

Physics 5500 — Statistical Mechanics, Fall 2019
Syllabus
Susanne Yelin

• **Instructor information**

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• **Contents**

- Thermodynamics
- Quantum mechanics
- Quantum statistical mechanics
- Ideal quantum gases – fermions and bosons
- Classical statistical mechanics
- Interacting gases
- Mean field theories
- Fluctuation and response

• **Structure of Class**

The two goals of this class are to (i) build a strong foundation of statistical mechanics thought processes that are also applicable in any subfield of physics, and (ii) to build problem-solving skills.

I will structure the class such that classes consist of discussion sessions, brief lecturing parts, and problem solving. Thus, it is expected that preparing the core content will be done to a good part by the student at home. In order for this to work out, I will rely heavily on active participation, both in class and via HuskyCT.

• **Textbook**

J. Javanainen has developed a script for this course which we will follow. Please read or download in HuskyCT. Since this is rather short, another recommended (but not required) book is “Statistical Mechanics” by R. K. Pathria and Paul D. Beale (3rd Edition). (Please order online or find yourself - I have not pre-ordered it at the bookstore.)

Standard books that have helped to develop this course is the book by Linda Reichl (newer editions are rather different from the first one, but it is rather comprehensive), other standard books for the topic are the one by Kerson Huang and the one by Kittel and Kroemer. All these are helpful but not necessary and not mandatory.

- **Homework**

Homework will be distributed weekly. It will consist of content preparation as well as problems in the style of the prelim exams. The homework is mandatory and will be graded.

- **Grading**

There will be three one-hour exams to practice prelim-type problem solving instead of the more traditional midterms and final. Each of these give 10% of the grade. The homework will count for 35%. There will be one presentation by each student, which will count 15%, the remaining 20% are given for online and in-class participation.

- **Online presence**

There is a HuskyCT site for the course. It will contain all the course materials except for the Pathria textbook. On the website, there will be also a questionnaire to be filled out (for credit) before each class.

- **General University Policies**

Regarding academic misconduct, harassment policies, and similar, please refer to the pages on <http://provost.uconn.edu/syllabi-references>.