Physics 310—Spring 2015

Prof. Andy Rex

Class meetings: 1:00 MT θF in Thompson 153

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Office hours: Monday 11:00-12:00 and Friday 11:00-12:00. If these times aren’t convenient, make an appointment for another time or walk in whenever you wish. Don’t feel bashful about dropping in any time; it’s my job to be available for you.

Physics 310 is an advanced problem-solving course in thermodynamics and statistical physics. The primary text for the course is *An Introduction to Thermal Physics* by Daniel Schroeder. Be sure to check out and bookmark the book’s web page, maintained by the author, at <http://physics.weber.edu/thermal/>. This site contains useful information, including a list of errors in the printed book. Recently the site has been updated to include tutorials on how to use Mathematica and Python. I will provide supplemental readings as needed.

Note that Physics 305 is normally a prerequisite for this course, but this prerequisite may be waived by permission of the professor on a case-by-case basis. The mathematical level and difficulty of assigned problems should be comparable to what you experienced in Physics 305 or Physics 351.

You are encouraged to use the books that have been placed on reserve in the library. At this stage of your scientific career, you can no longer expect that everything you need to know will be found in your primary text. The reserve books offer different and useful ways of looking at the topics we study as well as additional problems.

## Reserve books

Author Title

Baierlein Thermal Physics

Kittel Thermal Physics

Fermi Thermodynamics

We will try to cover as much of Schroeder’s text as possible. This requires skipping some sections along the way. The book contains a good balance of topics from both statistical physics and thermodynamics. Both of these approaches are important in the further study of physics and engineering. Chapter 7 contains some particularly interesting and current topics in quantum statistics, so it’s important that we cover enough of the basic statistics and thermodynamics to be able to appreciate the physics in Chapter 7.

Most students find that class attendance is necessary for mastery of the material. Your attendance and participation makes the classroom experience better for everyone involved, but especially for yourself. Unexcused absences will result in deductions from your class participation grade. *Bring your calculator to class every day*. On most days, I’ll ask you to compute something. Having a calculator handy is important, because there are lots of big numbers involved in statistical physics. Ideally, your calculator should calculate and display up to the order of 10999.

You should already know that conscientious performance of homework assignments is the best way to master any technical subject. Homework will be collected regularly (usually once or twice each week) and graded. You will normally have four days (e.g. Friday to Tuesday) or more to complete a homework assignment. Accordingly, late homework will not be accepted, except in case of documented, extended illness or other valid absence from campus approved in advance, e.g., a music performance or athletic contest.

It is necessary to use English in your homework solutions (in addition to the math symbols and numbers), so that it’s clear to you and the professor that you have a clear conceptual understanding. A numerically correct solution may get less than full credit if it’s not clear that you understand what you are doing. Draw graphs and use tables where appropriate.

Students are encouraged to work together on homework assignments. However, merely copying another student’s solution is not permitted and is in fact considered plagiarism. Homework papers are examined scrupulously for evidence of copying. If you consult with other students on homework problems, you should then write them up in your own words. Using outside resources such as published solutions or solutions available on the internet is strictly forbidden. For the university’s policy on academic integrity, see:

<http://www.pugetsound.edu/student-life/personal-safety/student-handbook/academic-handbook/academic-integrity/>

I recommend that you have access to some kind of symbolic math processor for use in solving homework problems. *Mathematica*, *Excel*, and *Python* are all powerful tools that are available on a number of computers in this building. Feel free to use any computer tools with which you’re familiar.

Final grades will be determined as follows:

Class Attendance and Participation 5%

Homework 35%

In-class exams 45%

Final Exam 15%

The in-class exams will be given at regular intervals, roughly every three to four weeks. The final exam will be a take-home exam, handed out on the last day of class and due at 12:00 noon on Wednesday, May 13.