

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY  
SAULT STE. MARIE, ONTARIO**



Sault College

**COURSE OUTLINE**

**COURSE TITLE:** Safety and Human Factors  
**CODE NO. :** AVT378-3 **SEMESTER:** Seven  
**PROGRAM:** Aviation Technology (Flight)  
**AUTHOR:** Brian Stewart  
**DATE:** Jan 2006 **PREVIOUS OUTLINE DATED:** Aug 2004  
**APPROVED:**

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**DEAN**

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**DATE**

**TOTAL CREDITS:** 4  
**PREREQUISITE(S):** AVT248  
**HOUR/WEEK:** 4

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## I. COURSE DESCRIPTION:

This course will complete the knowledge requirement for the ATPL as outlined in the ICAO Human Factors Training Manual (first edition – 1998), as well, will provide an opportunity to assess the level of skill acquired in these areas. Specifically you will complete the knowledge requirement for judgment and decision-making, the pilot – software relationship (liveware – software), interpersonal relations (liveware – liveware) and organizational environment (liveware – environment).

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

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

1. Effectively utilize the liveware – software component in the SHELL model to improve flight safety

### Potential Elements of the Performance:

- Rationale and benefits of SOPs
- Errors and limitations of written materials
- Automation's benefits and pitfalls

2. Use good judgment when making timely effective decisions

### Potential Elements of the Performance:

- Review the decision making process
- Be able to use the DECIDE model to effectively evaluate change
- Know the five hazardous attitudes , their antidotes and your personal hazardous attitude trend
- Understand the three levels of situational awareness and the factors that influence your level of situational awareness
- Understand the factors which may effect your good judgment and how to counteract them
- The categories of pilot behaviour and how you develop and employ them to make decisions

3. Analyze an accident or incident using Reason's Model

### Potential Elements of the Performance:

- Identify the failures in each of the five layers
- Develop or suggest strategies to reinforce each of the layers – this includes the productive activities layer where human factors play a major role
- Be aware of and able to recognize design and automation features which are latent failures in a system

4. Establish and manage a safety management program

Potential Elements of the Performance:

- Know the roles that Transport Canada and Management play in the development of a safety management program
- Identify the components of a safety management program
- The role of the safety manager
- How to establish the program
- How to manage the program
- Identifying hazards, assessing and managing their risk
- As part of the safety audit team, you will audit, identify hazards, assess risk and provide suggested mitigation's to improve the safety of the program. The written report will then be submitted to the safety coordinator prior to the end of the semester.

5. Effectively participate in a two crew flight environment

Potential Elements of the Performance:

- Communicate effectively to make decisions and manage resources
- Provide leadership
- Establish priorities
- To provide effective monitoring and cross checking to trap errors

**III. TOPICS:**

1. Documentation
2. Judgment, decision making and situational awareness
3. The five layers of Reason's Model
4. Latent failures with decision makers, line managers, accident preconditions and system defences
5. Potential problems with both the design and automation of aircraft cockpits
6. Review of flight physiology as it applies to the accidents preconditions
7. Regulations as they apply to safety management in Canadian aviation
8. Guidelines for the safety manager

9. Establishing the safety management program
10. Managing the program
11. Human factors as they relate to a safety management program
12. Hazard identification and risk management
13. Accident prevention plan
14. A human error approach to accident investigation
15. Crew resource management
16. LOFT scenarios

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

- 1) Human Factors for Aviation - Advanced Handbook  
Published by Transport Canada ISBN # 0-660-16656-9
- 2) Internet Access  
<http://www.psy.utexas.edu/psy/helmreich/nasaut.htm>  
<http://www.hf.faa.gov/>  
<http://www.crm-devel.org/resources/human.htm>  
<http://www.flightsafety.org>  
<http://www.raes-hfg.com/>  
<http://human-factors.arc.nasa.gov/>

#### **V. ADDITIONAL RESOURCES/TEXTS/MATERIALS::**

- 1) Human Factors for Aviation - Basic Handbook  
Published by Transport Canada ISBN # 0-660-16655-0
- 2) Pilots Guide to Medical Human factors  
Canada Communication Group ISBN # 0-660-14809-9
- 3) Human Factors for Flight – Frank H Hawkins (Second Edition)  
Ashgate ISBN # 1-85742-135-3
- 4) Human Factors for General Aviation – Stanley Trollip & Richard Jensen  
Jeppesen Sanderson ISBN # 0-88487-138-X
- 5) Aviation Safety Programs  
Jeppesen Sanderson ISBN # 0-88487-236-X

- 6) Human Factors in Aviation  
Earl L Wiener, David C Nagel
- 7) Pilot Judgement and Crew Resource Management  
Richard S Jensen
- 8) Human Factors in Multi Crew Operations  
Harry W Orlady
- 9) Flight Safety – A Primer for General Aviation Pilots  
Alexander T Wells
- 10) Aviation Psychology  
Stanley N Roscoe
- 11) Pilot – Mental and Physical Performance  
David C Edwards
- 12) Beyond Aviation Safety Human Factors  
Daniel E Maurino, James Reason, Neil Johnston, Rob B Lee
- 13) Flightdeck Performance  
Stanley Roscoe
- 14) Coping with Computers in the Cockpit  
Sidney Dekker and Erik Hollnagel
- 15) Flight Stress: Stress, Fatigue and Performance in Aviation  
Alan Stokes and Kirsten Kite

## **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 VI 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 for dress code policies and SOP GEN 1.6.7 for policy regarding absence from classes
- 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 VI)
- 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 VI). 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 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%	4.00
A	80 - 89%	3.00
B	70 - 79%	2.00
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.	

## VII. SPECIAL NOTES:

### Attitude and Conduct

Attitude plays an important role in your ability to exercise good judgement. Although attitude is not being graded, it affects your ability to learn as well as your safety as a student and future as a professional pilot. Students who display a strong tendency towards any of the five hazardous attitudes pose a grave risk to themselves and others. For this reason, students exhibiting one or several hazardous attitudes will be counseled and if necessary, will be sanctioned and given a letter of probation. If this is ineffective in modifying unacceptable behaviour, then the student will be withdrawn from the program.

The five hazardous attitudes are identified as Anti-authority, Impulsivity, Invulnerability, Machismo, and Resignation. These hazardous attitudes are described in "Human Factors for Aviation – Basic Handbook" on pages 151 and 152.

### Make-up Policy

- No make-ups on tests occurring prior to final exams.

- No make-ups on quizzes.
- If the final grade achieved for this course is less than 70%, a second final exam may be written at the discretion of the professor for this course. The second exam will be averaged with the first exam to determine the resulting exam mark, and the final grade will then be calculated.
- In the event that a second final exam is required, the highest achievable overall grade for this course will be a C
- Any student that requires 100% or greater on a make-up exam to pass the course will not be allowed to write a make-up exam.

**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 instructor 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.

**Plagiarism:**

Students should refer to the definition of “academic dishonesty” in the *Sault College 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.