

**Winter 2017 PHYA22H3 Introduction to Physics IIB**

**Required text:**

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

**Course outline:**

<b><i>Topic</i></b>	<b><i>Lecture hours</i></b>
Introduction to the course	1
TRAVELING WAVES <ul style="list-style-type: none"> <li>• 20.1 The Wave Model</li> <li>• 20.2 One-dimensional Waves</li> <li>• 20.3 Sinusoidal Waves</li> <li>• 20.4 Waves in Two and Three Dimensions</li> <li>• 20.5 Sound and Light</li> <li>• 20.6 Power, Intensity, and Decibels</li> <li>• 20.7 The Doppler Effect</li> </ul>	5
SUPERPOSITION OF WAVES <ul style="list-style-type: none"> <li>• 21.1 The Principle of Superposition</li> <li>• 21.2 Standing Waves</li> <li>• 21.3 Standing Waves on a String</li> <li>• 21.4 Standing Sound Waves and Musical Acoustics</li> <li>• 21.5 Interference in One Dimension</li> </ul>	4
WAVE OPTICS <ul style="list-style-type: none"> <li>• 22.1 Light and Optics</li> <li>• 22.2 The Interference of Light</li> <li>• 22.3 The Diffraction Grating</li> <li>• 22.4 Single-Slit Diffraction</li> <li>• 22.5 Circular-Aperture Diffraction</li> <li>• 22.6 Interferometers</li> </ul>	4
ELECTRIC CHARGES AND FORCES <ul style="list-style-type: none"> <li>• 25.1 Developing a Charge Model</li> <li>• 25.2 Charge</li> <li>• 25.3 Insulators and Conductors</li> <li>• 25.4 Coulomb's Law</li> <li>• 25.5 The Field Model</li> </ul>	3
THE ELECTRIC FIELD <ul style="list-style-type: none"> <li>• 26.1 Electric Fields Models</li> <li>• 26.2 The Electric Field of Multiple Point Charges</li> <li>• 26.3 The Electric Field of a Continuous Charge Distribution</li> <li>• 26.4 The Electric Fields of Rings, Planes, and Spheres</li> <li>• 26.5 The Parallel-Plate Capacitor</li> </ul>	2
THE ELECTRIC POTENTIAL <ul style="list-style-type: none"> <li>• 28.1 Electric Potential Energy</li> <li>• 28.2 The Potential Energy of Point Charges</li> <li>• 28.3 The Potential Energy of a Dipole</li> <li>• 28.4 The Electric Potential</li> <li>• 28.5 The Electric Potential Inside a Parallel-Plate Capacitor</li> <li>• 28.6 The Electric Potential of a Point Charge</li> <li>• 28.7 The Electric Potential of Many Charges</li> </ul>	3
POTENTIAL AND FIELD <ul style="list-style-type: none"> <li>• 29.1 Connecting Potential and Field</li> <li>• 29.2 Sources of Electric Potential</li> <li>• 29.3 Finding the Electric Field from the Potential</li> </ul>	1
CURRENT AND RESISTANCE <ul style="list-style-type: none"> <li>• 30.1 The Electron Current</li> <li>• 30.2 Creating a Current</li> <li>• 30.3 Current and Current Density</li> <li>• 30.4 Conductivity and Resistivity</li> <li>• 30.5 Resistance and Ohm's Law</li> </ul>	1
THE MAGNETIC FIELD <ul style="list-style-type: none"> <li>• 32.1 Magnetism</li> <li>• 32.2 The Discovery of the Magnetic Field</li> <li>• 32.3 The Source of the Magnetic Field: Moving Charges</li> <li>• 32.4 The Magnetic Field of a Current</li> <li>• 32.5 Magnetic Dipoles</li> <li>• 32.6 Ampère's Law and Solenoids</li> <li>• 32.7 The Magnetic Force on a Moving Charge</li> <li>• 32.8 Magnetic Forces on Current-Carrying Wires</li> </ul>	9
THE FOUNDATION OF MODERN PHYSICS <ul style="list-style-type: none"> <li>• 37.1 Matter and Light</li> <li>• 37.2 The Emission and Absorption of Light</li> <li>• 37.3 Cathode Rays and X Rays</li> <li>• 37.4 The Discovery of the Electron</li> <li>• 37.5 The Fundamental Unit of Charge</li> </ul>	1
NUCLEAR PHYSICS <ul style="list-style-type: none"> <li>• 42.1 Nuclear Structure</li> <li>• 42.2 Nuclear Stability</li> </ul>	2
<b>Total:</b>	36