Physics 335: Thermal Physics
Spring (12) 2015
Course Information

Instructor: Mark Taylor **Office:** Gerstacker 118 **Phone:** (330) 569-5241 (office)
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Office Hours: MWF 4:15-6:00, Tues. 1:00-4:00, Thurs. 1:00-4:00, Sunday 3:00-6:00.
Also, feel free to stop by at other times, call me, or send me email.

Physics Study Session: Thursday evenings 6:30-9:30, Gerstacker 123

Meeting Times: MWF 8:30-9:50, Colton 15

Textbook: An Introduction to Thermal Physics, by Daniel Schroeder

Course WebPage: http://www.hiram.edu/majors-and-minors/physics/courses/thermal-physics

Course Overview: Thermal or statistical physics provides the link between the microscopic world of atoms and molecules and the macroscopic world of everyday objects. This subject tackles such foundational issues as 1) the origin of irreversible processes from the time symmetric fundamental laws of physics and 2) the emergence of simple thermodynamic behavior in systems comprised of a large number of particles governed by an underlying chaotic dynamics. We will address these issues by examining the microscopic origins of the laws of thermodynamics. Since macroscopic systems are composed of an enormous number of particles, an exact description of each individual particle is impractical (if not impossible). Thus, we make use of probabilistic or statistical methods. While such an approach may appear to be approximate, in fact, statistical mechanics is a rigorous and exact theory of macroscopic matter. This course will cover the fundamentals of thermodynamics, statistical mechanics, and elementary transport theory. Since computer simulations play an important role in contemporary statistical mechanics research, we will also study the Monte Carlo method and everyone will carry out a computational project to investigate a magnetic, liquid, polymer, or other many-body system.

Class Preparation and Participation: It is very important that you read the relevant sections of the textbook *before each class session*. Having some time to think about the material beforehand will make the class meetings a lot more useful, so please come to class with questions and prepared for discussion. Since I don't want to do all the talking, each week at least two of you will be responsible for presenting a homework problem to the class. These presentations will be your chance to teach us. From my own experience I know that one of the best ways to learn something is to try to teach it to someone else.

Homework: As you well know by now, learning physics has a lot to do with "doing" physics and thus the weekly problem sets are a very important part of this course. I encourage you to talk with each other about these problem assignments and please come see me if you have questions. Your written solutions are due each Friday by 6 pm. Graded papers and solution sets will be returned within a week.

Exams: There will be a midterm exam (see syllabus) and a comprehensive take-home final.

Grading:

Class participation and presentations	10%
Problems sets	40%
Monte Carlo project	15%
Midterm exam	15%
Final exam	20%

Final grades are based on a fixed scale: ≥88%=A, ≥76%=B, ≥64%=C, ≥52%=D.
(For each letter grade, a "+" or "–" corresponds to the upper and lower 4% of the range.)

General Hiram College Course Policies: http://home.hiram.edu/physics/HiramCoursePolicy.htm