

**The University of Western Ontario
Commercial Aviation Management Program**

**Management and Organizational Studies
“Human Factors in Aviation”**

1. Course Information

Course Number:	MOS 3305	Course Name:	Human Factors in Aviation
Class Time:	Wed. 1:30-4:30	Class Location:	SSC 3024

Prerequisite

This course is limited to students enrolled in the Commercial Aviation Management (CAM) specialization of the Management and Organizational Studies (MOS) program. Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

2. Instructor Information

Instructor:	Dr. Suzanne Kearns	Rank:	Assistant Professor
Office:	SSC 3213	E-mail:	skearns4@uwo.ca
Telephone:	(519) 661-2111 x81465	Office Hours:	Wed. 12:30-1:30 & 4:30-5:30

3. Course Syllabus

Course Overview

The goal of the human factors discipline is to understand how human/system interaction can reduce error, increase productivity, maximize safety and enhance comfort. To accomplish this goal, knowledge of human physiology and psychology must be coupled with a good understanding of the system in question. This process will be evaluated and expanded upon throughout the duration of the course. The emphasis of this course will be the application of human factors theory to the aviation industry. In addition, the ability to locate, understand, and present aviation-related research will be fostered through the course assignments. At the end of the term, students will have the opportunity to design a short human factors training program and present it to the class.

Course Objectives

1. To become aware of the capabilities and limitations of humans with respect to:
 - making machines and devices do what is intended
 - responding appropriately to machines and devices
 - the environment they operate in
 - designing better systems
 - maximizing safe and efficient operations
2. To become familiar with aviation research
3. To become capable of conducting aviation research reviews and applying the findings to real-world scenarios.

4. To create a human factors training program, built upon the ADDIE-M model.

Course Requirements

Attendance: Attendance is mandatory in this course and absences will have a negative impact on your participation grade. A student should expect to lose 10% of the participation component of their grade in the course for each absence. For medical absences, refer to the policy on accommodation for medical illness (<https://studentservices.uwo.ca/secure/index.cfm>). If you have a valid excuse for an absence you must inform the instructor before the intended date. It is the instructor's discretion whether or not to excuse an absence.

Course readings: It is expected that all students will have completed their assigned course readings before attending each lecture. This is important as it provides an enhanced understanding of the course material and students will be prepared to ask questions in class. Abbreviated lecture notes and additional instructional material will be available for download on webct.uwo.ca. Students are advised to review lecture notes before completing the textbook readings as not all material in the text is relevant to the course.

Course assignments and late policy: The executive summary assignment in the course is due at the beginning of class on October 28th. Students who turn in their assignment after the first 30 minutes of class on October 28th will be subject to a 10% late penalty. This rule is in place to discourage students from using class time to complete their assignment and arriving at the end of the class period to turn it in. An additional 10% late penalty will be incurred for each additional 24 hour period that the assignment is late. There are no exceptions to this policy.

Plagiarism: Students must write their papers and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence.

Scholastic Offences: Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: <http://www.uwo.ca/univsec/handbook/appeals/scholoff.pdf>. Please keep in mind that ignorance of this policy is not considered an excuse for a scholastic offence.

Plagiarism Checking: All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Grading: Every effort will be made by the instructor to grade materials as quickly as possible. Once all student assignments have been graded, grades will be distributed through the course website at webct.uwo.ca.

4. Course Materials

Recommended Text

Wickens, C.D., Lee, J.D., Gordon, S.E., & Liu, Y. (2003). *An introduction to human factors engineering*. New York: Longman.

Course Website

Supplementary instructional and reference material may be posted on the course website. You can log onto the course website by visiting webct.uwo.ca with a valid student number and password.

5. Methods of Evaluation

There are four evaluation items within this course, as described below. The weighting of each item is presented below:

1. Class Participation	10%
2. Executive Summary	20%
3. Midterm Examination	45%
4. Training Program Presentation	25%

Description of Evaluation Items

1. **Class Participation:** A crucial element of this course is the sharing of ideas and opinions. Since each of us brings a unique background of experiences, much can be learned from class debate and discussion. However, perfect attendance alone will not guarantee a perfect participation grade. Your participation grade will be dependent on your *involvement* in class discussions and activities, questioning of student presentations, and attendance. Participation will account for 10% of your final grade.

Absences: All absences will impact your participation grade. As a rule of thumb, you can expect each absence to subtract 10% of your participation grade. Any absences that occur during the final two classes, on student presentation dates, will subtract 20% of your participation grade as class involvement during these presentations is very important. For medical absences, refer to the policy on accommodation for medical illness (<https://studentservices.uwo.ca/secure/index.cfm>).

If you have a valid excuse for an absence you must inform the instructor before the intended date. It is the instructor's discretion whether or not to excuse an absence.

2. **Executive Summary:** You will work in groups of three to complete this project. This assignment is intended to get you to think about a human factors research topic that is of interest to you. You will be required to dig into human factors research and choose a topic. Once you have chosen your topic you will act as a "human factors expert" and design a two page executive summary describing the topic. The goal of the executive summary is to present human factors research in an interesting and understandable way. The executive summary should be geared towards an aviation audience, such as you might find in a local flight school. You must have your topic approved by the instructor. You must incorporate information from at least 15 peer-reviewed journal articles into the executive summary. When you turn in the assignment you should submit: 1) a colour, print-ready copy of the executive summary suitable for distribution to a general aviation audience, 2) cut-and-paste the EXACT text from the executive summary into a word processing document, within which all academic references must be clearly indicated so the instructor can see how and where you incorporated your 15 research articles, and 3) an APA formatted reference sheet. Additional instructions will be provided in class. This executive summary is worth 20% of your final course grade. Executive summaries are due at the beginning of class on October 28th.

Steps to Complete Project

1. Find a Topic: The textbook and articles from *Ergonomics*, *Ergonomics in Design*, *Human Factors*, *The International Journal of Aviation Psychology* and *Aviation, Space and*

- Environmental Medicine* are full of relevant topics if you are searching for ideas. If you are having trouble or are unsure if your topic is appropriate visit the professor during office hours for suggestions.
2. **Get it Approved:** Once you have a topic that interests your group, submit it to the professor either after class, by e-mail, WebCT, or during office hours. The professor will either approve your topic or give you suggestions to refine your subject area. Each topic may only be researched by one group per course, so if you are especially interested in a specific topic get it approved early in the semester. The professor has the final say whether your topic is appropriate for the course.
 3. **Find Relevant Articles:** After gaining approval, dig further into the research and find at least 15 peer-reviewed journal articles that are relevant to your topic and combine to create a clear picture of the current research in that area.
 4. **Format an Executive Summary:** Using only two sheets of paper you will write up an overview of your research topic. This overview should be presented in a manner that is appealing to a general aviation audience. Photographs and charts are appropriate. Your sheet of paper may be used in any manner of your choice, folded like a brochure, coloured paper, etc. However, you are encouraged to remember the principles of human factors when designing the executive summary. On separate sheets of paper you will need to provide the instructor with a Word document with the exact text from the executive summary and all 15 references clearly integrated and an APA formatted reference list.
3. **Midterm Examination:** A midterm examination will be given on Friday, November 6th at 5:30 pm. The midterm examination will cover all material presented up to and including November 4th, including readings, lectures, videos, examples, etc. Therefore it is crucial that you take good notes throughout the term and complete all assigned readings. The exam format may include multiple choice, fill-in-the-blanks, short answer, and/or essay questions. Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating. The midterm examination is worth 45% of your final course grade.
 4. **Training Program Presentation:** The final assignment in the course is to convert the material from your group's executive summary into a training program. Your training program must be 25-30 minutes in duration and your group will present the training to the class during the last two weeks of the course. The training program **MUST** be based on the ADDIE-M model, which will be taught in the last few weeks of the course and supplemental readings will be provided on webct.uwo.ca. The presentation should be interactive with the audience, informative, and entertaining. Students are encouraged to think of creative ways of making human factors training fun! The training should be geared towards a general aviation audience. Students will have access to a TV/DVD/VCR, overhead projector, and data projector for their presentations. Training program presentations will be conducted in class on December 2nd and December 9th. PowerPoint slides from all groups are due at the beginning of class on December 2nd. This policy was created to limit the advantage of students presenting on the second date, as they cannot change their presentation based on observing the successes and failures of other students. The training program presentation is worth 25% of your final course grade.

Calendar – Lecture Overview and Required Readings

September 16, 2009

Syllabus Overview

Course Introduction

Ch. 1

- What is human factors?
- The scope of human factors science

Research Methods	Ch. 2
• Introduction to Research Methods	
• Experimental Research Methods	
• Descriptive Methods	
• Measuring Variables	
• Qualities of Good Research	

September 23, 2009

Visual System	Ch. 4
• The Stimulus: Light	
• The Receptor System: The Visual System	
• Sensory Processing Limitations	
• Bottom-Up Versus Top-Down Processing	
• Visual Search and Detection	
• Spatial Topic: Midair Target Detection	

Auditory, Tactile and Vestibular Systems	Ch. 5
• Sound: The Auditory Stimulus	
• The Ear: The Sensory Transducer	
• The Auditory Experience	
• The Sound Transmission Problem	
• Noise	
• The Other Senses	

September 30, 2009

Cognition	Ch. 6
• Information Processing Models	
• Object and Pattern Perception	
• Working Memory	
• A Design Example	
• Long-Term Memory	
• Attention and Mental Resources	

Decision Making	Ch. 7
• Definition of Decision Making	
• Classical Decision Theory	
• Heuristics and Biases	
• Naturalistic Decision Making	
• Real-World Decision Making Model	
• Improving Human Decision Making	
• Problem Solving	

October 7, 2009

Displays	Ch. 8
• Ways of Classifying Displays	
• Thirteen Principles of Display Design	
• Alerting Displays	
• Labels	
• Monitoring	
• Multiple Displays	

- Navigation Displays and Maps
 - Quantitative Information Displays: Tables and Graphs
- Control Ch. 9
- Principles of Response Selection
 - Discrete Control Activation
 - Positioning Control Devices
 - Verbal and Symbolic Input Devices
 - Voice Input
 - Continuous Control and Tracking

October 14, 2009

- Engineering Anthropometry and Ch. 10
Workspace Design
- Human Variability and Statistics
 - Anthropometric Data
 - General Principles for Work-Space Design
 - Design for Standing and Seated Work Areas
- Work Physiology Ch. 12
- Muscle Structure and Metabolism
 - The Circulatory and Respiratory Systems
 - Energy Cost of Work and Workload Assessment
 - Physical Work Capacity and Whole-Body Fatigue

October 21, 2009

Online Single-Pilot Resource Management (OSRM)

October 28, 2009

- Executive Summaries DUE**
- Stress and Workload Ch. 13
- Environmental Stressors
 - Psychological Stressors
 - Life Stress
 - Work Overload, Underload, and Sleep Disruption
- Automation Ch. 16
- Classes of Automation
 - Problems of Automation
 - Human-Centered Automation
 - Automation-Based Complex Systems

November 4, 2009

- Selection and Training Ch. 18
- Personnel Selection
 - Performance Support and Job Aids
 - Types of Performance Support and Job Aids
 - Training Program Design
 - Training Concepts and Issues
- Mid-Term Review

Mid-Term Exam – Friday, November 6th at 5:30pm (Classroom P&AB 34)

November 11, 2009

Description of evidence-based training
Overview of instructional design process (ADDIE-M)

November 18, 2009

Analysis, Design, and Development portions of the ADDIE-M model

November 25, 2009

Implement, Evaluate, and Manage portions of the ADDIE-M model

December 2, 2009

Student presentations of training programs
Presentation Notes Due from ALL groups

December 9, 2009

Student presentations of training programs