

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: Updated by Douglas McKinnon

DATE: June 2015 **PREVIOUS OUTLINE** June 2014
DATED:

APPROVED:



Director of Aviation



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 **Greg Mapp, Director of Aviation.***

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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 ConceptsPotential 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 DynamicsPotential 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 Technology Update Plus MasteringPhysics with eText – Access Card Package, 4/E

Author: James S. Walker

Publisher: Pearson (Addison Wesley)

ISBN: 0-321-90303-X

2) Scientific Calculator

Note: NO Cell/Smart Phones, General Purpose Computing Devices, or Graphic Calculators allowed during tests or quizzes

OPTIONAL RESOURCES:**1) Online-Supporting Web Site:**

**Title: Mastering Physics – Instant Access Card
(for Physics Technology Update, 4/E)**

ISBN: 0-321-90496-6

2) Student Solutions Manual:

Title: Study-Guide and Selected Solutions Manual

ISBN: 0-321-60200-5

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%
<u>Quizzes</u>	<u>30%</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%	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.	

If a faculty member determines that a student is at risk of not being successful in their academic pursuits and has exhausted all strategies available to faculty, student contact information may be confidentially provided to Student Services in an effort to offer even more assistance with options for success. Any student wishing to restrict the sharing of such information should make their wishes known to the coordinator or faculty member.

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:1. Course Outline Amendments:

The faculty member reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

2. Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

3. Prior Learning Assessment:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Key Dates Calendar for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio. Student Services, located in E1101, can provide information regarding the Prior Learning Assessment and Recognition policy or it can be viewed on the student portal.

Substitute course information is available in the Registrar's office.

4. Student Portal:

The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations, in addition to announcements, news, academic calendar of events, class cancellations, your learning management system (LMS), and much more. Go to <https://my.saultcollege.ca>.

5. Communication:

The College considers ***Desire2Learn (D2L)*** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of this Learning Management System (LMS) communication tool.

6. Accessibility Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with the Accessibility Services office. Visit Room E1101, call Ext. 2703 or email studentsupport@saultcollege.ca so that support services can be arranged for you.

7. Audio and Video Recording Devices in the Classroom:

Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. Students with disabilities who require audio or visual recording devices in the classroom as an accommodation will receive approval from their counsellor once the Audio and Video Recording Devices in the Classroom Policy has been reviewed by the student. Recorded classroom instruction will be used only for individual academic use and will not be used for any other purpose. Recordings may only be used for individual study of materials presented during class and may not be published or distributed. Intentional misuse of audio and video recordings or intentional misrepresentation when requesting the use of a device for recording shall constitute a violation of this policy and laws protecting intellectual property.

8. Academic Dishonesty:

Students should refer to the definition of “academic dishonesty” in the *Student Code of Conduct*. Students who engage in academic dishonesty will be issued a sanction under the Student Code of Conduct which could lead to and include expulsion from the course/program. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, students must use a documentation format for referencing source material.

9. Tuition Default:

Students who have defaulted on the payment of tuition (tuition has not been paid in full, payments were not deferred or payment plan not honoured) as of the first week of November (fall semester courses), first week of March (winter semester courses) or first week of June (summer semester courses) will be removed from placement and clinical activities due to liability issues. This may result in loss of mandatory hours or incomplete course work. Sault College will not be responsible for incomplete hours or outcomes that are not achieved or any other academic requirement not met as of the result of tuition default. Students are encouraged to communicate with Financial Services with regard to the status of their tuition prior to this deadline to ensure that their financial status does not interfere with academic progress.