

# Phys 455: “Thermal Physics”--- Spring 2009

## Course Information:

Instructor: Dr. L. Gan  
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Classes meet: Tue and Thur at 12:30pm-1:45pm  
DL Rm. # 213

Office hours: Tue 3:00pm-4:30pm  
Wed 3:00pm-4:30pm  
Other hours by appointment

Course web site: <http://people.uncw.edu/ganl/phy455/index.htm>

## Required Text:

“Thermal Physics”, by C. Kittel and H. Kroemer  
(W.H. Freeman and Company)

## Supplementary Readings:

- “Fundamentals of Statistical and Thermal Physics”, by F. Reif
- “Introduction to Statistical Mechanics and Thermodynamics”, by K. Stowe
- “Statistical Physics” by F. Mandl
- “A Modern Course in Statistical Physics” by L.E. Reichl

## Important!!!

Read ahead of the lecture and solve the weekly homework problems assigned. Weekly reading assignment is given below in the course outline. Even if you only read the assigned sections for about 30 minutes before each class, you will be much better prepared. Look through each chapter before we begin them. The course will move at a fast but steady pace and it is your responsibility to keep up with the lectures.

## Homework:

Approximately 3-7 problems will be assigned every week. Homework will be collected on Thursday during the class in one week after each assignment is announced. Show all works clearly. **Late homework will not be accepted.** It is absolutely essential that you work out the assigned problems.

## Examinations:

There will be two tests during the semester and a three-hour comprehensive final exam. The exams will consist of a mixture of multiple choice, conceptual

questions, and selected problems. The tentative dates of these exams are given below in the course outline. Do not miss any of these exams.

### **Make-up Exams:**

There will be no make-up exams. In case of evidence of extraordinary circumstance, each case will be discussed and evaluated on an individual basis. No general policy will apply to the class as a whole.

### **Grading:**

|                   |     |
|-------------------|-----|
| Homework          | 20% |
| Two tests         | 40% |
| Final examination | 40% |

### **Attendance:**

YOU ARE EXPECTED TO ATTEND ALL OF THE LECTURES! Your final grade will be dropped by **half a letter grade** if you have more than five absences. No absences can be excused. Attendance will be taken at the beginning of each class and will be closed 15 minutes after the class starts. Please do not be late!

### **Phys 455: “Thermal Physics” – Course Outline:**

| <b>Date</b>             | <b>Topic</b>                                     | <b>Text Reference</b> |
|-------------------------|--|-----------------------|
| Jan. 8                  | Introduction to Thermal Physics                  |                       |
| Jan 13, Jan 15          | States of a Model System                         | Chapter 1             |
| Jan 20, Jan 22          | Entropy and Temperature                          | Chapter 2             |
| Jan 27, Jan 29, Feb 3   | Boltzmann Distribution and Helmholtz Free Energy | Chapter 3             |
| Feb 5, Feb 10, Feb 12   | Thermal Radiation and Planck Distribution        | Chapter 4             |
| Feb 17                  | <b>Exam #1</b>                                   | Chapter 1-4           |
| Feb 19, Feb 24, Feb 26  | Chemical Potential and Gibbs Distribution        | Chapter 5             |
| Mar 3, Mar 5            | Ideal Gas  | Chapter 6             |
| Mar. 17, Mar 19         | Fermi and Bose Gases                             | Chapter 7             |
| Mar 24                  | <b>Exam # 2</b>                                  | Chapter 5-7           |
| Mar 26, Mar 31, April 2 | Heat and Work                                    | Chapter 8             |
| April 7, April 14       | Gibbs Free Energy and Chemical Reactions         | Chapter 9             |
| April 16, April 21      | Phase Transformation                             | Chapter 10            |
| April 23                | Review   | Chapter 1-10          |
| April 30                | <b>Final exam (11:30-2:30)</b>                   | Chapter 1-10          |

This schedule is subject to change.