

PHY357: Intermediate Laboratory
Spring 2009
SUNY College at Cortland - Physics Department

Course Description:

Intermediate Laboratory is a laboratory experience stressing precise experimental measurement using a variety of instruments and covering various branches of physics.

Two 3-hour laboratories. (3 cr. hr.) Prerequisite: Consent of department.

Course Information:

Laboratory Tue,Thu 8:30am-11:20am, Bowers 140

Professor Information:

Dr. Aphrodite Ahmadi, Assistant Professor of Physics

Office: Bowers 133 (Phone: 607-753-2919 **Emergency only**)

Email: Aphrodite.Ahmadi@Cortland.edu

Office Hours: Mon, Wed. 10:30am-11:30am and 12:00pm-1:00pm or by appointment

Attendance Policy:

Class attendance is mandatory. Missed classes (50-100% for the missed lab) and tardiness (10%) will count against your grade.

Required Text:

Physics 357 Intermediate Laboratory Lab Manual, Richard M. Wheeler, available in the College Store.

Evaluation of Student Grade:

Students will complete at least twelve laboratories, more if assigned.

Students will work in pairs. The laboratories are of little value if you let your partner do all the work. This laboratory is an important learning exercise; do your own work. Be aware that being late for class places your laboratory partner at a disadvantage.

Each group will maintain a laboratory notebook separate from the laboratory manual. Use a three-ring binder so material can be added and removed. Graph paper is supplied where appropriate in a laboratory exercise, but you should supply additional graph paper where needed; it should be linear graph paper with 10 lines to the inch.

This notebook will be graded after every third laboratory. If you hand in your laboratory book late, it will affect your grade (10%). In most cases we will do one laboratory per week. You will normally take data on the first day, and complete your report on the second day. I expect you to be finished with each laboratory at the end of the week.

The final grade in the course will be determined from the instructor's evaluation of: (1) the student's laboratory notebook, and (2) the student's performance in the laboratory. If the course is taken WI the writing assignments must be completed to receive credit for the course.

Laboratory Reports

Your laboratory reports should not be a rehash of the laboratory manual. I can read that as well as you can. Your laboratory report should contain the following sections:

1. Introduction: a short paragraph to motivate your experiment in your own words (Why is this experiment of importance? Why should the reader read this report? **This is a very important part of your report!**).
2. Procedures and data acquisition: a clear description of what procedures you followed and what data you took.

3. Calculations: what calculations you made.
4. Results and discussion: the results you obtained and the error associated with your results.
5. Conclusion: a final short paragraph stating your conclusion in your own words (What did you learn from this experiment? How important is your finding? Why was this experiment worth doing? **This is also a very important part of your report!**).

Here are a few important considerations:

1. The report should be presented in the order in which the results were obtained:

- A. Present the data with appropriate units.
- B. If there are multiple data entries, tables should be used.
- C. Calculations should follow.
- D. Necessary graphs should follow the calculations.
- E. Error analyses should be made for every calculated quantity.
- F. Conclusions should be drawn.
- G. If there are several sections to a laboratory they should appear sequentially.

2. Where applicable the student will use EXCEL to make graphs.

3. The student will use Graphical Analysis to do regression analysis of data.

4. Do not present data without the required calculations.

The write up will always specify what you should be doing. If you do not read the laboratory manual and include all calculations you will be penalized (10%). This is your responsibility.

5. Do not put graphs at the end of the report, they should always be imbedded in the report.

6. The report should stand on its own and be readable by an uninterested party.

If, in my estimation, a third person cannot understand what you have done, then the report is unacceptable. Thus a word to the wise, read your own report and be able to understand it.

With Writing Requirement

If you are taking this course WI then you will be responsible for two papers, each paper 1500 words in length. **The first is due the last class day of February. The second is due the last day of class in March. I will not accept late assignments.** If you want WI credit, you will adhere to this schedule. The papers are to be written with a word processor, double spaced, with a minimum of equations and/or figures. The topics are to be scientifically related, but not necessarily related to the laboratory experiments. You must use a spell checker and I encourage you to use the grammar checker too. If I find a misspelled word, I will hand the paper back immediately. You should read what you have written. I will correct the papers and then meet with you to discuss my findings and recommendations. I will hand your paper back to you and ask for revisions so long as there are corrections to be made.

Experiments

- 1 Data Distributions - room 140
- 2 Goodness of Fit - room 140
- 3 Method of Least Squares - room 140
- 4 Wave Motion - room 140
- 5 Speed of Light - room 139
- 6 E/M - room 134
- 7 Properties of Lenses - room 128
- 8 X-Ray Production - room 140
- 9 Meteor Impact – room 140
- 10 Light and the Laser - room 140
- 11 Low Voltage - room 140
- 12 Concave Grating Spectrometer - room 134
- 13 Microwaves - room 140

Tentative Schedule

The first class day is Thursday Jan. 22. I will discuss the procedures we will follow and outline the various laboratories on which you will work.

Be sure you have read the first laboratory for Tuesday Jan. 27. We will call this week 1.

The first three labs (1,2,3) will be presented by you. I will assign the labs to you on the first day of class (Thursday Jan. 22). Lab 1 is the longest one and will be divided into three parts for three students to present. Your presentation should be short (10 minutes at most). You want to describe the lab to your friends, so read and understand the labs before coming to class.

Never come to the laboratory without knowing and having read the laboratory on which you will be working.

Week	Exp. for Pair 1	Exp. for Pair 2	Exp. for Pair 3
1:T(Jan 27), R(Jan 29)	1	1	1
2:T(Feb 3)	2	2	2
2:R(Feb 5)	3	3	3

First Three Labs (1, 2, 3): due Tuesday, February 10

3:T(Feb 10), R(Feb 12)	4	5	6
4:T(Feb 17), R(Feb 19)	5	6	4
5:T(Feb 24), R(Feb 26)	6	4	5

Second Three Labs (4, 5, 6): due Tuesday, March 3

6:T(Mar 3), R(Mar 5)	9	9	9
7:T(Mar 10), R(Mar 12)	Spring Break	Spring Break	Spring Break
8:T(Mar 17), R(Mar 19)	7	8	10
9:T(Mar 24), R(Mar 26)	8	10	7
10:T(Mar 31), R(Apr 2)	10	7	8

Lab 9 plus Third Three Labs (7, 8, 10): due Tuesday, April 7

11:T(Apr 7), R(Apr 9)	11	12	13
12:T(Apr 14), R(Apr 16)	12	13	11
13:T(Apr 21), R(Apr 23)	13	11	12

Last Three Labs (11, 12, 13): due Tuesday, April 28

14:T(Apr 28), R(Apr 30)	Short Presentation	Short Presentation	Short Presentation
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The last week of class is free. Finish whatever you have not finished. I will not accept laboratory reports past Thursday May 7.