Cardinal Leger Secondary School
Science Department

Course Name: Physics, Grade 12
Course Code: SPH4U1
Level: University Preparation
Textbook: Nelson Physics 12

Ministry Guidelines: Science, 2008
Replacement Cost: $100
Number:

Course Overview:

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 the environment.
Prerequisite: Physics, Grade 11, University Preparation

Curriculum Strands and Overall Expectations:

Scientific Investigation Skills and Career Exploration

- demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating)
- identify and describe careers related to the fields of science under study, and describe the contributions of scientists, including Canadians, to those fields.

Dynamics

- analyse technological devices that apply the principles of the dynamics of motion, and assess the technologies' social and environmental impact
- investigate, in qualitative and quantitative terms, forces involved in uniform circular motion and motion in a plane, and solve related problems
- demonstrate an understanding of the forces involved in uniform circular motion and motion in a plane.

Energy and Momentum

- analyse, and propose ways to improve, technologies or procedures that apply principles related to energy and momentum, and assess the social and environmental impact of these technologies or procedures
- investigate, in qualitative and quantitative terms, through laboratory inquiry or computer simulation, the relationship between the laws of conservation of energy and conservation of momentum, and solve related problems
- demonstrate an understanding of work, energy, momentum, and the laws of conservation of energy and conservation of momentum, in one and two dimensions

Gravitational, Electric, and Magnetic Fields

- analyse the operation of technologies that use gravitational, electric, or magnetic fields, and assess the technologies' social and environmental impact
- investigate, in qualitative and quantitative terms, gravitational, electric, and magnetic fields, and solve related problems
- demonstrate an understanding of the concepts, properties, principles, and laws related to gravitational, electric, and magnetic fields and their interactions with matter

The Wave Nature of Light

- analyse technologies that use the wave nature of light, and assess their impact on society and the environment
- investigate, in qualitative and quantitative terms, the properties of waves and light, and solve related problems
- demonstrate an understanding of the properties of waves and light in relation to diffraction, refraction, interference, and polarization

Revolutions in Modern Physics: Quantum Mechanics and Special Relativity

- analyse, with reference to quantum mechanics and relativity, how the introduction of new conceptual models and theories can influence and/or change scientific thought and lead to the development of new technologies
- investigate special relativity and quantum mechanics, and solve related problems
- demonstrate an understanding of the evidence that supports the basic concepts of quantum mechanics and Einstein's theory of special relativity

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Evaluation:

Term Work	**70%**
Knowledge and Understanding	25%
Thinking	35%
Communication	15%
Application	25%
Final Assessment	**30%**
Formal Examination	30%
Course Total	**100%**

Learning Skills and Work Habits

E= Excellent G=Good S=Satisfactory N= Needs Improvement

Responsibility	• Fulfills responsibility and commitments. • Takes responsibility for and manages own behavior.
Organization	• Devises and follows a plan and process for completing tasks. • Establishes priorities and manages time
Independent Work	• Independently monitors, assesses, and revises plans to complete tasks and meet goals. • Uses class time to complete tasks.
Collaboration	• Accepts various roles and an equitable share of work in a group. • Builds healthy peer-to-peer relationships.
Initiative	• Looks for and acts on new ideas and opportunities. • Approaches new tasks with a positive attitude.
Self-Regulation	• Sets own goals and monitors progress towards achieving them. • Seeks clarification or assistance when needed.

Missed/Late/Incomplete Assignments

It is the student's responsibility to address missed, late, or incomplete assignments. Students are expected to complete assignments and to adhere to assignment deadlines as follows:

Due Date	10% Penalty Zone	Closure Date
A due date is set by the teacher.	1 school day late – 3% 2 school days late – 6% 3 school days late – 10% Maximum penalty of 10%	Once the closure date has passed, work is considered incomplete and a **mark of zero** applies.

Parent Signature: _____ Student Signature: _____