Physics 1500
Preparation for College Physics
Spring 2016

**Time:** Monday, Wednesday, Friday, 12:55-1:45 PM  
**Location:** JFB B-1

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**Course Description**

**Course Format**

**Homework and Grading Policy**

**Problem Solving Format**

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**Instructor:** [Z. Valy Vardeny](http://www.physics.utah.edu/~val), Distinguished Professor of Physics  
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**Course website:** [http://www.physics.utah.edu/~val/phys_1500](http://www.physics.utah.edu/~val/phys_1500)

**Office Hours:** Before class on W, F 11:30AM-12:50PM. However, before midterms a block of hours will be announced separately for review of the material.

**Note:** I make extensive use of the course website. [Homework & solutions](http://www.physics.utah.edu/~val/phys_1500) (which contains lecture schedule, homework assignments and solutions, as well as exam info) and important announcements are posted and updated continuously. If I spot mistakes in the text or in the solutions, I will announce these and post the corrections. **Please check the website frequently (at least weekly) for announcements and other updated information regarding this course.** This is especially important in light of the fact that we meet only three times per week.

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**Course Description:**

**The goal:** Physics 1500 is designed as a one-semester preparation for one of the introductory physics sequences in the Physics & Astronomy Department such as 2010/2020, 2110/2120, and 2210/2220. The material covered includes kinematics in one and two dimensions; Newton's laws of motion; rotational motion; work and energy; impulse and linear momentum; rigid body motion; and angular momentum (Chapters 1-8 of the textbook).

[Homework & Solutions](http://www.physics.utah.edu/~val/phys_1500) will be posted on the course website.

**How to achieve the goal:** Physics 1500 is about problem solving, which is the principle skill you will need to succeed in the introductory sequences. We emphasize study habits, basic math skills, format for solving problems; and lots of practice in order to get you ready for future physics
courses. This methodology (particularly the format for working problems) is stressed as much as the physics content in homework and exams. The problem-solving format may seem a bit rigid at times, but is designed to help you get at least a starting point in every problem, avoid mistakes, and present consistently clear and cogent written solutions. If you are already good at solving math ‘word problems’, then you should come and see me to discuss whether you should skip this introductory physics, and start directly with the physics sequence you need to take.

**Expect serious workload:** to keep up with the lectures and **homework schedule** (usually two homework assignments per week), expect to spend at least four hours studying and preparing for the class every week. I am glad to help you (see my **office hours** above) but no outside help can ever replace the time and efforts *you* invest in this class.

**Course requirements:** There are no formal prerequisites to this course, but you need to have a basic knowledge of **algebra and trigonometry** (high school level).

**Note on calculators:** You will need to have a calculator that can handle trigonometric functions and scientific notation.

**Required text:**


Because we will only be covering Ch. 1-8, you need purchase **only Vol. 1** of the textbook, rather than the complete volume, if you would like so. The ISBN-13 for Vol. 1 is: 9781285737034.

The textbook has probably a **COMPANION WEBSITE**; you may look for it.

**For students with disabilities:** The University of Utah Department of Physics & Astronomy seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in this course, reasonable prior notice must be given to the instructor and to the **Center for Disability Services**, 162 Olpin Union Bldg, 581-5020 (V/TDD) to make arrangements for accommodations. I strongly encourage you to come and talk to me about your disability, and necessary accommodations within the first two weeks of the semester.

**Course Format:**
We will spend two to three lecture days on each chapter section in the textbook, and there will be homework due weekly. The most important thing I can do is teaching you how to succeed in your main physics course sequence. The way to succeed is to develop certain habits, which consist mainly of working problems every class. It is for this reason that homework counts more than any one midterm exam, and in fact, almost as much as the final exam toward the final course grade. There would be about 20 HW assignments (due on Wednesday and Friday), three mid-term exams, and one final exam.

The following procedure would help you pass the course successfully:
**Habits of Successful Physics Students:**

- **Budget your time.** Schedule 1-2 hours of studying each day for Physics 1500.

- **Concentrate while you study.** Re-read summary sections of each chapter before you read material in the chapter. Pay close attention to the worked out examples.

- **You’ll need to read the lectures in your textbook (before or/and after class).** Lectures would help you get a starting point in your understanding, fill in gaps, make additional connections, and see more worked problems. But they are no substitute for focused reading of the textbook.

- **That all said, the only way to understand physics concepts well enough to use them is to practice on problems.** Physics is similar to music and sports in this regard. You cannot learn to play the piano by watching someone, or having someone tell you how. *You have to practice.* A physics student who knows the textbook but cannot do problems is like a beautiful flower with no petals.

- **Check your homework against the solutions posted on the webpage.** I will do my best to return all homework prior to exams, but may not always succeed. **You should make a copy of your homework to compare with the formal solutions, and study from them for the exams.**

- **Rework problems you missed on the last assignment as soon as you get the assignment back, and again when you study for the exams.** Reworking means: starting with a blank piece of paper and writing every step just as you would if you were writing the original assignment. When you get stuck, review the list of relevant formulas and examples. If still stuck, peek at the solution, and then start over from the beginning. Practice the problem until you can work it from beginning to end, without looking at the solution.

- **Review each step in the examples worked in class and ask yourself which formula was used, and if you understand the algebra.** Write the additional formulas and algebra in your notes.

- **Try every problem in the assignment.** You will have to limit the amount of time you spend on any problem to 20-30 minutes in order to do this.

**Homework policy:**

- **Homework is due every week on Wednesday and Friday.** Homework is turned in during the class on the **due date.**

- **I am planning on about 22 homework assignments throughout the semester, but only 20 homework assignment grades will be taken into account.** The lowest two homework grades will be dropped from calculating your final grade.

- **Late homework will not be accepted; no exceptions.** HW solutions will be posted before the next HW is due. Consider that you have up to 2 chances to miss homework without penalty (regardless of the reason) and that any one homework is essentially worth about 1% of your final grade.

- **Graded homework will be available after lecture.** We will do our best to get it back in less than a week, but this will not always be possible, particularly just before midterm exams. You are advised to make a **photocopy of your homework** so that you can compare it to the solutions, which will be available in the evenings of the due date.

- **Suggestions for turning in clear and ‘gradable’ homework:**
Label homework carefully with your name and assignment number.
Write clearly; use lots of space and lots of paper. Illegibility is grounds for losing points. Remember: whatever cannot be read; cannot be graded.
Follow the steps described in Problem Solving Format below.

Grading Policy:

- Homework assignments: 25% (scheduled for each Wednesday and Friday lecture classes)
- Midterm Exam #1: 15% (scheduled in Feb)
- Midterm Exam #2: 15% (scheduled in March)
- Midterm Exam #3: 15% (scheduled in April)
- Final Exam: 30% (scheduled on Thursday, April 28 at 1-3 PM, in B1)

Please note: If you have a problem with how a particular exam is graded, you must see me (rather than the grader or TA) within one week from the date of the grade. Otherwise please see the TA (or grader) for the homework assignment grades. We will not consider questions on re-grading of any kind after one-week time.

Problem Solving Format:
There is a methodology to doing physics problems that will help you get the answer even when you cannot foresee the answer when you start; and also help you avoid mistakes on those problems for which you can see the answer when you start. This methodology is simply a format for working problems; which, in the interest of your later success, I am requiring from you. These steps are an expanded version of those listed in Section 1.9 in the textbook, which you should read carefully.

- Remember to answer the question that is being asked. Read the problem through carefully two or three times and ask yourself what physical principles are involved.
- You must make a diagram of the problem with all of the variables used in the solution labeled on the diagram. The diagram should also show the coordinate axes (indicating positive and negative directions), where appropriate.
- Follow the diagram with a list of the given facts you understand from reading the problem, usually in the form of a variable followed by an equals sign and a number with units, for example, velocity $v = 5 \text{ m/s}$. These are the ‘given variables’.
- Write down and underline what (usually a variable) you are trying to find; these are the ‘unknown variables’.
- All numbers that are not dimensionless must always be written with units.
- Select a basic relationship or equation that can be used to find the unknown.
• Always work your problems algebraically all the way to the end, meaning you have the variable whose value you want on one side of an equals sign, and the algebraic expression in terms of things that you know on the other.

• Substitute numbers and units into the algebraic formula when calculating the final answer. Do not substitute numbers before getting the final algebraic answer.

• You need to box the final unknown variable (or solution) of the problem. If a problem has more than one part, the solution of each part must be boxed.

• Check your result: Do the ‘units match’. Is the answer reasonable? Is the plus or minus sign proper or meaningful?

Last updated January 5th, 2016.