



AVIA310: Human Factors in Aviation

Course Outline: Section – 001 / Winter

1. Course Information:

1.1 Class Location and Time:

Room: TBD

Lectures: Wednesday 5:30-8:20pm

1.2 Contact Information:

Instructor: Dr. Suzanne Kearns

Office: EV1-238

Office Hours: Mondays 10:00-12:00

Phone: x32789

Email: suzanne.kearns@uwaterloo.ca

2. Course Description:

A case study-influenced course emphasizing the need for pilots to recognize and improve interpersonal skills for problem solving and conflict management. Components introduce Crew Resource Management (CRM), the human component of the human-technology interface, and the cumulative act effect.

3 hours lecture, 0.5 course

Prerequisite: Level at least 2A Science and Aviation or Geography and Aviation students only

3. Textbook & Additional Expense

3.1 There is no **required** text for this course. Optional text: Wickens, C.D., Lee, J.D., Gordon, S.E., & Liu, Y. (2003). *An introduction to human factors engineering*. New York: Longman.

3.2 Additional Expense: To complete the 'Escape Room Challenge & Presentation' element of the course you will be required to visit a local escape room located at 283 Duke St. W. in Kitchener. You will be responsible for transportation to and from this location along with the cost of participating in the Escape Room (\$20, payable directly to the escape room). Combined, the cost of transportation and the escape room is expected to be approximately \$30. Note: an alternate assignment is available (see section 5.2, below).

4. Outcomes and Format

Course Outcomes: Through an interdisciplinary focus, with emphasis on teamwork and professional approaches, successful students will be able to:

- Analyze professional issues associated with human limitations, describe design characteristics of aircraft that enhance human capability, examine and apply academic theory that impacts pilot performance (referencing psychology, physiology, and ergonomics).

- Collaborate with team members to solve a real-world time-critical challenge. Identify, examine, and connect this experience with contemporary aviation human factors theory discussed in class and present the findings in written form.
- In a group setting, synthesize information from academic sources and produce an outreach video or presentation (and written material) exploring a human factors issue.

Course Format: The course will be organized as a combination of lecture, group discussion, group activities, and student presentations.

5. Evaluation

5.1 Class Attendance (10%): 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. For this reason, attendance is mandatory and will be evaluated as an element of the course grade (10%). Absences: All absences will impact your attendance grade. As a rule of thumb, you can expect each absence to subtract 10% of your participation grade (roughly 1% of your grade in the course). For medical absences, refer to the policy on accommodation for medical illness (<https://ugradcalendar.uwaterloo.ca/page/Regulations-Accommodations>).

5.2 Escape Room Challenge & Presentation (20%): Most human factors issues that contribute to aviation accidents are associated with crew inter-dynamics. In a classroom environment, it can be difficult to fully grasp how things like decision-making pitfalls or stress can impact real-world performance. To give students an opportunity to experience real-world problem solving within a group dynamic, this class will be completing an Escape Room as a required component of the course. Students will be assigned to random teams (random assignment is important; as professional pilot teams are usually not able to choose who they work with). Teams will compete in an escape room ‘tournament’ against two other teams. The teams will have class time to discuss their strategy, before the escape room, and are required to present to the class what human factors influences they noticed in their performance, after the escape room (in class the following week).

For attending and completing the Escape Room Challenge you will receive a participation grade of 5%. Your group’s analysis and presentation of how they experienced human factors within the escape room will be evaluated and make up 15% of your grade in the course. Your group’s presentation is expected to be 12-15 minutes in duration and should reference human factors issues discussed in lectures (or based upon your own research). Conflicts among group members must be brought forward to the course instructor and will be resolved. Grade disputes related to various levels of contribution from group-members should be brought forward to the instructor and will be resolved. For the group presentation, a group assignment disclosure is required (see end of this Outline).

**Alternate Assignment* – Participation in the Escape Room Challenge is voluntary. For students who are unable or unwilling to participate in the Challenge, an individual alternate assignment is available. Students choosing this option are required to read:

Weigmann, D. A. & Shappell, S. A. (2003). *A human error approach to aviation accident analysis: The human factors analysis and classification system*. Burlington, VT: Ashgate.

After reading the book, you will be asked to apply the human factors analysis and classification system (HFACS) to a well-known movie, case, or incident and produce a 7-page paper on the topic (10% of your grade in the course). The paper is due at the beginning of class on March 8, 2017. You will also present your analysis to the class on March 8, 2017, while peers are presenting their escape room analysis. The presentation is expected to be 10 minutes in duration (10% of your grade in the course).

5.3 Research & Outreach Assignment (30%): You will work in groups of three to four people 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 journal articles and choose a topic. Your group will choose a single broad topic, but each individual group member will choose a specific area of interest. For example, the group topic may be fatigue but individual group members may choose air traffic control, pilots, fatigue risk management, and crew scheduling as topic areas.

Once you have chosen your topic you will act as a modern “human factors expert” and each write a 1-page (approximately 250 word) blog post on your topic. The goal of working in groups is all work on a common topic (so that you have a team available to support you, help you understand the issue, and share academic resources). However, each person’s blog post must be individual.

The goal of this assignment is to present human factors research in an interesting and understandable way. The blog post should be geared towards an aviation audience, 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 blog post. Additional instructions will be provided in class. There are two steps to complete this assignment: 1) upload the blog post to the class website on Learn, 2) upload a second document that clearly identifies which sections of the blog post reference the required 5 journal articles. This executive summary is worth 20% of your final course grade.

The final component of this assignment is that you must work with your group to combine what you have learned in your research and present your findings to the class. This assignment is designed to help you build communication, teamwork, and outreach skills. Your presentation is expected to be 5-minutes per team member in your group (a 4-person group would make a 20-minute presentation). The presentation should be interesting, engaging, and interactive with the audience. You are encouraged to create videos to share with the class, as a component of the presentation. Your group will receive a single grade for the presentation which will count for 10% of your grade in the course. For the group presentation, a group assignment disclosure is required (see end of this Outline).

5.4 Final Examination (40%): A comprehensive final examination will be given at the end of the semester. A final exam review will be given prior to the exam. The final exam will cover all information in the course, including presentation, lectures, videos, etc. Therefore, it is crucial that you take good notes throughout the term. 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.

| Evaluation Item | Percentage of Course Grade |
|--|----------------------------|
| 5.1 Class Attendance | 10% |
| 5.2 Escape Room Challenge & Presentation OR Alternate Assignment | 20% |
| 5.3 Research & Outreach | 30% |
| 5.4 Final Examination | 40% |

Students are *required to complete all components* of this course. Extra assignments to improve grades *will not* be allowed.

Exams will be scored electronically and examined for unusual coincidences in the pattern of answers given which may be indicative and used as supporting evidence of cheating.

All communication with students must be through either the student’s University of Waterloo email account or via Learn. If a student emails the instructor or TA from a personal account, they will be requested to resend the email using their personal University of Waterloo email account.

Assignments are due on dates indicated. Last assignments are penalized 10% every 24-hours.

Grades will not be adjusted on the basis of need. It is important to monitor your performance in the course. Remember: *You* are responsible for your grades in this course.

6. Lecture Schedule

Lecture – Wednesdays 5:30-8:20pm

| | Reading from Optional Text |
|---|-------------------------------|
| January 4, 2017 <ul style="list-style-type: none">• Course Introduction, Overview of Syllabus, Expectations of Professionalism• What is human factors?• The scope of human factors science | Ch. 1 |
| January 11, 2017 <ul style="list-style-type: none">• The human visual system• Auditory, tactile, and vestibular systems<ul style="list-style-type: none">◦ <i>Situation awareness in aviation</i> | Ch. 4, 5 |
| January 18, 2017 <ul style="list-style-type: none">• Cognition• Decision Making<ul style="list-style-type: none">◦ <i>Decision making in aviation</i> | Ch. 6, 7 |
| January 25, 2017 <ul style="list-style-type: none">• Displays• Control<ul style="list-style-type: none">◦ <i>Workload management in aviation</i> | Ch. 8, 9 |
| February 1, 2017 <ul style="list-style-type: none">• Anthropometry• Work Physiology<ul style="list-style-type: none">◦ <i>Fatigue in aviation</i> | Ch. 10, 12 |
| February 8, 2017 <ul style="list-style-type: none">• Stress• Automation<ul style="list-style-type: none">◦ <i>Communication in aviation</i> | Ch. 13, 16 |
| February 15, 2017 <ul style="list-style-type: none">• Selection & Training• Escape Room Challenge - Assignment Discussion | Ch. 18 |
| March 1, 2017 <ul style="list-style-type: none">• Escape Room Challenge – held off-campus at ‘Adventure Rooms’ 283 Duke St. W. Unit 101, Kitchener. Plan to arrive at this location at 7:15pm. You will be finished by 10:15pm. You need to pay for your admission (\$20) when you arrive. Enter through the main glass door entrance on Duke St. W. | |
| March 8, 2017 <ul style="list-style-type: none">• Group Presentations & Discussion of Escape Room Challenge Experience | |

March 15, 2017

Aviation Resume Tips & Interview Skills – presented by UW’s Co-operative Education & Career Action

March 22, 2017

- Student Outreach Presentations

March 29, 2017

- Student Outreach Presentations
- Final Exam Review

7. University Policies Related to Assignments, Tests, and Final Exams

Academic Integrity:

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. The University’s guiding principles on academic integrity can be found here: <http://uwaterloo.ca/academicintegrity/>

Students are strongly encouraged to review the material provided by the university’s Academic Integrity office specifically for students: <http://uwaterloo.ca/academicintegrity/Students/index.html>

Students are also expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for their actions. Students who are unsure whether an action constitutes an offense, or who need help in learning how to avoid offenses (e.g., plagiarism, cheating) or about “rules” for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. Students may also complete the following tutorial: <https://uwaterloo.ca/library/get-assignment-and-research-help/academic-integrity/academic-integrity-tutorial>

When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline, <https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-71> Students who believe that they have been wrongfully or unjustly penalized have the right to grieve; refer to Policy #70, Student Grievance: <https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-70>

Note for students with disabilities: AccessAbility Services, located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

Mental Health: The University of Waterloo considers students' well-being to be extremely important. We recognize that throughout the term students may face health challenges - physical and / or emotional. **Please note that help is available.** Mental health is a serious issue for everyone and can affect your ability to do your best work. Counselling Services <http://www.uwaterloo.ca/counselling-services> is an inclusive, non-judgmental, and confidential space for anyone to seek support. They offer confidential counselling for a variety of areas including anxiety, stress management, depression, grief, substance use, sexuality, relationship issues, and much more.

Religious Observances: Student needs to inform the instructor at the beginning of term if special accommodation needs to be made for religious observances that are not otherwise accounted for in the scheduling of classes and assignments.

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. See Policy 70 - Student Petitions and Grievances, Section

4, www.adm.uwaterloo.ca/infosec/Policies/policy70.htm. When in doubt please contact your Undergraduate Advisor for details.

Appeals: A decision made or penalty imposed under Policy 70 - Student Petitions and Grievances (other than a petition) or Policy 71 – (Student Discipline) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 (Student Appeals) www.adm.uwaterloo.ca/infosec/Policies/policy72.htm

Unclaimed assignments: Unclaimed assignments will be retained until one month after term grades become official in quest. After that time, they will be destroyed in compliance with UW’s confidential shredding procedures.

Recording lectures: Use of recording devices during lectures is only allowed with explicit permission of the instructor of the course.

Research Ethics: The University of Waterloo requires all research conducted by its students, staff, and faculty which involves humans as participants to undergo prior ethics review and clearance through the Director, Office of Human Research and Animal Care (Office). The ethics review and clearance processes are intended to ensure that projects comply with the Office’s Guidelines for Research with Human Participants (Guidelines) as well as those of provincial and federal agencies, and that the safety, rights and welfare of participants are adequately protected. The Guidelines inform researchers about ethical issues and procedures which are of concern when conducting research with humans (e.g. confidentiality, risks and benefits, informed consent process, etc.). If the development of your research proposal consists of research that involves humans as participants, the please contact the course instructor for guidance and see <https://uwaterloo.ca/research/office-research-ethics>

Turnitin: Text matching software (Turnitin®) will be used to screen assignments in this course. This is being done to verify that use of all materials and sources in assignments is documented. To better understand the meaning of ‘similarity’ in Turnitin, see https://guides.turnitin.com/01_Manuals_and_Guides/Student/Classic_Student_User_Guide/17_Similarity_Check#Viewing_an_Originality_Report. Students will be given an option if they do not want to have their assignment screened by Turnitin®. In the first week of the term, details will be provided about arrangements and alternatives for the use of Turnitin® in this course.

Co-op interviews and class attendance:

Co-op students are encouraged to try and choose interview time slots that result in the least amount of disruption to class schedules. When this is challenging, or not possible, a student may miss a portion of a class meeting for an interview. Instructors are asked for leniency in these situations; but, a co-op interview does not relieve the student of any requirements associated with that class meeting.

When a co-op interview conflicts with an in-class evaluation mechanism (e.g., test, quiz, presentation, critique), class attendance takes precedence and the onus is on the student to reschedule the interview. CECA provides an interview conflict procedure to manage these situations.

Students will be required to provide copies of their interview schedules (they may be printed from JobMine) should there be a need to verify class absence due to co-op interviews.

Important Dates:

January 3, 2017 Winter Session classes begin.
January 16, 2017 Last day to add a course
January 23, 2017 Last day to withdraw from a course with 100% tuition refund
February 8, 2017 Final exam schedules released
February 20, 2017 Family Day
February 21, 2017 Deadline for 50% tuition refund
February 20-24, 2017 Study Days
March 17, 2017 Last day to withdraw from a course and receive WD (withdrew) grade

March 18, 2017 From this day on, WF (withdrew/failure) grade assigned to dropped courses

April 3, 2017 Winter Session classes end.

April 4-6, 2017 Study Days

April 7-25, 2017 April examination period

8. Other Information

- Bring student identification to exams.
- Nothing is to be on/at one's desk during an exam except a pencil, an eraser, and the individual's student card
- Do not wear baseball caps to exams
- Do not bring music players, cell phones, beepers, or other electronic devices to exams

9. FREQUENTLY ASKED QUESTIONS

| Question | Answer |
|---|--|
| How can I succeed in this course? | Attend class and tutorials, complete homework, focus on understanding the principles in a way that lets you apply them to new situations. |
| When will the exam grades be posted? | Grades are posted on Learn when they become available. |
| Can I come and see my exam? | You can review your exam during office hours or at any other mutually convenient time. |
| There is so much material. How can I possibly remember everything? | You do not need to remember everything. You need to understand the fundamental principles and how to apply them. |
| This mark is going to prevent me from getting accepted into graduate school/NASA. | Grades are given based on actual performance, as set out on the course outline. In order to be fair to all the students in the course, grade adjustments, extra assignments, and the reweighting of course components are not available. |
| I need a certain mark to get or maintain a scholarship. | |
| I tried really hard but I still got a poor mark. | |

10. Group Assignment Disclosure

Group Assignment Disclosure

Please read the disclosure below following the completion of your group assignment. Once you have verified these points, hand in this signed disclosure with your group assignment.

1. All team members have referenced and footnoted all ideas, words or other intellectual property from other sources used in the completion of this assignment.
2. A proper bibliography has been included, which includes acknowledgement of all sources used to complete this assignment.
3. This is the first time that any member of the group has submitted this assignment or essay (either partially or entirely) for academic evaluation.
4. Each member of the group has read the full content of the submission and is assured that the content is free of violations of academic integrity. Group discussions regarding the importance of academic integrity have taken place.
5. Each student has identified his or her individual contribution to the work submitted such that if violations of academic integrity are suspected, then the student primarily responsible for the violations may be identified. Note that in this case the remainder of the team may also be subject to disciplinary action.

Course: _____

Assignment: _____

Date: _____

| Name (print) | Signature | Section Contributed | Section Edited |
|---------------------|------------------|----------------------------|-----------------------|
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