

## Detailed Licensing

### Overview

**Title:** [Free Energy 1e \(Snee\)](#)

**Webpages:** 95

**Applicable Restrictions:** Noncommercial

**All licenses found:**

- [CC BY-NC 4.0](#): 93.7% (89 pages)
- [Undeclared](#): 6.3% (6 pages)

### By Page

- [Free Energy 1e \(Snee\)](#) - [CC BY-NC 4.0](#)
  - [Front Matter](#) - [CC BY-NC 4.0](#)
    - [TitlePage](#) - [CC BY-NC 4.0](#)
    - [InfoPage](#) - [CC BY-NC 4.0](#)
    - [Table of Contents](#) - [Undeclared](#)
    - [Licensing](#) - [Undeclared](#)
    - [Acknowledgments](#) - [Undeclared](#)
    - [Forward](#) - [Undeclared](#)
  - [1: Gas Equations of State](#) - [CC BY-NC 4.0](#)
    - [1.1: Units and the Perfect Gas Law](#) - [CC BY-NC 4.0](#)
    - [1.2: Van der Waals Equation](#) - [CC BY-NC 4.0](#)
    - [1.3: The Virial Equation](#) - [CC BY-NC 4.0](#)
    - [1.4: Phase Transitions](#) - [CC BY-NC 4.0](#)
    - [1.5: Corresponding States](#) - [CC BY-NC 4.0](#)
  - [2: Energy](#) - [CC BY-NC 4.0](#)
    - [2.1: Work and the Inexact Differential](#) - [CC BY-NC 4.0](#)
    - [2.2: Reversible and Irreversible Transitions](#) - [CC BY-NC 4.0](#)
    - [2.3: Exact and Inexact Partial Derivatives and Euler's Test](#) - [CC BY-NC 4.0](#)
    - [2.4: Internal Energy \(U\) and the Equipartition Theorem](#) - [CC BY-NC 4.0](#)
    - [2.5: Heat Transactions, Heat Capacity, and Adiabatic Systems](#) - [CC BY-NC 4.0](#)
  - [3: Enthalpy, Legendre Transforms, and Thermodynamic Proofs](#) - [CC BY-NC 4.0](#)
    - [3.1: Enthalpy and Changing Functions](#) - [CC BY-NC 4.0](#)
    - [3.2: Heat Capacities](#) - [CC BY-NC 4.0](#)
    - [3.3: Natural Variables and Legendre Transforms](#) - [CC BY-NC 4.0](#)
    - [3.4: The Joule and Joule-Thomson Experiments](#) - [CC BY-NC 4.0](#)
  - [4: Entropy and the 2nd Law](#) - [CC BY-NC 4.0](#)
    - [4.1: Introduction to Entropy](#) - [CC BY-NC 4.0](#)
    - [4.2: Entropy inside and outside- The 2nd Law and the Clausius Inequality](#) - [CC BY-NC 4.0](#)
    - [4.3: Calculating Entropy Changes](#) - [CC BY-NC 4.0](#)
    - [4.4: The Car Engine and the Carnot Cycle](#) - [CC BY-NC 4.0](#)
    - [4.5: Refrigeration](#) - [CC BY-NC 4.0](#)
    - [4.6: Maxwell Relationships](#) - [Undeclared](#)
  - [5: Helmholtz and Gibbs Energy](#) - [CC BY-NC 4.0](#)
    - [5.1: Helmholtz Energy \(and The Clausius Inequality Pt. II\)](#) - [CC BY-NC 4.0](#)
    - [5.2: Gibbs Energy](#) - [CC BY-NC 4.0](#)
    - [5.3: Calculations- Numerical and Derivations](#) - [CC BY-NC 4.0](#)
    - [5.4: Advanced Derivations - Maxwell Relationships II](#) - [CC BY-NC 4.0](#)
  - [6: Chemical Thermodynamics](#) - [CC BY-NC 4.0](#)
    - [6.1: Entropy and the 3rd Law](#) - [CC BY-NC 4.0](#)
    - [6.2: Energy, it's all relative](#) - [CC BY-NC 4.0](#)
    - [6.3: Enthalpy and Gibbs Energy of Formation- Hess's Law examples](#) - [CC BY-NC 4.0](#)
    - [6.4: Chemical reactions and chemical potential](#) - [CC BY-NC 4.0](#)
    - [6.5: Equilibrium Constants](#) - [CC BY-NC 4.0](#)
  - [7: Solutions and Colligative Properties](#) - [CC BY-NC 4.0](#)
    - [7.1: Partial Vapor Pressure](#) - [CC BY-NC 4.0](#)
    - [7.2: Partial Pressure Measurements and Raoult's Law](#) - [CC BY-NC 4.0](#)
    - [7.3: Excess Functions and Ideal Solutions](#) - [CC BY-NC 4.0](#)
    - [7.4: Henry's Law, Activity, and Ideal-Dilute Solutions](#) - [CC BY-NC 4.0](#)
    - [7.5: Colligative Properties](#) - [CC BY-NC 4.0](#)
  - [8: Phase Changes](#) - [CC BY-NC 4.0](#)
    - [8.1: The Gibbs Phase Rule](#) - [CC BY-NC 4.0](#)
    - [8.2: Entropy is the Reason Phase Changes Occur](#) - [CC BY-NC 4.0](#)

- 8.3: Other Examples of Phase Changes - *CC BY-NC 4.0*
- 9: Surfaces, Interfaces and Electrochemistry - *CC BY-NC 4.0*
  - 9.1: Surfaces and Surface Energy - *CC BY-NC 4.0*
  - 9.2: Surface Expansion Work - *CC BY-NC 4.0*
  - 9.3: Electrochemistry and the Nernst Equation - *CC BY-NC 4.0*
- 10: The Kinetic Theory of Gas - *CC BY-NC 4.0*
  - 10.1: Probability vs. Probability Distribution - *CC BY-NC 4.0*
  - 10.2: The Boltzmann Distribution - *CC BY-NC 4.0*
  - 10.3: Average and RMS Velocities - *CC BY-NC 4.0*
  - 10.4: Average relative velocity and collision frequency - *CC BY-NC 4.0*
  - 10.5: Appendix - Jacobians - *CC BY-NC 4.0*
- 11: Boltzmann Statistics - *CC BY-NC 4.0*
  - 11.1: The Black body Radiator - *CC BY-NC 4.0*
  - 11.2: Heat Capacity of Solids - *CC BY-NC 4.0*
- 12: Introduction to the Schrödinger Equation - *CC BY-NC 4.0*
  - 12.1: Einstein's Theory of Relativity - *CC BY-NC 4.0*
  - 12.2: The Schrödinger Equation - *CC BY-NC 4.0*
  - 12.3: Born interpretation - *CC BY-NC 4.0*
  - 12.4: The Eigenvalue Equation and operators - *CC BY-NC 4.0*
  - 12.5: The Freewave Potential - *CC BY-NC 4.0*
- 13: Potential Surfaces and the Heisenberg Uncertainty Principle - *CC BY-NC 4.0*
  - 13.1: Potential Energy Surfaces - *CC BY-NC 4.0*
  - 13.2: Complex Potential Energy Surfaces- Vibration - *CC BY-NC 4.0*
  - 13.3: Uncertainty and Superposition- Wavefunctions as Waves - *CC BY-NC 4.0*
- 14: Multidimensional Quantum Mechanics and Rotation - *CC BY-NC 4.0*
  - 14.1: Multidimensional Free waves and the Particle in a Cube - *CC BY-NC 4.0*
  - 14.2: Rotational Quantum Mechanics- Introduction - *CC BY-NC 4.0*
  - 14.3: Wavefunctions - *CC BY-NC 4.0*
  - 14.4: Spin Angular Momentum - *CC BY-NC 4.0*
  - 14.5: Angular Momentum Operators - *CC BY-NC 4.0*
  - 14.6: Addition of Angular Momentum and Term Symbols - *CC BY-NC 4.0*
- 15: The Hydrogen Atom - *CC BY-NC 4.0*
  - 15.1: The Bohr Model - *CC BY-NC 4.0*
  - 15.2: The Hydrogen Schrödinger Equation - *CC BY-NC 4.0*
  - 15.3: Hydrogen Radial Wavefunctions - *CC BY-NC 4.0*
  - 15.4: Spin-Orbit Coupling - *CC BY-NC 4.0*
  - 15.5: Spectroscopy - *CC BY-NC 4.0*
  - 15.6: Multielectron Atoms and Exchange - *CC BY-NC 4.0*
  - 15.7: Appendix - *CC BY-NC 4.0*
- Back Matter - *CC BY-NC 4.0*
  - Index - *CC BY-NC 4.0*
  - Glossary - *CC BY-NC 4.0*
  - Detailed Licensing - *Undeclared*