



# Physics 12

### Course Description:

Physics 12 is the study of classical mechanics, and electromagnetism and relativity. This course provides opportunities for students to apply the principles of physics to practical situations. Students would be expected to review the course material daily in order to succeed in this **fast moving course**. The majority of students who take Physics 12 need the course for pathways such as engineering, medicine, business or other disciplines. Therefore, this course will focus on the fundamental principles of Physics, the applications to real-life situations, and the design of appropriate experiments.

### *Core competencies*

Our measurements of <b>motion, time, space and energy</b> depend on our frame of reference.	Modelling the world in 2 dimensions – Using vectors and scalars in 2D to describe physical phenomena	Forces can cause <b>linear and circular motion</b> .	<b>Energy and Momentum</b> are conserved within a closed and isolated system.	Forces and energy interactions occur within <b>fields</b> .
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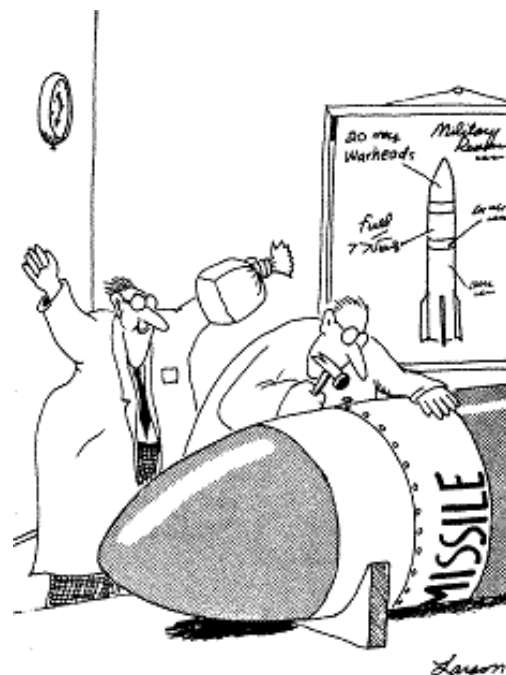
### Required Materials: (Materials must be brought to every class)

- 1 large 2 ring-binder
- Large notebook
- Pencil, pen, eraser, protractor, and ruler
- Scientific calculator or TI-83 calculator
- Computer
- Textbook

### Student Expectations:

Students will...

- Be seated and ready to work when the bell rings, with all materials.
- Speak and learn in English with the teacher and classmates.
- Be polite and respectful of everyone in the class.
- Wear their proper uniform at all times.
- Follow seating plans.



**Evaluation and Assessment:**

Note: Changes may be made. Students will be informed of any changes.

**Core (Mandatory) Concepts:**

<b>Units</b>		<b>Concept</b>	<b>Weighting</b>
Unit 1	<b>2D Kinematics and vectors</b> Kinematics allows us to predict, describe, and analyze an object's motion.	<ul style="list-style-type: none"> <li>- Graphical Analysis</li> <li>- Displacement</li> <li>- Speed and Velocity</li> <li>- Constant Acceleration</li> <li>- Vectors in 1 and 2-D</li> <li>- Vector Components</li> </ul>	10%
Unit 2	<b>2D Dynamics</b> Forces influence the motion of an object	<ul style="list-style-type: none"> <li>- Newton's Laws in 1 and 2-D</li> <li>- Inclines</li> <li>- gravity</li> </ul>	10%
Unit 3	<b>2D Momentum and Energy</b> Momentum and energy are conserved within a closed system.	<ul style="list-style-type: none"> <li>- Momentum and Impulse in 1 and 2-D</li> <li>- Relationship between Work, Energy and Power</li> <li>- Machines and Efficiency</li> <li>- Collisions and conservation of momentum</li> </ul>	10%
<b>Midterm Exam</b>			10%
Unit 4	<b>Circular motion and rocket science</b>	<ul style="list-style-type: none"> <li>- Circular motion occurs as a result of a centre seeking force and can be used to describe and predict the motion of objects</li> <li>- Gravitational forces and fields describe how masses interact.</li> </ul>	
Unit 5	<b>Electrostatics</b>	<ul style="list-style-type: none"> <li>- Coulomb forces</li> <li>- Electric fields</li> <li>- Electric potential energy</li> <li>- Electric Potential (Voltage)</li> </ul>	
Unit 6	<b>Electromagnetic Forces and Induction</b>	<ul style="list-style-type: none"> <li>- Magnets and magnetic fields</li> <li>- Current carrying wires</li> <li>- Solenoids</li> <li>- Forces on charged particles and currents in magnetic fields</li> <li>- Induction of current</li> </ul>	
<b>Final Exam</b>			40%

**Plus ONE MODULE of the following units (10% each)**

Special Relativity **OR** equilibrium

### Term mark Evaluation:

Evaluation	Percentage
Minor Assignments (Quizzes)	20%
Major Assignments (In Class, Labs)	30%
Tests (Unit Tests)	50%

### Semester Mark calculation:

Term 1: 25%

Term 2: 25%

Science fair project: 15%

Midterm exam: 10%

Final Exam: 25%

#### Student Learning Core Competencies



**Communication** -The communication competency encompasses the set of abilities that students use to impart and exchange information, experiences and ideas, to explore the world around them, and to understand and effectively engage in the use of digital media.



**Thinking** - The thinking competency encompasses the knowledge, skills and processes we associate with intellectual development. It is through their competency as thinkers that students take subject-specific concepts and content and transform them into a new understanding. Thinking competence includes



**Personal and Social** - Personal and social competency is the set of abilities that relate to students' identity in the world, both as individuals and as members of their community and society. Personal and social competency encompasses the abilities students need to thrive as individuals, to understand and care about themselves and others, and to find and achieve their purposes in the world.