

# 12 U Physics (SPH 4U)



This course enables students to deepen their understanding of physics concepts and theories. Students will continue their exploration of energy transformations and the forces that affect motion, and will investigate electrical, gravitational, and magnetic fields and electromagnetic radiation. Students will also explore the wave nature of light, quantum mechanics, and special relativity. They will further develop their scientific investigation skills, learning, for example, how to analyse, qualitatively and quantitatively, data related to a variety of physics concepts and principles. Students will also consider the impact of technological applications of physics on society and

## Forces

- Forces affect motion in predictable and quantifiable ways.
- Forces acting on an object will determine the motion of that object.
- Many technologies that utilize the principles of dynamics have societal and environmental implications.



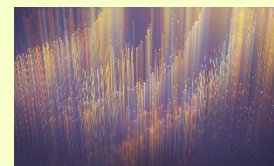
## Energy and Momentum

- Energy and momentum are conserved in all interactions.
- Interactions involving the laws of conservation of energy and conservation of momentum can be analysed mathematically.
- Technological applications that involve energy and momentum can affect society and the environment in positive and negative ways.



## Gravitational, Electric and Magnetic Fields

- Gravitational, electric, and magnetic forces act on matter from a distance.
- Gravitational, electric, and magnetic fields share many similar properties.
- The behaviour of matter in gravitational, electric, and magnetic fields can be described mathematically. Technological systems that involve gravitational, electric, and magnetic fields can have an effect on society and the environment.



## The Wave Nature of Light

- Light has properties that are similar to the properties of mechanical waves.
- The behaviour of light as a wave can be described mathematically.
- Technologies that use the principles of the wave nature of light can have societal and environmental implications.

## Revolutions in Modern Physics

- Light can show particle-like and wave-like behaviour, and particles can show wavelike behaviour.
- The behaviour of light as a particle and the behaviour of particles as waves can be described mathematically.