

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