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