

Required text:

Physics for Scientists and Engineers: A Strategic Approach, Third Edition by Randall D. Knight.

Course outline:

Topic	Lecture hours
Introduction to the course	1
TRAVELING WAVES	
x 20.1 The Wave Model	
x 20.2 One-dimensional Waves	
x 20.3 Sinusoidal Waves	
x 20.4 Waves in Two and Three Dimensions	
x 20.5 Sound and Light	
WAVE OPTICS	4
x 22.1 Light and Optics	
x 22.2 The Interference of Light	
x 22.3 The Diffraction Grating	
x 22.4 Single-Slit Diffraction	
x 22.5 Circular-Aperture Diffraction	
x 22.6 Interferometers	
25.3 Insulators and Conductors	3
x 25.4 Coulomb's Law	
x 25.5 The Field Model	
THE ELECTRIC FIELD	2
x 26.1 Electric Fields Models	
x 26.2 The Electric Field of Multiple Point Charges	
x 26.3 The Electric Field of a Continuous Charge Distribution	
x 26.4 The Electric Fields of Rings, Planes, and Spheres	
x 26.5 The Parallel-Plate Capacitor	
THE ELECTRIC POTENTIAL	3
x 28.1 Electric Potential Energy	
x 28.2 The Potential Energy of Point Charges	
x 28.3 The Potential Energy of a Dipole	
x 28.4 The Electric Potential	
x 28.5 The Electric Potential Inside a Parallel-Plate Capacitor	
x 28.6 The Electric Potential of a Point Charge	
x 28.7 The Electric Potential of Many Charges	
POTENTIAL AND FIELD	1
x 29.1 Connecting Potential and Field	
x 29.2 Sources of Electric Potential	
x 29.3 Finding the Electric Field from the Potential	
CURRENT AND RESISTANCE	1
x 30.1 The Electron Current	
x 30.2 Creating a Current	
x 30.3 Current and Current Density	
x 30.4 Conductivity and Resistivity	
x 30.5 Resistance and Ohm's Law	
THE MAGNETIC FIELD	9
x 32.1 Magnetism	
x 32.2 The Discovery of the Magnetic Field	
x 32.3 The Source of the Magnetic Field: Moving Charges	
x 32.4 The Magnetic Field of a Current	
x 32.5 Magnetic Dipoles	
x 32.6 Ampère's Law and Solenoids	
x 32.7 The Magnetic Force on a Moving Charge	
x 32.8 Magnetic Forces on Current-Carrying Wires	
THE FOUNDATION OF MODERN PHYSICS	1
x 37.1 Matter and Light	
x 37.2 The Emission and Absorption of Light	
x 37.3 Cathode Rays and X Rays	
x 37.4 The Discovery of the Electron	
x 37.5 The Fundamental Unit of Charge	
NUCLEAR PHYSICS	2
x 42.1 Nuclear Structure	
x 42.2 Nuclear Stability	
Total:	36