PHYS 180L
Engineering Physics I Lab
Fall 2013

Instructor: Dr. Thomas Herring  Phone: 445-4277
Office: CED 310  Email: thomas.herring@wnc.edu
Office Hours: M 10:00 am – 11:00 am
              T 2:30 pm – 4:00 pm
              W 5:30 pm - 6:30 pm
              Th 2:30 pm – 4:00 pm

Text: No required text. Laboratory materials will be provided during each lab session.

Prerequisites: MATH 181  Co-requisite: PHYS 180
Meeting Times: M or W 1:00 pm – 3:45 pm
Grading:

Lab Summaries 55%
Lab Notebook 15%
Formal Lab Reports (best 2 of 3) 30%

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
<th>Description</th>
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<tbody>
<tr>
<td>A</td>
<td>95% - 100%</td>
<td>73% - 75% C</td>
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<tr>
<td>A-</td>
<td>90% - 94%</td>
<td>70% - 72% C-</td>
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<tr>
<td>B+</td>
<td>86% - 89%</td>
<td>66% - 69% D+</td>
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<tr>
<td>B</td>
<td>83% - 85%</td>
<td>63% - 65% D</td>
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<tr>
<td>B-</td>
<td>80% - 82%</td>
<td>60% - 62% D-</td>
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<td>C+</td>
<td>76% - 79%</td>
<td>Below 60% F</td>
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Group Work: Nearly all of the work in the laboratory will be done in groups. Groups will consist of no more than 3 students. The instructor may change the composition of groups at any time. Discussion amongst groups is expected and encouraged but each group must perform their own measurements and submit their own original lab summaries and formal lab reports. Only in the case of limited equipment and with the instructor’s consent will groups of more than 3 be allowed to perform experiments as a single unit.

Lab Summaries: Lab summaries will be due at the beginning of the next lab session (before starting the next lab assignment) and will be graded on a 10 point scale. Each group should hand in one completed summary for each lab session. Each lab summary will consist of a brief written report that addresses each of the following questions regarding the experiment(s) from that session, in a narrative format (don’t just give me one line for each of these items).
What principle(s) of physics are you investigating?
What hypothesis/hypotheses have you proposed to test during this session?
What data will you gather to perform the experiment? (Note, you do not need to include the actual data gathered, just a list of data which were measured during the session).
What quantities did you calculate and what formulas were used? (Note, you do not need to show actual calculations, just formulas for quantities which define how those quantities relate to measured data).
What conclusion(s) can be drawn from your experiment(s), particularly but not limited to the validity of your hypothesis/hypotheses?
In what ways could your experiment be improved and/or changed to improve the accuracy and/or precision of your results?

At some time(s) during the lab session, as directed by the instructor or lab assistant, a class wide discussion of some or all of the above questions will take place. Each individual student’s contribution to this discussion will be observed by the instructor and will ultimately carry the weight equal to one lab summary in the determination of the lab summary portion of the grade.

**Lab Notebooks:** Each student should independently keep a lab notebook to record the details, data, and their observations about the experiment(s) carried out during each lab session. This also ensures that every student has their own record of the experiments in which they have participated during the course. Lab notebooks will be reviewed at random by the instructor and a grade will be recorded for each student individually. There will be at least 4 reviews of each student’s lab notebook. The score from each review will carry equal weight towards the determination of the grade. Also, a measure of participation as a part of your group, as determined by the instructor’s observations during the lab sessions, will carry the weight of one review of the lab notebook in the lab notebook portion of the grade.

The detailed contents of the lab notebook will not be the basis for the grade. Rather, the grade will be based upon the completeness of the record and the ease with which the student can retrieve details from the notebook when asked to do so. For example, the instructor might ask a student to show their uncertainty in a calculated quantity from the 2nd lab session during a review which is taking place during the 10th lab session. The student’s lab notebook should be organized in such a fashion that the retrieval of such details is a trivial task for the author of the notebook (not necessarily the instructor or some other student). The completeness of the lab notebook is also an indication of participation by the student and will be reflected in the aforementioned participation score which factors into the lab notebook portion of the grade.

**Formal Lab Reports:** Three experiments throughout the semester will require the submission of a formal lab report. Your group will choose one of the lab assignments from each of three sections (as indicated on the lab schedule posted online and in the lab on the bulletin board) and write a formal report about that topic. Details on how to write a formal lab report will be covered in class. An example lab report will also be provided. The information recorded in the lab notebook, including not only data but also experimenter observations, will be invaluable in the construction of the formal lab reports. Due dates will be posted on the lab schedule and are subject to change. If group members report that any member of their group is not contributing equally to the production of the formal lab reports that group member’s score on the report may be adjusted by the instructor to reflect their level of contribution. The instructor is required to speak with all members of the group, either individually or together, before any such adjustment will be made. The best two scores of the three submitted reports will count towards the final grade.
**Makeup Policy:** Three lab sessions during the semester will be reserved for making up any missed lab sessions. No additional lab makeup will be available. **If you have notified the lab assistant or instructor in advance that you will miss a lab session you will be allowed to make up the lab you missed.** No work will be accepted after the due date.

**Extra Credit:** There is no extra credit available.

**Dishonesty in Class:** I don’t anticipate any problems but here’s the policy anyway. Any dishonesty/cheating will result in an F in the course.

**Class Conduct:** Please be respectful of the learning environment, your fellow students, the instructor, and any visitors. This includes entering and leaving the room quietly (especially if arriving late or leaving early), silencing cell phones during class (just leave the room if you need to take the call), and engaging in side conversations not relevant to the course material.

**Lab Safety:** The safety of everyone in the lab is the collective responsibility of all participants. Students are required to observe all posted signs and follow any directions given by the instructor or lab assistant. Any behavior deemed dangerous or inappropriate by the instructor or lab assistant will be immediately halted. If you observe unsafe behavior taking place you must inform the instructor or lab assistant as soon as possible. Failure to comply with matters of safety will result in the expulsion of the violator from the lab for the remainder of that lab session and the loss of any course credit for the associated lab summary.

**Disability Statement:** WNC supports providing equal access for students with disabilities. Susan Trist (DSS Coordinator) is available to discuss appropriate academic accommodations that students may require. Please meet with me and contact Susan (445-3278) if you might require any accommodation.

I: **Catalog Course Description**
Explores vectors, rectilinear motion, particle dynamics, work and energy, momentum, rotational mechanics, oscillations, gravitation, fluids, wave properties and sound. Students must co-enroll in both lecture and lab to receive credit.

II: **Course Objectives**
Upon successful completion of PHYS 180L, the student will perform with a minimum accuracy of 80 percent, the following objective:

- Apply the scientific method to experiments in the laboratory.
- Develop procedures and observational skills as data is taken and gain a fundamental understanding of simple and complex apparatus used in the experiment.
- Apply analytical techniques, statistical analysis, graphical analysis, spread sheet data/recording to the experiments.
- Verify the theoretical ideas and concepts covered in lecture by completing a host of experiments.
- Take the time to discuss the procedure, the data, and the results of the experiment with the lab partner.

III: **Course Linkage**
Linkage of course to educational program mission and at least one educational program outcome.

**General Education Mission:** PHYS 180L is a general education class that promotes the development of knowledge, skills, and attitudes that will benefit students in their personal and professional endeavors.

**General Education Student Learning Outcome:** Students who successfully complete PHYS 180L satisfy the general education learning outcome of having problem solving, creative, and critical thinking skills. In addition, students will understand the methods of science and the role of science and technology in the modern world.

**Program Mission for AA/AS degree:** PHYS 180L satisfies the A.A./A.S. degree mission by providing academic knowledge and skills for successful transfer to meet higher educational goals.

**Program Student Learning Outcomes for AA/AS degree:** Students who successfully complete PHYS 180L will know the subject matter appropriate to the emphasis of the degree.