

New version dated January 5, 2011: the Monday CAPA help session is being cancelled.

Physics 252 - Winter 2011 Call # 06073

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Office Hrs	TUE, WED 9:30-10:30 am	Class meeting time	M W TH F 1:10 - 2:00 p.m

This syllabus, your homework, the lab handouts and additional information about the course can be found at <http://loncapa.phy.ohiou.edu>, use your oak id and password to login. The information presented in this document are subject to change, modifications to this syllabus will be announced in class. This document discusses the following topics:

1. Class schedule
2. Laboratory schedule
3. Class assignments, quizzes and exams
4. Grading policy
5. Additional information

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.

PHYS252 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, PHYS251. Since you have taken and passed PHYS251 you should assume that knowledge learnt in that course will be used during PHYS252. 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. PHYS252 deals with **simple harmonic oscillators, fluids, thermal properties of matter, heat, thermodynamics, wave phenomena, and optics**. PHYS252 instruction has two components: a class one and a laboratory one. In order to pass the class, you need to pass the class and the lab separately, more

information are given in the following sections of this syllabus.

1. Class schedule

Below is the class schedule for this section of PHYS252. It lists explicitly the chapter of the book that will be discussed: I expected you to read those chapters before attending class. The goal of class meeting is not to give a detailed and exhaustive presentation of the topic covered but to clarify difficult or confusing issues, and make you think critically about the material.

Jan 3	Chapter 14: Oscillations	Feb 7	Chapter 19: Entropy
5	Chapter 14: Oscillations	9	Chapter 20: Traveling waves
6	Chapter 14: Oscillations	10	Chapter 20: Traveling waves
7	Chapter 15: Fluids	11	Review, Assignment 5 due
Jan 10	Chapter 15: Fluids	Feb 14	Chapter 20: Traveling waves
12	Chapter 15: Fluids	16	Chapter 20: Traveling waves
13	Chapter 16: Matter	17	Chapter 21: Superposition
14	Quiz 1 , Assignment 1 due	18	Quiz 3 , Assignment 6 due
Jan 17	M.L. King day (no class)	Feb 21	Chapter 21: Superposition
19	Chapter 16: Ideal Gases	23	Chapter 22: Superposition
20	Chapter 16: Ideal Gases	24	Chapter 22: Wave Optics
21	Review, Assignment 2 due	25	Review, Assignment 7 due
Jan 24	Chapter 17: Work, heat and the 1 st law	Feb 28	Chapter 22: Wave Optics
26	Chapter 17: Work, heat and the 1 st law	Mar 2	Chapter 22: Wave Optics
27	Chapter 17/18: Micro/macro	3	Chapter 23: Ray Optics
28	Quiz 2 , Assignment 3 due	4	Quiz 4 , Assignment 8 due
Jan 31	Review	Mar 7	Chapter 23: Ray Optics
Feb 2	Chapter 18: Micro/macro	9	Chapter 24: Optical instruments
3	Chapter 19: Heat engines and refrigerators	10	Chapter 24: Optical instruments
	Assignment 4 due at 5pm	11	Review, Assignment 9 due
	Midterm tonight at 7:10 pm		
4	Chapter 19: Heat engines and refrigerators		

The **midterm exam** will be on Thursday February 3rd at 7:10 p.m., it will be a two hours exam in Walter Hall room 145 or 235.

The **final exam** will be a combined section exam on Wednesday March 16 at 7:00 pm. The rooms will be announced as soon as they are known. For up to date information on Final Exam scheduling, check the Registrar's web site. <http://www.ohio.edu/registrar/>

Homework assignments are due on Friday at 10am. TAs will hold homework help sessions in Walter Hall 245, 6 to 9 pm on Tuesdays and Wednesdays.

2. Laboratory schedule

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 curator 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.**

Week of:	Experiment	Number
Jan. 4	NO LAB THIS WEEK	
Jan. 10	Simple harmonic motion	12
Jan. 17	NO LAB THIS WEEK, Martin Luther King, Jr. Holiday	
Jan. 24	The Ideal Gas Laws	17
Jan. 31	Specific Heat of a Metal	19
Feb. 7	Latent Heats of Fusion and Vaporization of Water	20
	TECHNICAL REPORT	
	Draft due the week of Feb. 14 th in your laboratory	
	Final version due week of Feb. 28 th in your laboratory	
Feb. 14	Standing Transverse Waves on a String	15
Feb. 21	Velocity of Sound in Air	16
Feb. 28	Microwaves	30
Mar. 7	Plane mirrors and index of refraction	31

1. The experiments are from the Laboratory Experiments Physics 250 Series, 2008; which is on-line through LON-CAPA.
2. The lab reports are to be written up as described in the lab manual, and given to your lab instructor at the end of the lab or within 48 hours of the end of your lab. Your TA needs to sign your lab report before you leave the lab. The small green or black Vernon Royal Composition books with Quadrule ruling are to be used. They may be purchased at the bookstore.
3. **The technical report is described in the section in the lab manual on technical reports.** It includes an abstract, theory, experimental details, data, results (tables or graphs), conclusion, and bibliography in that order.
4. In writing the technical report, give particular attention to: English (spelling, precision of statements, proper word usage, etc.); handling of equations, tables, graphs (see your textbook here for examples); organization; neatness. Make sure that your theory is complete, relevant, and discusses the physical phenomena and equations used. In the conclusions, indicate: what you learned about the physical phenomena observed, the values obtained, the source of errors, and suggestions for improving equipment and technique so as to reduce the errors. The conclusions are important and require considerable thought.
5. Missed labs and/or lab reports shall count as zero (0). If more than two (2) labs and/or reports are missed with or without a University sanctioned excuse (and not made up in the case of a University excuse) the student shall fail the entire course. **Read the Physics Department Laboratory Makeup Policy** posted on the door of the laboratory. **You are responsible for this information.**
6. For each school day (Monday – Friday) a report is late, without excuse, two (2) points will be subtracted from the report grade. A 70% grade in lab is required to pass the lab unless otherwise stated in the lecture syllabus.
7. In the case of academic dishonesty (copying, plagiarism, etc. including material from the previous quarters, your lab partner, the lab manual), the grade on the lab report may result in a zero. If this happens on the technical report, you may fail the lab and hence the entire course since your total lab grade may now fall below 70% as the technical report is worth 30% of the total lab grade. All lab reports are to be your own work even though the data may have been taken by you and your lab partner.

****Bring your calculator, pen, memory stick, and a ruler to lab AND READ THE LAB BEFORE YOU COME.**

3. Class assignment, quizzes and exams

Each week, you are asked to solve homework problems as well as to take two in-class quizzes. You will also take a mid-term exam and a final exam. Finally, inclass questions will be used. The following sections give details on these assignments.

3.1 Staples needed for quizzes and exam.

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, <http://capa6.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 considered cheating for the purposes of the 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 formulas, notes or equations are stored that are relevant to the quiz or exam being taken and could give an unfair advantage. Penalties for storing such information may range from the student being required to delete the information immediately, to being given zero for the quiz or exam, or to failure for the entire course depending on the perceived importance of the information to the quiz or exam. A report may also be made to the Judiciaries. 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.

3.2 Exams

There will be one, combined midterm exam that will count 20% toward the final grade. It will last two hours. The final exam is a two hours exam and will be comprehensive. The final exam will count 25% toward the final grade.

3.3 Quizzes

Quizzes will be given during the classes usually every other Fridays. There will be two types of quizzes given, group quizzes and individual quizzes, each quiz will take 15 - 20 minutes. For group quizzes, you will be put in groups of 4-6 students. Each group will appoint a person as the "writer" for that group. That person will be given paper to record the names of the students in the group and the group response to the question. The second type of quiz, the individual quiz, will be given to each student. They will complete this quiz by themselves and turn it in after the allotted time. The grade for the class will be split equally between the two types of quizzes. The lowest score from the individual and the group quiz will be dropped. Textbooks, notes or other materials may not be consulted during work on either quiz. For the group quiz quiet discussion of the solution is expected between members of the group. The group may ask questions of the instructor who can respond only with suggestions on how to complete the solution. The instructor will not give direct answers to the solution. Anyone who misses a quiz will be given a makeup if they have a valid university excuse. The total quiz grade will count 20% toward the final grade.

3.4 Homework assignment

Personalized sets of homework will be provided to each student throughout the quarter. These 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 and shown on the computer screen.** 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, rochej@ohio.edu.

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 Acrobat. The screen version can be 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: FireFox, Netscape, Internet, or Safari. 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. Roche at rochej@ohio.edu. Include the course, browser version, location, a brief description of the problem and any error messages you have seen. 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 homework will count 15% toward the final grade. The average grade on the homework is ~90%. There is a small correlation between the homework 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.

4. Grading policy

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 ≥ 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. For this class, the weights of the different parts of the class are:

Final exam: 25%	Quizzes: 20%
Midterm exam: 20%	Homework: 15%
Laboratory: 20%	

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.

In addition, you can earn up to 5 bonus points (but only up to one point per week). The goal of the bonus points is to foster communication with your instructor. To earn a bonus point, you may for example point out difficulties with the LON-CAPA system, request that specific exercises be worked out in class or request specific topic of discussions for the Friday review sessions. A bonus point is given to the first student making a request on a specific topic. Bonus points are given at the discretion of the instructor.

5. Additional information

5.0 Suggested study plan

The Student Handbook for MATH 263 A and B gives the following good study plan. I suggest you follow something of this kind to be successful in PHYS252:

1. Read the book before class
2. Go to class, ask questions during class
3. Do the homework, read the book and ask questions during the help session
4. Study for the quiz
5. Take the quiz

6. Review the quiz and ask questions if needed

5.1 Statement regarding the mathematical and physics knowledge assumed

Students taking PHYS252 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 PHYS252. 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

5.2 Attendance

The instructor recommends that all students attend class 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 makeups on exams, quizzes, or lab work.

5.3 Cheating

Students suspected of cheating will be warned and may be asked to change seats during exams or quizzes, take a retest 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 cheating may be given an F 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.