PHYS 155: The Physics Behind the Internet (Winter 2010); Course reference number: 24838; Credits: 4
Schedule: M,W,F 12:00-12:50, Room 110 Willamette Hall

Instructor: Michael Raymer  Office: 276 Willamette (at front of building), phone: 346-4785  email: raymer@uoregon.edu
Office hours: Tu 3:30-4:30 Th 2:30-3:30, and by appointment (best to email first)

Co-Instructor: Daniel Lincoln  Location: TBA  email: dlincoln@uoregon.edu
Office hours: M Tu 2:00-3:30, and by appointment (best to email first)

Homework Grader: Matt Beachly  Office: 118 Volcanology, phone (308) 627-7067;  email: beachly@uoregon.edu
Office hours: M Tu 1:00-2:00, and by appointment (best to email first)

Physics Drop-In Help Center WIL 147. Help with any standard math or physics question can be obtained here, and is staffed 5 days a week (Most times it is open. Hours are posted on the door.) Note: Some of the computer-related topics in this course may be outside the expertise of the tutors there.

Course Home Page: Blackboard system, https://blackboard.uoregon.edu/webapps/login/

Course Description: A non-science major's introduction to the physics concepts that explain how information is stored, transmitted, and processed. This is a physics class—not a technology or computer science class. Physics is the discipline of understanding how relatively simple things work. Fundamental issues in physics will be discussed using only elementary math and simple algebra.

Prerequisites: no formal requirements, but see below.

Schedule of Lectures and Readings: The schedule of topics we will cover in this course, with reading assignments for you to complete before each class is given in a separate document, titled “Schedule of Lectures and Readings.” Reading Assignments are for reading in ADVANCE of each class. (Except that for the first class.) Note that we are not going through the book in the order of the chapters. We are going to first discuss high-level computer and Internet concepts, then go back and study the underlying physics.

Required Materials:
Calculator: You will need a scientific calculator for this course, and you must bring it to all exams, and we encourage you to bring it to class. At minimum, it should be able to calculate using scientific notation for large and small numbers. For example the Sharp EL531WBBK will work if you want a really cheap one, while some TIs’ and HPs will do even more. There should be plenty of choices at the UO bookstore.

i>clicker: You need to purchase an i>clicker from the UO bookstore (about $35 new, with good resale value). You will use this to respond to class polls and to take in-class reading quizzes (see the grades section below). You must bring your clicker to every class, and I will expect you to obtain and register one prior to Monday of the second week of classes. You will need to register your clicker following instructions on Blackboard in the Course Documents section for this course.

Text: The required textbook for this course is The Silicon Web by Michael Raymer. It will be available at the UO bookstore. I have arranged a way to have the prices discounted by an amount equal to my author’s royalties (approximately 10%). I am not making any money from text sales for this course.

We will post lecture notes for the course (the slides we show in class) on the course Blackboard site. Check the Announcements page for updates on when new notes are posted. In general, these notes will be available soon after the corresponding material is covered in class. You should still plan to take your own notes during class.

Use of Math: One of the main aspects of physics is that you can use mathematics to understand how things work. As such, you will need to employ some basic math skills—fractions, simple algebra (solve 2 x = 5), square roots, exponents and scientific notation, how to use a calculator, and how to draw and interpret graphs. We'll review the math concepts needed, and we won't go anywhere near the kind of math you need in an upper-level physics class.

Grades: Grades for the course will be based on class participation (measured by clicker poll questions), reading quizzes (measured by clicker quiz questions), homework, one quiz, two midterm exams, and a final exam, weighted as:
* Daily Classroom Participation (i>clicker-based Polls and Reading Quizzes): 10%
* Homework: 30%
* Quiz 2%  * Midterm exam 1: 10%  * Midterm exam 2: 20%  * Final exam: 28%
**Grading scale:** The expected grading scale for this course is: 100-85 = A, 84.9-72 = B, 71.9-65 = C, 64.9-50 = D, <50 : in danger of F. If necessary, I may apply a curve to achieve a higher average final grade. However, you are guaranteed at least the grade listed here based on your course average. Pass/fail grading option: A passing grade requires at least the equivalent of a C-grade.

**Reading Quizzes:** Most of the classes will begin with a short reading quiz, using your clicker. The quizzes should add incentive to do the assigned reading before class, and the questions are designed to be easy if you've done the reading (they won't test mastery of the material). Your responses are known only to you and the Instructors. Bring pencil, paper, and calculator to every class for these.

**Polls:** Classes will involve poll questions which can be answered with your clicker. It doesn’t matter whether or not you get these questions right, as long as you give some answer. Your responses are known only to you and the Instructors.

We understand you may need to miss an occasional class; therefore in computing your final grade, we will drop your two lowest class days of Poll and Reading Quiz scores, including any missed or "forgot-my-clicker" days.

**Attendance:** You will need to show up promptly at the beginning of each class to take and get credit for each clicker quiz, and to participate in class. Some of your lowest scores are dropped, as mentioned above, in computing your final grade, so this allows you to miss a couple of classes without penalty if necessary.

**Homework:** Weekly homework sets will be assigned on Blackboard about one week before they are due. We encourage you to work together in solving homework problems, but you must write up the solutions on your own, in your own words. Homework is due each Wednesday at 4:30 pm; put into the designated In-Box (location: basement of Willamette - directly below our classroom). We will accept late homework no more than 24 hours late (4:30 pm Thursday in the homework In-Box). Up to 24-hour late homework will have 20% deducted. We will try to post solutions to each homework assignment within one day after it is due.

**Homework Teams:** Several times during the course (not every week), we will reassign a couple of problems (in extended form) from the previous week’s assignment, with the requirement that you answer the questions again, this time as part of a Homework Team. The purpose is so that classmates can better learn the material by explaining it to peers. We will form permanent teams of 3 to 4 members during the second week.

**Makeup exams (NONE):** The exams are pre-scheduled so you can avoid scheduling conflicts. Thus, there will be no makeup exams for this course, so please check the dates now. If you have a serious and documented reason for missing an exam (death in the family, serious illness), your final-exam score will count in place of the missed midterm exam score. That is, your final-exam score will count for more than it would otherwise. Otherwise, you'll receive a zero score for a missed exam.

**Final exam:** The final exam will be held from 10:15 am-12:15 pm on Friday, Mar 18. You must take the exam at this time. (No exceptions.) You must bring a calculator to the final.

**Participation:** As an active learner, you will obviously need to participate regularly in class. The main ways to participate are by asking and answering questions verbally and by answering clicker questions. Remember, you get credit just for answering the poll questions (even incorrectly). Also, if you do give a wrong answer, this is in some sense good: this means you have the chance to learn something! We don't expect you to have mastered the material by the time we discuss it in class. But of course, you should master it by exam time!

**Office Hours:** We will be thrilled if you ask questions in class or during office hours. This tells us you're actually making an effort to learn something. For any questions related to physics and the Internet, just interrupt us anytime. Also, feel free to email us before class if you find something in the reading especially confusing.

**Incompletes:** According to the rules of the University, "A mark of I (incomplete) may be issued when the quality of work is satisfactory but a minor yet essential requirement of the course has not been completed for reasons acceptable to the instructor."

**Students with Disabilities or other special needs:** If you have specific physical, psychiatric, or learning disabilities and require accommodations during lectures, please let Michael Raymer know early in the semester, preferably in the first week, so that your learning needs may be appropriately met.