

2013

331 Modern Physics I Laboratory

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Instructors:

Dr. Justin J. Link
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Room: LND 108

Phone: 745-2854

Hours: MW 9:15-10:15AM, T 10-11 & by appt.

Dr. Stephen Yerian

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Room: LND 104

Phone: 745-3407

Hours: MWF 10-11 AM & by appt.

Course Description: In this course you will learn lab techniques that will assist you in further understanding the material covered in Modern Physics I, PHYS 330. This is a one credit hour lab course and is separate from the PHYS 330 lecture with a separate grade. The topics covered in lab predominately complement the lecture, but a few topics are independent material.

Course Objectives: After completing this course, students should:

- Display intellectual curiosity about and intuition into the processes of the physical universe, with emphasis on discoveries post 1895 to present.
- Display critical thinking skills, especially those skills require for the analysis and synthesis of knowledge pertaining to the physical universe, with emphasis on discoveries post 1895 to present.
- Demonstrate technical proficiency in the principles and techniques of theoretical and experimental modern physics.
- Have a working knowledge of how to manipulate and interpret complex sets of data with the use of computer software such as Microsoft Excel.
- Display effective oral and written communication skills especially with regards to communicating scientific theories and models, data, results, outcomes, and proposals.
- Have a greater appreciation for the rigor, meticulousness, and applications of the discussed scientific material.
- Experience the satisfaction of realizing that physics is everywhere in our daily lives.

Course Requirements and Grading:

Pre-Labs	10%
Lab notebook/summaries	40%
Notebook Exams	15%
Formal Lab Report/ Scientific Paper:	15%
Presentations	10%
Responsible Conduct of Research (CITI Completion)	10%

Attendance is mandatory. All absences must be made up. When possible, absences should be pre-arranged with the instructor at least one week in advance. Two absences without excuse will result in a failing grade for the course.

Pre-Lab reports will be completed in your notebook and must be turned in at the beginning of each lab; otherwise the grade is a **zero**. Directions/guidance for the pre-labs will be given for each lab. Information on the laboratory notebook and the formal lab report will be provided separately. All information will be distributed through blackboard. Students are responsible for coming to lab prepared with all necessary material. **All lab reports turned in late will be penalized 1/3 of a letter grade for each class day late. Per departmental policy, lab reports turned in after 2 weeks from the due date is a zero unless prior arrangements are made.**

General Rules:

1. Do not eat, drink, or smoke in either laboratory.
2. Report any spill of liquids. Wear safety glasses where appropriate. There are special UV absorbing glasses in the spectroscopy laboratory.
3. Be cautious of high voltages required for the photomultiplier tubes, for some of the discharge tubes, and for the x-ray tubes.
4. If you accidentally expose a box of film, notify the instructor.
5. Do not attempt to operate any equipment without prior instruction on its use.
6. Do not attempt to repair equipment without prior consultation with an instructor.
7. Observe radiation hazard warning signs in the x-ray laboratory.

Grading scale:

	87-89 B+	77-79 C+	67-69 D+	Below 60 F
93-100 A	83-86 B	73-76 C	60-66 D	
90-92 A-	80-82 B-	70-72 C-		

Courtesy: Please leave your cell phones, i-Pods, etc. turned off during class.

Modern Physics Fall 2013 Schedule

<u>Week #(Date)</u>	<u>Lab (Group completing the lab that week)</u>
1 (8/27-28)	Introduction and Muon Detector Data (A, B, C)
2 (9/3-4)	Analysis of Muon Detector Data (A, B, C)
3 (9/10-11)	Lab Report Due for Muon Detector Handheld Spectrometer & Intro to Spectrometer (A, B, C)
4 (9/17-18)	Spectrometer with Film (A)/ e/m (B)/ Photoelectric Effect (C)
5 (9/24-25)	Spectrometer with Film (C)/ e/m (A)/ Photoelectric Effect (B)
6 (10/1-2)	Spectrometer with Film (B)/ e/m (C)/ Photoelectric Effect (A)
10/4	Responsible Conduct of Research (CITI Program) to be finished
7 (10/8-9)	No lab: Fall Break Lab Report Due for e/m on 10/11
8 (10/15-16)	Analysis of spectrometer films (A, B, C)
9 (10/22-23)	Exam I (Bring your notebook!!!) & Lab Report Due for Spectrometer
10 (10/29-30)	Electron Diffraction (A)/ X-ray Diffraction (B)/ Hydrogen Deuterium (C)
11 (11/5-6)	Electron Diffraction (C)/ X-ray Diffraction (A)/ Hydrogen Deuterium (B)
12 (11/12-13)	Electron Diffraction (B)/ X-ray Diffraction (C)/ Hydrogen Deuterium (A)
13 (11/19-20)	Hydrogen Deuterium Lab Report Due Diffraction Analysis (A, B, C)
11/25	Paper Due on the Photoelectric Effect
14 (11/26-27)	No Lab: Thanksgiving
15 (12/3-4)	Exam II (Bring your notebook!!!) Electron and X-Ray Diffraction Lab Reports Due
16 (12/10-11)	Presentations