

Physics 1375 Foundations of Nano Science

Spring, 2013

Course Information:

Location: Room 316 Old Engineering Hall

Class Times: MWF 3:00-3:50pm

Text: See discussion below

Professor: James V. Maher

Contact Information: Phone 4-2180; Email jvmaher@pitt.edu; Office 602A CL

Office Hours: 10:00-10:50am Tuesday and Wednesday or by appointment. The Tuesday and Wednesday office hours will be held on the fourth floor of Old Engineering Hall, some weeks in Room 408 and other weeks in Room 402 (whichever room is not used that week for the introductory teaching lab course).

Course Description and Objectives:

This course provides an introductory overview of the scientific issues that arise when we attempt to extend our current knowledge of physical systems into the nano length scale. Simple one-dimensional quantum problems will be examined, and difficulties of extending these to small but significant arrays of particles will be discussed. Simple statistical mechanical systems will be discussed, and difficulties of bringing them down to much smaller numbers of particles will be discussed. The course will include a consideration of all these issues as applied to one nano-system of interest.

Prerequisites: Physics 0175 and an introduction to university level chemistry are pre-requisites for this course.

Text: There is no ideal textbook available at the level of this course, so we will work from parts of two different books: Modern Physics: A Textbook for Engineers, by Robert L. Sproull and Statistical Physics, Berkeley Physics Course Volume 5 by F. Reif. Both of these books are out of print. The Physics Department has agreed to fund the use of the chapters of these books that we need for this first offering of this course. The textbook sections will be posted on the course web-site.

CourseWeb: A CourseWeb site for this course has been created and from there you may view announcements, send email to the instructor and download course material (such as the syllabus, the textbook discussed above, exam announcements and exam solutions). To access the CourseWeb site, go to <http://courseweb.pitt.edu> and login using your Pitt email username and password.

Class Participation: I encourage you to participate fully in class discussions. In my experience, most questions asked during class are questions that many students would like to hear answered, and I welcome the opportunity to answer such questions.

Homework: To truly understand physics, you need to be able to take first principles and apply them to new situations. Thus, problem-solving skills are important to learning and understanding physics. Therefore homework is a crucially important part of the course.

Exams: There will be **two** mid-term exams (in lecture) and a 1 hour 50 min cumulative final examination. The exams are expected to fall on:

- Exam 1: Wednesday, February 13.
- Exam 2: Wednesday, April 3.
- Final: Thursday, April 25 from 2:00 – 3:50PM

Course Grades: Your grade in the course will be based on homework and exams. The grades will be weighted according to the table below:

Homework 10%
Midterm Exams 25% each
Final Exam 40%

Office Hours: See above

Academic Integrity: “Students in this course will be expected to comply with the University of Pittsburgh’s Policy on Academic Integrity. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries, telephones and programmable calculators.”

Disabilities: If you have a disability that requires special testing accommodations or other classroom modifications, you need to notify both the instructor and the Disability Resources and Services no later than the 2nd week of the term. You may be asked to provide documentation of your disability to determine the appropriateness of accommodations. To notify Disability Resources and Services, call 648-7890 (Voice or TTD) to schedule an appointment. The Office is located in 216 William Pitt Union.