



**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 'base' 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 for ‘uniformly accelerated motion’
- e) the ‘acceleration due to gravity’ – “free fall”
- f) projectile motion
- g) forces
- h) Newton’s first law of motion – the ‘law of inertia’
- i) Newton’s second law of motion
- j) Newton’s third law of motion
- k) types of forces
- l) the force of gravity
- m) the distinction between ‘mass’ and ‘weight’
- n) the ‘normal force’ and Newton’s Third Law of Motion
- o) static and kinetic frictional forces
- p) the tension force
- q) static equilibrium problems
- r) applications of Newton’s laws of motion

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

Potential Elements of the Performance:

- a) work and energy
- b) kinetic energy
- c) gravitational potential energy
- d) conservation of mechanical energy
- e) power
- f) the conservation of energy
- g) efficiency
- h) mechanical advantage (actual)
- i) velocity ratio (ideal mechanical advantage)
- j) analyze and describe simple machines
- k) momentum
- l) impulse
- m) conservation of momentum
- n) angular measurement
- o) angular velocity
- p) angular acceleration
- q) equations of rotational kinematics
- r) relationship between *angular motion* and *linear motion*
- s) normal acceleration or centripetal acceleration
- t) centripetal and centrifugal forces

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

Potential Elements of the Performance:

- a) mass density
- b) weight density
- c) specific gravity
- d) 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) the hydraulic press
- j) Archimedes' principle
- k) fluids in motion
- l) Bernoulli's Principle and Equation

**5. TEMPERATURE AND HEAT**

Potential Elements of the Performance:

- a) temperature
- b) temperature scales
- c) absolute temperature scales
- d) heat
- e) thermal linear expansion of solids
- f) thermal area expansion of solids
- g) thermal volume expansion of solids
- h) thermal volume expansion of liquids
- i) units of heat measurement
- j) specific heat capacity
- k) changes of state
- l) specific latent heat of fusion
- m) specific latent heat of vapourization
- n) methods of heat transfer
- o) Boyle's gas law
- p) Charles' gas law
- q) Gay-Lussac's gas law
- r) the general gas law
- s) the ideal gas law

**6. WAVE MOTION AND SOUND**

Potential Elements of the Performance:

- a) types of waves
- b) periodic motion
- c) the nature of sound
- d) the frequencies of a sound wave
- e) speed of sound
- f) 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 GASES
- 5. TEMPERATURE and HEAT
- 6. WAVE MOTION and SOUND

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:****1) TEXTBOOK:**

**Title:** PHYSICS 4th edition  
**Author(s):** James S. Walker  
**Publisher:** Pearson (Addison Wesley)

**2) Scientific Calculator (graphics NOT required)**

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

Your final grade in PHY 125 will be determined on the basis of four tests to be administered during the semester. The topics covered in each of the four tests are as follows:

Test #1 ----- Topic Number 1 and 2

Test #2 -----Topic Number 2  
Topic Number 3

Test #3 ----- Topic Number 4

Test #4 ----- Topic Number 5

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:

<b>Grade</b>	<b><u>Definition</u></b>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
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 may not be granted admission to the room. This decision rests entirely with the instructor.*

## VII. COURSE OUTLINE ADDENDUM:

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