

# SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

## COURSE OUTLINE

**COURSE TITLE:** Instruments and Operations  
**CODE NO. :** AVT117-1 **SEMESTER:** One  
**PROGRAM:** Aviation Technology (Flight)  
**AUTHOR:** Brian Stewart  
**DATE:** Aug 07 **PREVIOUS OUTLINE DATED:** Sept 06  
**APPROVED:**

	_____	_____
	<b>DEAN</b>	<b>DATE</b>

**TOTAL CREDITS:** 1  
**PREREQUISITE(S):** None  
**HOURS/WEEK:** 1

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## I. COURSE DESCRIPTION:

AVT117 is one component of the background knowledge you will require to become a safe and competent private pilot. If you refer to the study and reference guide for a private pilot you'll find flight instruments and operations under the aeronautics – general knowledge section. During this course you will gain a sufficient level of understanding flight instruments and flight operations to help you decide if it is safe to fly.

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

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

1. Explain the function and operation of the pitot static instruments  
Potential Elements of the Performance:
  - How the pitot static system works including errors, icing and alternate source.
  - Principles of operation of the pitot static instruments, errors and malfunctions.
  - Airspeed indicator markings and definitions
  
2. Explain the function and operation of the gyro instruments  
Potential Elements of the Performance:
  - Principles of operation, errors and malfunctions.
  - Instrument limitations and sources of power.
  - Gyroscopic inertia and gyroscopic precession
  
3. Explain the function and operation of the direct reading magnetic compass  
Potential Elements of the Performance:
  - Principles of operation.
  - Compensating for variation and deviation.
  - Turning and acceleration errors.
  - Compass serviceability checks.
  
4. Effectively utilize the flight instruments to fly without visual references.  
Potential Elements of the Performance:
  - How to deal with the loss of visual references.
  - Using the control and performance instruments to get the desired performance.
  - Getting an effective instrument scan.
  - Emergencies due to the loss of flight instruments.
  - Recovery from inadvertently entered unusual attitudes.

5. Incorporate all relevant flight information into your decision making process to effectively make a go/no go decision.

Potential Elements of the Performance:

- What are your responsibilities as the pilot in command.
- Dealing with various weather considerations.
- See and be seen.
- Airport markings.
- Units of measurement and conversion.
- Effect of surface condition and slope on your ability to take off and landing safely.
- How to handle wind while manoeuvring on the ground.
- The effect of wake turbulence.

6. Calculate all relevant flight information from the pilot operating handbook (aircraft flight manual).

Potential Elements of the Performance:

- Use of the aircraft flight manual approved operational information.
- Calculate take off distance, landing distance, crosswind component, fuel burn and cruise performance.
- Calculation of all V speeds and the affect atmospheric conditions have on achieving them.
- Calculation of your crosswind component and what the Canadian Runway Friction Index means.

7. Understand aircraft performance to a level sufficient to be successful in both flight and ground training.

Potential Elements of the Performance:

- Effect of density altitude on performance.
- Why attitude plus power equals performance.
- V speed definitions.
- Ground effect.
- Flight for range and endurance.
- The flight envelope – stall, slow flight, spin, spiral.
- The relationships in a turn.

8. Determine if the aircraft is within the required weight and balance limitations.

Potential Elements of the Performance:

- Calculate an aircraft's weight and balance.
- The importance of weight and balance and centre of gravity position and limitations.
- How to adjust loads to comply with the flight envelope.
- Significance of normal, utility and aerobatic categories.

9. Deal with aircraft critical surface contamination.

Potential Elements of the Performance:

- What constitutes a clean aircraft.
- What is the cold soaking phenomenon and when might it occur.
- Who is responsible to ensure your aircraft is clean prior to take off?
- What effect does critical surface contamination have on aircraft performance?
- Types of de-icing fluids

10. Deal with an emergency survival situation and how the search and rescue services can work in your favour.

Potential Elements of the Performance:

- Basic survival techniques, including signalling for assistance.
- How to monitor and help people in distress.
- ELT's – their function and serviceability.

### III. TOPICS:

1. Pitot Static System
2. Airspeed Indicator
3. Vertical Speed Indicator
4. Altimeters – encoding, radio/radar
5. Magnetic Compass
6. Gyroscope
7. Heading Indicator
8. Attitude Indicator
9. Turn and Bank Indicator/Turn Coordinator
10. Instrument Flying
11. Flight Operations – general
12. Aircraft Performance
13. Weight and Balance
14. Search and Rescue
15. Critical Surface Contamination.

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

- 1) From the Ground Up
- 2) Study And Reference Guide For Written Examinations For The Private Pilot Licence Aeroplane – Fifth Edition November 2006  
<http://www.tc.gc.ca/civilaviation/general/Exams/guides/tp12880/Menu.htm>
- 3) Transport Canada Aeronautical Information Manual (TC AIM)  
<http://www.tc.gc.ca/CivilAviation/publications/tp14371/menu.htm>
- 4) Canadian Private Pilot Answer Guide

**V. OTHER RESOURCES/TEXTS/MATERIALS:**

- 1) The Advanced Pilot's Flight Manual – William Kersner
- 2) Instrument Procedures Manual – Transport Canada – TP2076E January 2000.
- 3) Aerodynamics for Naval Aviators – ASA-ANA

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

The student will be assessed by a combination of attendance and department, quizzes, tests and a final exam. Weighting of each will be as follows: 30% for quizzes, 30% for all tests prior to the final exam and 40% for the final exam. A minimum mark of 70% is required to pass the course. Make-up tests are not permitted except in accordance with section VII of this outline.

Unexcused absences will result in 2% deduction of the final mark for each occurrence, arriving for class late will result in a 1% deduction of the final mark for each occurrence, and violations of the dress code will result in a 1% deduction of the final mark for each occurrence. Refer to the SOP GEN 1.3.1.8 for dress code policies and SOP GEN 1.3.1.13 for the policy regarding absence or tardiness.

Quizzes will be given without prior notice.

If it is necessary to write a second final exam in order to pass the course, the highest grade achievable will be a "C". (See make-up policy in section VII)

Students may request a deferment of a test for compassionate reasons.

Compassionate Grounds for deferment will include but not be limited to death of an immediate family member, personal illness, or recent diagnosis of a serious illness of a family member. **Make-ups will not be permitted after the fact for compassionate reasons.**

**"F" grades in any subject at the end of a semester will result in termination from the Aviation program.**

Although attitude, co-operation, etc., are not graded, students may be terminated based on their performance in this area (see section VII). These attributes are also considered in the selection of the Air Canada Award and other scholarships.

Dates of tests will be announced at least 1 week in advance.

A classroom code of conduct (behaviour) can be found in the SOP General section, and will be adhered to.

The following semester grades will be assigned to students in this course:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 - 100%	
A	80 - 89%	4.00
B	70 - 79%	3.00

C	assigned if a make-up exam was required to complete the course	2.00
F (Fail)	below 70%	0.00
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.	
CR (Credit)	Credit for diploma requirements has been awarded.	

## VI. SPECIAL NOTES:

### Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

### 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.

### Communication:

The College considers **WebCT/LMS** 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 the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. Students who engage in academic dishonesty will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Outline Amendments:

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

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

**VII. PRIOR LEARNING ASSESSMENT:**

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

**VIII. DIRECT CREDIT TRANSFERS:**

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.