Physics 251 - Winter 2003

Call# s 04963 - 04964 - Syllabus

Instructor	Prof. Dr. Ch. Elster	Text	Physics for Scientists and Engineers
Office	Clippinger 242-C		Paul A. Tipler, 4th Edition
Phone	(740) 593-1697	Course Site	www.phy.ohiou.edu/~ elster/phys251/
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Office Hours	MW noon-1:00PM (and by app.)		

Call# 04963		Call# 04964	
M W Th F	Morton 115 11:10-12:00	M W F	Morton 115 11:10-12:00
		Th	Morton 127 11:10-12:00

This syllabus, your homework, and additional information about the course can be found at

http://loncapa.phy.ohiou.edu

The following list of chapters should be covered in approximately the order indicated.

Jan	6	Introduction and Chapter 1	Feb	10	Chapter 8
	8	Chapter 2		12	Chapter 8
	9	Chapter 2		13	Quiz 5, Assignment 5 due
	10	Chapter 2, Quiz 1		14	Chapter 8
Jan	13	Chapter 3	Feb	17	Chapter 9
	15	Chapter 3		19	Chapter 9
	16	Quiz 2, Assignment 1 due		20	Quiz 6, Assignment 6 due
	17	Chapter 3		21	Chapter 9
Jan	20	Martin Luther King Day	Feb	24	Chapter 9
	22	Chapter 4		26	Chapter 10
	23	Quiz 3, Assignment 2 due		27	Quiz 7, Assignment 7 due
	24	Chapter 4		28	Chapter 10
Jan	27	Chapter 4+5	Mar	3	Chapter 10
	29	Chapter 5		5	Chapter 11
	30	Quiz 4, Assignment 3 due		6	Quiz 8, Assignment 8 due
	31	Chapter 5		7	Chapter 11
Feb	3	Chapter 6+7	Mar	10	Chapter 12
	5	Review, Assignment 4 due		12	Chapter 12
	6	Chapter 6+7		13	Quiz 9, Assignment 9 due
	7	Chapter 6+7		14	Review

The **Midterm Exam** will be on

February 5, 2003 from 7:10 - 9:00 PM (Room will be announced)

The **Final Exam** will be on

March 19, 2003 at 4:40 PM (Room will be announced)

Course Information

Physics 251 is the first course of a three-quarter sequence in general physics for students of science and engineering. The material presented in the 250-series courses is aimed to present a unified view of physics by analyzing its core principles, their implications, and their limitations. Physics 251 deals with the specific topics of:

- Measurement
- Motion in one and two dimensions
- Newton's laws of motion
- Conservation of energy
- Systems of particles and conservation of momentum
- Rotational dynamics
- Angular momentum
- Gravity
- Static Equilibrium

All student are assumed to have a working knowledge of calculus equivalent to Math 263A/B. Vector arithmetic and calculus will be used to solve problems throughout the course. However, the necessary mathematical techniques will be briefly reviewed as necessary when they first arise. Scientists and engineers take physics courses not just to encounter a broad view of basic science, but also to develop problem-solving skills that are important to incorporate for studies in all fields. Solving physics problems is not just about what you know, but also how you think and approach problems in new and unfamiliar situations. Developing and honing these skills is an important aspect of this course.

Quizzes and Exams

No books, notes or formulae stored in electronic or written form may be consulted during the quizzes or exams. Students are expected to remember basic formulae and definitions. A formula sheet will be provided with the exams by the instructor. Students will need a simple and cheap 'scientific' calculator such as the TI30X. The particular functions that will be required are the trigonometric functions and their inverses, logarithms, square roots, scientific notation, and exponentiation. I strongly recommend that you do not buy an elaborate programmable calculator just for this course. You will not need its power, and tis complexity may confuse you. However, any calculator form the TI80 series family will be allowed, but if you do use any advanced features of your calculator, you must record that in your solution (e.g. solution of quadratic equations, solutions of sets of linear equations, numerical integration, regression analysis, etc.). Also, remember that consulting of formulae or notes stored in a calculator is considered cheating for the purposes of exams and quizzes, just like using written notes or a book. During exams and quizzes we will do random checks of calculators to ensure that no formulae, notes, or equations are stored that are relevant to the quiz or exam being taken and cold give an unfair advantage. Penalties for storing such information may range from the student being required to delete the information immediately, to being given a zero for the quiz or exam. A report may also be made to the Judiciaries. Calculators from other manufacturers (similar to the TI80 series) will be allowed, but no calculators or electronic storage device may be used that has a h high capacity storage device (e.g. hard drive, CD or ZIP drive) or has the ability for wireless communication (e.g. Palm Pilots, etc.).

Attendance

The instructor recommends that all students attend each lecture, but roll will not be taken. Students are responsible for all material covered in class whether they attend or not. A University Excuse (see O.U. Handbook) is required for any make-ups on exams or laboratory work.

Cheating

Students suspected of cheating will be warned and may be asked to change seats during exams or quizzes, take a re-test or may be asked to resubmit the work in the case of laboratory reports. This is not an indication that cheating has actually occurred, but is a preventative measure to reduce the chances of cheating in suspicious circumstances. Students caught in flagrant cheating will be failed for the course. If the student does not agree with this action, the student may file a grievance through established University channels. The instructor may also initiate a review by the University Judicial Board. This action could result in suspension of the student or other punitive actions by the Judicial Board.

The value of a degree from Ohio University is largely determined by the strength of the reputation of all of us. Academic dishonesty cannot be tolerated and reflects on the reputation of all of us and on the ability of graduating seniors to obtain jobs.

Final Grades

The final grade for this course will be determined from a weighted average of the course homework sets, the weekly in-class quizzes, the midterm examination, the laboratory, and the final exam. The percentage of the final score associated with each portion is as follows:

Grade Component	Weight
Homework	20 %
Quizzes	15 %
Midterm Exam	15 %
Laboratory	20 %
Final Exam	30 %

The individual numerical scores will weighted as given above and added to give a total score out of 100. Letter grades will be awarded approximately as follows:

A- to A+ :	90 to 100
B- to B+ :	80 to 89
C- to C+ :	70 to 79
D- to D+ :	60 to 69
F	< 60

While a numerical score will be used to determine your grade, I think it useful to share with you what I expect students in particular letter grade bands to be able to do after completing this course.

An **A student** will be able to correctly solve problems involving the motion of particles subject to Newton's laws of motion, whether the motion occurs in straight lines or in circular paths. They will provide all the steps necessary for the solution and they will explain them citing the relevant physical principles. They will be able to solve problems involving vectors in two and three dimensions, including the three dimensional properties of vectors such as torque and angular momentum. They will be able to solve problems involving both the conservation of linear momentum in one or two dimensions, and the conservation of angular momentum. They will be able to apply the principles of particle dynamics to systems of particles, and in particular to rigid bodies. They will probably complete nearly all of the homework (> 95 %). They will have learened how to write laboratory reports in a lab notebook and will have written a very good technical report of one of the experiments.

A **B student** will be able to apply correctly the principles of conservation of energy and momentum to mechanical systems. They will be able to correctly solve most problems

involving the motion of particles moving in straight lines, but probably will have difficulties with rotational motion. They will give well structured solutions to problems, but nay not complete them. They will be able to solve problems involving vectors in two and three dimensions, including the linear momentum. They will have learned how to write laboratory reports in a lab notebook and will have written a very good technical report of one of the experiments.

A **C student** will be able to apply the principles of conservation of energy and momentum to mechanical systems but will make mistakes in their solutions. They will be able to correctly solve some problems involving the motion of particles in straight lines. Hey will give some structure to the solutions of problems but will often not complete all steps. They will be able to solve most problems involving vectors in tow dimensions. They will probably complete most of the homework (> 90 %). They will have learned how to write laboratory reports in a lab notebook and will have written an acceptable or good technical report of one of the experiments.

A **D student** will get some parts to many problems correct but find it difficult to correctly complete any of the problems on exams. Parts of the problems that are correct will probably not be explained. Diagrams will be missing as well as statements regarding the physical principles used. They will usually get more than 50 % of the multiple choice questions on exams correct. They will probably complete more than 70% of the homework with difficulty. They will have leanred how to weirte laboratory reports in a lab notebook and will have written an acceptable technical report of one of the experiments.

To get an **F** in this course, a student will either have failed the lab (see notes regarding passing the lab in the syllabus) or have had severe difficulties with the material of the course, e.g. getting less than 70 % of the homework, failing to grasp the concepts of vectors, being unable to handle the mathematical knowledge required to solve the problems given, not being able to explain the solution to problems, even when they are correct.

Statement regarding the mathematical knowledge assumed and taught

Students taking Physics 251 are required to have passed Math 263A or the equivalent elsewhere. This means that a student has the skills necessary to handle the mathematics required by Physics 251. Specifically a student is expected to be fluent in the following topics:

- Basic arithmetic and logical operations
- Algebra of single and multiple variable equations
- Graphical representation of equations
- Linear equations
- Solution of simultaneous equations with 2 or 3 variables.
- Trigonometric functions, their definitions, properties and associated identities
- Properties of logarithmic and exponential functions
- Differentiation of simple functions (e.g. x, x^2, $x^{-1/2}$, $\log x$, $\sin x$)
- Integration of simple functions (e.g. x, x^2, $x^{-1/2}$, $\sin x$)

In addition, during this course the properties of vectors will be taught, including

- Vector addition and subtraction
- Vector multiplication (both dot and cross product)