Physics 12

Kinematics (2D)

- Vector analysis
- Relative motion
- Accelerated motion
- Projectile motion
- Relationships between variables

$$d = v_i \cdot t + \tfrac{1}{2} a \cdot t^2$$

$$v_f = v_i + a \cdot t$$

$$V_f^2 = V_i^2 + 2 \cdot a \cdot d$$

$$d = \frac{v_i + v_f}{2} \cdot t$$

Dynamics (2D)

- Application of Newton's Laws
  - Inertial vs gravitational mass
  - Apparent weight
- Net force
- Acceleration of a system

$$F = \frac{G \cdot m_1 \cdot m_2}{r^2}$$

$$F = k \cdot x$$

$$F_N = m \cdot g$$

$$F = m \cdot a$$

$$F = \mu \cdot F_N$$

Choose one of the two <u>electric</u> modules below:

Electrostatics

- Electric charge
- Electric force
- Electric field
- Electric potential energy
- Applications of electrostatics

$$F = K_E \cdot \frac{q_1 \cdot q_2}{r^2}$$

$$E = \frac{F}{q}$$

$$E = \frac{K \cdot q}{d^2}$$

Electromagnetic Forces and Induction

- Properties of magnetism
- Electromagnetic force and field
- Electromagnetic induction

Faraday's Law

Lenz's Law

Choose one of the two force modules below:

Equilibrium

Translational Equilibrium

Rotational Equilibrium

Torque

Lever, fulcrum, lever arm

Centre of gravity

Static Equilibrium

$$\text{Torque} = F \cdot r \cdot \sin(\text{theta})$$

Circular Motion and Gravitation

Uniform Circular Motion

Kinematics

Dynamics

Universal Gravitation Law

Gravitational field strength

$$v = \frac{2 \cdot \pi \cdot r}{t}$$

$$a = \frac{v^2}{r}$$

$$F_{net} = m \cdot \frac{v^2}{r}$$

$$F = \frac{G \cdot m_1 \cdot m_2}{r^2}$$

$$G = \frac{F}{m}$$