

Physics 372 – Winter 2019

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Lectures: STI Theatre A

Tuesday: 2:30 PM

Wednesday: 4:30 PM

Friday: 3:30 PM

Tutorial: Tuesday: 9:30 AM (**STI Theatre A**) (**first tutorial is Jan. 29**). Tutorials will primarily be used to go over the most recent assignment. *Please note that if no one is present at 9:30, I will leave.*

Text: *An Introduction to Thermal Physics*, by Daniel Schroeder, Some supplementary material will also be provided, as required.

Notes: Taking notes is the responsibility of the student!

Course Content¹

1. Introductory material
2. Basic Concepts: Temperature, Thermal Equilibrium, Heat, Work, First Law, Kinetic Theory (Sections 1.1 - 1.6 of text plus supplemental material, and so throughout)
3. Equations of State, Differentials and some implications of First Law
4. Second Law and Entropy in Statistical Mechanics, the Einstein solid and interacting systems (Sections 2.1 - 2.6)
5. Relation between Entropy and other quantities of interest, Predictions for various thermal properties, Third Law, Diffusive Equilibrium (Sections 3.1 - 3.6 of text)
6. Carnot Cycle, Heat Engines, Refrigerators, Applications; Throttling and Liquifaction (Sections 4.1 - 4.4 of text)
7. Free Energy, Chemical Reactions, Phase Changes in pure substances and mixtures [Sections 5.1 - 5.3 of text (5.4 if time permits)]. Alt: Gravity and application to stars.
8. Thermodynamic identities, natural variables, and Maxwell's relations.
9. Boltzmann Distribution and applications, Equipartition Theorem, Maxwell Speed Distribution, Partition Functions, Ideal Gas (Sections 6.1 - 6.7 of text)
10. Quantum Statistics, Fermions and Bosons (Chapter 7 but not in detail)
11. (If time permits) Systems of Interacting Particles: Weakly Interacting Gases, Ising Model (Sections 8.1 - 8.2 of text)

¹Allow for the possibility of some variation in course content and order.