### 1. One-Dimensional Kinematics (review)

* Motion in one dimension
* Vectors vs. scalars
* Displacement vs. Distance
* Velocity vs. Speed
* Using the four kinematics equations to solve problems:
  + x = xo +vot + ½ at2
  + v = vo + at
  + v2 = vo2 + 2aΔx
  + vavg = (v + vo)/2
* Graphical interpretation of motion

**2. Two-Dimensional Kinematics**

* Adding vectors in two dimensions
* Basic vector operations
* Vector components
* Projectile motion

**3. Dynamics**

* Review of One Dimensional Dynamics
* Resolving Forces into Two Dimensions
* Two Dimensional Forces
* Inclined Planes
* Static Equilibrium - Tension Force

**4. Circular Motion**

* Kinematics of UCM
* Dynamics of UCM
* Vertical UCM
* Buckets of Water
* Rollercoasters
* Cars going over hills and through valleys
* Horizontal UCM
* Unbanked Curves
* Banked Curves
* Conical Pendulum
* Period, Frequency, and
* Rotational Velocity

**5. Gravitation**

* Gravitational Force
* Gravitational Field
* Surface Gravity
* Gravitational Field in Space
* Orbital Motion
* Kepler's Third Law of Motion

**6. Energy**

* Review of One Dimensional Forces, Work and Energy
* Two Dimensional Forces and Work
* Gravitational Potential Energy
* GPE, Kinetic Energy and Elastic Potential Energy
* Conservation of Energy Problem Solving
* GPE and Escape Velocity
* Power

**7. Momentum**

* Momentum
* Impulse­/Momentum Equation
* The Momentum of a System of Objects
* Types of Collisions
* Conservation of Momentum
* Collisions in Two Dimensions

**8. Simple Harmonic Motion**

* Period and Frequency
* SHM and UHM
* Spring Pendulum
* Simple Pendulum
* Sinusoidal Nature of SHM

**9. Waves**

* Wave Motion
* Types of Waves
* Interference
* Standing Waves on a String

**10. Sound Waves**

* Characteristics of Sound
* Sources of Sound
* Open Tubes
* Closed Tubes
* Interference
* Doppler Effect

**11. Rotational Movement**

* Axis of Rotation and Angular Properties
* Rotational Kinematics
* Rotational Dynamics
* Angular Momentum
* Rotational Kinetic Energy

**12. Electric Charge and Force**

* Electric Charge
* Atomic Structure and source of Charge
* Conduction and Induction
* Electroscope
* Electric Force ­ Coulomb's Law
* Electric Force in Two Dimensions
* Electric Field • Electric and Gravitational Fields
* Electric Field of Multiple Charges
* Electric Field in Two Dimensions

**13. Electric Field and Potential**

* Electric Potential Energy
* Electric Potential (Voltage)
* Electric Potential due to a Uniform Electric Field
* Capacitance and Capacitors

**14. Electric Current and Circuits**

* Circuits
* Conductors
* Resistivity and Resistance
* Circuit Diagrams Electric Current & DC Circuits
* Measurement
* EMF & Terminal Voltage
* Kirchhoff's Rules