课程代码（Coursenumber）
Chemistry 7960 (796)

课程对象（Audience）
Primarily for Graduates

开课教师（Teacher）
Professor Loring

学期（Semester）
Spring

课程描述（Description）
Course grade is based on performance on a series of take-home assignments. Two of these, one in the middle of the term and another at the end, will be designated \exams". On the problem sets, you are free to consult any person or resource, but the work that you turn in must be your own. On the exams, you are not allowed to consult any person, but may consult any book, de\_ned to be anything identi\_ed by an ISBN. The grade will be computed by the following weights: 60 % problem sets, 40 % exams.

课程提纲（Syllabus）
I. Statistical mechanics with classical mechanics
-Partition functions with quantum and classical mechanics
-Collections of interacting classical particles
II. Weakly interacting systems
-Intermolecular potentials
-Virial expansions of thermodynamic functions
III. Equilibrium properties of classical liquids
-Liquid structure, distributions, and correlation functions
-Connection between structure and thermodynamics
-Exactly soluble model: one-dimensional uid
-Thermodynamic perturbation theory
IV. Phase transitions and critical phenomena
-Phenomenology: universality and exponents
-Lattice models
-Mean \_eld approaches
-Renormalization group approaches
V. Simulation Techniques
-Monte Carlo methods: Metropolis method, sampling rare events, free energy
calculations
-Molecular dynamics: integrators for classical dynamical equations
VI. Nonequilibrium statistical mechanics
-Nonequilibrium ensemble average
-Fluctuations and correlations
-Linear response theory & uctuation-dissipation theorem: molecular transport,
molecular spectroscopy, and chemical reaction kinetics
-Stochastic dynamics: Langevin and Fokker-Planck equations, microscopic origin of
dissipation
-General connections between nonequilibrium processes and equilibrium
thermodynamics: Nonequilibrium work relations, Jarzynski and Crooks theorems,
interpreting single molecule measurements.

课时信息（Totalhours）
16304 LEC 001 TR
08:30AM - 09:55AM
BKL 219
Loring,R (rfl2)

教参信息（Textbookinfo）
Introduction to Modern Statistical Mechanics, D. Chandler
A Course in Statistical Mechanics, H. L. Friedman
Statistical Mechanics, R. K. Pathria
Modern Course in Statistical Physics, L. E. Reichl
1 Introduction to Statistical Mechanics by S. K. Sinha (Hardcover - Oct. 30, 2005)
ISBN-13: 978-1842653029
世界各地拥有馆藏的图书馆（OCLC）:80
2 Glassy Materials and Disordered Solids: An Introduction to Their Statistical Mechanics, (Revised Edition) by Kurt Binder and Walter Kob (Paperback - Apr. 30, 2010)
ISBN-13: 978-9814273442
世界各地拥有馆藏的图书馆（OCLC）:2
3 Statistical Mechanics: A Concise Introduction for Chemists by B. Widom (Paperback - May 3, 2002)
ISBN-13: 978-0521009669
世界各地拥有馆藏的图书馆（OCLC）:267
4 An Introduction to Thermodynamics and Statistical Mechanics by Keith S. Stowe (Hardcover - June 11, 2007)
ISBN-13: 978-0521865579
世界各地拥有馆藏的图书馆（OCLC）:170
5 Introduction To Statistical Mechanics by James Rice (Paperback - Mar. 15, 2007)
ISBN-13: 978-1406719208
6 An Introduction to Thermodynamics and Statistical Mechanics by A. K. Saxena (Hardcover - May 30, 2010)
ISBN-13: 978-1842655283
世界各地拥有馆藏的图书馆（OCLC）:29
7 Elements of Statistical Mechanics: With an Introduction to Quantum Field Theory and Numerical Simulation by Ivo Sachs, Siddhartha Sen, and James Sexton (Paperback - Apr. 15, 2010)
ISBN-13: 978-0521143646
世界各地拥有馆藏的图书馆（OCLC）:3
8 Introduction to Quantum Statistical Mechanics by N. N. Bogolubov, N. N., and Jr. Bogolubov (Paperback - Dec. 11, 2009)
ISBN-13: 978-9814295826
世界各地拥有馆藏的图书馆（OCLC）:69
9 Statistical Mechanics: An Introduction by Evelyn Guha (Hardcover - Oct. 24, 2007)
ISBN-13: 978-1842653357
世界各地拥有馆藏的图书馆（OCLC）:61
10 Introduction to Nonextensive Statistical Mechanics: Approaching a Complex World by Constantino Tsallis (Hardcover - Mar. 11, 2009)
ISBN-13: 978-0387853581
世界各地拥有馆藏的图书馆（OCLC）:55