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

Sault College

COURSE OUTLINE

COURSE TITLE:	Safety and Human Factors		
CODE NO. :	AVT 3780-3	**SEMESTER:**	Seven
PROGRAM:	Aviation Technology (Flight)		
AUTHOR:	Brian Stewart		
DATE:	January/02	**PREVIOUS OUTLINE DATED:**	Aug/00
APPROVED:			

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DEAN **DATE**

TOTAL CREDITS:	4
PREREQUISITE(S):	AVT2480
HOUR/WEEK:	**4**

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 SHEL 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 deportment, participation, presentations, skill assessment and a final exam. Weighting of each will be as follows: 10% for attendance and deportment, 20% for participation, 10% for quizzes, 15% for the accident investigation presentation, 15% human factors skill assessment and 30% for the final exam. A minimum mark of 70% is required to pass the course. Re-writes are not permitted except in accordance with section VI of this outline.

- When attendance is taken, the attendance mark will be awarded as follows: unexcused absences will result in 2% deduction, arriving for class late will result in a 1% deduction, and violations of the dress code will result in a 1% deduction up to a maximum of the attendance grade. In the event of illness, a telephone call must be made prior to the beginning of the class (a voice mail message is acceptable). Examples of dress code violations will include, but not limited to, not shaving, not wearing a tie, etc.
- Participation will be assessed by your observable behaviour during class. This will include having homework assignments completed, asking and answering questions during class and a wiliness to be an active member in discussion groups.
- Quizzes may be given without prior notice.
- If it is necessary to re-write the final exam in order to pass the course, the highest grade achievable will be a "C". (See re-write 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. **Rewrites will not be permitted after the fact for compassionate reasons.**
- **"R" grades in any subject at the end of a semester will result in termination from the Aviation program. Re-writes in aviation subjects are not permitted except as provided in the re-write policy below.**
- Attendance is mandatory for all Aviation classes unless approval is granted in advance. In the case of illness, a phone call, voice mail or e-mail message is expected.
- If a student expects to be late or will be delayed for any reason, every attempt should be made to contact the professor, or leave a message on voice mail or e-mail.
- 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.

The following semester grades will be assigned to students in postsecondary courses:

Grade	Definition	Grade Point Equivalent
A+	93 - 100%	4.00
A	87 - 92%	3.75
B	80 - 86%	3.00
C	70 - 79%	2.00
R (Repeat)	70% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
U	Unsatisfactory achievement in field placement or non-graded subject areas.	
X	A temporary grade. This is used in limited situations with extenuating circumstances giving a student additional time to complete the requirements for a course (see *Policies & Procedures Manual – Deferred Grades and Make-up*).	
NR	Grade not reported to Registrar's office. This is used to facilitate transcript preparation when, for extenuating circumstances, it has not been possible for the faculty member to report grades.	

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 these students will be counseled and will be put on a behavioural contract. If counseling is ineffective, 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.

Re-Write Policy

- No re-writes on tests occurring prior to final exams.
- No re-writes on any Transport Canada exam.
- 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 be then calculated.

- In the event that a second final exam is required, the highest achievable overall grade for this course will be a C

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 E1204 or call Extension 493, 717, or 491 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 *Student Rights and Responsibilities*. 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.

VIII. 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.