



Physics 114: Syllabus

Week	Topic	G&T	B&B
1	From micro to macro, 0th and 1st laws, Equilibrium, Heat capacity	Chs. 1 and 2.1-2.11	Chs. 1.1-1.3, 2, 11, 12 and Apps. C.6 and C.7
2	2nd and 3rd laws, Entropy, Heat engines	Ch. 2.12-2.20, 2.23.1, 2.24.1	Chs. 13, 14.1-14.4 and 18
3	Free energy, Thermodynamic potentials, Maxwell relations, Legendre transforms	Ch. 2.21-2.22, 2.23.2, 2.24.2	Chs. 16 and 27
4	Probability theory, Lagrange's undetermined multipliers, Counting microstates	Chs. 3 and 4.1	Chs. 1.4, 3 and Apps. C.1-C.3, C.13
5	More counting, Statistical basis for S and T , Microcanonical and Canonical ensembles, Applications: Equipartition, Maxwellians	Chs. 4.2-4.6, 4.14.1, 4.14.2 and 6.1, 6.2	Chs. 4.1-4.6, 5, 14.5-14.8, 15, 19 and App. C.8
6	More about the Canonical partition function with examples, Simulations of ensembles	Ch. 4.7- 4.11, 4.13	Chs. 4.7, 20, 21
7 ^T	<i>Test 1: this week</i>		

^T Test week

Note : There will sometimes be additional readings. Books will be on our seminar shelf in Cornell Library, or else you will have electronic versions.

Week	Topic	G&T	B&B	Schroeder
8	Grand Canonical ensemble, Density of states, Chemical potential and reactions	Chs. 4.12, 6.5, 6.6, 6.11.1, 7.1, 7.2 and 7.5	Ch. 22	Ch. 7.1
9	Para- and ferromagnets, Ising model	Ch. 5.1-5.9	Example 20.5 and Ch. 28.8	Ch. 8.2
10	Counting bosons and fermions, Black body radiation	Ch. 6.3-6.5.1, 6.7	Chs. 23, 29, 30.1 and Apps. C.4, C.5	Ch. 7.2, 7.4
11	Fermi and Bose gasses, BEC, Einstein and Debye solids	Ch. 6.8 - 6.10, 6.11.2	Chs. 24, 30.2 - 30.4	Ch. 7.3, 7.5, 7.6
12	Phase equilibria and transitions	Ch. 7.1-7.4	Chs. 26.1, 26.4, 28.1-28.7	Ch. 5.3, 5.4 (to top of p.195)
13	Real gasses, Special topics	Chs. 8.1-8.3, 8.5 (to top of p. 436)	Ch. 26.3	8.1
Reading period ^T	<i>Test 2: Self-scheduled btwn May 6-10</i>			
14*	Pressure and Transport, more Special topics		Chs. 6-10 (selections)	1.7

* This last seminar will be held during our Finals slot on May 16.