

Physics 252 - Spring 2005
Call # 05261 Syllabus

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Text **Physics for Engineers and Scientists**
Paul A. Tipler and Gene Mosca
5th edition 2004
M W TH F Walter Hall 245 8:10 - 9:00 a.m.

Mar 28 Chapter 13, Fluids
30 Chapter 13
31 Chapter 13
Apr 1 Chapter 13

May 9 Chapter 19 2nd Law of Thermodynamics
11 Chapter 19
12 Quiz, Assignment 6 due
13 Chapter 19

Apr 4 Chapter 14 Oscillations and Waves
6 Chapter 14
7 Quiz, Assignment 1 due
8 Chapter 15 Traveling Waves

May 16 Chapter 20 Thermal Properties and Processes
18 Chapter 20
19 Quiz, Assignment 7 due
20 Chapter 21 Electric Field I, point charges

Apr 11 Chapter 15
13 Chapter 15
14 Quiz, Assignment 2 due
15 Chapter 15

May 23 Chapter 21
25 Chapter 21
26 Quiz, Assignment 8 due
27 Chapter 22 Electric Field II, continuous charge distributions

Apr 18 Chapter 16, Superposition/Standing Waves
20 Chapter 16
21 Quiz, Assignment 3 due
22 Chapter 16

May 30 Memorial Day
Jun 1 Chapter 22 Gauss's Law
2 Quiz, Assignment 9 due
3 Review

Apr 25 Chapter 16
27 Review, Assignment 4 due, Midterm tonight
28 Chapter 17 Temperature & Kinetic Theory
29 Chapter 17

The midterm exam will be on Wednesday April 27th at 7:00 p.m. the room will be announced as soon as it is known.

May 2 Chapter 18 Heat & 1st Law of Thermodynamics
4 Chapter 18
5 Quiz, Assignment 5 due
6 Chapter 18

The final exam will be on Monday June 6th at 12:20 p.m. Walter Hall 245

Grading policy

General

Scientists and engineers are usually put into situations where they have to do things they, and others, have not done before. A bridge of a given type may have been built before but not in this new location; a new computer may use the same architecture as slower speed models but not at this new higher speed; a doctor may be treating a patient with a common disorder but not in this patient.

One reason why scientists and engineers take physics is because your departments know that we test your ability to cope with unfamiliar situations and recognize that the questions we present to you are readily answered (i) with a knowledge of basic science, (ii) the capacity to interpret illustrations, graphs and tables, (iii) the ability to read carefully and process unfamiliar scientific information. The questions will often feature illustrations or wording that may at first sight make you think you cannot solve the problem but this is not so. Solving physics problems is not just about what you know but also about how you think. You need to know the basics and apply that knowledge in new and unfamiliar problems.

Memorization of facts that are quickly forgotten is a useful asset in physics, as in many other subjects, but is not sufficient. You will not be able to pass on memory alone. You will need to learn the basic principles and know how to apply them.

Physics 252 is the second of a four-quarter sequence in General Physics for students of science and engineering. It is assumed that you have previously taken the first course of the series, Physics 251, which deals with Newtonian mechanics, rotational dynamics and gravitation. Since you have taken and passed Physics 251 you should assume that knowledge learnt in that course will be used in solving some of the problems set for Physics 252. In particular you are assumed to be familiar with topics such as: the motion of particles subject to Newton's laws of motion, in straight lines and in circular paths; solution of problems involving vectors in two and three dimensions, including the three dimensional properties of vectors such as torque and angular momentum; the use of the principle of conservation of energy in mechanical systems; the principles of both conservation of linear momentum, in one or two dimensions, and conservation of angular momentum; the principles of particle dynamics to systems of particles and rigid bodies.

While a numerical score will be used (see subsequent section) to determine your grade, I think it useful to share with you what I expect students in particular grade letter bands to be capable of when they complete this course. Physics 252 deals with **fluids, simple harmonic oscillators, wave phenomena, thermal properties of matter, heat, thermodynamics and electrostatics.**

An A student will be able to solve correctly problems involving: both stationary and moving ideal fluids; simple harmonic oscillators such as the simple pendulum, a mass connected to a spring, a mass connected to two or more springs, the physical pendulum; wave motion and the properties of traveling waves including addition of waves and standing waves; properties of sound waves; thermal properties of matter; heat transfer; zeroth, first and second laws of thermodynamics; kinetic theory of gases; equipartition theory; properties of electrically charged particles, insulators and conductors; Coulomb's and Gauss's laws of electrostatics; determination of electric forces, and electric fields.

A B student will be able to solve problems in almost all the areas but make minor mistakes and be unable to solve problems in one major area, such electrostatics, thermodynamics, wave mechanics or fluids.

A C student will be able to answer most or all of the shorter problems in all areas correctly or with only minor mistakes but will have difficulties with the longer problems through missing key steps or failing to use the correct principles.

A D student will be get some parts to many problems correct but find it difficult to complete correctly

any of the longer problems on the exam. Parts of problems that are correct will probably be not explained, diagrams will be missing as will statements regarding the physical principles used.

To get an F in this course a student will have had severe difficulties with the material of the course in all areas. They will probably have been unable to complete the suggest problems without the use of the textbook or other assistance.

Statement regarding the mathematical and physics knowledge assumed

Students taking Physics 252 have passed MATH 263A and B and Physics 251, or the equivalent courses elsewhere. These are more than just check marks in boxes. It means that you have the skills necessary to handle the math required by Physics 252. Specifically, you are 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

Logarithmic and exponential function properties

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 , $x^{-1/2}$, x^{-1} , $\sin x$

Simple line integrals

vector addition and subtraction

vector multiplication, both dot and cross products

Motion of particles and solid objects

Conservation of energy and momentum

In addition you will be taught during this course how to perform simple surface integrals

Grading System

	Contribution toward the final grade
Midterm Exam	20%
Quizzes	15%
In Class questions	5%
Lab	20%
Assignments	15%
Final Exam	25%
Total	100%

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 and is also available at the class web site, on <http://loncapa.phy.ohiou.edu>. Students will need a simple and cheap (less than \$20) "scientific" calculator such as the TI 30 X. The particular functions you will require are: the trig. functions sine, cosine and tangent (sin, cos and tan) and their inverse, e.g. arcsin, \sin^{-1} or inv sin, etc.; logarithms (log); square root; scientific notation; exponential. Students who have not used a scientific calculator before should make sure they are familiar with how to perform long calculations as well as use the above functions. I strongly recommend you do not buy an elaborate programmable calculator just for this course. You will not need its power, and its complexity may confuse you. However, any calculator from the TI 80 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 equation, solution of sets of linear equations, numerical integration, regression analysis. Also, remember, consulting formulae or notes stored in a calculator is not allowed for the purposes of the exams and quizzes, just like using written notes or a book. Calculators, from other manufacturers, similar to the TI 80 series will be allowed but no calculator or electronic device may be used that has a high capacity storage device e.g. a hard drive, CD or ZIP drive, or has the ability for wireless communication, e.g. Palm Pilots etc.

Midterm exam

There will be one, midterm exam that will count 20% toward the final grade. It will last two hours.

Final Exam

The final exam is a two hour exam and will be comprehensive.
The final exam will count 25% toward the final grade.

Quizzes

Quizzes will usually be given during the classes on Thursdays. The quizzes are individual quizzes and will take 20-25 minutes in the second half of the class. The lowest score from the quizzes will be dropped. Anyone who misses a quiz will be given a makeup if they have a valid university excuse. Missed quizzes without a makeup counts as zero. Textbooks, notes or other materials may not be consulted during work on quiz. The total quiz grade will count 15% toward the final grade.

In-Class Questions

The in-class questions will be posed throughout the lectures, and responses will be collected. Questions will be graded 3 pts for a correct response and 2 pts for an incorrect response. The percentage will be scaled at the end such that a score of 75% or higher will represent full credit. Other in-class exercises may also be included in this portion of the grade. The in-class questions grade will count 5% toward the final grade.

Homework Assignments

Personalized sets of homework will be provided to each student throughout the quarter. These problems are to be completed and graded through our Learning On-Line Computer Assisted Personalized Assignment (LON-CAPA) system. Students can enter their answers in a computer terminal and get them graded immediately on the screen. A student can try each problem up to 10 times. **Each set has a due**

date and time assigned at the top of the page. You will access your assignments via the World Wide Web (WWW). The address is <http://loncapa.phy.ohiou.edu>. You need to enter your Oak login id and your password to log onto this computer system. Please report any problems with access to the instructor ASAP.

Once you login to the system a second browser window will open up with a remote control similar like the one on the right. This will be your main navigation tool.

If this window does not appear, exit your browser and log in again.

Useful buttons:

NAV Clickable list of problems and materials.

COM Send an internal e-mail.

GRDS Check your score

PRT Print material

EXIT Exit LON-CAPA



To access your assignment after you have logged in select the 'Student ' role in your particular course. You will be presented with the course home page. Click on **NAV**. Scroll to the current assignment and click on the problem. Problems are color-coded, and if the assignment is open, the due date is listed on the same line. Green indicates the problem has been completed. Light green indicates the problem has multiple parts (see parts of for solved status). Yellow means the problem is open. Bright yellow indicates it is due in the next 24 hours, and pink indicates the problem is closed (answers may be available).

Enter the answers in the boxes provided (or via pull- down menus). Press submit answer to send the answer to the computer. Feedback will be provided. Read this carefully. If you are correct, you will be provided with a receipt number. **RECORD THIS NUMBER !!!**

If there is a technical problem, this number will provide proof that you have done your assignment. You are allowed multiple attempts at a problem. The number of attempts is displayed below the problem and in the navigation page.

To obtain a printout of your assignment, go to one of the problems in the assignment. Select **PRT** on the remote. To print the assignment, select "The whole primary sequence". You can then select 1 or 2 column output and portrait (use other options at your own risk!). Press submit. The system will create a PDF (Adobe Portable Document Format) file which can be read, and then printed, using Adobe Acroread. The screen version is pretty ugly, but the print version should look much better.

WARNING! CAPA will stop accepting answers at the exact due time listed on the assignment. The time on the computer is *NOT* necessarily the time on your watch. Waiting to the last hour to do your assignment is not suggested. Additionally, the computer load can get pretty high at due times. Do not wait until the last minute!

Tips: Here are a few tips when entering answers:

- Keep a notebook with your written solutions in.
- Keep a list of your answers! When you get to the 10th try on a problem, you can easily confuse yourself.
- Read the computer feedback carefully!
- Scientific notation is entered in the form **6.02E23** not 6.02×10^{23}

Browsers: The following browsers should work with LON-CAPA: Netscape 3, 4, or 6, Internet Explorer 4, 5, or 6. Your browser will need to have "cookies", "Javascript" and "Java" enabled.

HELP !!! If you are having technical difficulties checkout <http://loncapa.phy.ohiou.edu/help>, if that does

not work please e-mail Dr. Braslavsky at braslavs@ohio.edu. Include the course, browser version, location, a brief description of the problem and any error messages you have seen.

You may if you wish turn in hand written answers to the homework. These will be due at the same time as the Assignment but you will be given only one chance to get it right. Thus students are strongly recommended to use the WWW to enter their solutions. Credit for homework that is late will only be given after the first two assignments if you have a very good excuse.

Since the TAs for this course have no homework to grade there will be extended hours for students to consult with TAs for help. However TAs are forbidden to do the problems for the students. They are to help the students get to a position where they can do the problem for themselves. The homework help times and places will be announced in class.

If you find you get the right answer but do not know why please come and see the instructor or one of the TAs. Please bring your solution with you so we can have a concrete discussion.

The purpose of the homework is to encourage you to regularly study the material and to learn how to solve the problems correctly. If you “cheat” by trying to find answer through picking the right equation from a book or copying it from a friend you will not be able answer similar questions on exams or quizzes because then you will be required to explain, show or otherwise use the physics principles that underlie “the equation”. We expect you to collaborate with others during your solution of the homework but if you do not understand why an answer is the correct one come and ask.

The home work will count 15% toward the final grade. The average grade on the home work is ~90%. There is a small correlation between the home work grade and your overall grade for the course, but it is very small. It is there to help you learn the material in preparation for the exams.

Laboratory

You are required to register for a laboratory for this class. **A passing grade on the laboratory of at least 70% is required in order to pass the course.** A missed lab without a valid university excuse counts as zero and cannot be made up. Only labs for which you have a valid university excuse can be made up by scheduling the make up through the curators office (042 Clippinger). Where possible labs should be made up during the week in which they were due to be taken. Students waiting until the last weeks of the quarter to make up labs missed in the first part of the quarter will be denied make up privileges even if the original excuse for the missing lab was valid.

Not only must the lab be passed to pass the entire course, but if a student misses more than 2 labs without a valid University excuse then the lab will be failed as well as the entire course.

The laboratory counts 20% towards the final grade.

Attendance

The instructor recommends that all students attend class but roll will not be taken. However, In Class Questions grade will be influenced by the amount of participation. 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 makeups on exams, quizzes, or lab work.

Final Grades

The individual numerical scores will be 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 \geq 90;
B- to B+ 80 to 89;
C- to C+ 70 to 79;
D- to D+ 60 to 69;
F < 60.

The bands may be adjusted down but never up. This information is given so that you can work out what you need to do to get a particular final grade. No letter grades are applied to individual parts of the course, only the numerical scores from the parts, with the weightings shown, are used to calculate the final letter grade for the course. Each instructor values each part of the course in their own way. They use their own weights when assigning a final grade letter. Comparisons are not possible between a part of the course of one instructor with that same part for another instructor.

You should also be aware that most students score about 90% on homework and labs, and many get a similar score on quizzes, this means that most of the spread in the grades is determined by the exams.