

PHYS121
Fall 2011

David Buehrle
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Title: Fundamentals of Physics I

Lecture: Tuesday 7:00 PM – 8:50 PM Thursday 6:30 PM – 7:20 PM, Rm 1412

Section 0401

Discussion: Wednesday 6:30 PM – 7:20 PM, Rm 3301

Lab: Monday 8:00 PM – 9:50 PM, Rm 3306

TA: George Wilkie
gwilkie@umd.edu

Section 0402

Discussion: Monday 6:30 PM – 7:20 PM, Rm 3301

Lab: Wednesday 7:30 PM – 9:20 PM, Rm 3306

TA: Jack Wimberley
jtwimb@umd.edu

Section 0403

Discussion: Thursday 7:30 PM – 8:20 PM, Rm 3301

Lab: Tuesday 5:00 PM – 6:50 PM, Rm 3306

TA: Jack Wimberley
jtwimb@umd.edu

Section 0404

Discussion: Monday 5:00 PM – 5:50 PM, Rm 3301

Lab: Monday 6:00 PM – 7:50 PM, Rm 3306

TA: George Wilkie
gwilkie@umd.edu

Section 0405

Discussion: Tuesday 6:00 PM – 6:50 PM, Rm 3301

Lab: Thursday 7:30 PM – 9:20 PM, Rm 3306

TA: Guilherme Miranda
gmiranda@umd.edu

Section SEF1

Discussion: Tuesday 6:00 PM – 6:50 PM, Rm 3301

Lab: Thursday 7:30 PM – 9:20 PM, Rm 3306

TA: Guilherme Miranda
gmiranda@umd.edu

Section SEF2

Discussion: Wednesday 6:30 PM – 7:20 PM, Rm 3301

Lab: Monday 8:00 PM – 9:50 PM, Rm 3306

TA: George Wilkie
gwilkie@umd.edu

Textbook: Knight, Jones, Field: *College Physics*, 2e

Physics is a science which attempts to unify elements of the natural world by means of observation, mathematics, and the use of precise language. Using methods developed by physicists, we can describe many events that occur in our everyday lives. The principles of physics provided a basis for most of the technologies that are an essential part of modern life. In this sense, physics is *practical*. Many laws developed by physicists, such as the law of conservation of energy, are of tremendous practical importance. These same laws also help physicists understand the very tiny constituents of matter as well as the motions of giant clusters of galaxies. Thus the study of physics helps us understand some fundamental relationships between the matter in our surroundings and the evolution of the universe. In this sense physics is *profound*. In PHYS 121, you begin your own exploration of the natural world using

some of the concepts, tools, and methods commonly employed by physical scientists. PHYS 121 deals with motion of particles and rigid bodies with in small and large systems.

Math Background

The use of algebra and trigonometry are essential in this class. In addition, you need to recall the essentials of vector algebra and interpreting graphs. Your first assignment will be to help assess your competency with the math.

Homework

Weekly homework problems are listed below. Be sure to note that there are problems from the textbook as well as online exercises. The online exercises are accessed through MasteringPhysics. I have observed in the past that there is a strong correlation between the steady effort needed to successfully complete homework and performance on examinations. Although we will not collect and grade homework, there will be several quizzes using homework problems directly. The hourly examinations will have similar problems as well. Solutions to all homework assignments will be available on ELMS.

Assessments

1. There will be three examinations, each lasting a full period. Dates are in the schedule below.
2. You will have ten (more or less) 10-minute quizzes during your discussion period. The dates are indicated on the timeline
3. A final exam will take place at the end of the course
4. Ten laboratory experiments are scheduled. All must be done. You must complete and submit a report for every experiment
5. Your grade will be based on the following:

| | |
|-----------------------------|-----|
| Quizzes | 20% |
| Online Homework Assignments | 20% |
| Lab Reports | 20% |
| Hourlies | 20% |
| Final Exam | 20% |

Extra Help

Feel free to call my office phone anytime. The best way to communicate is via email.

Your TA will post his office hours

The Slawsky Clinic offers free tutoring for those who may need additional help improving their problem solving skills

Physics 121 Course Schedule

Fall 2011 — Professor Buehrle

version 1

| | <i>HW due</i> | <i>Lecture topic</i> | <i>Book sections</i> | <i>Tutorial</i> | <i>Lab</i> |
|--------|---------------|--|----------------------|------------------------------------|------------------------|
| Aug 31 | | All about the course | | ** No tutorial ** | ** No lab – |
| Sep 2 | HW 0 | Representing position and motion | 1.1–1.3 | | but do survey |
| Sep 5 | | ** Labor Day ** | | <i>Tutorials begin</i> | on the web ** |
| thru | | Graphing motion; Acceleration | 2.1–2.4 | <i>Wednesday, Sep 7:</i> | Labs begin Sept |
| Sep 9 | HW 1 | The case of constant acceleration | 2.5–2.7 | The meaning | 12 |
| | | | | of speed | |
| Sep 12 | | Numbers, units, and uncertainty | 1.4 | | Reaction Time |
| thru | | Force and mass: Newton's laws | 4.1, 4.2 | | |
| Sep 16 | HW 2 | Springs, strings, and atoms | 4.3, 4.4, 8.3 | Interpreting graphs | |
| | | | | and equations | |
| Sep 19 | | Solving problems with Newton's laws | 4.5, 4.6 | | Grandfather |
| thru | | Newton's third law | 4.8, 5.7 | | Clock, part 1 |
| Sep 23 | HW 3 | Apparent weight | 5.3 | Newton's third law | |
| Sep 26 | | Drag | 5.6 | | Grandfather |
| thru | HW 4 | Review and discussion | | Reconciling | Clock, part 2 |
| Sep 30 | | Exam 1 | | common sense and | |
| | | | | Newton's laws | |
| Oct 3 | | Vectors in physics; Relative motion | 3.1–3.3; 3.5 | | Let it Roll |
| thru | | Sideways acceleration | 3.6–3.8 | Velocity and | |
| Oct 7 | HW 5 | Newton's laws in 2-D | 4.4–4.7 | acceleration in two | |
| | | | | dimensions | |
| Oct 10 | | Using Newton's laws in 2-D | 5.2, 5.4, 5.8 | | Let it Roll, |
| thru | | Friction | 5.5 | | continued |
| Oct 14 | HW 6 | Circular motion and forces | 6.3–6.4 | The purpose of | |
| | | | | free-body diagrams | |
| Oct 17 | | Gravity and orbits | 6.5–6.7 | | Endangered |
| thru | | Momentum | 9.1–9.3 | Relating equations | Creatures |
| Oct 21 | HW 7 | Conservation of momentum | 9.4–9.6 | to common sense: | |
| | | | | "Oomph" | |
| Oct 24 | | Work, energy, and power | 10.1, 10.2, 10.8 | | No Free |
| thru | HW 8 | Kinetic and potential energy | 10.3, 10.4 | | Launch, part 1 |
| Oct 28 | | Conservation of energy | 10.6, 10.7 | Work and energy | |
| Oct 31 | | Review and discussion | | | No Free |
| thru | HW 9 | Exam 2 | | | Launch, part 2 |
| Nov 4 | | Rotational motion and torque | 7.1–7.3 | Common sense and | |
| | | | | equations: Torque | |
| Nov 7 | | Rotational dynamics | 7.4, 7.5 | | Roller Coaster, |
| thru | | Equilibrium and balance | 8.1, 8.2 | | part 1 |
| Nov 11 | HW 10 | Elasticity and strength of materials | 8.4 | Properties of matter | |
| Nov 14 | | Density and pressure in fluids | 13.1–13.3 | | Roller Coaster, |
| thru | HW 11 | Buoyancy; Fluids in motion | 13.4, 13.5 | | part 2 |
| Nov 18 | | Viscosity and fluid flow in tubes | 13.6, 13.7 | Making sense of | |
| | | | | pressure in a liquid | |
| Nov 21 | | Thermal energy and temperature | 11.4 | | ** No lab Nov |
| thru | HW 12 | Gas pressure and the ideal gas law | 12.1, 12.2 | ** No tutorial Nov 23–25 ** | 21–25 ** |
| Nov 25 | | ** Thanksgiving holiday — No class ** | | | |
| Nov 28 | | Gas processes; Thermal expansion | 12.3, 12.4 | Gases in | Gravity, part 1 |
| thru | HW 13 | Review and discussion | | containers | |
| Dec 2 | | Exam 3 | | | |
| Dec 5 | | Energy usage in living systems | 11.1–11.3 | Heat and | Gravity, part 2 |
| thru | | Heat flow, and similarity to diffusion | 11.5, 12.8 | temperature | |
| Dec 9 | HW 14 | Using thermal energy; Entropy | 11.6–11.9 | | |
| Dec 13 | | Course discussion and review | | ** No tutorial ** | ** No lab ** |
| Dec 20 | | Final Exam: 7:00–9:00 p.m. | | | |

Dear Student:

In this course you will be using MasteringPhysics™, an online tutorial and homework program that accompanies your textbook.

What You Need:

- ✓ **Your UMD email address**
- ✓ **A student access code** (Comes in the Student Access Kit that may have been packaged with your new textbook or is available separately in your school's bookstore. Otherwise, you can purchase access online at www.masteringphysics.com.)
- ✓ **The ZIP code for your school:** 20742

- ✓ **A Course ID:** **MPBUEHRLE39960**

Register

- Go to www.masteringphysics.com and click **New Students** under Register.
- To register using the Student Access Code inside the MasteringPhysics Student Access Kit, select **Yes, I have an access code**. Click **Continue**.

–OR– **Purchase access online:** Select **No, I need to purchase access online now**. Select your textbook and whether you want to include access to the eBook (if available), and click **Continue**. Follow the on-screen instructions to purchase access using a credit card. The purchase path includes registration, but the process may differ slightly from the steps printed here.

- **License Agreement and Privacy Policy:** Click **I Accept** to indicate that you have read and agree to the license agreement and privacy policy.
- Select the appropriate option under “Do you have a Pearson Education account?” and supply the requested information. Upon completion, the **Confirmation & Summary** page confirms your registration. This information will also be emailed to you for your records. You can either click **Log In Now** or return to www.masteringphysics.com later.

Log In

- Go to www.masteringphysics.com.
- Enter your Login Name and Password and click **Log In**.

Enroll in Your Instructor's Course and/or Access the Self-Study Area

Upon first login, you'll be prompted to do one or more of the following:

- Enter your instructor's MasteringPhysics Course ID.
- Select your text, if available, and **Go to Study Area** for access to self-study material.
- Enter a Student ID. Your instructor *may* request that you enter a special Student ID for this course. If so, be sure to enter this information EXACTLY as instructed.

Click **Save** and **OK**.

Congratulations! You have completed registration and have enrolled in your instructor's MasteringPhysics course. To access your course from now on, simply go to www.masteringphysics.com, enter your Login Name and Password, and click **Log In**. If your instructor has created assignments, you can access them by clicking on the **Assignments** button. Otherwise, click on **Study Area** to access self-study material.

Support

Access Customer Support at www.masteringphysics.com/support, where you will find:

- System Requirements
- Answers to Frequently Asked Questions
- Additional contact information for Customer Support, including Live Chat