Physics 221A
Winter 2002

Texts: *Physics* (5th Edition) by Douglas C. Giancoli
Physics 221A Class Exercises Packet
Physics 221 General Physics II Laboratory Manual
Optional: Student Study Guide to accompany Giancoli

Prerequisites: You are expected to have a working knowledge of algebra, geometry and trigonometry, as well as the basic topics from Physics 220. If not, you should review these topics as soon as possible. Appendix A of your text may be helpful in reviewing mathematics, and the chapter summaries for Chapters 1 –9 of your text may be useful for reviewing physics topics.

The nature of this course is such that we will generally review important concepts briefly as we need them. A Math Self-Quiz as well as Review Sheets for the exams in Physics 220A last fall are available upon request if you wish to assess your personal preparation.

Course description: Physics 221 is the second half of a standard one year non-calculus sequence of college physics, recommended for life science majors. This second semester we will focus on electricity, magnetism, waves, and optics.

The course consists of two lectures, two discussion sessions, and one lab each week.
Lectures: Mon & Weds 9-9:50am
Discussions: Tues & Thurs 9 – 9:50am *or* 10 – 10:50am
Labs: Weds 4 – 5:50pm *or* Thurs 3:00 - 4:50pm

Because learning physics often means *doing* physical activities, there will be a tendency for the traditional distinction between "lecture" and "discussion" to be somewhat fluid. Thus, we may perform some hands-on exercises or work through numerical examples in "lecture," and some of the exercises in the "discussion" sessions will lead naturally to awareness of a "new" concept rather than reinforce a previously-studied topic.

The attached schedule outlines the amount of time devoted to the various topics under study this semester, indicates the associated labs and reading material in the text, and specifies the dates for the exams. Fundamental topics will generally be encountered in multiple aspects of the course, but there may be some material which is covered only in the labs, readings, or practice sets and other material discussed in class which does not appear in the text or labs. You are responsible for *all* the material covered in each of the three components of the course, as well as the material in other course assignments (readings and practice sets).

In order for this course to be responsive to the particular interests and skills of the students, the amount of time spent on certain topics may be adjusted from the tentative schedule provided. However the dates of the exams will not be changed without the consensus of the class. All adjustments to the schedule will be conveyed in class, and you are responsible for knowing the

adjustments to the schedule. The material covered on each exam will be specified by a Review Sheet, which will be available at least two days before the exam.

Course objectives: It is my hope that students enrolled in this course will find opportunity to enhance their critical thinking skills and to deepen their understanding of the physical world. Physics is that branch of human endeavor concerned with predictive analysis of physical phenomena; with this definition physics is an *activity* rather than simply a body of information. In this course conceptual understanding of specific physics concepts will be emphasized along with analytical skills of broad applicability. Developing an understanding of this form of inquiry (in addition to many of the specific physics concepts we will study) should serve you in your chosen field.

COURSE POLICIES

Attendance: It is impossible to learn physics without a consistent and sustained effort, and you are therefore expected to attend each lecture, discussion session, and lab for which you are enrolled. Although there is no official attendance requirement for the lecture/discussion portions of the course, there will be credit-bearing assignments in both lecture and discussion sessions on a regular basis. Thus, an undue number of absences *will* affect your course grade, as outlined in detail under "Grading policy." Attendance is absolutely required for the weekly labs; you cannot pass this course without completing at least 70% of the lab exercises.

However, it is understood that occasionally absences are unavoidable due to weather, illness, or other personal issues. The grading policy allows you to drop your quiz score, and class exercise score without any explanation of absence required; however, none of your lab or exam scores will be dropped. You are encouraged to contact me if you must miss class, and it is always *the responsibility of the student* to obtain notes or assignments from a classmate for missed lectures and/or to arrange make-up work with the instructor if the reason for the absence warrants such opportunity. Make-up work, including make-up exams, will only be arranged for situations when the absence is documented to be necessary, and decisions regarding the opportunity for make-up work are generally more favorable when arrangements are made *before* the absence occurs. (Note that severe weather conditions may fall into the category of an unavoidable absence even if the university does not officially close.) In all cases, be advised that make-up work may be more extensive than the original assignment.

Participation: You are expected to actively participate in the various class activities: flashcard questions, discussions, and exercises. You are particularly encouraged to ask questions at any time in order to clarify your understanding. If you prefer to ask your questions in a private setting and my office hours are not convenient for you, I am happy to arrange alternate meeting times upon request. Email might also be a convenient venue for asking your questions, particularly if you commute to campus.

Preparation: You are expected to bring your flashcard, exercise packet, pencil, paper, and a working calculator (with trigonometric functions) to lecture and discussion, and to bring your lab manual, pencil, and calculator to lab each week. You may use your calculator on the quizzes and exams, but formulas related to this course may not be stored in your calculator. Calculators may be shared for designated group activities (most of the class exercises) but may not be shared on

quizzes or exams. I will always bring an extra calculator to class on quiz/exam days, which will remain at the front of the room for use by students with forgotten and/or non-functional calculators on that specific day.

Practice: Practice sets, consisting of both conceptual questions and quantitative problems, will be assigned for each chapter. These practice sets will not be collected for grading, but solutions to the practice sets will be available at MS^3 (377 PAD) so that you can check your own work. You are expected to work through the practice sets at the time they are assigned so that any difficulties you may experience can be addressed as early as possible. You are encouraged to give each assigned question or problem serious effort before referring to the solutions! A sincere personal effort on the practice sets *will* help your course grade in many ways, not the least of which being that the quizzes and exams will often contain questions or problems similar to those encountered in the practice sets.

As with any skill, practice is the best way to improve your problem-solving ability. A general guideline is that the more difficulty you have with the practice sets, the more extra problems you should work related to those topics. However, all students are encouraged to work as many extra problems as time allows. (Note that solutions to the odd numbered problems are available in the back of your text, and the publisher's solutions manual is available in my office.) You are also encouraged to work with other students in the class on the practice sets and other out-of-class efforts; study groups often facilitate your ability to master the course material.

Reserve materials: Solutions to the practice sets, quizzes, and exams, as well as examples of the class exercises, will be placed on reserve in MS^3. (Please inform me if additional copies at the library will assist your ability to access the solutions, and I will establish a reserve notebook at the library as well. However, note that reserves at the library will often have a 2 week delay between posting and availability.)

Academic Support: In addition to the course instructor, academic support for this class is available to you through two other GVSU venues:

Scheduled tutoring: 200 STU;
Walk-in assistance: MS^3 (377 PAD).

You are also free to employ a private tutor at your discretion if you so chose. In all cases the tutor's activities should be limited to explaining concepts and *assisting you* with solving problems. It will not benefit you to simply watch a tutor solve problems! A tutor is prohibited from assisting you with any credit-bearing home assignments for this course, but the course instructor is always available for assistance.

Disabilities: Students with documented disabilities are advised to register with the Office of Academic Support (OAS) as soon as possible in order for appropriate accommodations to be arranged. All requests from the OAS will be honored, but no special arrangements will be made without request from the OAS. Failure to register in a timely fashion may result in the requested accommodations being delayed or unavailable.

Posting of grades: If you provide a code name, your scores on course assignments will be posted on my office door. The grade postings will be updated approximately once a week. If you

observe any discrepancy between your posted scores and your graded coursework, please inform me as soon as possible.

Academic Honesty: All students are expected to present their own work for grading and evaluation. Note that academic dishonesty will automatically result in a grade of "F" for the assignment and/or the course and will be reported to the appropriate campus authorities. Flagrant violations may result in more severe penalties as determined by the appropriate campus authorities. See page 78 of the GVSU course catalog for specific definitions of academic honesty.

GRADING POLICY

Class exercises: The course will include in-class exercises (generally during discussion sessions) and/or short homework assignments on a regular basis. Some of these will be graded; others will be evaluated according to participation. A sincere effort in the class exercises can enhance your course grade not only in credit granted but also in helping you learn the material. Your lowest exercise score will be dropped before determining your course average, and your course average on the class exercises will count as 5% of your final course grade.

Quizzes: Quizzes will be given in class on a weekly basis, excluding weeks in which an exam is given. The quizzes will be given during the Thursday discussion sessions as indicated on the attached schedule, and will last about 15 minutes. The quizzes will be closed book and will emphasize conceptual understanding from class and problem-solving skills from the practice sets. Your lowest quiz score will be dropped before determining your course average, and your course average on the quizzes will count as 10% of your final course grade.

Exams: There will be 3 one-hour midterm exams, and a two-hour comprehensive final exam. Each exam will consist of a section emphasizing conceptual understanding (40%) and a problem-solving section (60%). You will be expected to be familiar with the fundamental equations of the concepts under study; derived equations will be provided. A Review Sheet specifying fundamental equations, derived equations, important concepts, and specific applications with which you are expected to be familiar will be available at least 2 days before the exam. All exams are closed book and closed notes. Each midterm exam counts 15% of your final course grade; the final counts 25%.

Laboratory: Physics is an experimental science, and the weekly lab exercises are an important component of the course. The lab is a time for you to explore how the concepts under study in class apply to actual physical systems. The labs are designed to coordinate with the course material and be completed within the lab period. Specific policies regarding labs are determined by individual lab instructors; lab grades from different instructors will be normalized so that all lab sections have the same mean score. The general intention is to give you credit for sincere investigations, and the mean score for each lab section is expected to be around 90%. Your normalized lab score will count 15% of your final course grade, but you must complete at least 70% of the lab exercises in order to pass the course.

SUMMARY OF GRADING POLICY

The above components will be weighted as follows:

Daily work (exercises, etc)	5%
Weekly quizzes (lowest dropped)	10%
Midterm exams (15% each)	45%
Final exam	25%
Laboratory	15%*

* At least 70% of the labs must be performed in order to pass the course.

Grades will be assigned according to the following scale:

92 - 100	A	72 – 77	C
90 – 91	A-	70 – 71	C-
88 – 89	B+	68 – 69	D+
82 – 87	B	60 – 67	D
80 – 81	B-	below 60	F
78 – 79	C+		

Final course grades may be slightly curved upwards.

Tentative Schedule

Week of	Lecture	Text	Discussion	Lab
Jan 7	**M** Intro; review & preview **W** Electric charge & force	Ch.16	**Tu** Electric charge **Th** Electric force, Q1	1. Electrostatics
Jan 14	**M** Coulomb's law **W** Electric field	Ch.16	**Tu** Coulomb's law **Th** Lines of force, Q 2	2. Electric fields
Jan 21	**M** Electric potential **W** Capacitors	Ch.17	**Tu** Electric potential **Th** Electric field; Q3	3. Current and resistance
Jan 28	**M** Ohm's Law **W** *Exam 1*	Ch.18	**Tu** *Review* **Th** Resistors	4. Ohm's Law
Feb 4	**M** Combining resistors **W** Combining capacitors	Ch.19	**Tu** Resistor networks **Th** Capacitors; Q4	5. Resistors in series and parallel
Feb 11	**M** Magnets **W** Magnetic fields	Ch.20	**Tu** Magnets **Th** B-field; Q 5	6. Magnetic fields
Feb 18	**M** Magnetic forces **W** Induced EMF	Ch.20 Ch 21	**Tu** Magnetic force **Th** Induction*; Q6	7. Magnetic interactions
Feb 25	**M** Applications of induction **W** *Exam 2*	Ch.21	**Tu** *Review* **Th** TBA	8. EM Induction
Mar 4	**Spring Break**		No classes	No Labs
Mar 11	**M** Simple Harmonic Motion **W** Creation of waves	Ch.11 Ch.11	**Tu** Mass on a spring **Th** Pendulum; Q7	9. Simple Harmonic Motion
Mar 18	**M** Behavior of waves **W** Sound Waves	Ch.11 Ch.12	**Tu** Waves **Th** Standing waves; Q8	10. Standing Waves*
Mar 25	**M** EM Waves **W** Reflection of light	Ch.22 Ch.23	**Tu** Visible Spectrum **Th** Reflection; Q9	11. Plane mirrors
Apr 1	**M** Image formation by mirrors **W** Refraction of light	Ch.23	**Tu** Spherical mirrors **Th** Refraction; Q10	12. A study of refraction
Apr 8	**M** Prisms and lenses **W** *Exam 3*	Ch.23	**Tu** *Review* **Th** The eye	13. Convex Lenses
Apr 15	**M** Interference **W** Diffraction	Ch.24	**Tu** I & D **Th** *Evals, Review*	14. Interference and Diffraction
Apr 22	Tuesday, Apr 23, 8:00 - 9:50 am *Final Exam (Comprehensive)*			

*Not included in course packet. Will be distributed in class.

Important Dates:

Jan. 28	Exam 1
Feb. 25	Exam 2
Mar.1 (5pm)	Drop Deadline
Mar. 3-10	Spring Break
Apr. 8	Exam 3
Apr. 23 (8am)	Final Exam