PHYS 182L
Engineering Physics III Lab
Spring 2014

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 2:00 pm – 3:45 pm
W 5:30 pm - 6:45 pm
Th 2:00 pm – 3:45 pm
F By Appointment

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

Prerequisites: PHYS 180  Co-requisite: PHYS 181L

Meeting Times:
T 7:00 pm – 9:45 pm

Grading:
Lab Summaries 35%
Lab Discussions 20%
Lab Notebook 10%
Formal Lab Report (Lead Author) 25%
Formal Lab Reports (Contributor) 10%

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade</th>
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<tbody>
<tr>
<td>95% – 100%</td>
<td>A</td>
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<tr>
<td>90% - 94%</td>
<td>A-</td>
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<tr>
<td>86% - 89%</td>
<td>B+</td>
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<tr>
<td>83% - 85%</td>
<td>B</td>
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<tr>
<td>80% - 82%</td>
<td>B-</td>
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<tr>
<td>76% - 79%</td>
<td>C+</td>
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<td>73% - 75%</td>
<td>C</td>
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<tr>
<td>70% - 72%</td>
<td>C-</td>
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<td>66% - 69%</td>
<td>D+</td>
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<td>63% - 65%</td>
<td>D</td>
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<td>60% - 62%</td>
<td>D-</td>
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<tr>
<td>Below 60%</td>
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Group Work: Some of the work in the laboratory will be done in groups. Groups will consist of no more than 2 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 work. In some cases limited equipment will force larger groups to work together. These instances will be indicated by the instructor. In such cases each original lab group should still submit their own work.
Lab Summaries: Lab summaries will be due at the beginning of the lab no later than two weeks after the session in which the experiments were performed and will be graded on a 10 point scale. 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 or a bullet point list 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 measured physical properties which were measured during the experiment).
- 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 calculated quantities relate to measured physical properties of the system).
- What conclusion(s) can be drawn from your experiment(s), particularly but not limited to the validity of your hypothesis/hypotheses? Back this up by interpreting your data.
- In what ways could your experiment be improved and/or changed to improve the accuracy and/or precision of your results?

The average of the lab summary scores will count for 35% of the final grade.

Lab Discussions: At the beginning or end of each lab session we will take time as a class to discuss the experimental design, measurement techniques, data analysis and results of each experiment. For each of these sessions a facilitator will be assigned to take notes and provide a summary of the discussion. Within one week after the discussion a draft of the discussion summary should be provided to the rest of the class for editing and comments. Two weeks from the discussion the facilitator should submit a final discussion summary to the instructor. Each student should submit at least one such summary. The highest score of all submitted summaries will count for 20% of the final grade.

Lab Notebooks: Each student should independently keep a lab notebook to record the details concerning, experimental 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. Reviews of lab notebooks will be scored from 0 – 5 where zero is a completely missing record and 5 is a complete, coherent, and easily retrieved record.
Formal Lab Reports: 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. The structure of these reports is more formal than the summaries and will be discussed at length in class.

Formal Lab Lead Author: Each student should submit one formal lab report as the lead author. Other members of the group should be in the author list but the lead author should be listed first. The formal lab report is due no later than the lab session during the 14th week of class. Members of a lab group must choose different experiments for the topics of their formal lab reports. The lead author must submit a draft to the other members of the lab group no later than the 12th week of the semester so that they can provide contributor reports as detailed below. The lead author is responsible for submitting these reports with their final paper. The report will be scored on a scale of 1-100 and count for 25% of the final grade.

Formal Lab Contributor: Each lab group member is required to provide substantive feedback on each other group member’s formal report draft. Copies of the draft should be made available to the contributors no later than the lab session during the 12th week of classes. The feedback on the draft should be submitted to the lead author in written form. Each contributor should identify specific contributions they have made to the lead author’s paper when writing their contributor report. The contributor reports will be scored from 1-10 and the average will count for 10% of the final grade.

Makeup Policy: Two to three lab sessions during the semester will be reserved for making up any missed lab sessions. No additional lab makeup will be available. Only 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.