

Course name	Physics 219, Statistical Physics
Meeting place, time	ISB 231, TuTh 10-11:45 AM
Instructor	G.-H. (Sam) Gweon
Office hours	TuTh 9-10 AM, or by appointment
Instructor coordinates	ISB 249, gweon@ucsc.edu, http://griffin.ucsc.edu
Textbook	<i>Statistical Mechanics</i> R. K. Pathria and Paul D. Beale
References	<i>Equilibrium Statistical Physics</i> Plischke and Bergersen <i>Statistical Physics of Particles</i> , Mehran Kardar <i>Statistical Physics of Fields</i> , Mehran Kardar <i>Thermodynamics</i> , Fermi <i>Fundamentals of Statistical and Thermal Physics</i> F. Reif <i>Statistical Physics</i> , Landau, Lifshitz and Pitaevskii <i>Statistical Mechanics</i> , Feynman <i>Statistical Mechanics</i> , S. K. Ma <i>Statistical Mechanics</i> , K. Huang
Course website	http://griffin.ucsc.edu/teaching/current

Course objectives Review thermal physics, gain solid understanding of statistical physics, learn to carry out simple and not-so-simple calculations for response functions, practice numerical calculations. Be able to deal with the graduate qualifier level of problems with ease. Be able to understand the modern view on phase transition.

Evaluation The course evaluation will be based roughly half on homework (from 5 to 7 sets are expected), and the other half on the final exam (no midterm). If you do very poorly in either of these two categories, you may not pass this course, almost regardless of how you do in the other. Some questions will be posted on the on line forum, in addition to homework, to facilitate student understanding. Your participation in on-line discussions (or other discussions) is highly recommended. You will get credit for your on-line activities.

Emergency If highly unusual personal circumstances arise to prevent you from participating in core course activities, you should communicate with me as soon as you can, so that you will get the best consideration for makeup opportunities.

Get all help you can get. At a graduate level of physics, talking is very important way of communicating physics. So, talk out loud. Get all help you can get from me, your buddies, and yourself, by not being afraid to ask. The web forum will be available for your discussion at the course web site (see “Evaluation” above).

Lecture plan The following table is a rough plan for lectures. Changes are very likely to occur as we go along.

Lectures are only loosely based on the textbook. In particular, we will probably not have time to go over (somewhat non-standard) subjects in chapters 9 and 11.

Lec	Week	Day	Subject
1	1	4-2	Thermodynamics review
2	1	4-4	Thermodynamics review
3	2	4-9	Probability
4	2	4-11	Probability
5	3	4-16	Kinetic theory of gas (lecture possibly shortened/moved)
6	3	4-18	Kinetic theory of gas
7	4	4-23	Semi-classical statistical mechanics
8	4	4-25	Interactions
9	5	4-30	Interactions
10	5	5-2	Quantum statistical mechanics
11	6	5-7	Quantum statistical mechanics
12	6	5-9	Quantum particles
13	7	5-14	Quantum ideal gas
14	7	5-16	Quantum ideal gas
15	8	5-21	Phase transitions
16	8	5-23	Landau-Ginsburg theory
17	9	5-28	Correlations, Exact solutions
18	9	5-30	Monte Carlo and renormalization group
19	10	6-4	Renormalization group
20	10	6-6	Linear response theory or review
		6-11	Final exam (12-3PM)