

Winter 2012

Physics 35200 Statistical Mechanics

Day/Time: MW 09:00 - 10:20 am
 Location: KPTC 101
 Lecturer: Cheng Chin, cchin@uchicago.edu
 Office: GCIS 107
 Office Hours: MW 10:30 - 11:30 am
 Grader: Ran Huo, huor@uchicago.edu
 Website: http://ultracold.uchicago.edu/phys_winter12

Class outline:*Thermodynamics*

Wk 2 01/09 M Laws of thermodynamics
 Wk 2 01/11 W Entropy and thermodynamic potentials

Statistical mechanics

Wk 3 01/18 W Statistical distribution and statistical matrix
 Wk 3 01/20 F Statistical entropy *HW1*
 Wk 4 01/23 M Statistical ensembles
 Wk 4 01/25 W Gibbs distributions
 Wk 5 01/30 M Non-interacting systems and equivalence of ensembles
 Wk 5 02/01 W Interacting systems (I) *HW1 due, HW2*
 Wk 6 02/06 M Interacting systems (II)
 Wk 6 02/08 W Fluctuations and correlations (I)
 Wk 7 02/13 M Fluctuations and correlations (II)
 Wk 7 02/15 W Discussions: Fundamental assumptions of statistical mechanics
 and thermodynamics *HW2 due, HW3*

 Wk 8 02/20 M Class presentations
 Wk 8 02/22 W Class presentations

Quantum systems and critical phenomena

Wk 9 02/27 M Fermi and Bose distributions
 Wk 9 02/29 W Mean-field theory *HW3 due, HW4*
 Wk 10 03/05 M Phase transitions and criticality
 Wk 10 03/07 W Scale invariance and renormalization group *HW4 due*

Evaluation

Problem sets: 50% Presentation/term paper: 50%

Textbooks

(recommended) *thermodynamics*, Enrico Fermi
 (required) *Statistical Physics (Part I)*, L. D. Landau and E. M. Lifshitz