Preparatory Physics: PH 100-MG

Summer Term 2008

Class meetings: Monday, Wednesday, 3:00–5:05 PM; CH 445
Instructor: Prof. Renato Camata (e-mail: camata@uab.edu , office phone: 205-934-8143)

Office hours: Monday, Wednesday 1:30-3:00 PM; other times by appointment.
Office location: Campbell Hall, Rm. 306

Prerequisite: MA 106 or equivalent.

Required Textbook:

- **Cutnell & Johnson**, Physics (7^{th} Ed.) if you plan to take Physics 201 (PH 201)
- **Halliday, Resnick and Walker**, Physics (7^{th} Ed.) if you plan to take Physics 221 (PH 221).

Last Day to Withdraw with "W": July 7

Course Web Page: http://www.phy.uab.edu/~rcamata/PH100.htm

Course Description: This introductory course is designed to prepare students for their first college-level physics course (either PH 201 or PH 221) through development of mathematical and problem-solving skills. A major focus will be on learning how to identify and apply fundamental physics principles to solving problems. Practice and feedback in problem-solving techniques are provided, with the aim to improve reading comprehension, critical thinking, and mathematical skills necessary for proficiency in future coursework. We will test and apply these skills to kinematics, vectors, force and motion, and energy. Students successfully completing this course should be able to understand how to solve physics-related word problems, including visualizing and sketching the problem, identifying relevant and solicited information, and applying kinematics to solve the problem.

This course is designed for students who intend to take PH 201 or PH 221 in the future and is not appropriate as a stand-alone course. The level is appropriate for students who have had little experience in physics.

Resources needed: Enrolled students must have one of the *textbooks* listed above and a *calculator* with scientific functions (especially trigonometric functions with arguments in degrees and radians). Textbook, calculator and a personal notebook must be brought to each class. Instructions will be provided for accessing *WebAssign*, the online homework system that will be used in the course. In order to access *WebAssign* students may use their own computer with any recent web browser or any student-accessible computer labs at UAB. Please contact instructor or departmental advisor if information is needed about available computer access at UAB.

Course Grade: Student performance in the course will be determined using the following assessment tools with corresponding weights:

15% In-Class Work
25% Homework
35% Simple average of 3 Tests
25% Final Exam

The weights shown in the previous page will be used to calculate the course weighted average and letter grades will be assigned according to the following table:

Weighted Average Range	Grade
89.0% to 100% inclusive	**A**
79.0% to 88.9% inclusive	**B**
65.0% to 78.9% inclusive	**C**
50.0% to 64.9% inclusive	**D**
0.0% to 49.9% inclusive	**F**

Weighted averages will be rounded up to the nearest 0.1%

Students are expected to maintain an up-to-date spreadsheet of their scores. At any time students should be able to calculate their projected weighted average and grade based on obtained and anticipated scores.

- **In-Class Work.** Students will work exercises *in class.* Each person must turn in a solution. This work will be scored. Students are expected to show their work and document on paper a comprehensive effort on the exercise: an incorrect numerical answer may still receive full credit if the work shown demonstrates the correct method; a paper turned in with the correct answer, but little work shown, may receive little credit.
- **Homework.** Homework will be assigned via *WebAssign* (https://www.webassign.net/uab/login.html), which may be accessed through any computer with an internet connection. Problems will be selected from the textbook and from other sources on *WebAssign*. *Do not hesitate to ask for help* on a problem after you give it a good try, but note that *WebAssign* gives you 5 chances without penalty. Homework sets must be completed on-line before 8:00 AM on the day the set is due (see schedule below).
- **Tests.** There will be three closed-book tests throughout the course. Problem types will be similar to those from lectures, in-class work, and homework.
- **Final Exam.** There will be a closed-book, in-class, comprehensive final exam. Problem types will be similar to those from lectures, in-class work, homework and tests.

Make-up Policy: Make-up of graded activities may be arranged with the instructor if one of the following conditions is met:

(1) If a reasonable excuse is provided to the instructor *prior* to the activity *or*
(2) If a doctor's excuse is provided to the instructor

Notes:
- *Make-up tests must be taken within 1 week of the scheduled test.*
- *Only 1 make-up homework assignment is allowed.*
- *Only 2 in-class work assignments are allowed*.

Attendance Policy: Attendance is strongly recommended. Class sessions will involve scored exercises (in-class work).

Text reading assignments: Material corresponding to each lecture should be read before class.

Work for extra credit: No additional work will be assigned for extra credit.

Special accommodations: Please contact Dr. Camata for an appointment to discuss special accommodations.

Course Schedule *and* Important Dates

CJ = Cutnell & Johnson (for PH 201); **HRW** = **Halliday, Resnick and Walker** (for PH 221).

Date	Topics *and* Activities Due	Reading
06/02/08	Course Introduction, Units of Measurement, Significant Figures, Math Basics, Graphing	CJ Ch. 1.1 - 1.4 HRW Ch. 1
06/04/08	One dimensional kinematics: Constant Velocity *Begin Homework 1*	CJ Ch. 2.1 - 2.5 HRW Ch 2.1 - 2.7
06/09/08	One dimensional kinematics: Constant Acceleration I	CJ Ch. 2.1 - 2.5 HRW Ch 2.1 - 2.7
06/11/08	One dimensional kinematics: Constant Acceleration II **Homework 1 due 06/11; 8:00AM** *Begin Homework 2*	CJ Ch. 2.1 - 2.5 HRW Ch 2.1 - 2.7
06/16/08	One dimensional kinematics: Free Fall	CJ Ch. 2.6 – 2.8 HRW Ch. 2.9 – 2.10
06/18/08	**Homework 2 due 06/18; 8:00AM** Review: One dimensional kinematics **TEST 1: One dimensional kinematics**	
06/23/08	Vectors and Trigonometry review Two dimensional kinematics: constant acceleration *Begin Homework 3*	CJ Ch. 1.5 – 1.9 Ch. 3.1 – 3.2 HRW Ch. 3; 4.1 – 4.3
06/25/08	Two dimensional kinematics: constant acceleration **Homework 3 due 06/25; 8:00AM** *Begin Homework 4*	CJ Ch. 3.3, 3.5 HRW Ch. 4.5 – 4.6
06/30/08	Two dimension kinematics: projectile motion	CJ Ch. 3.3, 3.5 HRW Ch. 4.5 – 4.6
07/02/08	**Homework 4 due 07/02; 8:00AM** Review: Two dimensional kinematics **TEST 2: Two dimensional kinematics**	
07/07/08	Newton's Laws: Mass, Force, and Equations of Motion *Begin Homework 5*	CJ Ch. 4.1 – 4.10 HRW Ch. 5; 6.1 – 6.3
07/09/08	Newton's Laws: Equilibrium Problems	CJ Ch. 4.11 HRW Ch 6.1 – 6.3
07/14/08	Newton's Laws: Equilibrium & Non-Equilibrium Problems **Homework 5 due 07/14; 8:00AM** *Begin Homework 6*	CJ Ch. 4.11 – 4.13 HRW Ch. 5.9, 6.1–6.3
07/16/08	Newton's Laws: Non-Equilibrium Problems	CJ Ch. 4.12 – 4.13 HRW Ch. 5.9, 6.1-6.3
07/21/08	**Homework 6 due 07/21; 8:00AM** Review Newton's Laws. **TEST 3: Newton's laws**	
07/23/08	Principles in Energy: work, kinetic energy, and conservation of energy *Begin Homework 7*	CJ Ch. 6.1 – 6.5 HRW Ch 7.1 – 7.6 HRW Ch 8.1 – 8.5
07/28/08	Principles in Energy: work, kinetic energy, and conservation of energy	CJ Ch. 6.1 – 6.5 HRW Ch 7.1 – 7.6 HRW Ch 8.1 – 8.5
07/30/08	What have we learned? Final Review. **Homework 7 due 07/30; 8:00AM**	
Final Comprehensive Exam: Monday, August 4, 4:15PM – 6:45PM		

Course Learning Objectives:

By successfully completing this course a student should be able to:

1. Demonstrate proficiency in using a scientific calculator for physics computations.
2. Readily apply algebraic, trigonometric and graphing techniques to physics problems.
3. Learn to use the language of physics, both in thinking and on paper:
    a. Translate "word problems" to physics language.
    b. Draw diagrams appropriate to the task or problem.
    c. Translate diagrams to equations, using principles and laws of physics.
    d. Solve and calculate.
    e. Check magnitudes, units and reasonableness.
    f. Conceptually explain the result.
4. Avoid the "formula" *(rote-learning)* approach to problem solving; embrace the "principle" approach.
5. Memorize, be able to explain in words and apply in equation form, the *basic laws* of physics in the first 6 (7) chapters of Cutnell & Johnson (Halliday, Resnick & Walker); to be identified in class.
6. Carry out a decision making process: identify a problem type and decide which basic physics law(s) apply(ies).
7. Be precise and make needed approximations when approaching physics problems.
8. Use vector-component techniques appropriately in physics calculations.
9. Apply problem-solving skills to areas listed in Course Description.
10. Conceptually, quantitatively and verbally explain and defend the solution to a problem using the language of physics.
11. Demonstrate on in-class work, tests, and final exam that one understands the problem and its solution, not that one simply has somehow managed to write down the correct number as an answer.
12. Demonstrate proficiency at using online homework resources in a manner that encourages, not avoids, one's use of the manual, visual, audio and abstract/conceptual learning tools described above.
13. Maintain an ongoing, quantitative measure of one's progress and learning in physics.