

Physics 135 – How Things Work - Fall 2008

Course Syllabus

Instructor: Dr. Roberto Ramos (Physics)

Office: Disque 624 **Phone:** 215-895-2729 **Email:** rcr32@drexel.edu **Office Hours:** TBA

Time & Place: Tues & Thurs 4 pm – 5:50 pm, Disque 108 **Credits:** 4.0

Target Audience: Students seeking a connection between science and everyday life, or seeking courses with more scientific real-world content.

Required Materials (available at Drexel Bookstore):

(1) *How Things Work: The Physics of Everyday Life*, 3rd ed. by Louis A. Bloomfield*

(2) **WileyPlus Access Code** for *How Things Work: The Physics of Everyday Life*, 3rd ed. by Louis A. Bloomfield.

- ***(2) is required to complete the course.** The WileyPlus website contains an electronic e-book version of *How Things Work*, accessible during the quarter the student is registered. One may also opt to purchase the Access Code and read the e-book online.
- WileyPlus URL <http://edugen.wiley.com/edugen/class/cls76298/>
- Course Website: <http://www.pages.drexel.edu/~rcr32/htw/phys135.htm>

Brief Description of the Course:

This science elective examines the science behind everyday phenomena and devices. It uses everyday experiences and interesting technologies to convey principles of physics spanning motion, forces, electromagnetism, optics, modern physics, materials and advanced technologies. The **broad goals of the course are:**

- To become aware of science in everyday life
- To develop and expand physical intuition
- To learn that the world is predictable and not magical

Unique Features:

- Good number of lecture demonstrations and videos
- Use of a Personal Response System or “clickers” for active feedback
- Emphasis on *conceptual* understanding

Course Breakdown:

In-class Reading Quizzes/Participation	- 10 %
Midterm	- 20 %
Finals	- 30 %
Homework	- 20 %
Presentation	- 20 %

Homework: *Homework will be assigned and submitted via the WileyPlus homework website.* The nature of homework problems may be multiple-choice, text or simple numerical problems. You may discuss approaches with other students but your final answer must be yours alone and in your own words. Late problem sets are acceptable for reduced credit until 4 days after due date: The maximum credit is 95% during the first 24 hrs, 90% during the second 24 hrs, and so on. Video presentations of portions of the show “Some Assembly Required” will be shown and homework based on these will be assigned.

Exams: A closed-book, in-class midterm will be given in the middle of the quarter. A closed-book Final Exam will also be given during Finals Week. Typically, these consist of multiple-choice questions, short essays, and a simple problem-solving item. *Questions about lecture demonstrations performed in class or videos shown in-class will be asked.* If you miss an exam and fail to provide valid justification, you get zero for that exam. Complaints regarding grading of exams and homework will be entertained up to 1 week after they are handed back in class.

Participation/Reading Quizzes: To keep you engaged during class, I will ask questions about lectures, topics and any pre-assigned readings. You will submit your answer via a Classroom Response System or “clickers” and receive credit for correct answers.

Project: Students, in groups of 2-3, will be required to present a project that will demonstrate their understanding of a particular phenomenon or device of their choosing. Suggested topics will be provided. Topics must be submitted and pre-approved by the instructor. The project is typically in the form of a 15-minute group powerpoint presentation and must be presented orally. *Students must use their own words and cite references. Extensive quotations from references or work showing no clear mental processing or critical thinking will lead to a poor grade.*

Extra Credit: Extra credit can come from writing/submitting, on a weekly basis (no retroactive credit) a 10 sentence essay on how you saw physics in a recent experience and connecting it to lessons in-class.

Tentative Course Schedule Spring Quarter 2008

This schedule is tentative (**subject to change**) and will be determined by availability of lecture demonstration experiments and actual progress of the class.

- **Physics of Moving Objects**
 - Sept 23: Intro to HTW/ Physics of Moving and Crashing Objects, Amusement Park Physics (1.1, 1.2, 2.3, 2.1, 3.3)
 - Sept 25: Fictitious Forces, Cyclones, Toolbox Physics, Segway, Gyroscopes and Tops (2.1, 3.3)
 - Sept 30: Hot air Balloons, Helium Balloons, Submarines and Hydraulics (5.1, 5.2)
 - **Physics in and around the Home**
 - Oct 2: Woodstoves, Circuit Breakers and Insulation, Incandescent vs Fluorescent Lighting (7.1, 7.3, 14.2)
 - Oct 7: Video1: Some Assembly Required
 - Oct 9: To be Announced
 - Oct 14: Lightning Generators, Shielding, Air Cleaners, Photocopiers (10.1, 10.2, 10.3)
 - **Physics in Electromagnetic Devices**
 - Oct 16: Fridge magnets, Credit Cards, Microphones, Metal Detectors, AC Adaptors (11.1,11.2)
 - Oct 21: **MIDTERM EXAM**
 - Oct 23: Video2: Some Assembly Required
 - **Physics of Electromagnetic Spectrum and Electronic Devices**
 - Oct 28: Microwave Ovens, Radio, Electromagnetic Spectrum, Sunlight, Rainbows, Polaroids (13.1, 13.2, 14.1)
 - Oct 30: Lasers, LEDs, CD/CD-R/CD-RW Players and Optical Recording (14.3, 15.2)
- OCT 31 – LAST DAY FOR WITHDRAWAL***
- Nov 4: Optics and Optical Illusions
 - **Physics of Modern and Future Technologies**
 - Nov 6: Imaging: MRI, X-rays, MEG and Imaging the Nanoscale (16.2)
 - Nov 11: Physics of Cryogenics and the Ultra-cold, Superconductors and Quantum Devices
 - Nov 13: Laboratory Visits
 - Nov 18: Physics of Materials (C1)
 - Nov 20: Video3: Some Assembly Required
 - Nov 25: Presentations
 - Dec 2: Presentations
 - Dec 4: Review

FINALS