GENERAL PHYSICS with LAB II
PHY 213-001
FALL 2005

Instructor:	Dr. Wayne Bresser
Office:	SC 143
Office Hours:	MWF 1:00 – 2:00 T, R 12:10 – 1:00, also by appointment
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Contacting Instructor: As you can see, I have office hours during the week, and I will try to be in my office and available to talk with you during those times. However, I have an open door policy, so please don't feel limited to my "official" office hours. Particularly if you have a quick question, feel free to drop by anytime. Or, if you prefer, feel free to contact me to set up an appointment.

Course Time: T, R 9:25 a.m. - 12:05 p.m.
Course Location: SC 128

Lecture Text: **Physics** by Cutnell & Johnson (6th Edition) REQUIRED
Student Study Guide by Cutnell, Johnson, and Comella (Optional)
MCAT Study Guide by Joseph Boon (Optional)

Textbook Web Site: http://he-cda.wiley.com/WileyCDA/HigherEdTitle/productCd-0471151831.html
Click on the "Student Companion Site" (top left corner) and visit several of the following resources:

- WWW Solutions
- Self-Assessment Tests
- Concept Simulations
- Practice MCAT Quizzes
- Web Links
- Interactive Learningware
- Interactive Solutions
- Integration of Concept Essays

Blackboard: Regularly check Blackboard in Announcements, Course Information, Course Documents, Assignments, and External Links for homework assignments/solutions and other information.

Required Materials: Any non-programmable, non-graphing calculator, a 3-ring binder for lab/activity work and a clear plastic ruler (with centimeter scale).

Prerequisite: PHY 211

Course Description: This course is the second in a sequence of two courses in a non-calculus introduction to classical physics using guided inquiry activities. Topics for the course include the study of oscillations, waves and sound, electric forces and fields, DC circuits, magnetic forces and fields, AC circuits, geometrical optics, and physical optics.

Course Objective: To achieve a thorough understanding of the basic concepts and principles of physics and and to strengthen the understanding of these concepts by applying them to a broad range of interesting applications. Students will acquire skills in scientific methods, critical reasoning and problem solving, and on experimentation with data acquisition and analysis.

Electronic devices: Please set your cell phones, watch alarms and pagers to silent mode or turn them off.

Attendance: **You are required to attend all lectures/labs and to participate in classroom discussions.** You are responsible for all materials and assignments presented in class. Almost every class will review questions, exercises and problems similar to ones found on the exams.

"Lecture" class time will be a combination of lecture and active student participation with a focus on understanding principles and answering/solving physical problems.

Lecture Topics: Tentatively we will cover:

Chapter 10. Simple and Harmonic Motion and Elasticity
Chapter 16. Waves and Sound
Chapter 17. The Principle of Linear Superposition and Interference Phenomena
Chapter 25. The Reflection of Light: Mirrors
Chapter 26. The Refraction of Light: Lenses and Optical Instruments
Chapter 27. Interference and the Wave Nature of Light
Chapter 18. Electric Forces and Electric Fields
Chapter 19. Electric Potential Energy and the Electric Potential
Chapter 20. Electric Circuits
Chapter 21. Magnetic Forces and Magnetic Fields
Chapter 22. Electromagnetic Induction

Lecture Schedule:

Week #	Dates		Chapters
	Tuesday	Thursday	
1	Aug. 23	Aug. 25	10
2	Aug. 30 Sept. 1	16	
3	Sept. 6	Sept. 8	16, 17
4	Sept. 13	Sept. 15	17
5	Sept. 20	Sept. 22	25
6	Sept. 27	Sept. 29	25, 26
7	Oct. 4	Oct. 6	26
8	Oct. 11	Oct. 13	27
9	---------	Oct. 20	27
10	Oct. 25	Oct. 27	18
11	Nov. 1	Nov. 3	18, 19
12	Nov. 8	Nov. 10	19
13	Nov. 15	Nov. 17	20
14	Nov. 22	---------- 20	
15	Nov. 29	Dec. 1	21
16	Dec. 6	Dec. 8	22

Course Work: The course will be taught in a studio format that emphasizes active learning rather than the passive learning approach of past lecture courses. In a given class meeting, there can be any combination of lecture, discussion, problem solving, demonstration, computer-based activities, or laboratory work.

In-class Activities: **Group activities:** Groups of 2-3 students will be given activities that will involve problem solving, mini-labs, and computer-based simulations/problems. The instructor will make sure that all members of a team are actively involved in all group activities and may rotate group members to ensure this.

Individual activities: Students will be assigned activities to be performed individually. These could include quizzes, homework, simulations, etc.

The instructor will often (but not always) grade these in-class activities. There will be no make-up activities. Missing a class will result in a zero for the activities completed during that class.

Lab Reports: You will write a formal lab report for several of the mini-lab activities. Each group will submit **one** lab report. The reports will be graded on a scale of 10. However each member of the group should keep a copy of the submitted in their own folder. The lab report format will vary slightly with each lab as needed.
NOTE: In order to share the cost of printing, please take turns printing your lab reports.

Reading: You are required to read the assigned chapters before the lectures in order to participate in the lecture sessions by asking questions, answering them and being an active part in the solution of examples presented in class.

Reading Quizzes: There will be several reading quizzes throughout the semester. These will consist of a few multiple-choice questions and/or fill-in problems designed to test your understanding of the material. Make-up quizzes will not be given.

Homework: Homework will generally be assigned each class meeting. The assignments will consist of readings in the textbook and problem sets. Note, homework sets are due by 5:00 PM on the due date. Overdue homework sets will be penalized. Assistance on homework from fellow classmates and the instructor (see office hours above) is allowed. You should work together (but not copy from one another). Good marks will be given to those whose work shows clarity, organization, reasoning and full solutions. Quick short answers (even if correct) without reasoning or complete solutions will not receive good marks. Solutions will be posted on Blackboard as soon as possible after the due date.

The lowest grade for lab reports, the lowest grade for quizzes and the lowest grade for homeworks will be dropped.

Tests and exam: Three regular tests (approx. 90 minutes each) and one comprehensive final exam will be given. Exams will be taken without use of books or notes. However, the instructor will provide an equation page. Use of a non-programmable, non-graphing calculator will be allowed. A brief exam review (from your questions) will be given in class sometime during the week before each exam. ***There will be no make-up exams.***

Tentative Exam Dates:		Chapters:
	Thursday, Sept. 22	10, 16, 17
	Thursday, Oct. 27	25, 26, 27
	Tuesday, Nov. 15	18, 19
Final Exam:	Tuesday, Dec. 13, 2005 10:10 AM -- 12:10 PM	Ch. 20, 21, 22 + previous chapters

Important Dates: The date scheduled for any of the three exams may be changed if deemed necessary by the instructor. Such a change will be announced in lecture as soon as possible prior to the originally scheduled date.

August 22 (M)	First Day of Class
August 27 (SAT)	Last Day to Register
September 5 (M)	Labor Day Holiday
September 22 (R)	FIRST EXAM
October 17 - 18 (M - T)	Fall Break Holidays
October 22 (SAT)	Mid-term Grades Due
October 27 (R)	SECOND EXAM
October 31 (M)	Last Day to Withdraw with a W
November 15 (T)	THIRD EXAM
November 24 - 26 (W - F)	Thanksgiving Holidays
December 9 (F)	Last Day of Class
December 13 (T)	FINAL EXAM

Grading: Your final grade will be determined by the path that gives the higher total:

COMPONENTS	**PATH #1**	**PATH #2**
Three exams	30%	40%
Comprehensive Final Exam	30%	20%
Homework	15%	15%
Lab reports	10%	10%
Quizzes	10%	10%
Concept Tests (pre- and post-test)	5%	5%

Final Grade Assignment:	PERCENTAGE	LETTER GRADE
	90% or higher	A
	80% - 89.9%	B
	70% – 79.9%	C
	60% - 69.9%	D
	Less than 60%	F

This syllabus may be modified by the instructor at any time during the semester. Request further explanation if any part of this syllabus or any course procedure or requirement is unclear.

*** Mid-Term Grades for First-Year Students ***

NOTE: First-year students will receive mid-term assessments of their performance.

- Mid-term grades will be issued only to students who have successfully completed fewer than 30 semester hours;
- Students will be able to access mid-term grades through Norse Express as soon as faculty submit the grades;
- Mid-term grades are not part of students' permanent records; they will be replaced by final class grades when these are submitted; Mid-term grades do not guarantee a good or bad class grade; they reflect a current level of performance that can be altered by the quality of subsequent work.

*** NKU Student Honor Code ***

"The work you will do in this course is subject to the Student Honor Code. The Honor Code is a commitment to the highest degree of ethical integrity in academic conduct, a commitment that, individually and collectively, the students of Northern Kentucky University will not lie, cheat, or plagiarize to gain an academic advantage over fellow students or avoid academic requirements."

This syllabus may be modified by the instructor at any time during the semester.
Request further explanation if any part of this syllabus or any course procedure or requirement in unclear.

This section is intended for you to use as a guide and reference for general physics lab reports. It is important that you read the practices and procedures as outlined in this introduction. The labs are intended to provide you with; 1) hands-on experience with the concepts we have been going over in class, 2) practice in taking measurements (a very important part of being in science or engineering), and 3) practice working in groups.

Each group must submit a lab report for each experiment performed. The following format is recommended and should be adhered to closely unless your instructor decides otherwise. Use 8 1/2" x 11" paper and do not write on the back of the sheets. Write legibly or (even better) type, and use proper grammar. Points will be taken off for misspelled words and incorrect grammar. A small portion of your grade may be based on your in-lab performance.

FORMAT FOR WRITING A LAB REPORT

1) **LAB INFORMATION**
Title, your name and lab partners' names, and date(s) of performing experiment.

2) **INTRODUCTION**
A very brief overview of the purpose (goals) and the main results of the experiment. If a known physical quantity was measured in the experiment then you should state the numerical value of the result that you obtained for that quantity and also state how close your result was to the expected result.

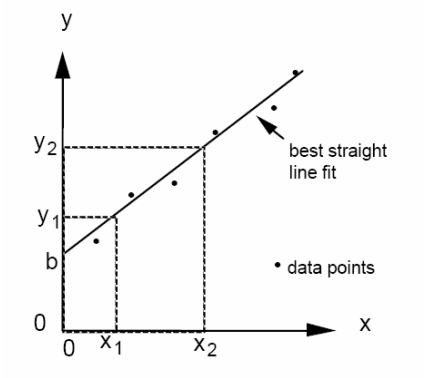
3) **EXPERIMENTAL PROCEDURE**
Describe what you did, in order. Do not copy the procedure from the handouts. Your procedure may include diagrams or other helpful information that will make the lab easier to perform. Your procedure should be complete enough so that an individual could read your procedure and could perform the lab as you did. Don't report numbers or results in this section.

4) **OBSERVATIONS / DATA**
List and describe the raw experimental data collected during the experiment. Data should always be reported in a clear and organized way (use tables). Include all plots and graphs in this section. The axes of all graphs should be clearly labeled (quantity and units) and each graph should be titled so that it clearly indicates exactly what data are being plotted.

When calculating a slope of a line on a graph, make sure to choose grid points that are near the beginning and end of the line respectively in order to have a large difference in x and y values. Draw a circle around those two points which will be used for the calculation of the slope. Label $\bullet$x and $\bullet$y, and calculate the slope right there on the graph. Scales should be chosen so that the plot should takes up the whole graph, so that plotting accuracy is increased. An example

Given two points (x_1, y_1) and (x_2, y_2) on the best straight line through the data points, the equation for the line is $y = mx + b$.

$$m = \frac{\text{rise}}{\text{run}} = \frac{\text{change in y}}{\text{change in x}} = \frac{y_2 - y_1}{x_2 - x_1}$$



b = the intercept on the y-axis at x = 0.

If you use a spreadsheet program (e.g., Excel) to plot your data and fit a line, be sure to set scales so that the data takes up the whole page (as above) and that the equation for the fitting line is displayed on the graph as well as the line itself.

NOTE: Answer all the assigned questions with complete sentences.

5) **CALCULATIONS and RESULTS**

List the equation(s) and show a sample calculation(s) that you carried out. Then state the result(s) of the experiment and compare your result(s) to the accepted or theoretical value(s) (if available) by computing a percent error. Also state what you consider to be the most likely causes of this error.

Percent error is used when comparing a result to an accepted value.

$$\% \text{ error} = ((X - X_s) / X_s) \times 100\%$$

where X_s = the standard or accepted value and X = the experimental value

Percent difference is used when comparing two results from different experimental methods.

The average of the two measurements is probably closer to the actual value than either measurement. So, the average is used in the denominator.

$$\% \text{ difference} = ((X_1 - X_2) / X_{avg}) \times 100\ \%$$

where X_1 = an experimental value,
X_2 = an experimental value obtained by another method,
$X_{avg} = (X_1 + X_2)/2$ = the average value of X_1 and X_2

6) **CONCLUSIONS**

Discuss the findings, i.e., discuss what the data tell you and what conclusions you can draw from the experiment.