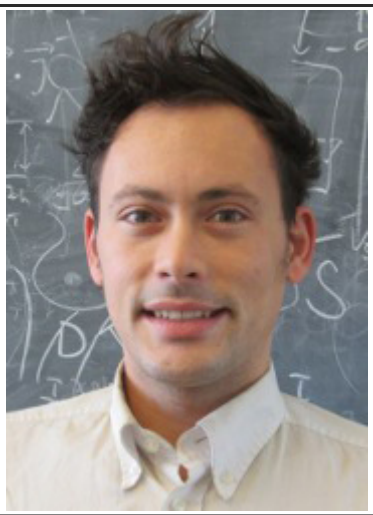
Physics 2 Laboratory

Instructor Information

		
Prof. Silas Hoffman Course Instructor	Mr. Charles Parks Materials Kit Management	Mr. John Mocko IOLab Technical Support
Email (mailto:silas.hoffman@ufl.edu) | Phone: (352) 392-9237	**Email** (mailto:%20parks@phys.ufl.edu) | Phone: (352) 392-0516	**Email** (mailto:%20mocko@ufl.edu) | Phone: (352) 392-0488

Course Description

The Physics 2 Lab online course offers students the experience to complete individual investigations remotely, using the same data acquisition techniques and data analysis as students in campus-based sections. Each student will build the experimental apparatus from materials shipped to them from the physics department (no cost to you), and utilize a sensor cart to collect data for further analysis (rental or purchase option for cart, see below). Collaboration with lab partners is required during the sense-making stage of the analysis. Some labs will differ from the campus-based sections due to cost of apparatus, although care is taken to match the learning outcomes between alternate investigations.

Prerequisite Knowledge and Skills: Basic algebra and trigonometry; manual dexterity for performing experimental procedures.

Credits: 1 credit

Purpose of Course

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

- Observe and make measurements on simple electrical systems.
- 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 mass density or to determine fundamental constants such as the acceleration due to gravity.

Course Objectives

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

1. Identify quantitative and qualitative variables in an experimental investigation,
2. Design procedures and carry them out to measure quantitative variables systematically,
3. Graph and analyze those measurements via linearization and regression techniques, and
4. Interpret analysis relative to proposed theoretical principles to determine material and physical constants of the theory.

Student Expectations

This is a listing of the expectations and standards we have for students enrolled in this course:

- Pay attention to course announcements and email.
- Attend lab meetings scheduled at the time of your lab section to ask questions.
- Post weekly to the discussion board and offer assistance on the boards in addition to answering the questions posed each week.
- Have access to the required material below and work diligently to securing these materials before the first lab starts.
- Read the lab manual and supporting lab module pages, which offer tips and videos for completing each lab.
- Seek assistance from your instructor when you need help.
- Follow the student code of conduct, including the Honor Code, and bear witness to incidents of academic misconduct and report accordingly.

Labs will vary in length and difficulty. Since the labs are done asynchronously and you are building your own apparatus, they will take more time to complete. It will be helpful to have a workspace where you can move the apparatus for periods of time when you are focused on other tasks.

Required Course Materials

This course consists of hands-on lab experiments that complement Physics 2 lecture. The kit consists of disposable materials you will need to complete the course objectives. The kit DOES NOT INCLUDE the iOLab mentioned below. Students are responsible for obtaining an iOLab cart as well. Students are required to:

1. Purchase or rent an IOLab cart. See details below about options
2. Submit a **valid shipping address** to receive a UF Physics 2 laboratory kit.

The kit will be shipped the week of January 18 (if not sooner) via UPS Ground. Kits returned due to incorrect or undeliverable addresses submitted to the shipping information form linked above will cause delay and added costs to students for resending at current rates. Please check that the address entered can receive packages delivered by UPS.

Students utilizing financial aid: It typically takes a week or more into the beginning of the semester for financial aid to be disbursed to student accounts. DO NOT WAIT until the disbursement to order materials. You may utilize the **UF BOOKSTORE DEFERRED PAYMENT PROGRAM (https://www.bsd.ufl.edu/textadoption/studentview/viewbysection/DefProg.aspx)** to order your IOLab

- PURCHASE or RENT an **iOLab cart**
  - Vendor: MacMillian Publishing
  - Purchase Options: Bookstore, **Vendor Website (https://store.macmillanlearning.com/us/product/iOLab-Version-2.0/p/1464101469?searchText=iolab)**
  - Rental Option: **Vendor Website (https://store.macmillanlearning.com/us/product/iOLab-Version-2.0/p/1464101469?searchText=iolab)** (see note below)

Purchase IOLab from the Bookstore

The IOLab is a mobile cart with sensors and probes used to collect data that you will analyze in this course. The bookstore may have these in stock. If not, see below for the next option:

Purchase or Rent the IOLab from MacMillan Student Store

1. Go to the **vendor website (https://store.macmillanlearning.com/us/product/iOLab-Version-2.0/p/1464101469?searchText=iolab)** .
2. Select the triangle (underneath "Format") to reveal a drop down of rental and purchase options.

Assistance

If you need assistance regarding	**then contact the following** (contact info above)

Specific labs, feedback, grading	Prof. Silas Hoffman
Shipment/issues with your lab materials kit	Mr. Charles Parks
Troubleshooting the IOLab cart	Mr. John Mocko
Shipment or returns of IOLab cart	MacMillan Student Store

Canvas Information

Canvas is the where course content, grades, and communication will reside for this course.

- **ufl.instructure.com**
- For issues with Canvas, please contact the **UF Help Desk (http://helpdesk.ufl.edu)** via **email (mailto:helpdesk@ufl.edu)**
- (352) 392-HELP (4357)

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 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.

Your instructor will hold a weekly office hour to offer support regarding completing lab assignments.

Make-up Policy: Generally, lab work including IOLab data collection and completed lab questions are due on Sundays at 11:59PM. Acceptance of late work is consistent with university policies that can be found athttps://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

For a foreseeable absence, it is your responsibility to identify yourself as requiring an accommodation prior to the absence.

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 (http://www.iolab.science/running-application.html)**. Students will be required to use Microsoft Excel to process data.

Lab Group Policy: Students will not have specific lab parter assignments. 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 using the discussion board forum. Students will turn in individual assignments and use the discussion boards for all communication about labs. Communication is expected to be frequent throughout each week and will be evaluated based on the quality of your substantive contributions to the discussion.

University Policies

University Policy on Accommodating Students with Disabilities: Students requesting accommodation for disabilities must first register with the Disability Resource Center (352-392-8565, http://www.dso.ufl.edu/drc (http://www.dso.ufl.edu/drc/)) by providing appropriate documentation. 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 https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/ (https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) .

****Netiquette: Communication Courtesy:** All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats.

https://www.cise.ufl.edu/wp-content/uploads/2019/08/CISE_Netiquette_Guide.pdf (https://www.cise.ufl.edu/wp-content/uploads/2019/08/CISE_Netiquette_Guide.pdf)

COURSE EVALUATION: Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/ (https://gatorevals.aa.ufl.edu/students/) . Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/ (https://urldefense.proofpoint.com/v2/url?u=https-3A__ufl.bluera.com_ufl_&d=DwMFAg&c=sJ6xIWYx-zLMB3EPkvcnVg&r=y2HjEMjRMHJhfdvLrqJZlYczRsfp5e4TfQjHuc5rVHg&m=WXko6OK_Ha6T00ZVAsEaSh . Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/ (https://gatorevals.aa.ufl.edu/public-results/) .

ATTENDANCE AND MAKE-UP POLICY: Excused absences and allowances for make-up work are consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx)) and require appropriate documentation.

Grading

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

LABS

You will complete 9 labs, each worth a total of 11 points. These points may be divided among submissions of data, excel workbooks, and postings to the discussion board. 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 your instructor.

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.

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.

Weekly discussion questions will accompany each lab to mediate this desired outcome of thoughtful discourse based on your experience completing laboratory exercises. Discussions are moderated to ensure posts remain on topic. Any harassment or inappropriate posts will be removed. After a warning, subsequent inappropriate posts will be deleted and the individual will lose access to discussion boards.

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 Friday before the lab is due, however it is to your benefit to post to the discussion board earlier in the week so you can discuss it with other class members. A**

few discussion board tasks require two postings with the first post deadline of Friday and t second post deadline of Sunday. These are noted in the instructions of the applicable discussion boards.

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 9 labs	11 points per lab
Timely submission of mailing address	1 point
TOTAL	**100 points**

Your course grade will not be assigned based on a curve, but based on a percentage of the earned points to the maximum points available. This 100-point fixed scale rounded to the nearest point:

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
94	90	87	84	80	77	74	70	67	64	60	<59.5

Calendar

Wk #	Release Date	Lab #	Lab Name
1-4	1/10/21	0	**SUBMIT MAILING ADDRESS** **Orientation and Inventory Check**
5	2/7/21	1	Electrostatics: Magic Tape
6	2/14/21	2	Electrostatics: Pie Plate Demonstrator
7	2/21/21	3	Equipotential Line Mapping
8	2/28/21	4	Resistance and Resistivity

9	3/7/21	6	RC Circuits
10	3/14/21	7	Magnetic Field Mapping
11	3/21/21	8	Distance Dependence of Magnetic Field due to a Bar Magnet
12	3/28/21	9	Induced EMF and Lenz's Law
13	4/4/21	10	Image Formation from Lens

Disclaimer:This syllabus represents my 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.

Course Summary:

Date	Details	
Sun Jan 17, 2021	Introduce yourself! (https://ufl.instructure.com/courses/419598/assignments/4520450)	due by 11:59pm
Mon Jan 18, 2021	Shipping Information Form (https://ufl.instructure.com/courses/419598/assignments/4520435)	due by 11:59pm
Fri Feb 12, 2021	Confirm Kit Arrival and Inventory Check (https://ufl.instructure.com/courses/419598/assignments/4520451)	due by 11:59pm
	Lab 1 - Magic Tape Video (https://ufl.instructure.com/courses/419598/assignments/4520440)	due by 11:59pm
Sun Feb 14, 2021	Levitating Magic Tape (https://ufl.instructure.com/courses/419598/assignments/4520437)	due by 11:59pm
	Magic Tape Lab Report - U-Tape attracted, L-Tape repelled by foam plate (https://ufl.instructure.com/courses/419598/assignments/4520439)	due by 11:59pm

Date	Details	
	Magic Tape Lab Report - U-Tape repelled, L-Tape attracted to Foam Plate (https://ufl.instructure.com/courses/419598/assignments/4520436)	due by 11:59pm
Fri Feb 19, 2021	Lab 2 - Pie Plate Demonstrator Video (https://ufl.instructure.com/courses/419598/assignments/4520441)	due by 11:59pm
Sun Feb 21, 2021	Lab 5 - Temperature and Resistivity (https://ufl.instructure.com/courses/419598/assignments/4520444)	due by 11:59pm
	Lab 5 - Temperature and Resistivity Report Upload (https://ufl.instructure.com/courses/419598/assignments/4520456)	due by 11:59pm
	Pie Plate Demonstrator Lab Report (https://ufl.instructure.com/courses/419598/assignments/4520438)	due by 11:59pm
Fri Feb 26, 2021	Lab 3 - Equipotential Mapping Discussion Board (https://ufl.instructure.com/courses/419598/assignments/4520443)	due by 11:59pm
Sun Feb 28, 2021	Lab 3 - Equipotential Map (https://ufl.instructure.com/courses/419598/assignments/4520453)	due by 11:59pm
	Lab 3 - Equipotential Mapping Lab Report (https://ufl.instructure.com/courses/419598/assignments/4520454)	due by 11:59pm
Fri Mar 5, 2021	Lab 4 - Resistance and Resistivity Discussion Board (https://ufl.instructure.com/courses/419598/assignments/4520442)	due by 11:59pm
Sun Mar 7, 2021	Lab 4 - Resistance and Resistivity Lab Report (https://ufl.instructure.com/courses/419598/assignments/4520455)	due by 11:59pm
Fri Mar 12, 2021	Lab 6 - RC Circuits Discussion (https://ufl.instructure.com/courses/419598/assignments/4520445)	due by 11:59pm

Date	Details	
Sun Mar 14, 2021	Lab 6 - RC Circuits Excel Spreadsheet Upload (https://ufl.instructure.com/courses/419598/assignments/4520457)	due by 11:59pm
	Lab 6 - RC Circuits Lesson File Upload (https://ufl.instructure.com/courses/419598/assignments/4520458)	due by 11:59pm
Fri Mar 19, 2021	Lab 7 - Magnetic Field Mapping Discussion (https://ufl.instructure.com/courses/419598/assignments/4520446)	due by 11:59pm
Sun Mar 21, 2021	Lab 7 - Magnetic Field Maps Submission (https://ufl.instructure.com/courses/419598/assignments/4520459)	due by 11:59pm
Fri Mar 26, 2021	Lab 8 - Distance Dependence of Magnetic Field Strength Discussion (https://ufl.instructure.com/courses/419598/assignments/4520447)	due by 11:59pm
Sun Mar 28, 2021	Lab 8 - Distance Dependence on Magnetic Field Strength Excel Upload (https://ufl.instructure.com/courses/419598/assignments/4520460)	due by 11:59pm
Fri Apr 2, 2021	Lab 9 - Induction Discussion Post (https://ufl.instructure.com/courses/419598/assignments/4520448)	due by 11:59pm
Sun Apr 4, 2021	Lab 9 - Induction IOLab Lesson File Upload (https://ufl.instructure.com/courses/419598/assignments/4520461)	due by 11:59pm
Fri Apr 16, 2021	Lab 10 - Discussion Thread (https://ufl.instructure.com/courses/419598/assignments/4520449)	due by 11:59pm
Sun Apr 18, 2021	Lab 10 - Data and Comprehension Questions Upload (https://ufl.instructure.com/courses/419598/assignments/4520452)	due by 11:59pm