

# TABLE OF CONTENTS

## Licensing

### 1: C1) Abstraction and Modeling

- 1.1: About this Text
- 1.2: Modeling in Physics
- 1.3: Units and Standards
- 1.4: Unit Conversion
- 1.5: Significant Figures

### 2: C2) Particles and Interactions

- 2.1: Inertia
- 2.2: Momentum
- 2.3: Force and Impulse
- 2.4: Examples

### 3: C3) Vector Analysis

- 3.1: Coordinate Systems and Components of a Vector (Part 1)
- 3.2: Coordinate Systems and Components of a Vector (Part 2)
- 3.3: Examples

### 4: C4) Systems and The Center of Mass

- 4.1: The Law of Inertia
- 4.2: Extended Systems and Center of Mass
- 4.3: Reference Frame Changes and Relative Motion
- 4.4: Examples

### 5: C5) Conservation of Momentum

- 5.1: Conservation of Linear Momentum
- 5.2: The Problem Solving Framework
- 5.3: Examples
- 5.4: More Examples

### 6: C6) Conservation of Angular Momentum I

- 6.1: Angular Momentum
- 6.2: Angular Momentum and Torque
- 6.3: Examples

### 7: C7) Conservation of Angular Momentum II

- 7.1: The Angular Momentum of a Point and The Cross Product
- 7.2: Torque
- 7.3: Examples

## 8: C8) Conservation of Energy- Kinetic and Gravitational

- 8.1: Kinetic Energy
- 8.2: Conservative Interactions
- 8.3: Universal Gravity
- 8.4: Other Forms of Energy
- 8.5: Relative Velocity and the Coefficient of Restitution
- 8.6: Examples

## 9: C9) Potential Energy- Graphs and Springs

- 9.1: Potential Energy of a System
- 9.2: Potential Energy Functions
- 9.3: Equilibrium and Turning Points
- 9.4: Advanced Application- Springs and Collisions
- 9.5: Examples

## 10: C10) Work

- 10.1: Introduction- Work and Impulse
- 10.2: Work on a Single Particle
- 10.3: The "Center of Mass Work"
- 10.4: Examples

## 11: C11) Rotational Energy

- 11.1: Rotational Kinetic Energy, and Moment of Inertia
- 11.2: Rolling Motion
- 11.3: Examples

## 12: C12) Collisions

- 12.1: Types of Collisions
- 12.2: Examples

## 13: Application - Orbits and Kepler's Laws

- 13.1: Orbits
- 13.2: Kepler's Laws
- 13.3: Weight, Acceleration, and the Equivalence Principle
- 13.4: Examples

## 14: N1) Newton's Laws

- 14.1: Forces and Newton's Three Laws
- 14.2: Details on Newton's First Law
- 14.3: Details on Newton's Second Law
- 14.4: Details on Newton's Third Law
- 14.5: Free-Body Diagrams
- 14.6: Vector Calculus
- 14.7: Examples

## 15: N2) 1 Dimensional Kinematics

- 15.1: Position, Displacement, Velocity
- 15.2: Acceleration

- 15.3: Free Fall
- 15.4: The Connection Between Displacement, Velocity, and Acceleration
- 15.5: Examples

## 16: N3) 2 Dimensional Kinematics and Projectile Motion

- 16.1: Dealing with Forces in Two Dimensions
- 16.2: Motion in Two Dimensions and Projectile Motion
- 16.3: Inclined Planes
- 16.4: Examples

## 17: N4) Motion from Forces

- 17.1: Solving Problems with Newton's Laws (Part 1)
- 17.2: Solving Problems with Newton's Laws (Part 2)
- 17.3: Examples

## 18: N5) Friction

- 18.1: Friction (Part 1)
- 18.2: Friction (Part 2)
- 18.3: More Examples

## 19: N6) Statics and Springs

- 19.1: Conditions for Static Equilibrium
- 19.2: Springs
- 19.3: Examples

## 20: N7) Circular Motion

- 20.1: Motion on a Circle (Or Part of a Circle)
- 20.2: Banking
- 20.3: Examples

## 21: N8) Forces, Energy, and Work

- 21.1: Forces and Potential Energy
- 21.2: Work Done on a System By All the External Forces
- 21.3: Forces Not Derived From a Potential Energy
- 21.4: Examples

## 22: N9) Rotational Motion

- 22.1: Rotational Variables
- 22.2: Rotation with Constant Angular Acceleration
- 22.3: Relating Angular and Translational Quantities
- 22.4: Newton's Second Law for Rotation
- 22.5: Examples

## 23: N10) Simple Harmonic Motion

- 23.1: Introduction- The Physics of Oscillations
- 23.2: Simple Harmonic Motion
- 23.3: Pendulums
- 23.4: Advanced Topics

- [23.5: Examples](#)

## 24: Waves in One Dimension

- [24.1: Traveling Waves](#)
- [24.2: Standing Waves and Resonance](#)
- [24.3: Conclusion, and Further Resources](#)
- [24.4: In Summary](#)
- [24.5: Examples](#)
- [24.6: Advanced Topics](#)
- [24.7: Exercises](#)

## 25: Thermodynamics

- [25.1: Introduction](#)
- [25.2: Introducing Temperature](#)
- [25.3: Heat and the First Law](#)
- [25.4: The Second Law and Entropy](#)
- [25.5: In Summary](#)
- [25.6: Examples](#)
- [25.7: Exercises](#)

[Index](#)

[Glossary](#)

[Detailed Licensing](#)