**Physics Outline**

**Unit 0** – Fundamentals: Si units, converting units, dimensional analysis, graphing, making measurements and observations, simple equation algebra

**Unit 1a** – Velocity: simple constant motion, speed, velocity, interpreting motion graphs (position v. time and velocity v. time)

**Unit 2a** – Acceleration: accelerated motion, freefall, interpreting motion graphs

**Unit 3** – Projectiles: vector combinations (same direction, opposite direction, perpendicular vectors), projectile motion (horizontally launched with calculations, non-horizontally launched by vector components)

**Unit 4b** – Newton’s Laws: newton’s 3 laws of motion

**Unit 5b** – Applications of Newton’s Laws: specific forces and uses of Newton’s laws, friction, pressure, air resistance, circular motion, universal gravitation

**Unit 6** – Momentum: momentum, impulse, collisions, conservation of momentum

**Unit 7** – Mechanical energy: work, power, potential and kinetic energy, conservation of energy

**Unit 8c** – Electrostatics: electric charge interactions, methods of electrical charging, electrical potential energy

**Unit 9 c** – Electric current: flow of electric charge (current), voltage, resistance, electric power, circuits (series and parallel)

**Unit 10** – Magnetism: cause of magnetism from atomic level up to bar magnet, electromagnetism (build an electromagnet), electric motor, electric generator, transformer, electrical power distribution

**Unit 11d** – Mechanical waves: simple harmonic motion (pendulum), transverse and longitudinal waves, interference, standing waves

**Unit 12d** – Sound waves: specific longitudinal waves, Doppler effect, resonance, diffraction, interference

**Unit 13** – Light and color: electromagnetic waves/radiation, electromagnetic spectrum, human light/color reception, color mixing, polarization, refraction, diffraction

**Unit 14** – Optics: reflection, refraction, mirrors (plane, concave, convex), lenses (convex, concave), ray diagrams, image formation (real, virtual)