PHYS 506: Thermal physics and statistical mechanics **COURSE INFORMATION**
Spring 2012

INSTRUCTOR:

Yuriy V. Pershin

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OFFICE HOURS:

Thursday 11:00 to 12:30 or by appointment

CLASS MEETINGS:

T TH 9:30AM to 10:45AM (PSC205)

TEXTBOOK:

Required:
Thermal Physics (2nd Edition), Charles Kittel and Herbert Kroemer, (1980)
ISBN-10: 0716710889
Suggested reading:
Fundamentals of Statistical and Thermal Physics, F. Reif (last edition).

COURSE WEB PAGE:

http://www.physics.sc.edu/~pershin/courses.htm
Check this page frequently for announcements, homeworks, assignments, etc.

OBJECTIVES

This course is a rigorous introduction to thermal physics using statistical mechanics. After completion of the course, students will be able to analyze simple models for a wide range of physical systems using statistical techniques.

REQUIREMENTS

- **Homework.** Homework assignments will be typically given once per week. You will generally have one week to work on the homework.
- **Reading assignments and quizzes.** The chapters covered in the class should be read prior to the lecture. Short quizzes will be given at any time. Their purpose is to help keep your reading up to date. Each quiz contains questions from recent lectures and reading assignments.
- **Exams.** Two mid-term exams will be given accordingly to the schedule.
- **Final exam.** The final exam is comprehensive and will include all material covered during the semester. All students must take the final exam.
- **Attendance.** Lecture attendance is mandatory. Unexcused absence is not allowed and will automatically reduce the score score by $n(n\text{-}1)$ points.
- **Project assignments** (for graduate students only).

Course calendar/schedule*

Date	Day	Topic	Text Reading	Notes
Jan 10	Tue	Course overview, States of a Model System	Ch. 1	First Day of Class
Jan 12	Thu	States of a Model System	Ch. 1	
Jan 17	Tue	Entropy and Temperature	Ch. 2	
Jan 19	Thu	Entropy and Temperature	Ch. 2	
Jan 23	Tue	Boltzmann Distribution	Ch. 3	
Jan 26	Thu	Helmholtz Free Energy	Ch. 3	
Jan 31	Tue	Thermal radiation and Planck distribution	Ch. 4	
Feb 2	Thu	Thermal radiation and Planck distribution	Ch. 4	
Feb 7	Tue	Chemical Potential and Gibbs distribution	Ch. 5	
Feb 9	Thu	Chemical Potential and Gibbs distribution	Ch. 5	
Feb 14	Tue	Ideal Gas	Ch. 6	
Feb 16	Thu	Ideal Gas	Ch. 6	
Feb 21	Tue	Fermi and Bose Gases	Ch. 7	
Feb 23	Thu			Exam 1
Feb 28	Tue	Fermi and Bose Gases	Ch. 7	
Mar 1	Thu	Heat and Work	Ch. 8	
Mar 6	Tue			Spring break
Mar 8	Thu			Spring break
Mar 13	Tue	Heat and Work	Ch. 8	
Mar 15	Thu	Gibbs Free Energy and Chemical Reactions	Ch. 9	
Mar 20	Tue	Gibbs Free Energy and Chemical Reactions	Ch. 9	
Mar 22	Thu	Phase Transformations	Ch. 10	
Mar 27	Tue	Phase Transformations	Ch. 10	
Mar 29	Thu	Semiconductor Statistics	Ch. 13	
Apr 3	Tue			Exam 2
Apr 5	Thu	Semiconductor Statistics	Ch. 13	
Apr 10	Tue	Kinetic Theory	Ch. 14	
Apr 12	Thu	Kinetic Theory	Ch. 14	
Apr 17	Tue	Kinetic Theory	Ch. 14	
Apr 19	Tue	Review	Ch. 1-10, 13-14	Last Day of Class
TBA				Final Exam

*This is a tentative schedule. Adjustments that need to be made during the semester will be announced in the class.

GRADING:

Your overall score will be a sum of all grades you have accumulated during the course, weighted as follows:

Quizzes: 10%

Homework problems: 20%

Exams #1, #2, each: 20%

Final Examination: 30%

Class attendance (*n* times unexcused): -n(n-1)%

You will be provided with a list of basic constants during each examination. You may use a non-programmable calculator. You cannot use notes, textbook or any other materials. Exams will be based on the material discussed in the class, homeworks, quizzes, and textbook.

GRADING SCALE:

The final grade will be based on the following scale:

Percent	Grade
89-100	4.0 (A)
85-88	3.5 (B+)
76-84	3.0 (B)
72-75	2.5 (C+)

Percent	Grade
63-71	2.0 (C)
50-62	1.0 (D)
<50	0 (F)

ACADEMIC RESPONSIBILITY:

All work you submit must be your own and must comply with the rules stated on this sheet. Please refer to *Carolina Community* for further information concerning the Code of Student Academic Responsibility. Cell phones, PDA's and graphic calculators are not allowed in class.