Ormiston Shelfield Community Academy

A Level Physics Curriculum Overview

OUTCOMES VALUES CHOICES

YEAR 12

AUTUMN 1

Foundations of physics
- Quantities and units
- Derived units
- Scalar and Vectors

Motion
- Distance, displacement, speed and velocity
- Acceleration
- Equations of motion
- Freefall (PAG 1.1 Acceleration of free fall)
- Projectile motion

Forces in action
- Force, mass, weight, centre of gravity, drag
- Free body diagrams
- Moments
- Density
- Archimedes Principle

Work, done, energy and power
- Work done, energy and conservation of energy
- Kinetic and gravitational potential energy
- Power and efficiency

AUTUMN 2

Materials
- Springs and Hooke's law
- Elastic potential energy
- Deforming materials
- Stress-strain, Young's modulus (PAG 2.1 Determining Young's modulus)
- PAG 12.1 (Materials presentatin)

Laws of momentum
- Newton's laws of motion
- Impulse
- Collisions in 2D

Charge and current
- Current and Charge
- Moving charges
- Kirchoff's 1st law
- Mean drift velocity

Energy, power and resistance
- Circuit symbols, p.d and e.m.f
- Electron gun
- Resistance and I-V characteristics
- Diodes
- Resistance and resistivity (PAG 3.1Resistivity of a metal)

SPRING 1

Electrical circuits
- Kirchoff's laws and circuits
- Combining resistors
- Analysing circuits
- Internal resistance (PAG 4.2 Circuits with more than one source of e.m.f)
- Potential dividers
- Sensing circuits

Waves 1 and 2
- Progressive waves
- Wave properties, reflection, refraction, diffraction and polarisation
- E.M Waves
- Refractive index and total internal reflection
- PAG 5.3 Using an oscilloscope and PAG 6.2 Experiments with light
- Superposition of waves
- Interference
- Young's double slit
- Stationary waves in air columns

Quantum physics
- Photon model and photoelectric effect
- Einstein's photoelectric effect equation
- Wave-particle duality

Thermal physics
- Temperature
- Solids, liquid gases
- Internal energy
- Specific heat capacity (PAG 11.2 – determining the SHC of a metal)

SPRING 2

SUMMER 1

SUMMER 2

YEAR 13

Ideal gases
- Kinetic theory of gas
- Gas laws (PAG 8.2 – Invetsigating the relationship between pressure and volume)
- Root mean square speed
- Boltzmann constant

Circular motion
- Angular velocity and radian
- Centripetal acceleration and forces

Oscillations
- Oscillations and simple harmonic motion (PAG 10.1 – Factors affecting simple harmonic motion))
- Damping and driving
- Resonance

Gravitational fields
- Newton's laws of gravitation
- Keplar's Laws
- Satellites
- Gravitational Potential

Stars
- Objects in the universe
- Life cycle of stars
- Hertzsprung-Russell diagram
- Spectra and star light

Cosmology (Big Bang)
- Astronomical distances
- Doppler effect
- Hubble's Law
- Evolution of the universe

Capacitance
- Capacitors in circuits and uses
- Charging and discharging capacitors (PAG 9.1 – Investigating the charge and discharge of capacitors)

Electric fields
- Coulomb's law
- Uniform electric fields
- Electric potential and energy

Magnetic fields
- Charged particles in magnetic fields
- Electromagnetic induction
- Fraday's Law and Lenz's law
- Transformers

Particle physics
- Alpha – particle scatterin
- Antiparticles
- Quarks
- Beta decay

Radioactivity
- Nuclear decay equations
- Radioactive decay calculations (PAG 7.1 – Investigating random nature of radioactive decay)
- Radioactive dating

Nuclear physics
- Einstein's mass – energy equation
- Binding energy, nuclear fission and fusion

Medical Imaging
- X-Rays, CAT Scans, Gamma camera and PET scans, Ultrasound and Doppler imaging

Revision of identified topics