

PHYSICS 2414, Lecture §010
Physics for Life Science Majors
Fall 1999

INSTRUCTOR:	Dr. Michael G. Strauss, Nielsen Hall 311, 325-3961 ext. 36311 Email: mgstrauss@ou.edu Office Hours: Mon, Wed 2:00-3:30 p.m. or by appointment.
CLASS HOURS:	M,W,F 12:30-1:20 p.m., Dale Hall, Room 211
DISCUSSION:	Section 011 - Tuesday, 8:30- 9:20 a.m., Nielsen 209 Section 012 - Tuesday, 9:30-10:20 a.m., Nielsen 209 Section 013 - Tuesday, 11:30-12:20 p.m., Nielsen 209 Section 014 - Tuesday, 12:30- 1:20 p.m., Nielsen 209 Section 015 - Tuesday, 1:30- 2:20 p.m., Nielsen 209
TEACHING ASSISTANTS:	Fred Brown, Nielsen Hall B20 (basement), 325-3961 ext. 36520 Office Hours: Mon 10:30-11:30 a.m., Tues 4:00-5:00 p.m.
TEXTBOOKS:	<i>Physics, 5th Edition</i> , by Douglas Giancoli (Prentice Hall, 1998) <i>The Competent Problem Solver</i> , University of Minnesota (McGraw-Hill, 2000)
CLASS WEB PAGE:	http://www.nhn.ou.edu/~strauss/phys2414
TEXT WEB PAGE:	http://www.prenhall.com/giancoli

1. Course Description, Objectives, and Prerequisites

1.1 DESCRIPTION

Physics 2414 is the first semester of a two semester introductory physics course aimed primarily at the health science professions and life science majors. The course focuses on the area of physics known as mechanics, but also covers fluids and oscillatory motion.

1.2 OBJECTIVES

1.2.1 Understand the Basic Physics Principles Covered During the Semester

The goal of physics is to understand the physical universe. An understanding of the subjects covered in the class will help prepare those of you who must take pre-professional exams covering physics. Beyond that, an understanding of physical principles may help you perceive the world around you in a more comprehensible, enjoyable, and fascinating way.

1.2.2 Think Critically, Logically, and Analytically When Solving Problems

In order to solve a problem, you must critically examine the information available in a given situation, determine an effective method to approach the problem, and carry through to the solution, including a critical examination of the final answer to see if it is reasonable. These skills are not only essential to solving problems in physics, but to solving problems in general, and are applicable to many situations in many different environments. We will use various methods and techniques to help develop these skills.

1.3 PREREQUISITES

Math 1523 is a required prerequisite. This course requires the use of algebra and trigonometry. You should be familiar with solving simultaneous equations, polynomial functions, logarithmic and exponential functions, and introductory analytical geometry (e.g. vectors). A short discussion of some of these topics appears in the appendices to the text. In addition, I will hand out a brief quiz that will help determine if you have acquired the necessary math skills required for this course. If you are not experienced and proficient with these math skills I highly recommend you do not attempt this course until you have mastered them.

2. A Word About Physics

This is a physics class and, therefore, it has similarities to all other physics classes. Physics is a mathematical science and will require using mathematics as a tool for solving problems. For some students, the math serves as an obstacle to learning physics. I highly recommend that you become very comfortable with the mathematics described in the appendices in the text and on the initial math quiz *before* progressing any farther into the semester.

Some students believe that if they can follow the lectures in class, then they have learned physics. This is not true. To learn physics, a student must do a significant amount of work outside of class thinking about, and interacting with, the course material. *No one ever learns physics by simply reading about it or listening to someone talk about it. You learn it by making the effort to understand the material and by solving problems using the principles learned.* The standard requirement in a college class is that you spend two hours outside class working on the material for every hour in class. Since this is a four hour class, **you should plan on spending about eight hours per week outside of class** interacting with the material and solving problems. Few students will be able to succeed in this class without investing that amount of time.

Finally, physics is an objective science. Problems assigned in physics will usually have objective answers. Consequently, grading standards tend to remain high in physics and other science classes.

3. Course Philosophy

I want you to enjoy Physics 2414. The material we will be covering is fascinating and applicable. It's implications can be observed in almost everything you interact with every day. In order to make this class as interesting and useful as possible, I will need to get feedback from you. Please feel free to ask questions in class and to come by my office during office hours. During the semester, I will give you opportunities to write a summary of which concepts are difficult, and of which you find interesting, and to make suggestions to improve the class.

As stated in Section 2, you can only learn physics by personally interacting with the material and solving problems. Consequently, I emphasize three methods of learning in this class:

1. Reading and thinking about the assigned material **before** it is discussed in class.
2. Solving problems using the physics concepts and principles, including specific problem solving techniques.
3. Discussing the material and solving problems in class, including working with your classmates.

Thinking about problems and solving them on a regular basis will allow you to learn and appreciate the subject matter in a natural way, without having to cram everything at the last moment. Remember that this is a four hour class so you should spend about eight hours per week outside of class interacting with the material.

4. Course Structure and Assignments

The course will be divided into **8 units**, each about one to two weeks long. A few days before each unit begins, I will distribute a detailed description of the material and problems covered in that unit, as well as the Reading Questions for the unit (see section 4.1). A calendar listing the tentative due dates for course assignments is attached as the last page of this syllabus. The calendar may be revised at the discretion of the professor. The eight units are outlined below.

Unit	Chapters	Subject
1	1-2	Introduction and Kinematics in One Dimension
2	3	Vectors and Kinematics in Two Dimensions
3	4	Newton's Three Laws
4	5	Circular Motion and Gravity
5	6-7	Work, Energy, and Momentum
6	8-9	Rotational Motion and Equilibrium
7	10	Fluids
8	11-(12?)	Vibrations, Waves, (and Sound?)

Your final grade will be based on the assignments described in the remaining part of Section 4:

4.1 READING QUESTIONS AND CLASS LECTURES

It is important that you read the material that will be covered in class **before** we discuss it in class. Therefore, you will be asked to read every chapter before we discuss it in class and answer **Reading Questions** about the chapter. These Reading Questions will consist of short answers to a number of questions about each chapter. (See Section 5 for details on how these assignments will be graded.) Class lectures will be used to clarify and elaborate on concepts which were difficult to understand during your own study. *Class lectures will not necessarily cover all material that you are responsible for learning, but will primarily cover the material that you did not understand during your own reading and study.* Reading questions must be answered using the form on the World Wide Web which is accessible from the class home page at <http://www.nhn.ou.edu/~strauss/phys2414>. If answering the questions on the web is a hardship for you, please talk with the professor personally about this issue.

4.2 GROUP PROBLEMS

During your discussion section, you will work on problems with other students who have been assigned to a group with you. Groups will be rearranged a few times during the semester. The groups will allow you to work together with your peers to understand the material. Group activities will primarily consist of working on “context rich” problems as described in *The Competent Problem Solver*. All activities in the group are cooperative, not competitive, with everyone in the group receiving the same grade on the group assignment. A good group member is not necessarily one who knows the answers. A good group member is one who comes prepared and regularly participates in the group discussion, who enters into the spirit of trying to help his or her fellow group members answer questions, work problems, and better understand the material.

4.3 HOMEWORK

One homework assignment will be given for each unit. The homework will consist of about 20-25 problems assigned mostly from the text. **Homework will be due by 5:00 p.m. on the date specified.** It should be handed in during class or deposited in the box outside of my office. Here are some suggestions for how to get the most out of the homework:

1. *Read the problems as soon as you get them.* You don’t have to spend any time working on them; just think about them as you read and study the material.
2. *Don’t procrastinate.* You will have at least a week to work on the problems. Don’t wait until the last minute to do them. Many students find that it is very helpful to attempt the problems even before the material is discussed in the class lecture.
3. *Ask Questions.* If you are having problems with the homework, seek help. You may discuss the problems with your classmates, with me during office hours, or with the discussion section instructor.

Although you may discuss the homework with your classmates, all work handed in must be your own. Copying another person’s work is plagiarism, and will be considered cheating. I encourage you to talk with others in order for you to get a general understanding of the problem. However, each person must work out a detailed solution of the problem individually. Doing the homework is the one of the best ways to prepare for the quizzes and exams.

4.4 EXAMS

There will be four Unit exams and a final. The exams will be held during the regular class time and will cover material from one or two units (2-3 chapters). The final will be comprehensive, covering material from the entire semester. The best preparation for these exams is a thorough understanding of the material including an understanding of the problems done for homework and during discussion section. Problem solving techniques used during the discussion section will also be used on the exams.

5. Grading

Your grades will be based on all of the assignments discussed in section 4. Most of the Reading Questions (section 4.1) will simply be checked to see that you have completed the assignment and you will receive points for just turning in a *completed* assignment. However, I will randomly chose one Reading assignment during the semester to grade in detail. If you have not turned in the assignment that I randomly chose to grade, you will not get any credit for half of your reading assignment grade. Therefore, it is very important that you turn in your reading questions every time they are due. **There will be no scheduled make-up quizzes or exams.** However, an excused

absence for medical reasons will be accepted. I will need a signed notice from your doctor along with his or her telephone number. If at all possible, please inform me before any quiz or exam of any medical difficulties. Your final grade will be based approximately on the points shown below. This chart may be modified at the discretion of the professor. Any modifications will be announced to the class.

Assignment	Number	Points Each	Total Points
Reading Questions	10	4	40
Reading Questions (Graded)	1	40	40
Special "Participation" Quiz	4	5	20
Group Problem	11	10	110
Homework	8	20	160
Unit Exam	4	105	420
Final Exam	1	210	210
Total			1000

The following criteria will be used for determining letter grades:

- A: Superior Work. Student demonstrates an excellent and thorough understanding of the subject.
- B: Excellent Work. Student demonstrates an above average understanding of the subject.
- C: Good Work. Student demonstrates an average understanding of the subject.
- D: Fair Work. Student demonstrates below average understanding of the subject and has completed all assignments.
- F: Unsatisfactory Work. Student does not demonstrate an adequate understanding of the subject or has not turned in all assignments

The actual letter grade will be determined as the semester progresses. In past years, grade distributions were **approximately**: **A** (870-1000 points), **B** (750-870 points), **C** (630-750 points), **D** (510-630 points), **F** (0-510 points). The grade distributions will probably be approximately the same this semester, with an average GPA of about 2.5. However, anyone scoring more than 900 points will automatically receive an "A", >800 points a "B", >700 points a "C", and >600 points a "D". If you have any questions about the grade on a particular assignment, you should discuss your questions with the professor *within one week after the graded assignment has been returned*. I will not discuss any assignments after this one week period.

6. Policies

6.1 CALCULATORS

You will need to use a calculator for quizzes and exams. Using a preprogrammed calculator in a quiz or exam to store information not available to the entire class, including solutions or equations, is considered cheating.

6.2 CHEATING

The University policy on cheating will be followed. See the student handbook under academic misconduct for a description of infractions and policies.

6.3 STUDENTS WITH DISABILITIES

Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me personally as soon as possible so that we can discuss accommodations necessary to ensure full participation in this class and facilitate educational opportunities.

TENTATIVE CALENDAR OF ASSIGNMENT DUE DATES

(This calendar may be revised so please consult assignment sheets or the web page on a regular basis.)

Week	Date	Monday	Tuesday	Wednesday	Thursday	Friday
1	Aug 23 - Aug 27			Chap 1 Reading Questions (This one is not graded)		Chap 2 Reading Questions
2	Aug 30 - Sep 3					
3	Sep 6 - Sep 10	Labor Day	Unit 1 HW Due (Chapters 1-2)	Chap 3 Reading Questions		
4	Sep 13 - Sep 17			Unit 2 HW Due (Chapter 3)		Exam #1 Units 1-2 (Chapters 1-3)
5	Sep 20 - Sep 24	Chap 4 Reading Questions				
6	Sep 27 - Oct 1			Unit 3 HW Due (Chapter 4)		Chap 5 Reading Questions
7	Oct 4 - Oct 8					Texas Game
8	Oct 11 - Oct 15		Unit 4 HW Due (Chapter 5)	Exam #2 Units 3-4 (Chapters 4-5)		Chap 6 Reading Questions
9	Oct 18 - Oct 22					
10	Oct 25 - Oct 29	Chap 7 Reading Questions				Unit 5 HW Due (Chapters 6-7)
11	Nov 1 - Nov 5	Exam #3 Unit 5 (Chapters 6-7)		Chap 8 Reading Questions		
12	Nov 8 - Nov 12					Chap 9 Reading Questions
13	Nov 15 - Nov 19		Unit 6 HW Due (Chapters 8-9)	Exam #4 Unit 6 (Chapters 8-9)		Chap 10 Reading Questions
14	Nov 22 - Nov 26			Thanksgiving Vacation		
15	Nov 29 - Dec 3			Unit 7 HW Due (Chapter 10)		Chap 11 (12?) Reading Questions
16	Dec 6 - Dec 10					Unit 8 HW (Chapters 11-12?) Due Date TBA

Final Exam is Scheduled for Friday, December 17, 1:30 p.m - 3:30 p.m.