SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

SAULT COLLEGE

COURSE OUTLINE

COURSE TITLE:	Physics

CODE NO. :	PHY125	**SEMESTER:**	One

PROGRAM:	Aviation Technology – Flight

AUTHOR:	Douglas McKinnon

DATE:	Sept 2011	**PREVIOUS OUTLINE DATED:**	Sept 2010

APPROVED:

"S.Hause"

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CHAIR   DATE

TOTAL CREDITS:	4

PREREQUISITE(S):	N/A – However Grade 12 Physics is highly recommended

HOURS/WEEK:	4

Physics   PHY125

I.   COURSE DESCRIPTION:

The intention of this course is to provide both a review of, and a more in-depth study of many of the concepts of applied physics introduced in secondary school physics curricula. An attempt will be made to limit the topics to those which should prove to be relevant to the aviation flight student.

II.   LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

A) Write definitions for the concepts introduced in his/her own words

B) Answer questions demonstrating knowledge and understanding of the concepts presented.

C) Answer questions requiring extrapolation of the course content.

D) Solve problems requiring an understanding of the course theory.

1.   **Introduction and Mathematical Concepts**

   a) mathematics of basic physics
   b) units of measurement
   c) "base" quantities and units
   d) S.I. metric prefixes and their abbreviations
   e) "derived" quantities and "derived" units
   f) conversion of units of measure
   g) significant figures
   h) numerical "accuracy" and „precision"
   i) "vector" and "scalar" quantities

2.   **Kinematics and Dynamics**

   Potential Elements of the Performance:

   a) Distance and displacement
   b) Speed and velocity
   c) Acceleration

d) Equations of "uniform accelerated motion"
e) Acceleration due to gravity – free fall
f) Projectile motion
g) Definition and characteristics of forces
h) Types of forces
i) Distinguish between mass and weight
j) Definition and application of Newton's three laws of motion
k) "normal force" and Newton's third law of motion
l) Static and kinetic frictional forces
m) The tension (tensile) force
n) Static equilibrium problems

3. **WORK, ENERGY, IMPULSE, MOMENTUM and ROTATIONAL KINEMATICS**

Potential Elements of the Performance:

a) Define and describe work and energy
b) Distinguish between kinetic and potential energy
c) Gravitational potential energy
d) Conservation of energy and mechanical energy
e) Definition of power
f) Efficiency
g) Mechanical advantage
h) Velocity ratio
i) Analyze and describe"simple" machines
j) Define and describe Momentum
k) Define and describe Impulse
l) Understand the conservation of momentum
m) Describe and determine Angular measurement and derivation of velocity and acceleration
n) Equations and attributes of rotational kinematics
o) Describe the relationship between angular and linear motion
p) Define and describe normal and centripetal forces.
q) Quantify normal and centripetal forces

4. **MECHANICAL PROPERTIES OF SOLIDS, LIQUIDS AND GASES**

Potential Elements of the Performance:

a) Mass density
b) Weight density
c) Specific gravity
d) Define pressure
e) Units of pressure measurement

     f) Pressure at a depth in a liquid
     g) Atmospheric, absolute and gauge pressure
     h) Pascal's Law
     i) Describe the hydraulic press
     j) Understand and apply Archimede's Principle
     k) Fluids in motion
     l) Understand and apply Bernoulli's Principle and Equation

5. **TEMPERATURE and HEAT**

Potential Elements of the Performance:

     a) Define and describe temperature
     b) Convert between various temperature scales
     c) Define and describe heat
     d) Quantify thermal linear, area and volume expansion of solids
     e) Quantify thermal volume expansion of liquids
     f) Define specific heat capacity
     g) Define and describe physical characteristics of changes of state
     h) Describe and quantify specific heat of fusion and vaporization
     i) Understand various methods of heat transfer
     j) Understand and quantify the ideal and general gas laws
     k) Awareness of Boyle's, Charles' and Gay-Lussac's gas laws

6. **WAVES, MOTION and SOUND**

Potential Elements of the Performance:

     a) Types of waves
     b) Periodic motion
     c) Describe the nature of sound
     d) Understand the frequencies of sound waves
     e) Quantify the speed of sound
     f) Describe and quantify the attributes of loudness and intensity of sound

III. TOPICS:

1. Introduction and Mathematical Concepts
2. Kinematics and Dynamics
3. Work, energy, impulse, momentum and rotational kinematics
4. Mechanical properties of solids, liquids and gasses
5. Temperature and heat
6. Wave motion and sound

IV.   REQUIRED RESOURCES/TEXTS/MATERIALS:

    1) Textbook:
       Title: Physics
       Author: James S. Walker
       Publisher: Pearson (Addison Wesley)

    2) Scientific Calculator

       – NO PHONE or GRAPHIC Calculators allowed

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V.   EVALUATION PROCESS/GRADING SYSTEM:

Your final grade in PHY125 will be determined on the basis of four tests to be administered during the semester.
The four tests are of equal weight. (i.e. **Each of the four tests is worth 25% of your final grade.**) As a result, ***provided you have received a passing grade in each of the four tests,* your final grade will simply be an average of your four test results.** If your final average is below 50%, *or* if you have received a failing grade in one or more of the unit tests, whether you receive an „X" grade (*Incomplete*) or an „F" grade (*Fail*) is entirely at the professor"s discretion. The decision will be based upon *your final average* (e.g. 32% **would** result in an F grade while 48% **might** result in an X grade.); *your attendance* during the semester; *your attitude* while in the classroom; *your perceived level of effort* during the semester; etc.. In any case, should you find yourself with an X grade at the end of the semester, in order to upgrade your mark to a passing grade you will be required to write a "make-up" **examination *covering the entire course content.** Should you receive a passing grade on the make-up examination (50% or higher) your X grade will be upgraded.* The best you can do after receiving an X grade as a result of a failing average is a „C" grade! If you were required to write the supplemental examination as a result of having failed or missed one test you may substitute the exam result for this test result. Prior to administering any test you will be notified a full week in advance. Should you, for any reason (*within reason of course*), not be able to be in attendance on a day for which a test has been scheduled it is **your responsibility** to notify the teacher **prior** to the test! *If your reasons are acceptable* a date will be set during which you may write a substitute test for the one you have missed.

The following semester grades will be assigned to students:

Grade	Definition	Grade Point Equivalent
A+	90 – 100%	4.00
A	80 – 89%	
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00

CR (Credit)   Credit for diploma requirements has been

	awarded.
S	Satisfactory achievement in field /clinical placement or non-graded subject area.
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR	Grade not reported to Registrar's office.
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.

Once the classroom door has been closed, the learning process has begun. Late arrivers will not necessarily be granted admission to the room. This decision lies solely with the Professor.

VII.   COURSE OUTLINE ADDENDUM:

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