

A *Modern Course in Statistical Physics* is a textbook that provides a grounding in the foundations of equilibrium and nonequilibrium statistical physics, and focuses on the universal nature of thermodynamic processes. It illustrates fundamental concepts with examples from contemporary research problems. One focus of the book is fluctuations that occur due to the discrete nature of matter, a topic of growing importance for nanometer scale physics and biophysics. Another focus concerns classical and quantum phase transitions, in both monatomic and mixed particle systems. The book treats such diverse topics as osmosis, steam engines, superfluids, Bose-Einstein condensates, quantum conductance, light scattering, transport processes, and dissipative structures, all in the framework of the foundations of statistical physics and thermodynamics. All classical statistical physics is derived as limiting cases of quantum statistical physics.

This revised and updated third edition gives comprehensive coverage of numerous core topics and special applications, allowing professors flexibility in designing individualized courses. The inclusion of advanced topics and extensive references makes this an invaluable resource for researchers as well as students - a textbook that will be kept on the shelf long after the course is completed.

From the contents:

- Complexity and Entropy
- Thermodynamics
- The Thermodynamics of Phase Transitions
- Equilibrium Statistical Mechanics I: Canonical Ensemble
- Equilibrium Statistical Mechanics II: Grand Canonical Ensemble
- Brownian Motion and Fluctuation – Dissipation
- Hydrodynamics
- Transport Coefficients
- Nonequilibrium Phase Transitions



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