

Syllabus

**Course**: P209B_001  **Monday** 2 – 4:40 pm  Darwin Hall 311

**Instructor**: Dr. So Young Han, hanso@sonoma.edu, www.sonoma.edu/users/h/hanso/

**Office Hours**: MWR : 10 – 10:45 am Darwin 300B, Tel.:664-3242

**Course Description**: The laboratory component of the algebra based physics P210B. Students are developing their ability to perform measurements of physical phenomena and to increase their appreciation of the sense of the physical universe gained through experimentation. It covers electricity and magnetism, waves and optics.

**Prerequisite**: P209A or P116 and previous or concurrent enrollment in P210B.

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**University Policies**

There are important University policies that you should be aware of, such as the add/drop policy; cheating and plagiarism policy, grade appeal procedures; accommodations for students with disabilities and the diversity vision statement.  [http://www.sonoma.edu/uaffairs/policies/studentinfo.shtml](http://www.sonoma.edu/uaffairs/policies/studentinfo.shtml)

**Accommodations for Students with Disabilities**

If you need disability related accommodations for this class, such as a note taker, test taking services, special furniture, use of service animal, etc., please contact the office of Disabled Student Services (DSS) located in Salazar Hall, Room 1049, Tel: 664-2677

www.sonoma.edu/UAffairs/policies/disabilitypolicy.htm

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**Objective**: 

1. Reinforce physics concepts learned from lectures with hand-on experiments.

2. Develop an ability to design and perform physics experiments and use scientific instrumentation.

3. Practice analyzing and interpreting experimental data within the context of theory.

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**In this class especially,**

1. Your goal is **not** to blindly following lab procedures, generate preliminary results, and leave.

2. You are the main operator in this lab. You need to know what you are doing during each step of your action.

3. Always try to obtain the best results. Don’t be satisfied with a proper/expected result. Think about how you can make your measurements better.

4. The group with the best results (in an acceptable time frame) will be rewarded bonus points.

5. When you obtain data from your measurement, think about what the results imply and what could have been errors in your measurements. How could you fix the possible source of error? If you can obtain **logical scientific reasoning** for your errors/and results, you will be also rewarded bonus points.

6. Your laboratory manual and instructor are only for your guidance. The given procedure in the manual is only an outline and you are encouraged to upgrade/ modify.
**Materials to bring:** Lab worksheet (From the instructor during lab.)
- Pre-lab report (The completed work will be collected at the beginning of each lab.),
- Lab Manual for guidance (You can purchase in class during the 2nd week.),
- Lab Notebook with permanent binding
- Calculator and a memory stick

**Attendance:**
Attendance is mandatory. To pass you cannot miss 3 labs or more. You can make up only one lab at the end of the semester.
1 point will be deducted from the lab worksheet score for students showing up late (15 minute). It is your responsibility to check in for late attendance.

**Grade:**
- Pre- Lab report 15%
- Lab worksheet (one per group) 40%
- Daily quiz 20%
- Individual Lab Report 15%
- Lab Notebook 10%

A [93 above, A- [92-89], B+ [88-86], B [85-83], B- [82-79], C+ [78-76], C [75-73], C- [72-69], D [68-60], F [Below 60]

*([www.sonoma.edu/users/h/hanso/](http://www.sonoma.edu/users/h/hanso/))
Most communication and the important dates will be posted on this web page. Check the instructor’s website frequently.

* In the Lab Texting or using personal laptops is not allowed. Lab computers should be only used for the laboratory activity.

* Lab Note Your lab-note will be collected 2 times throughout the semester.
Record all information obtained during the lab. Use it for lecture notes, diagrams, and relevant information. Keep tract of all data, calculation, discussion with partners, and other idea.

[Your Lab Note should include...]
- The table of content with date and title of experiment
- Title of the experiment, Date, and all partners' names participated.
- Outline the plan for the experiment and the steps taken to conduct it.
- Simple sketch: the experiment setup and equipments with labels.
- Write down raw data and calculations. Also sketch graphical data.

* Lab worksheet (10point each)
You may get the lab worksheet from the instructor at the beginning of each lab. Complete the worksheet at least 15 minute before the lab ends.
Turn in one lab worksheet per group before taking a quiz.

* Individual lab report
You need to complete 1 formal individual lab reports this semester. You may submit a late report no later than 1 week after the due. You will have 10% grade deduction for late works. Your lab report should be typed, single-spaced with font size 12, and more than 3 pages.

* Quiz We will have a quiz at the end of each lab. The daily quiz covers pre-lab report, lab introductory lectures, and lab procedures. You cannot make up a missed quiz.

*Grades* are based on an absolute scale, not a curve.
# Tentative Schedule

<table>
<thead>
<tr>
<th>Week of</th>
<th>Date</th>
<th>Lab Topic</th>
<th>Notes</th>
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<tbody>
<tr>
<td>W1</td>
<td></td>
<td>No lab this week!</td>
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<tr>
<td>W2</td>
<td>Aug 31</td>
<td>Lab 1. Introduction and EXCEL</td>
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<tr>
<td>W3</td>
<td>Sep 7</td>
<td>Labor day Holiday</td>
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<tr>
<td>W4</td>
<td>Sep 14</td>
<td>Lab 2. Waves1; SHM, Data Studio</td>
<td>Lab note Due</td>
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<td>W5</td>
<td>Sep 21</td>
<td>Lab 3. Waves2; String Standing Wave</td>
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<td>W6</td>
<td>Sep 28</td>
<td>Lab 4. Static Electricity: Charge, Force, Potential and Fields</td>
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<td>W7</td>
<td>Oct 5</td>
<td>Lab 5. Electric Resistance and Ohm’s Law</td>
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<tr>
<td>W8</td>
<td>Oct 12</td>
<td>Lab 6. DC Circuit (Individual Report1)</td>
<td>Report 1 Due</td>
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<td>W9</td>
<td>Oct 19</td>
<td>Lab 7. Magnetic Fields of a solenoid</td>
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<td>W10</td>
<td>Oct 26</td>
<td>Lab 8. Magnetic Fields of Helmholtz Coils</td>
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<td>W11</td>
<td>Nov 2</td>
<td>Lab 9. Geometric Optics: Properties of Light</td>
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<td>W12</td>
<td>Nov 9</td>
<td>Lab 10. Thin Lenses</td>
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<td>W13</td>
<td>Nov 16</td>
<td>Lab 11. Wave Optics 1</td>
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<td>W14</td>
<td>Nov 23</td>
<td>Thanksgiving Holiday</td>
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<tr>
<td>W15</td>
<td>Nov 30</td>
<td>Lab 12. Wave Optics</td>
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<tr>
<td>W16</td>
<td>Dec 7</td>
<td>Lab 13. Make up lab</td>
<td>Lab note Due</td>
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### [Individual Lab Report Format]

**Title**

**Date:**

**Name:**

**Partners:**

**Purpose and Objectives**

Short abstract and objective of the lab. (~1-2 sentences)

**Concepts and Theory**

Describe concepts and theory used in the lab. What is the physics behind the lab? Include all physics equations and constants used. Use complete sentences. A list of topics (or bulleted topics) is not good enough. (~1/2 of page)

**Equipment and Setup**

List of all equipments used

Sketch a diagram of the instrument set up with labels

**Procedures**

1. Describe each step of experiments.
2. Number each step.

**Data and Data analysis**

All data should be labeled and should have proper units.

Present raw data and calculated values neatly using available tools such as tables and graphs.

**Discussion and Conclusion**

Compare your data with theory. Evaluate your data.

What is a possible source of error? How can you improve your measurement? (Be specific and explain. ‘human error’ or ‘being careful’ is not good enough.)

This part should be at least ½ of page long.

**Do your part.**

What was your role in the group. (Write down what you did physically in the lab.)

### Lab Procedures

- Turn in Assignments
- Lab Introductory Lecture
- Planning and Instrument Set up
- Measurements
- Short Calculation & 2nd Measurement
- Data Analysis and Evaluations
- Discussion and Developing Concepts
- Turn in Worksheet
- Take a Quiz