

# SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



## COURSE OUTLINE

**COURSE TITLE:** Ace Physics

**CODE NO. :** PHY 94 **SEMESTER:** 11F

**PROGRAM:** Academic Upgrading

**AUTHOR:** Matthew Moore

**DATE:** March 2012 **PREVIOUS OUTLINE DATED:** N/A

**APPROVED:**

	<hr/>	<b>CHAIR</b>	<hr/>	<b>DATE</b>
<b>TOTAL CREDITS:</b>	No post-secondary credit			
<b>PREREQUISITE(S):</b>	MTH050 or higher			
<b>HOURS/WEEK:</b>	5 hours in-class, self-directed			

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*For additional information, please contact Carolyn Hepburn, Director  
School of Native Education and Academic Upgrading  
(705) 759-2554, Ext. 2499*

**I. COURSE DESCRIPTION:**

Successful learners must tackle each chapter and demonstrate content mastery by completing the corresponding test with a grade of 70% or higher. Learners will have their choice of final topic based on which program they are looking at taking in post-secondary. Graduates of this course will have the knowledge and understanding of all of the major concepts in the world of physics and will be well prepared for a variety of college post-secondary programs.

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

Upon successful completion of this course, the student will demonstrate the ability to:

1. **The Physics Tool Kit:** to get the basic tools they will need to attack other chapters ahead.

Potential Elements of the Performance:

- Standards of Measure
- Introduction to the Metric System
- Length, Area and Volume
- Other Units of Measure
- Significant Digits, Accuracy, and Precision
- Calculations with Measurements
- Problem-Solving Methods

2. **Vectors:** to understand how vectors can be used to solve problems with forces.

Potential Elements of the Performance:

- Vectors and Scalars
- Components of a Vector
- Vectors in Standard Position

3. **Motion, Force and Movement:** to understand how objects move relative to their speed, direction and gravitational pull.

Potential Elements of the Performance:

- Speed Versus Velocity
- Acceleration
- Uniformly Accelerated Motion and Free Fall
- Projectile Motion
- Force, Law of Inertia, Law of Acceleration

- Friction
- Total forces in One Dimension
- Gravity and Weight
- Law of Action and Reaction
- Impulse and Momentum
- Collisions
- Forces in Two Dimensions
- Concurrent Forces in Equilibrium
- Torque, Parallel Force and Center of Gravity

4. **Work, Energy, Rotational Motion and Simple Machines:** to understand how changes in physical activity can accomplish different tasks including how they are related and how they differ from their everyday meanings.

Potential Elements of the Performance:

- Work, Power, Energy, and Conservation of Energy
- Rotational Motion, Angular Momentum and Centripetal Force
- Power in Rotational Systems
- Transferring Rotational Motion
- Gears and Pulleys
- Machines and Energy Transfer
- Lever, Wheel-and-Axle, Pulley, Inclined Plane and Screw
- Wedge and Compound Machines
- Effect of Friction on Simple Machines

5. **Light, Reflection and Refraction, and Color:** to understand how the reflection and refraction of light effects how we see objects and how color is projected to our eyes. Also to understand the use of mirrors to create different images.

Potential Elements of the Performance:

- Nature of light, Speed of Light
- Light as a wave and particle, Photometry
- Mirrors and Images
- Images formed by Plane, Concave, and Convex Mirrors
- Law of Refraction
- Total Internal Reflection
- Types of Lenses
- Images Formed by Converging and Diverging Lenses

6. **Electricity and Magnetism OR Hydraulic and Pneumatic Systems:** this final unit will be determined by the program interest of the learner. Learners who are interested in Electrical programs will learn about how electricity and magnetics are used in a variety of applications. Learners who are interested in mechanical programs will understand how hydraulics and pneumatics drive many industrial machines.

Potential Elements of the Performance:

- Electrical Charges, Induction, Coulomb's Law
- Electric Fields, Simple Circuits, Ohm's Law
- Series, Parallel and Compound Circuits
- Electric Instruments, Voltage Sources, Cells
- Electric Power
- Magnetic Effects of Currents
- Induced Magnetism, Electromagnets and Current
- Generators, Motor Principle, Magnetic Forces
- Alternating Current Electricity
  
- Properties of Matter, Solids, Liquids, Gases
- Hydrostatic Pressure, Air Pressure, Buoyancy
- Fluid Flow
- Temperature
- Heat Transfer, Specific Heat, Change of Phase
- Expansion of Solids and Liquids
- Charles' Law, Boyles's Law, Combination

**III. TOPICS:**

1. The Physics Tool Kit and Vectors
2. Motion, Force and Movement
3. Work, Energy, Rotational Motion, Simple Machines
4. Light, Reflection, Refraction and Color
5. Electricity and Magnetism (If chosen don't do Topic 6)
6. Hydraulic and Pneumatic Systems (If chosen don't do Topic 5)

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

- *Applied Physics, (8<sup>th</sup> Ed.) Dale Ewen; Neill Schurter; P.Erik Gunderson*

**V. EVALUATION PROCESS/GRADING SYSTEM:**

Unit 1 (Chapters 1 & 2) Test .....	20%
Unit 2 (Chapters 3 – 6) Test .....	20%
Unit 3 (Chapters 7 – 9) Test .....	20%
Unit 4 (Chapters 19 – 21) Test .....	20%
Unit 5 (Students Choice) Test .....	20%

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The following semester grades will be assigned to students:

<u>Grade</u>	<u>Definition</u>
A+	90 – 100%
A	80 – 89%
B	70 - 79%
F (Fail)	69% and below
W	Student has withdrawn from the course without academic penalty.

**VI. SPECIAL NOTES:**Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

If learners do not attend class or progress at a good pace they will be withdrawn. See the Academic Upgrading policies and procedures for more details.

**VII. COURSE OUTLINE ADDENDUM:**

The provisions contained in the addendum located on the portal form part of this course outline.