

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



**COURSE OUTLINE**

**COURSE TITLE:** Safety and Human Factors  
**CODE NO. :** AVT378-3 **SEMESTER:** Seven  
**PROGRAM:** Aviation Technology (Flight)  
**AUTHOR:** Brian Stewart  
**DATE:** Jan 2010 **PREVIOUS OUTLINE DATED:** Jan 2009

**APPROVED:**

“B. Punch”

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**CHAIR**

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**DATE**

**TOTAL CREDITS:** 4

**PREREQUISITE(S):** AVT248

**HOURS/WEEK:** 4

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## I. COURSE DESCRIPTION:

In addition to completing the Human Factors knowledge requirement for the ATPL as outlined in the ICAO Human Factors Training Manual (first edition – 1998), this course will meet the knowledge and skills required for crew resource management.

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

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

1. Develop personal defense strategies to reduce the occurrence of unsafe acts.  
Potential Elements of the Performance:
  - Understand how our personality, and our physiological, psychological, psychosocial and physical needs affect our ability to perform.
  - What is the new view of errors?
  - The rationale and benefits of SOPs.
  - Automation, its benefits and pitfalls.
2. 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.
  - Be aware of and able to recognize design and automation features which are latent failures in a system.
3. Apply the process of Single Pilot Resource Management(SRM).  
Potential Elements of the Performance:
  - The "5P" check
  - The SRM decision process
4. Effectively participate on a team or in a crew.  
Potential Elements of the Performance:
  - Communicate effectively to make decisions and manage resources.
  - Provide leadership and followership.
  - Establish priorities to manage workload.
  - Be aware of how decisions related to problem solving fit in the big picture.
  - Resolve conflicts.
  - Provide constructive critiques.
  - Manage threats to reduce or trap errors.

5. Explain the role safety management programs (systems) play in improving the efficiency and safety of complex systems.  
Potential Elements of the Performance:
  - The components of SMS.
  - The regulatory framework for SMS in Canada.
  - The role of the safety manager.
  - The use of reporting systems to provide a proactive approach to reducing incidents and accidents.
6. Explain the rationale and process in applying threat and error management.
  - Definitions.
  - Types of threats.
  - Types of errors.
  - Handling threats, errors and undesired aircraft states.
7. Explain industry training initiatives to reduce accidents.  
Potential Elements of the Performance:
  - CFIT.
  - ALAR.

### III. TOPICS:

1. Reason's Model
2. Unsafe Acts – Errors And Violations
3. Personal Defences
4. Organizational Defences
5. Physiological And Psychological Preconditions
6. Single Pilot Resource Management
7. Communications
8. Situational Awareness
9. Problem Solving/Decision Making/Judgement
10. Leadership/Followership
11. Stress Management
12. Interpersonal Skills
13. Critique
14. Threat And Error Management
15. Safety Management Systems
16. Incident and Hazard Reporting Systems
17. CFIT

18. ALAR

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

1) Human Factors for Aviation - Advanced Handbook  
Published by Transport Canada ISBN # 0-660-16656-9

2) Internet Access

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

- 1) Aircraft Accident Analysis: Final Reports  
James M. Walters and Robert L. Sumwalt III
- 2) Aviation Psychology  
Stanley N Roscoe
- 3) Aviation Safety Programs, A Management Handbook, 3<sup>rd</sup> Edition  
Richard H. Wood
- 4) Beyond Aviation Safety Human Factors  
Daniel E Maurino, James Reason, Neil Johnston, Rob B Lee
- 5) Controlling Pilot Error, Volume 10, Culture, Environment, & CRM  
Tony Kern
- 6) Coping with Computers in the Cockpit  
Sidney Dekker and Erik Hollnagel
- 7) Flightdeck Performance  
Stanley Roscoe
- 8) Flight Discipline  
Tony Kern
- 9) Flight Safety – A Primer for General Aviation Pilots  
Alexander T Wells
- 10) Flight Stress: Stress, Fatigue and Performance in Aviation  
Alan Stokes and Kirsten Kite
- 11) Human Factors in Aviation  
Earl L Wiener, David C Nagel
- 12) Human Factors in Multi Crew Operations  
Harry W Orlady
- 13) Human Factors Training Manual  
ICAO Doc 9683-AN/950
- 14) Managing the Risks of Organizational Accidents  
James Reason
- 15) Pilot Judgement and Crew Resource Management  
Richard S Jensen
- 16) Pilot – Mental and Physical Performance  
David C Edwards

## 17) Redefining Airmanship

Tony Kern

## 18) The Human Contribution

James Reason

## 19) The Limits of Expertise

R. Key Dismukes, Benjamin A. Berman and Loukia D. Loukopoulos

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

The student will be assessed by a combination of attendance and deportment, assignments, tests and a final exam. Weighting of each will be as follows: 20% for each of the 2 assignments, 20% 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 for dress code policies and SOP GEN 1.6.7 for policy regarding absence from classes
- 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 VI). These attributes are also considered in the selection of the Air Canada Award and other scholarships.
- A classroom code of conduct can be found in the SOP General section, and will be adhered to.
- Dates of tests will be announced at least 1 week in advance.

The following semester grades will be assigned to students:

<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
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:

### **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.

### **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.

### **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.

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 Academic Calendar of Events 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.

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

Disability 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 your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

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*. A professor/instructor may assign a sanction as defined below, or make recommendations to the Academic Chair for disposition of the matter. The professor/instructor may (i) issue a verbal reprimand, (ii) make an assignment of a lower grade with explanation, (iii) require additional academic assignments and issue a lower grade upon completion to the maximum grade “C”, (iv) make an automatic assignment of a failing grade, (v) recommend to the Chair dismissal from the course with the assignment of a failing grade. 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.

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. Announcements, news, the academic calendar of events, class cancellations, your learning management system (LMS), and much more are also accessible through the student portal. Go to <https://my.saultcollege.ca>.

Electronic 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. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.

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. *For all AVT classes there is an additional incentive not to miss class. Please refer to Section VI Evaluation Process/Grading System for further information.*

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 will not be allowed to attend class and will be removed from the flight and simulator training schedule until such time as tuition payment has been arranged with Financial Services. This may result in incomplete course work and a delay in completion of the flight training. 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.