Southern Victoria High School
Pro Utilitate Hominum - For The Betterment of Mankind
Phone: 273-4762 13 School Street, Perth-Andover NB E7H 4T4 Fax: 273-4765

Physics 122

Teacher: Mr. Christopher McLaughlin
Classroom location: B212
Course Time: Period 5
E-mail: Chris.McLaughlin@nbed.nb.ca

Course Requirements: A mark of at least 65% in Physics 111/112 is strongly recommended.

COURSE DESCRIPTION

Physics 122 is the second of two physics courses designed for students who intend to go to university or technical school. The course aims to engage students in relating physics concepts to societal contexts and applications. A student-centered approach to theoretical and practical investigations is the basis of the curriculum. Physics 122 will focus on three interdependent aspects of the discipline: content, methods of inquiry, and context.

COURSE OBJECTIVES / OUTCOMES

Unit 1: Dynamics Extension (25 hours)

- Use vector analysis in two dimensions for systems involving two or more masses, relative motions, static equilibrium, and static torques
- Use vectors to represent forces
    - Normal
    - Frictional
    - Acceleration of an object when acted by unbalanced forces
- Select and use appropriate numeric, symbolic, graphical and linguistic modes of representations to communicate ideas, plans and results
- Use vector analysis in two dimensions for systems involving two or more masses, relative motions, static equilibrium and torques
- Design an experiment identifying and controlling major variables
- Evaluate and select appropriate instruments for collecting evidence and appropriate processes for problem solving, inquiring and decision making
- Carry out procedures controlling major variables and adapting or extending procedures where required
- Compile and display evidence, by hand or computer, in a variety of formats, including diagrams, charts, tables, graphs and scatter plots
- Apply quantitatively the law of conservation of momentum to one dimensional collisions and explosions
- Design an experiment identifying and controlling major variables
- Evaluate and select appropriate instruments for collecting evidence and appropriate processes for problem solving, inquiring and decision making
- Carry out procedures controlling major variables and adapting or extending procedures where required
- Compile and display evidence, by hand or computer, in a variety of formats, including diagrams, charts, tables, graphs and scatter plots
- Analyze and describe examples where energy- and momentum-related technologies were developed and improved over time
- Describe and evaluate the design of technological solutions and the way they function using principles of energy and momentum
- Explain the importance of using appropriate language and conventions when describing events related to momentum and energy
- Identify multiple perspectives that influence a science related decision or issue apply quantitatively the laws of conservation of momentum to one and two dimensional collisions and explosions
- Determine in which real-life situations involving elastic and inelastic interactions the laws of conservation of momentum and energy are best used
- Design an experiment identifying and controlling major variables
- Evaluate and select appropriate instruments for collecting evidence and appropriate processes for problem solving, inquiring and decision making
- Carry out procedures controlling major variables and adapting or extending procedures where required
- Compile and display evidence, by hand or computer, in a variety of formats, including diagrams, charts, tables, graphs and scatter plots
- Work cooperatively with team members to develop and carryout a plan and troubleshoot problems as they arise

Unit 2: Projectiles, Circular Motion and Universal Gravitation (25 hours)

- Analyse and describe examples where technologies were developed based on scientific understanding
- rocket launcher
- skeet shooter
- describe and evaluate the design of technological solutions and the way they function, using scientific principles
- Construct, test and evaluate a device or system on the basis of developed criteria
- Analyze quantitatively the horizontal and vertical motion of a projectile
- Analyze qualitatively and quantitatively the horizontal and vertical motion of a projectile
- Describe uniform circular motion using algebraic and vector analysis
- Explain quantitatively circular motion using Newton's laws
- Identify questions, analyze, compile, and display evidence and information to investigate the development over time of a practical problem, issue, or technology
- Explain qualitatively the relationship between displacement, velocity, time and acceleration for simple harmonic motion
- Explain quantitatively the relationship between potential and kinetic energies of a mass in simple harmonic motion
- Compile and organize data, using data tables and graphs to facilitate interpretation of the data

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- Explain qualitatively Kepler's first and second laws and apply quantitatively Kepler's third law
- Use appropriate numeric and graphic analysis to explain and apply the law of universal gravitation to orbital rotations
- Distinguish between scientific questions and technological problems

Unit 3: Fields (30 hours)

- Explain the roles of evidence, theories and paradigms and peer review in the development of the scientific knowledge associated with a major scientific milestone.
- Communicate questions, ideas and intentions, and receive, interpret, understand, support and respond to the ideas of others.
- Describe magnetic, electric and gravitational fields as regions of space that affect mass and charge.
- Describe magnetic, electric and gravitational fields as regions of space that affect mass and charge.
- Describe magnet ic, electric and gravitational fields by illustrating the source and direction of the lines of force.
- Describe electric fields in terms of like and unlike charges, and magnetic fields in terms of poles.
  - Draw the magnetic field around one or more bar magnets in various orientations.
  - Describe the Earth's magnetic field and how it changes with time.
- Define and delimit problems, estimate quantities, interpret patterns and trends in data and infer or calculate the relationship among variables.
- Compare Newton's Law of universal gravitation with Coulomb's Law and apply both laws quantitatively.
- Apply Ohm's Law to series, parallel, and combination circuits
  - Extend the work-energy theorem to develop the concept of electric potential *energy.*
  - *D*efine electric potential *difference.*
  - *D*escribe factors that control electrical resistance
  - Define electric current
  - Draw a schematic diagram for series, parallel, and simple combination circuits
  - Investigate the relationship between voltage rises and voltage drops across circuit elements
  - Describe the energy transformations
- Carry out procedures controlling the major variables, selecting and using instruments effectively, accurately and safely, and adapting or extending procedures where required
- Apply Ohm's Law to series, parallel, and combination circuits
- Carry out procedures controlling the major variables, selecting and using instruments effectively, accurately and safely, and adapting or extending procedures where required
- State a prediction and a hypothesis based on available evidence and background information
- Design an experiment and identify
- Apply Ohm's Law to series, parallel, and combination circuits
- Carry out procedures controlling the major variables, selecting and using instruments effectively accurately, and safely, and adapting or extending procedures where required
- State a prediction and a hypothesis based on available evidence and background information
- Design an experiment and identify specific variables
- Describe the magnetic field produced by a current in a long, straight conductor, and in a solenoid
  - illustrate the use of hand rules
- Analyze qualitatively the forces acting on a moving charge in a uniform magnetic field
- Analyae qualitatively electromagnetic induction by both a changing magnetic flux and a moving conductor
  - use Lenz's law to predict the directions of induced current
  - describe the construction and operation of step-up and stepdown transformers, including ratio of turns and power in power out calculations
- Compare and contrast the ways a motor and generator function, using the principles of electromagnetism
- Describe and compare direct current and alternating current
  - illustrate the third hand rule for motors
- Describe the historical development of a technology
- Describe the functioning of domestic and industrial technologies, using scientific principles
  - Analyse natural and technological systems to interpret and explain their structure and dynamics
  - Select and integrate information from various print and electronic sources or from several parts of the same source

COURSE EXPECTATIONS (Role of student)

In order to be successful in Physics 122, in addition to completing assignments, **homework (30 minutes/night)** and projects, you will need to bring the following to class each day: textbook, calculator, pencil and notebooks (binder for day to day work).

COURSE TEXTBOOKS AND MATERIALS

Text: Physics - McGraw Hill Ryerson

Recommended Materials:

- Pencils, pens, and erasers
- Binder with lined paper, graph paper and dividers
- Ruler
- Scientific or Graphing Calculator
- Google E-mail account

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Mark Distribution:	**Midterm Grade**	**June Grade**	**Final Grade**
	70% Class Work	60% Class Work	40% Midterm Grade
	30% Midterm Exam	40% Final Exam	60% June Grade

INTERNET SITES

Blog:	http://svchemistry.edublogs.org
Remind:	http://www.remind.com
Edmodo	http://www.edmodo.com
School Site:	http://svhs.nbed.nb.ca/

EXTRA HELP PLAN

I will be available by appointment at noon hour or after school. Please note that my supervision schedule will impact my availability during noon hour and after school.

Note: Policies regarding deadlines, plagiarism, procedures, routines, classroom expectations, attendance, exemptions, homework, etc. are posted on the school website.

Student Name: _____ Student Signature: _____

Parent Signature: _____ Parent E-mail: _____

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