Physics 122
Course Outline 2014 - 2015

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Unit 1: Review of Mechanics in 1D
- Kinematics
  - Position & Velocity
  - Acceleration
- Dynamics
  - Types of Forces
  - Newton's Laws

Unit 2: Mechanics in 2D
- Application of Vectors
- Projectile Motion
- Impulse & Momentum
- Force Problems
- Torque

Unit 3: Newton's Universal Law of Gravity
- Circular Motion
- Universal Gravitation

Unit 4: Work & Energy
- Work
- Types of Energy
- Conservation of Energy

Unit 5: Electrostatics
- Static Electricity
- Coulomb's Law
- Electrostatic Fields

Unit 6: Electric Potential
- Electric Potential
- Capacitance
- Dielectrics
- Electrical Energy Storage

Unit 7: Circuits
- Electric Current
- Ohm's Law
- Resistivity
- Resistors in Series and Parallel
- Measuring Current and Voltage

Part II – Laboratory Experiment or Engineering Project

In this part of the course you will develop your own laboratory experiments and/or an engineering projects. More information will be forthcoming.

Evaluation (depends on incentives):

Part I	50%
Part II	20%
Final Exam	30%

Materials:
USB Memory Stick
Scientific Calculator

Additional Resources: http://jmh.nbed.nb.ca/teacher/note/digital-resources-spring-2015-courses

"…high schools face intense criticism from college educators, policymakers, education reformers, and the public for graduating a significant number of students who are not well prepared for college and do not possess needed technological and problem-solving skills to enter the workplace." – Physics Today, May 2002.

Focus on General Physics & Science Skills

Physics is the study of nature, of matter and energy and their interactions. Mastery of physics happens through the use of concepts and calculations. The ability to predict what will happen in nature given changes in certain quantities is conceptual and mathematics is the language used to communicate those concepts through calculations. The skills you will develop and strive for are summarized below, and in general they apply to all disciplines of science.

- **Proficiency in mathematics**
  - You don't need to know everything; however, strong equation solving, algebra, and graphing skills are a necessity.
  - Review skills needed for a particular problem.
- **Problem Solving & Scientific Reasoning**
  - The ability to apply logic reasoning to arrive at a solution.
  - Familiarity with the scientific method.
  - Study other science courses.
  - Science Fair participation.
  - Keep your brain sharp through logical activities (reading, puzzles, chess, video games with a problem solving element, etc.)
- **Technical Knowledge**
  - Become comfortable with computers (tablets, smartphones, etc.) and their software. That includes exposure and use of new computer programs frequently used in science and general strategies of how to learn any new computer program.
  - Strong emphasis on learning to use spreadsheet programs for problem solving/data analysis (Excel).
  - Basics of how machines and electronic devices work.
- **Excellent Study Habits**
  - Pay attention; stay focused – especially during the transition from lecture to class work.
  - Review notes and text daily (especially any new vocabulary and concepts).
  - YouTube videos while you work on similar problems.
  - Do assigned work.
  - Efficient use of time (nearly all assigned tasks can be completed in allotted class time).

Rethinking High School Physics/Science

- Deepen understanding and knowledge of Science and Mathematics.
- Contextual and conceptual understanding of Physics.
- Promote Scientific Inquiry/Thinking and Logic.
- Important Physics does not come from facts.
- Successfully problem-solve your way through unfamiliar situations.
- Stimulate student question generation.
- Accommodate student interests.
- Awareness and self-monitoring of learning.
- Go from a "hands-on" to a "minds-on" approach.