DEPARTMENT OF PHYSICS

Fall 2005	**PHYSICS 11**	**22 September 2005**

INSTRUCTOR: H. E. Smith
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Office Hours: W 10:00 – 11:30, or by appointment.

TEACHING ASSISTANTS: Frank Golf
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COURSE SCHEDULE:

Lectures:	TTh		12:30 – 1:50pm	WLH 2001
Discussion Section:	W		4:00 – 4:50pm	WLH 2005

The first Discussion Section will meet Wedneday Sep. 28.

Midterm Exam: (*TENTATIVE*)	Th	Nov 3	12:30 – 1:50pm	
Final Exam:	W	Dec 7	11:30 – 2:30pm	

COURSE WEBSITE: *http://cassfos02.ucsd.edu/physics/ph11/*

All course materials, including reading assignments, homework & solutions, etc. will be linked to the WebSite. Grades will be posted via WebCT — *http://webct.ucsd.edu.* In addition we'll include other sites with good background material in support of lectures & reading.

ABOUT PHYSICS 11: Physics 11 is a course designed for non-science majors — specifically for Revelle College Liberal Arts Majors. The course will be very different from other Physics courses taught at UCSD and from those taught at most other Universities. The course is designed to prepare students to be informed citizens in a technical society. Physics is a quantitative science, thus Physics 11 will treat the *quantitative* aspects of mechanics, electricity and magnetism and modern physics. We will attempt to balance this with a *descriptive* discussion of important concepts in contemporary physics.

In Physics 11 we'll discuss the science of Mechanics as first developed by Galileo and refined by Newton and, very briefly, as further refined by Einstein. Topics include: the laws of motion, forces, gravity — both Newton's and Einstein's Theories, momentum and energy, and related subjects. A tentative course schedule is attached. Where possible, lectures will follow the text, but will not be identical to it. Demonstrations will be given when we have suitable equipment that works.

COURSE TEXT: Because this is not a standard course, there is not an ideal textbook. The selected text will cover the quantitative section of the course — reading, problem assignments, etc. It was selected because it is a good general text at approximately the appropriate level and because it costs $10 less than the competition:

- **Serway & Faughn** *College Physics:*, 7^{th} Edition(Harcourt: 2005).

You do not need to purchase the whole publishers package — just the text. It can be found on the Web for under $100 new; Sixth Edition is OK — used for about $40.

You will have to rely heavily on my lectures for the descriptive material and for guidance as to the balance between quantitative and descriptive treatments. I will also hand out a list of supplemental reading.

RESERVE LIST: A Reserve List is being created for Physics 11 in the Undergraduate Library. Books that will be placed on reserve will include both versions of the text.

PREREQUISITES: We will use the tools that you learned in high school mathematics — algebra, trigonometry, vectors — in the quantitative parts of the course. Because Revelle Students are expected to take calculus, we will use calculus where appropriate, and more importantly, we will strive to give you a physical understanding of calculus. If you have not had calculus, I encourage you to stick with the course because: a) calculus will be essential for a relatively small part of the course material, b) we will attempt to provide alternative explanations for all calculus based material.

ASSIGNMENTS: Discussion/Problem sets will be assigned weekly. Assignments will not be collected or graded, but will be discussed in the Discussion Section meetings on Wednesday following their assignment. Solutions will be posted on the Course Website.

LABORATORY: Physics is an Experimental Science. Virtually everything that we believe about the physical Universe is subject to experimental verification. Physics 11 has a laboratory component in which you will perform simple tests of two physical phenomena and verify our description experimentally. Each laboratory exercise is expected to take about 1 hour of preparation, 2 hours of laboratory time, and about 1 hour to write-up the results. The laboratory write-ups will be graded and will comprise 25% of your grade. Sign-ups for laboratory slots will be made the week of October 4 (Week 2) and Labs will begin the week of October 11 (Week 3).

LAB SCHEDULE: TBD
(Tentative)

EXPT SCHEDULE:	#1	Kinematics: Egg Drop	Weeks 3–6
	#2	Equivalence Principle	Weeks 6–9

GRADING: There will be 9 “Reading Quizzes”, given each Tuesday at the beginning of class. These will test your reading of the material for that week’s lectures and will provide us with guidance on subjects for discussion in lecture. Quizzes will typically have two questions in multiple choice format. Each quiz will count 5 points: 2 points for each question and 1 point for showing up and responding. You will have an opportunity to discuss your answers with your colleagues before quizzes are collected. The Reading Quiz grade will be the sum of your best 8/9 quiz scores and will comprise 10% of your grade.

Two laboratory experiments will be performed and the results described in a graded write-up; this will account for 25% of your grade.

Finally, there will be a midterm and final exam which will comprise 25% and 40% of your grade respectively.
Grades will be calculated as follows:

Reading Quizzes	40 pts = 10%
Laboratory	100 pts = 25%
Midterm	100 pts = 25%
Final	160 pts = 40%
	400 pts = 100%

Quizzes & exams will be closed book and notes. Relevant formulae will be provided.

HOW TO DO WELL IN PHYSICS 11: Most of us have an intuitive feel for the basic subjects of Mechanics. Intuition aside, it is unfortunately the case that there is no substitute for working problems; *work lots of problems.* I suggest the following strategy:

Reading: Read the assigned chapters carefully, preferably before the relevant lecture (*remember the reading quiz!*), but at least before you attempt the homework. Use the Quick Quizzes and Review Questions to check your understanding of the material.

Lecture: Attend Lectures and try to pay attention to the key principles (not just how to do the example problems). If you do not understand something *ask questions.* Please do not feel intimidated or self-conscious; if something in lecture is not clear to you it is probably unclear to many other students as well. It is far better to clarify ideas when they are presented than to attempt reconstruction later.

Assignments: Work the homework *before* looking at the solutions or attending the section meetings. If the solution eludes you, give it your best shot before seeking help elsewhere. The problems are sometimes complex, but are frequently straightforward if approached in methodical fashion without panic.

Discussion Sections: These are your principal means for help/contact. There will be a Discussion Session on Wednesday evenings in which the TA will work problems from the homework and from the previous quizzes and discuss the material presented during the week's lectures. It is intended that you bring questions about the lectures, problems, etc. to the discussion section just as you might to office hours. You may come to the discussion meeting any time during the period and stay as long (or little) as you need. Experience shows that students who organize their questions/problems ahead of time and participate in the discussion obtain the greatest benefit.

If you need additional help, see the TA or Prof. Smith during office hours or make an appointment to see Prof. Smith.

Exams: Review the lecture material. Review the assigned problems and discussion questions; these will be the best guide as to what will be covered on the exams. Work a few more problems if there are areas where you still feel uncertain.

Synthesize!. It is very important to build upon the material studied in previous weeks and to gain a *comprehensive* understanding of the material. Focusing only on the particular formulae and principles to be applied on the bi-weekly quiz is poor strategy. It is regrettably common that students score well on the quizzes where understanding of one or two key formulae may suffice, but perform poorly on the final exam which requires broader application of these principles and requires application of a whole quarter's worth of formulae (and counts 40% of your grade).

ACADEMIC DISHONESTY: Please read the "UCSD Policy on Integrity of Scholarship". The rules covering academic honesty will be rigorously enforced. For the purposes of this class cheating includes submitting another person's work as your own for grade consideration, copying from another student on assignments or exams or knowingly allowing another student to copy from you, and use of any unauthorized materials in an exam. *Any confirmed case of cheating will result in an "F" grade in Physics 11 and referral to the appropriate dean for disciplinary action.*

TENTATIVE COURSE SCHEDULE

Lectures		Topic	Reading/Quiz
Sep 22	Th	Introduction: Natural Philosophy in the Renaissance	Ch. 1
Sep 27	T	Motion: Displacement, Velocity, Acceleration	Ch. 2 §1 – 7
Sep 29	Th	Constant Acceleration; Gravity	
Oct 4	T	Motion in Two Dimensions	Ch. 3 §1 – 6
Oct 6	Th	Projectiles: Fly Balls and Bombs	
Oct 11	T	Force, Mass & Inertia	Ch. 4 §1 – 5
Oct 13	Th	Newton's Laws of Motion	
Oct 18	T	Friction & Newton	Ch. 4 §6 Ch. 7 §8
Oct 20	Th	Gravity as a Force: Newton's Description	
Oct 25	T	Circular Motion: Satellites & Orbits	Ch. 7 §1 – 7;10
Oct 27	Th	Gravity and Spacetime: Einstein's Theory Extreme Gravity: Black Holes & Neutron Stars	
Nov 1	Th	The Fundamental Forces of Nature	
Nov 3	T	Midterm *(TENTATIVE)*	Ch. 1 – 4,7
Nov 8	T	Work and Energy	Ch. 5 §1 – 8
Nov 10	Th	Energy Conservation & Transformation	
Nov 15	T	Momentum	Ch. 6 §1 – 5
Nov 17	Th	Conservation of Momentum	
Nov 22	T	Angular Momentum	Ch. 8 §1 –7
Nov 27	Th	HAPPY THANKSGIVING	
Dec 2	T	Special Relativity	Ch. 26 §1 – 10
Dec 4	Th	Implications of Relativity: Space Travel Are We Alone? Life In The Universe	
Dec 7	W	FINAL EXAM 11:30am – 2:30pm	