

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 2012	PREVIOUS OUTLINE DATED:	Sept 2011
APPROVED:	"Colin Kirkwood"		Sept/12
	_____ DEAN		_____ DATE
TOTAL CREDITS:	4		
PREREQUISITE(S):	N/A – However Grade 12 Physics is highly recommended		
HOURS/WEEK:	4		

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For additional information, please contact Colin Kirkwood, Dean - School of Environment, Technology and Business

(705) 759-2554, Ext. 2688

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

Potential Elements of the Performance:

- 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 4th edition with MasteringPhysics™

Author: James S. Walker

Publisher: Pearson (Addison Wesley)

2) Scientific Calculator

– NO PHONE or GRAPHIC Calculators allowed

V. EVALUATION PROCESS/GRADING SYSTEM:

EVALUATION PROCESS/GRADING SYSTEM:

Final grade will be awarded based on the composite score of tests and quizzes as follows:

Tests	70%
Quizzes	15%
<u>Assignments</u>	<u>15%</u>
Total	100%

The percentages shown above may be adjusted to accurately evaluate student skills. Students will be notified of any changes made.

Each test/quiz are of equal (i.e. proportional), "weight" regarding grading. Each will examine your knowledge of a number of topics and will be administered within one week of completing those and related topics. Prior to administering any test you will be notified a full week in advance.

Should you, for any reason (within reason of course) not attend for a test which has been scheduled, it is your responsibility to notify the professor 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. Acceptance is based solely on the discretion of the Professor.

Quizzes are intended to account for student attendance, ensure that the student has a general understanding of the concepts being taught, and if assigned homework is being accomplished in a timely manner. Quizzes can be administered without prior notice. There are no substitute or make-up quizzes. Your lowest quiz score will be excluded from the final grading scheme.

In order to obtain your letter grade the following percentage-letter grade equivalents will be used:

The following semester grades will be assigned to students:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	
A	80 – 89%	4.00
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.