

**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 3010

*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:	8:30-9:30, 12:30-1:30

**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*

**Accessibility:** DAN Management and Organizational Studies strives at all times to provide accessibility to all faculty, staff, students and visitors in a way that respects the dignity and independence of people with disabilities. Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may wish to contact Services for Students with Disabilities (SSD) at 661-2111 #82147 for any specific questions regarding an accommodation. More information about “Accessibility at Western” is available at: <http://accessibility.uwo.ca>.

**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](http://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 28<sup>th</sup>. Students who turn in their assignment after the first 30 minutes of class on October 28<sup>th</sup> 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

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

Kearns, S. (2010). *E-Learning in aviation*. Aldershot, England: Ashgate.

#### 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	15%
2. Executive Summary	20%
3. Final Examination	45%
4. Training Program Presentation	20%

#### 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 15% 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 four or five 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 four 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 5 peer-reviewed journal articles per group member into the executive summary (20 for 4-person groups or 25 for 5-person groups). 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 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. **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 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:** You will write up a 4-page 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. **Final Examination:** A final examination will be given at the end of the semester. The final examination will cover all material presented in class, 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 final examination is worth 45% of your final course grade.
4. **Training Program:** The final assignment in the course is to convert the material from your group's executive summary into a training program. You will present your training program to the class and will also submit a 2-4 page training summary based on the ADDIE model. 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 model, which will be taught in the last few weeks of the course. 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. The 2-4 page training summary will clearly describe each element of the ADDIE-M model and how your group's training program considered each element in the design of the training program. Some elements deal with the future (such as course evaluation), so students should present a plan on how it will be conducted. Additional details will be provided in class. PowerPoint slides from all groups and ADDIE summaries are due at the beginning of the second-last class of the semester. 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 or failures of other students. The training

program is worth 20% of your final course grade, with the write-up worth 10% and the presentation worth 10%.

*Calendar – Lecture Overview and Required Readings*

**September 14, 2011**

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 21, 2011**

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 28, 2011**

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 5, 2011**

- 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 12, 2011**

- Engineering Anthropometry and Workspace Design Ch. 10
- 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 19, 2011**

- 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

**October 26, 2011**

- Executive Summaries DUE**
- 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

The Live of Aviation Training EIA Ch. 1

**November 2, 2011**

Overview of instructional design process EIA Ch. 7  
 Analysis EIA Ch. 8

**November 9, 2011**

Analysis, continued EIA Ch. 8  
 Design EIA Ch. 9

**November 16, 2011**

Online Single-Pilot Resource Management (OSRM)

**November 23, 2011**

Develop, Implement, Evaluate EIA Ch. 10, 11, & 12

**November 30, 2011**

Student presentations of training programs  
*Presentation Notes Due from ALL groups*

**December 7, 2011**

Student presentations of training programs

## **GENERAL INFORMATION**

If, on medical or compassionate grounds, you are unable to meet your academic responsibilities, i.e., unable to write term tests or final examinations or complete course work by the due date, you should follow the instructions listed below. You should understand that academic accommodation will not be granted automatically on request. You must demonstrate that there are compelling medical or compassionate grounds that can be documented before academic accommodation will be considered. Read the instructions carefully. In all cases, action must be taken at the earliest possible opportunity, preferably prior to the scheduled examination, test or assignment.

1. Check the course outline to see if the instructor has a policy for missed tests, examinations, late assignments or attendance. The course outline should include the preferred method of contact (e-mail, phone, etc.).
2. Inform the instructor prior to the date of the scheduled time of the test or examination or due date of the assignment. If you are unable to contact the instructor, leave a message for him/her at the department office.
3. Bring your request for accommodation to the Social Science Academic Counselling Office, Room 2105, Social Science Centre, telephone 519 661-2011 or fax 519 661-3384. Be prepared to submit documentation of your difficulties.
4. If you decide to write a test or an examination you should be prepared to accept the mark you earn. Rewriting tests or examinations or having the value of the test or examination reweighted on a retroactive basis is not permitted.

## **TERM TESTS and MID-TERM EXAMS**

1. If you are unable to write a term test, inform your instructor (preferably prior to the scheduled date of the test). If the instructor is not available, leave a message for him/her at the department office.
2. Be prepared, if requested by the instructor, to provide supporting documentation. Submit your documentation to the Social Science Academic Counselling Office.
3. Make arrangements with your professor to reschedule the test.
4. The Academic Counselling Office will contact your instructor to confirm your documentation.

## **FINAL EXAMINATIONS**

1. You require the permission of the Dean, the instructor, and the Chair of the department in question to write a special final examination.
2. If you are unable to write a final examination, contact the Social Science Academic Counselling Office in the first instance to request permission to write a special final examination and to obtain the necessary form. You must also contact your instructor at this time. If your instructor is not available, leave a message for him/her at the department office.
3. Be prepared to provide the Social Science Academic Counselling Office and your instructor with supporting documentation.
4. You must ensure that the Special Examination form has been signed by the instructor and Department Chair and that the form is returned to the Social Science Academic Counselling Office for approval without delay.



## **LATE ASSIGNMENTS**

1. Advise the instructor if you are having problems completing the assignment on time (prior to the due date of the assignment).
2. Submit documentation to the Social Science Academic Counselling Office.
3. If you are granted an extension, establish a due date.
4. Extensions beyond the end of classes must have the consent of the instructor, the Department Chair and Dean. A Recommendation of Incomplete form must be filled out indicating the work to be completed and the date by which it is due. This form must be signed by the student, the instructor, the Department Chair, and the Dean=s representative in the Academic Counselling Office.

## **SHORT ABSENCES**

If you miss a class due to a minor illness or other problems, check your course outlines for information regarding attendance requirements and make sure you are not missing a test or assignment. Cover any readings and arrange to borrow notes from a classmate.

## **EXTENDED ABSENCES**

If you are absent more than approximately two weeks or if you get too far behind to catch up, you should consider reducing your workload by dropping one or more courses. This must be done by the appropriate deadlines. (Refer to the Registrar=s website for official dates.) The Social Science Academic Counsellors can help you to consider the alternatives. At your request, they can also keep your instructors informed of your difficulties.

## **DOCUMENTATION**

\$ Personal Illness: If you consulted Student Health Services regarding your illness or personal problem, you should complete a Records Release Form at the time of your visit allowing them to notify Social Science Academic Counselling Office. Once your documentation has been assessed, the academic counsellor will inform your instructor that academic accommodation is warranted.

\$ If you were seen by an off-campus doctor, obtain a certificate from his/her office at the time of your visit. The doctor must provide verification of the severity of the illness for the period in question. Notes stating "For Medical Reasons" are not considered sufficient.

\$ In Case of Serious Illness of a Family Member: Obtain a medical certificate from the family member's physician.

\$ In Case of a Death: Obtain a copy of the newspaper notice, death certificate or documentation provided by the funeral director.

\$ For Other Extenuating Circumstances: If you are not sure what documentation to provide, ask an Academic Counsellor.

**Note:** Forged notes and certificates will be dealt with severely. To submit a forged document is a scholastic offense and you will be subject to academic sanctions.

## **ACADEMIC CONCERNS**

\$ You need to know if your instructor has a policy on late penalties, missed tests, etc. This information may be included on the course outline. If not, ask your instructor.

\$ You should also be aware of attendance requirements in courses such as Business and English. You can be debarred from writing the final examination if your attendance is not satisfactory.

\$ If you are in academic difficulty, check the minimum requirements for progression in your program. If in doubt, see your Academic Counsellor.

\$ If you are registered in Social Science courses but registered in another faculty (e.g., Arts or Science), you should immediately consult the Academic Counselling Office in your home faculty for instructions.