

# Syllabus for Thermodynamics and Statistical Physics, PHYS 313

Fall 2006

MWF 9:15-10:15 A, NSCI 207

**Instructor:** Ataur R. Chowdhury

**Office:** NSCI 118

**Office Hours:** TR 9:00-10:30 A (NSCI 118)

**Contact:** Phone (907) 474-6109  
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**Prerequisites:** PHYS 212X or permission of instructor.

**Textbook:** Fundamentals of Statistical and Thermal Physics, Reif, McGraw-Hill Publishers.

**References:**

- 1) A. H. Carter (Classical & Statistical Thermodynamics);
- 2) R. B. Bauman (Modern Thermodynamics with Statistical Mechanics);
- 3) H. B. Callen (Thermodynamics and an Intro. to Thermostatistics);
- 4) T. Espinola (Introduction to Thermodynamics);
- 5) H. S. Robertson (Statistical Thermophysics);
- 6) D. V. Schroeder (Thermal Physics).

**Course Outline:** Random walk and binomial distribution; statistical description of systems of particles; statistical foundations of macroscopic systems; measurement of macroscopic parameters; properties of ideal gases; free expansion and throttling processes; formulation of statistical mechanics; concept of ensembles; partition function treatment of ideal gas and paramagnetic materials; thermodynamic conditions of equilibrium of chemical species; fundamentals of quantum statistics; Bose-Einstein and Fermi-Dirac statistics; low temperature behavior of magnetic materials; and elementary theory of transport processes.

## Course Requirements/ Policies:

### Class Attendance:

This course is generally regarded as one of the basic courses taught in undergraduate curriculum, and it is highly expected that the students will commit themselves to attend the class regularly. The students will be expected to take part in meaningful discussion and ask questions to better comprehend the subject material. Active participation during the lecture and the tutorial sessions is essential for a comprehensive understanding of the subject, and it is highly encouraged.

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## Homework:

On the average, 5-8 problems will be assigned each week. The homework will be due back the following Wednesday by 5:00 p.m. in instructor's mailbox inside the department office (NSCI 102). NO LATE HOMEWORK WILL BE ACCEPTED. NO EXCEPTIONS (barring emergencies and extreme situations). Group work is highly encouraged for solving problems, and for additional help with the homework the students are most welcome to consult the instructor during the office hour or any other time by prior appointment.

## Tutorial Session:

One hour per week (M 4:40-5:40 P, NSCI 204) will be devoted to doing problems not included in the homework. Both the instructor and students will take part in solving a pre-selected set of problems during this session. Students may also bring in subjects materials for further discussion and clarification during this session. This session is designed to promote a better understanding of the subject and will not be a part of the grade.

## Pop Quiz:

There will be one pop quiz every week of the semester. The dates for the quizzes will not be specified and these will be designed to assess students' understanding of the subject material from the preceding week. The quiz may include problems similar to the homework and may also include 'intuitive' questions pertaining to the subject materials. Of all quizzes only the ten best will be considered for grading.

## Examinations:

There will be a midterm examination (Oct. 25, Wednesday) and a final comprehensive examination (Dec.16, Saturday, 8:00-10:00 A) for this course. Examinations will consist of, in most part, problems similar to those in the homework and those worked out in class, and may include 'intuitive' questions related to the subject materials.

## **Grading Policy:**

Homework	35%
Midterms	16
Quiz	25
Final	<u>24</u>
	100%

## **Disability Services:**

It is the policy of the university that all students have equal access to the campus and course materials. Students with special needs and/ or disabilities should contact *Student Support Services* (509 GRUE, 474-6844) and/ or *Disability Services* (203 WHIT, 474-7043) for help that they may need.

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## Initial Questionnaire

NAME: \_\_\_\_\_ Student # \_\_\_\_\_

Academic Major(s) \_\_\_\_\_

Physics and Mathematics courses completed:

Physics courses this semester: