

# MIP|W

## Birmingham

### AS and A2 Level Course Outlines

#### Physics

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The course covers the following topics that are common to all specifications but students should check carefully that sessions are relevant to their own particular studies:

**Topic 1 - Mechanics I:** Vectors; Equations of constant acceleration; Projectiles;  $F = ma$ ; Work, energy, power; Newton's laws.

**Topic 2 - Electricity:** Current; Voltage; Resistance; Electromotive force (EMF); Internal resistance and resistivity; Current-voltage graphs; Potential dividers.

**Topic 3 - Waves:** Single slit diffraction (qualitative treatment only); Two source interference patterns; Standing waves; Polarisation; Phase

**Topic 4 - Quantum Physics:** Wave-particle duality; Photoelectric effect; Line spectra; De Broglie wavelength; Electron diffraction.

**Topic 5 - Particle Physics:** Quark-Lepton model, including hadrons, baryons and mesons; Particle interaction to include fundamental forces, exchange particles, conservation laws and Feynman Diagrams.

**Topic 6 - Mechanics II:** Circular motion; Simple harmonic motion (SHM); Momentum.

**Topic 7 - Electric & Gravitational Fields:** Newton's law; Coulomb's law; Electric fields; Gravitational fields.

**Topic 8 - Capacitors & Electromagnetism:** Capacitors; Magnetic fields; Motion of charged particles in magnetic fields; Electromagnetic induction.

**Topic 9 - Radioactivity:** Nuclear radiations; Nuclear decay equations; Calculations including the exponential decay formula;  $E = mc^2$ ; Fission; Fusion.

**Topic 10 - Thermal Physics & Gases:** Ideal gases;  $pV = nRT$ ; Kinetic energy and its proportionality to Kelvin temperature; Internal energy; Specific heat capacity