

**Sir John A. Macdonald Collegiate Institute Course Brief**

<b>Course Name</b>	Grade 12 Physics	<b>Grade</b>	12
<b>Course Code</b>	SPH 4U1	<b>Credit Value</b>	1.0
<b>Pre-Requisite</b>	SPH 3U1	<b>Or Recommended Pre-Requisite</b>	Grade 11 University Math
<b>Type of Course</b>	University		

TEXTBOOKS	REPLACEMENT COST (if lost or damaged)
PHYSICS BOOK TWO (Concepts and Connections)	\$ 124.95

**COURSE DESCRIPTION**

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 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.

**Curriculum Strands/Categories (this may differ depending on discipline and level)**

**Dynamics**

- 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**

- Quantum Mechanics and Special Relativity 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.

**Assessment and Evaluation of Student Achievement**

Unit	Unit Title/Description	Evaluation Task	Achievement Chart Focus
Unit 1 <b>Kinematics and Dynamics</b>	Chapters 1 & 2: Kinematics (1-D and 2-D)	Test / Quizzes LAB: Uniform acceleration (1.2)	K , T A, C
	Chapters 1 & 2: Dynamics (1-D and 2-D)	Test / Quizzes	K
		LAB: Determining coefficient of friction	K, T, A, C
		LAB: Inclined Plane	A ,C
		Dry Lab: Interpreting Graphs	A, C

Unit 2 <b>Energy and Momentum</b>	Chapter 4: Linear Momentum (1-D) Linear Momentum (2-D)	Test / Quizzes Test / Quizzes	K, T K, T, A
	Chapter 5: Energy and Interactions	Test / Quizzes  Lab: a) Hooke's Law b) 1 and 2 D Collision c) S.H.M.	K, T  A, C, T A, C, T A, C, T
Unit 3 <b>Gravitational, Electrical, and Magnetic Fields</b>	Chapter 8: Gravitational Fields (Universal Gravitation) Electric Fields (field strength, electric potential, electric potential energy, mapping electric fields)	Test / Quizzes Activity: teacher's Choice Lab: Pendulum (6.1)	K,T,C T A,C
	Chapter 9: Magnetic fields & artificial magnetic fields Applications of Fields	Test / Quizzes Activity: Teacher's Choice	K,T,C T, C
	Contrasting: magnetic vs. electric vs. gravitational fields		K, T, C
Unit 4 <b>The Wave Nature of Light</b>	Chapter 10: The wave theory of light  Technological applications (WNL)	Lab: Simple Harmonic Motion (10.1) Teacher's Choice	K  T, C

### Levels of Achievement

For Grades 9 to 12, a student's achievement of the overall curriculum expectations will be evaluated in accordance with the achievement charts in the provincial curriculum and will be reported using percentage marks.

Achievement Level	Percentage Mark Range	Achievement Description
HL4/L4+ L4 LL4/L4-	95 – 100 87 – 94 80 – 86	Level 4 identifies achievement that surpasses the provincial standard. The student demonstrates the specified knowledge and skills with a high degree of effectiveness.
HL3/L3+ L3 LL3/L3-	77 – 79 73 – 76 70 – 72	Level 3 represents the provincial standard for achievement. The student demonstrates the specified knowledge and skills with considerable effectiveness. Parents of students achieving at level 3 can be confident that their children will be prepared for work in subsequent grades/courses
HL2/L2+ L2 LL2/L2-	67 – 69 63 – 66 60 – 62	Level 2 represents achievement that approaches the provincial standard. The student demonstrates the specified knowledge and skills with some effectiveness. Students performing at this level need to work on identified learning gaps to ensure future success.
HL1/L1+ L1 LL1/L1-	57 – 59 53 – 56 50 – 52	Level 1 represents achievement that falls much below the provincial standard. The student demonstrates the specified knowledge and skills with limited effectiveness. Students must work at significantly improving learning in specific areas, as necessary, if they are to be successful in the next grade/course

Students who achieve below 50% have not met curriculum expectations; a credit will not be granted.

Learning Skills	Assessment of Learning Skills
Responsibility Organization Independent Work Collaboration Initiative Self-Regulation	Excellent (E) Good (G) Satisfactory (S) Needs Improvement (N)

Weighting by Strands/Categories			
Knowledge and Understanding	34%	Communication	22%
Thinking	22%	Application	22%

CALCULATION OF FINAL MARK	
→	70% for evaluations conducted throughout the course
→	30% for a Culminating Activity – The C/A will occur in the final 6 weeks of the course (which includes a Final Exam)
→	7.5 % Culminating Activity
→	22.5 % Final Exam

**\*\*Assessments and evaluations are subject to change\*\***