

SOUTH CARLETON HIGH SCHOOL**Ottawa-Carleton District School Board****COURSE OUTLINE****SPH4U - GRADE 12 University Prep Physics**

Credit Value: 1 credit

Hours: 110

Prerequisite: SPH3U

Expectations

The 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 analyze, 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 the environment.

Big Ideas

Unit Title	Physics Focus For Learning Expectations
Dynamics	<ul style="list-style-type: none"> Forces affect motion in predictable and quantifiable ways. Forces action on an object will determine the motion of the object. Many technologies that utilize the principles of dynamics have societal and environmental implications.
Energy and Momentum	<ul style="list-style-type: none"> Energy and momentum are conserved in all interactions. Interactions involving the laws of conservation of energy and conservation of momentum can be analyzed mathematically. Technological applications that involve energy and momentum can affect society and the environment in positive and negative ways.
Gravitational, Electric and Magnetic Fields	<ul style="list-style-type: none"> Gravitational, electric and magnetic forces act on matter from a distance. Gravitational, electric and magnetic fields share many similar properties. The behavior of matter in gravitational, electric and magnetic fields can be described mathematically. Technological systems that involve gravitational, electrical, and magnetic fields can have an effect on society and the environment.
The Wave Nature of Light	<ul style="list-style-type: none"> Light has properties that are similar to the properties of mechanical waves. The behavior of light as a wave can be described mathematically. Technologies that use the principles of wave nature of light can have societal and environmental implications.
Revolutions in Modern Physics: Quantum Mechanics and Special Relativity	<ul style="list-style-type: none"> Light can show particle-like and wave-like behavior, and particles can show wave-like behavior. The behavior of light as a particle and the behavior of particles as waves can be described mathematically. Time is relative to a person's frame of reference. The effects of relativistic motion can be described mathematically. New theories can change scientific thought and lead to the development of new technologies.

*NOTES: a. Specific learning expectations are available for each unit of study. b. The sequence of topics may not be exactly as listed above.

Accommodations for Exceptional Students

The Science department makes every effort to accommodate the identified needs of exceptional (IPRC'd) students and will attempt to differentiate curriculum delivery methods, student modes of expression, and assessment methods as recommended by the student's individual education plan (IEP).

Career Planning

The Science department makes every effort to ensure that students are aware of career opportunities related to various fields of science under study, and describe the contributions of scientists, including Canadians, to those fields.

Technology and Textbooks

The school will supply all laboratory resources and materials.

Textbook: Physics 12 (Nelson) replacement cost = \$85.00

Evaluation

Term Evaluations (70%)	Summative Evaluation (30%)
Students will be evaluated according to the overall expectations of the Ontario curriculum. Assessment tools include both summative and formative tasks including but not limited to; tests/quizzes, assignments, projects, lab reports, skill based performance tasks and rich assessment tasks	<p>The exam portion of the summative will occur during the exam period in Jan/June and will evaluate the whole semester's work. All students must be present unless a medical certificate is provided.</p> <p>Project or assignment summative evaluation will be completed before the exam period begins.</p>

More information on South Carleton High School's policy on Assessment and Evaluation, on Academic Integrity, on punctuality, absenteeism and examinations can be accessed on our school website.