

## Syllabus of PHYS 109 (Spring 2021)

**Textbook:** College Physics, A strategic Approach.

Randall D. Knight, Brian Jones and Stuart Field, third edition, 2014, Pearson,

ISBN-10: 1-292-05715-7

*This course is designed for students in Health Science to enable them to appreciate the basic concepts of physics which are relevant to their further studies.*

### **Part I Force and Motion**

Chapter 2 Motion in One Dimension

Chapter 3 Vectors and Motion in Two Dimensions

Chapter 4 Force and Motion

Chapter 5 Applying Newton's Laws

Chapter 8 Equilibrium and Elasticity

### **Part II Conservation Laws**

Chapter 9 Impulse and Momentum

Chapter 10 Energy and Work

### **Part III Properties of Matter**

Chapter 13 Fluids

### **Part V Optics**

Chapter 18 Ray Optics

### **Part VI Electricity and Magnetism**

Chapter 20 Electric Fields and Forces

Chapter 21 Electric Potential

Chapter 22 Current and Resistance

### **Part VII Modern Physics**

Chapter 30 Nuclear Physics

# Details of the selected chapters from the Textbook

## Part I Force and Motion

### Chapter 2 Motion in One Dimension

- 2.1 Describing Motion
- 2.2 Uniform Motion
- 2.3 Instantaneous Velocity
- 2.4 Acceleration
- 2.5 Motion with Constant Acceleration
- 2.6 Solving One-Dimensional Motion
- 2.7 Free Fall

### Chapter 3 Vectors and Motion in Two Dimensions

- 3.1 Using Vectors
- 3.3 Coordinate Systems and Vector Components
- 3.4 Motion on a Ramp

### Chapter 4 Force and Motion

- 4.1 Motion and Force
- 4.2 A Short Catalog of Forces
- 4.3 Identifying Forces
- 4.4 What Do Forces Do?
- 4.5 Newton's Second Law
- 4.6 Free-Body Diagrams
- 4.7 Newton's Third Law

### Chapter 5 Applying Newton's Laws

- 5.1 Equilibrium
- 5.2 Dynamics and Newton's Second Law
- 5.3 Mass and Weight
- 5.4 Normal Forces
- 5.5 Friction
- 5.7 Interacting Objects
- 5.8 Ropes and Pulleys

### Chapter 8 Equilibrium and Elasticity

- 8.1 Torque and Static Equilibrium
- 8.2 Stability and Balance

## **Part II Conservation Laws**

### **Chapter 9 Impulse and Momentum**

- 9.1 Impulse
- 9.2 Momentum and the Impulse-Momentum Theorem
- 9.3 Solving Impulse and Momentum Problems
- 9.4 Conservation of Momentum
- 9.5 Inelastic Collisions

### **Chapter 10 Energy and Work**

- 10.1 The Basic Energy Model
- 10.2 Work
- 10.3 Kinetic Energy
- 10.4 Potential Energy
- 10.6 Using the Law of Conservation of Energy
- 10.7 Energy in Collisions
- 10.8 Power

## **Part III Properties of Matter**

### **Chapter 13 Fluids**

- 13.1 Fluids and Density
- 13.2 Pressure
- 13.3 Measuring and Using Pressure
- 13.5 Fluids in Motion
- 13.6 Fluid Dynamics

## **Part V Optics**

### **Chapter 18 Ray Optics**

- 18.2 Reflection
- 18.3 Refraction
- 18.5 Thin Lenses: Ray Tracing
- 18.7 The Thin-Lens Equation

## **Part VI Electricity and Magnetism**

### **Chapter 20 Electric Fields and Forces**

- 20.1 Charges and Forces
- 20.2 Charges, Atoms, and Molecules
- 20.3 Coulomb's Law
- 20.4 The Concept of the Electric Field
- 20.5 Applications of the Electric Field
- 20.7 Forces and Torques in Electric Fields

## **Chapter 21 Electric Potential**

- 21.1** Electric Potential Energy and the Electric Potential
- 21.7** Capacitance and Capacitors

## **Chapter 22 Current and Resistance**

- 22.1** A Model of Current
- 22.2** Defining and Describing Current
- 22.5** Ohm's Law and Resistor Circuits

## **Part VII Modern Physics**

### **Chapter 30 Nuclear Physics**

- 30.1** Nuclear Structure
- 30.4** Radiation and Radioactivity
- 30.5** Nuclear Decay and Half-Lives