

University of Maryland

Department of Physics

Spring 2011

Prof. Steven Anlage

Physics 404

Title:

Physics 404 (formerly PHYS 414) is an introductory course on thermodynamics, statistical mechanics and kinetic theory. It is designed for physics majors but also suitable for advanced undergraduate students in astronomy, biology, chemistry, engineering and space sciences. 3 Credits

Prerequisite:

Physics 273, Math 241. It is desirable to have some introductory quantum mechanics preparation such as is gained by taking Physics 401 concurrently, but not mandatory.

Instructor:

Prof. Steven Anlage, Room 1363 (Physics/CNAM). You can find the CNAM either by 1) going through the blue door labeled "Center for Nanophysics and Advanced Materials" in the basement of the physics building, or 2) entering from the plaza between the Math and Physics buildings.

Phone: 5-7321, e-mail: anlage@umd.edu, World-Wide-Web: <http://www.cnam.umd.edu/anlage/AnlageHome.htm>

Schedule:

Two lectures weekly,
TuTh..... 12:30 pm - 1:45pm (PHY 1402)

Required Text:

C. Kittel and H. Kroemer (KK) , *Thermal Physics*, 2nd Edition (Freeman, San Francisco, 1980) (ISBN: 978-0716710882). Recommended for background reading: D. V. Schroeder, *Thermal Physics* (Addison Wesley Longman, 2000) (ISBN: 978-0201380279).

Lectures:

You will be responsible for material presented in lecture that is not in the book. If you miss a lecture you are responsible for finding out from a classmate what we did in class.

Homework:

The homework assignments will be given on the class website. The assignment will be due at the beginning of class on Thursdays. Please staple papers and show your name, assignment number and date due. Two homework problems will be graded quantitatively (0-10) and the rest will be graded qualitatively (0-2).

Doing the homework is a very important part of this course! Homework will be returned by the following week. Late homework will not be accepted. As compensation, the lowest homework grade from the semester will be dropped.

Exams:

There will be two "mid-term" exams and a final exam. All exams will be counted towards your final grade. Make-up exams (for any of the exams) must be requested well in advance of the exam; the reason for the absence must be documented and in accord with University policy (see p. 33 of <http://www.umd.edu/catalog/0607/chapter4.pdf>). If an exam is unexpectedly canceled (due to inclement weather, etc.) it is automatically rescheduled for the next class period.

In grading, we are looking more at the reasoning that you use, rather than the final number you arrive at. So remember to carefully set up the problem on paper, even if you cannot see the way through to the solution.

The final exam is Tuesday, May 17 from 1:30 – 3:30 PM.

Computers

Developing a working knowledge of computers in the context of physics problem solving is an important skill. You are encouraged to solve problems using programs such as Mathematica, and you are also encouraged to visualize the solutions using spreadsheet programs. Note that

a student version of Mathematica is available for home use for \$10 from OIT: <http://www.oit.umd.edu/slic/products/wolfram/mathematica6.html>

Dropping the Course:

Note: the last day to drop with a “W” is April 8.

Final Grade:

Based approximately on homework (~30%), mid-terms (~40%), and final (~30%).

Academic Dishonesty (cheating):

Academic dishonesty is a serious offense that may result in suspension or expulsion from the university. In addition to any other action taken, the normal sanction is a grade of “XF”, denoting “failure due to academic dishonesty,” and will normally be recorded on the transcript of the offending student.

Office Hours

You are strongly encouraged to attend office hours to ask questions, discuss the homework problems, and talk about physics in general. The office hours will be held 3:00-4:00 PM on Mondays, and 4:00-5:30 PM on Wednesdays, just before the homework is due. My office is right next to Prof. Lobb's in the Center for Nanophysics and Advanced Materials.

Class Web Site:

http://www.physics.umd.edu/courses/Phys404/Anlage_Spring11/index.html

Tips For Doing Well In This Course:

- 1) Read the assignment in the book *before* and *after* the material is covered in lecture.
- 2) Freely ask questions in lecture, after lecture, and during office hours. Also discuss problems with your friends and classmates.

3) Work all of the homework questions and problems. You are allowed and encouraged to discuss homework with anyone you wish. However, in order to really learn, don't just copy solutions from somewhere or someone else; rather, work through them in detail yourself. Afterwards, make use of the solution sets, your TA's office hours, and me to make certain you understand all of the solutions. The exams will sometimes involve homework problems.

4) Seek help immediately if you do not understand the material or can't solve the problems. Help is available from your TA, and from me. Don't wait until just before the exams! If you are experiencing difficulties in keeping up with the academic demands of this course, contact the Learning Assistance Service, Suite 3125 of South Campus Dining Hall, 314-7651. Their educational counselors can help with time management, reading, note-taking and exam preparation skills.

5) Remember that you are responsible for material discussed in class, even if it does not appear in the textbook.