Syllabus Spring 2015 SSU

Course: P116 Thursday 1 – 3:40 pm Darwin Hall 308
Instructor: Dr. So Young Han, hanso@sonoma.edu, www.sonoma.edu/users/h/hanso/
Office Hours: M W : 11 – 11:50 am, Darwin 300B, Tel.: 664-3242

Course Description: The laboratory component of the calculus based physics P114. It covers classical mechanics, momentum, energy conservation and rotation.

GE: Category B1 or B3 and GE laboratory requirements.

Prerequisite: Previous or concurrent enrollment in P114

Objective:

1. Reinforce physics concepts learned from lectures with hands-on experiments.
2. Develop ability to design and perform physics experiments and use scientific instrumentation.
3. Practice analyzing and interpreting experimental data and compare them with theory.
4. Prepare future experimental physicist
5. Practice leadership and cooperative working skills.

Attitudes in this lab:

1. Your goal is not 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 in 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 it 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 (Down load it from the web and finish it before labs),
- Lab Notebook with permanent binding (Points deduction for not bringing to the lab)
- 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 for late attendance.

**Grade:**
- Pre- Lab report 20%
- Lab notebook 10%
- Lab worksheet (one per group) 50%
- Individual Lab Report 20%

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/)*
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 graded 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 equipment with labels.
- Write down raw data and calculations. Also sketch graphical data.

* Lab worksheet (10point each) You will 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.

* Individual lab report You need to complete 2 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 3pages.

*Grades Your Grade is based on an absolute scale, not a curve.
Tentative Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lab Topic</th>
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<tbody>
<tr>
<td>W1</td>
<td>Jan 22</td>
<td>No lab this week!</td>
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<tr>
<td>W2</td>
<td>Jan 29</td>
<td>Lab 1. EXCEL and DATA Studio</td>
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<td>W3</td>
<td>Feb 5</td>
<td>Lab 2. 1D Motion: Gravitational Acceleration</td>
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<td>W4</td>
<td>Feb 12</td>
<td>Lab 3. Vectors and Force Table</td>
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<td>W5</td>
<td>Feb 19</td>
<td>Lab 4. Newton’s Laws of Motion (Individual Report 1)</td>
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<td>W6</td>
<td>Feb 26</td>
<td>Lab 5. 2D Motion</td>
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<td>W7</td>
<td>Mar 5</td>
<td>Lab 6. Frictions</td>
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<td>W8</td>
<td>Mar 12</td>
<td>Lab 7. Energy</td>
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<td>W9</td>
<td>Mar 19</td>
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<td>W10</td>
<td>Mar 26</td>
<td>Lab 8. Momentum (Individual Report 2)</td>
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<td>W11</td>
<td>Apr  2</td>
<td>Lab 9. Ballistic Pendulum</td>
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<td>W12</td>
<td>Apr  9</td>
<td>Lab 10.1. The Rocket</td>
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<td>W13</td>
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<td>Lab 10.2. Rocket Launch</td>
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<td>W14</td>
<td>Apr 23</td>
<td>Lab 11. Rotational Motion</td>
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<td>W15</td>
<td>Apr 30</td>
<td>Lab 12. Pendulum</td>
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<tr>
<td>W16</td>
<td>May  7</td>
<td>Lab 13. Make up</td>
</tr>
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Spring Break

[Individual Lab Report Format]

Title: 

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 equipment used
Sketch a block 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.
Show all calculation and works. (Ex) 2.0 x 3.0 = 6.0
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.)