

## Thermodynamics and Statistical Physics: SYLLABUS

### 1. General Information:

Course: Thermodynamics and Statistical Physics (PHYS 313),  
Room: NSCI 207,  
Time: MWF 9.15am - 10.15am, M 4.40pm - 5.40pm (tutorial session)  
Credits: 4.0 CR,  
Prerequisites: PHYS 212X or permission of instructor.

### 2. Instructor

Instructor: Heinz Wiechen,  
Office: Geophysical Institute 708D (Elvey Building),  
Contact: phone: 4745914, email: hew@gi.alaska.edu,  
Office Hours: anytime.

### 3a. Course Textbook: Fundamentals of Statistical And Thermal Physics, Reif, Mc-Graw-Hill Publishers

**”Course Textbook” does NOT mean that i will follow this book page by page, line by line. It means that you will find all topics which are taught in class in a very similar way in the book !**

### 3b. Supplementary Readings:

Theory of Heat, Becker, Springer.  
The use of the library is recommended.

### 4. Course Outline:

Random walk and binomial distribution; statistical description of systems of particles; statistical foundations of macroscopic systems; measurements 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 processes; fundamentals of quantum statistics; Bose-Einstein and Fermi-Dirac statistics; low temperature behavior of magnetic materials; elementary theory of transport processes.

### 5. Course Goals

The general goal of this course is to provide an introduction into a basic topic which is of fundamental importance with respect to many other fields in physics, e.g., Plasma Physics, Non-Linear Dynamics or Astrophysics.

### 6. Instructional Methods:

Lectures, blackboard, homework, discussion of problems and applications.

### 7. Course Calendar

To formulate a detailed (daily or weekly) schedule is not appropriate in the very beginning. It will depend on questions and suggestions of the students, which are very welcome. A rough schedule is given by the textbook.

#### 8. Course policies:

Please, show up in time. Otherwise you will disturb your fellow students in a disrespectful way. This is not acceptable. Please, attend the classes regularly. It is in YOUR interest. Not doing this will result in serious problems with homework and exam. Do the homework ! It is in YOUR interest. Students may discuss problems and homework in groups. But each student has to deliver his/her own hand written solutions of the homework problems. Plagiarism is forbidden.

#### 9. Evaluation:

The grading is based to 60% on the homework, 10% on the midterm and to 30% on the final exam. The final grading will be as follows:

100% - 85% : A

84% - 80% : A-

79% - 75% : B+

74% - 65% : B

64% - 60% : B-

59% - 55% : C+

54% - 45% : C

44% - 40% : C-

39% - 35% : D+

34% - 25% : D

24% - 20% : D-

19% - 10% : E

9% - 0% : F

#### 9. Tutorial session:

One hour per week (M 4:40p - 5:40p, NSCI 204) is a tutorial session. This will be a question and answer session, homework will be discussed and further problems not included in the homework. This session is designed to promote better understanding of the subject. Regarding the attendance: see course policies. In addition to this tutorial session the instructor appreciates it to answer questions anytime.

#### 10. Disability Services

Contact Office of Disabilities Services.