

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



**COURSE OUTLINE**

**COURSE TITLE:** Human Factors in Aviation

**CODE NO. :** AVT119-2

**SEMESTER:** One

**PROGRAM:** Aviation Technology (Flight)

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**DATE:** August 2015 **PREVIOUS OUTLINE DATED:** May 2014

**APPROVED:**

  
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**CHAIR**

  
\_\_\_\_\_  
**DATE**

**TOTAL CREDITS:** 2

**PREREQUISITE(S):** None

**HOURS/WEEK:** 2

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*For additional information, please contact Greg Mapp, Director of Aviation*  
*705 759-2554, Ext 2865*

**I. COURSE DESCRIPTION:**

The focus of this introductory course is the function of the body in a unique and sometimes hostile environment. We will define human factors and the role they have and continue to play in flight safety. You will learn the effect altitude has on your bodily functions, the link between fitness, nutrition and your aviation medical, why sensory conflicts can be disorienting, potential visual and vestibular illusions, how to deal with accelerations, about stress and the role it plays in your performance, and the challenges of a pilot becoming pregnant.

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

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

1. Define human factors and explain its importance in aviation

Potential Elements of the Performance:

- Define where flight physiology fits
- Role in aviation and why?
- Historical perspective in the development of human factors
- A simple model of pilot performance
- Four basic human factor principles

2. Explain your role in learning

Potential Elements of the Performance:

- Learning styles – active versus passive
- Techniques to improve learning
- Student/Instructor relationship

3. Outline the role your brain plays in flying an aircraft

Potential Elements of the Performance:

- The parts and how they work
- The brain's role in information processing
- The metabolic system
- The brain's capabilities

4. Describe the basic function of the human body

Potential Elements of the Performance:

- The body's framework
- The digestive system
- The metabolic system
- The circulatory system

5. Describe the atmosphere

Potential Elements of the Performance:

- Composition and characteristics of the atmosphere
- Atmospheric effect on gasses
- Physiological divisions of the atmosphere

6. Explain the effects the atmosphere has on the body's function

Potential Elements of the Performance:

- Respiration
- Hypoxia, types, stages, symptoms, factors affecting your susceptibility, prevention and treatment
- Carbon monoxide poisoning
- Decompression
- Trapped gasses
- Evolved gasses

7. Relate the significant role your health plays in a safe flight and a safe career

Potential Elements of the Performance:

- Importance of diet
- The importance of hydration
- Benefits of physical fitness
- Caffeine and its effects
- Effects of smoking, drugs and alcohol on physical fitness and ultimately flight safety
- Dangers of self-diagnosis
- Over the counter medications
- Total and partial incapacitation

8. Appreciate, comprehend and develop strategies to deal with environment

Potential Elements of the Performance:

- Fatigue, sleep and circulation rhythms
- Noise
- Temperature extremes
- Air quality
- Anaesthesia
- Blood donations
- IMSAFE checklist

9. Explain how the eye works, how to maintain an effective scan and its role in orientation

Potential Elements of the Performance:

- Optical depth and distance illusions
- The light spectrum
- Visual terminology – focal vision, ambient vision, myopia, presbyopia, hyperopia, astigmatism, refractive error, accommodation, depth of field
- Anatomy of the eye
- Navigation
- Night vision
- Blind spots
- Factors affecting visual acuity
- Effects of hypoxia and smoking
- Fixation and motion
- Visual illusions according to phase of flight and their effects on orientation
- Eye protection
- Minimizing your susceptibility to illusions
- Meaning of design eye reference

10. Explain the role hearing plays in effective communication

Potential Elements of the Performance:

- How we hear, anatomy of the ear, impediments to hearing
- Sound, hearing loss, hearing protection
- Interpretation of the sound
- Expectancy
- Active listening
- Proper phraseology

11. Explain the role of vestibular apparatus plays in orientation

Potential Elements of the Performance:

- The physiological senses used for orientation

- How the ears (vestibular system) provide orientation
- Illusions resulting from angular acceleration
- Illusions resulting from linear acceleration
- Actions which can reduce your susceptibility to illusions

12. Understand the significant effects stress can have on your performance, flight safety and your health

Potential Elements of the Performance:

- What is stress
- Types of stress
- Effects of stress
- How stressed are you
- Managing or preventing stress

13. Cope with acceleration and motion sickness in effect

Potential Elements of the Performance:

- Situations in civilian flying
- Tolerance to "G" forces
- Causes of motion sickness and some suggestions to reduce your

14. Understand the effects pregnancy has on one's ability to fire

Potential Elements of the Performance:

- Background knowledge
- Challenges when flying
- The rules

### **III. TOPICS:**

1. Introduction to Human factors
2. Learning to fly
3. The brain, its role in decision making
4. Basic human anatomy
5. Atmosphere
6. Altitude physiology
7. Vision
8. Hearing
9. Orientation
10. Stress
11. Acceleration and motion sickness
12. Pregnancy

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

- 1) Human Factors for Aviation - Basic Handbook / Published by Transport Canada ISBN # 0-660-16656-9
- 2) Internet Access

**ADDITIONAL RESOURCES/TEXTS/MATERIALS:**

Your Sault College Library is an excellent resource!  
A.I.M. – Aeronautical Information Manual

**Web Links:**

<http://www.tc.gc.ca/eng/civilaviation/opssvs/aviationsafety-menu.htm>  
<http://www.faa.gov/pilots/safety/pilotsafetybrochures/>  
<http://flightsafety.org/>  
<http://www.airforce.forces.gc.ca/dfs-dsv/index-eng.asp>  
<http://www.casa.gov.au/scripts/nc.dll?WCMS:HOMEPAGE::pc=HOME>

## V. 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. In order to pass the course, A minimum grade of B must be achieved, otherwise the course must be repeated in accordance with the Aviation Standard Operating Procedures. 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.
- 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.**
- 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:

Grade	Definition	Grade Point Equivalent
A+	90 – 100%	4.00
A	80 – 89%	
B	70 - 79%	3.00
C	60 – 69.4%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	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.	

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:**

### 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.

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

### 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.



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.

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 <choose November, March, or June> 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.

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>.

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.**

**VII. COURSE OUTLINE ADDENDUM:**

The provisions contained in the addendum located on the portal form part of this course outline.