
AVIA310: Human Factors in Aviation

Course Outline: Section – 001 / Winter

1. Course Information:

1.1 Class Location and Time:

Room: MC 2034

Lectures: Wednesdays 11:30-2:20

1.2 Contact Information:

Instructor: Dr. Suzanne Kearns

Office: EV1-238

Office Hours: Thursdays 10:30-12:30pm (or by appointment)

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 (approximately \$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 for those unable or unwilling to participate in the escape room (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 (10%): 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 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 ‘rate’ their team-mates on human factors skills and provide constructive feedback. A discussion on the activity will be held in class the following week.

For attending and completing the Escape Room Challenge you will receive a participation grade of 10%.

**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 10-page paper on the topic (10% of your grade in the course).

5.3 Human Factors Consulting Project (30%): See Appendix 1 at the end of this outline.

5.4 Test 1 and Test 2 (25% each): Two tests will be given through the semester, after we have finished covering course material. The tests will cover all lecture information in the course, including presentation, lectures, videos, etc., up until the test day. Test 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 Attendance OR Alternate Assignment	10%

5.3 Human Factors Consulting Project <i>50% of grade determined by instructor and 50% of grade determined by industry partner</i>	30%
5.4 Test 1	25%
5.5 Test 2	25%

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 11:30-2:20pm

Reading from Optional Text Ch. 1

September 12, 2018

- Course Introduction, Overview of Syllabus, Expectations of Professionalism
- What is human factors?
- The scope of human factors science

September 19th, 2018

- The human visual system
- Auditory, tactile, and vestibular systems

September 26st, 2018

- **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 + tax) when you arrive. Enter through the main glass door entrance on Duke St. W.

Ch. 4, 5

October 3rd, 2018

- Escape Room Challenge - Discussion
- Cognition
- Decision Making

Ch. 6, 7

October 12th, 2018

- Displays
- Control

Ch. 8, 9

- Workload management in aviation
- October 17th, 2018 Ch. 10, 12
- **Test 1**
- October 24th, 2018
- Anthropometry
 - Work Physiology
 - *Fatigue in aviation*
- October 31st, 2018 Ch. 13, 16
- Stress
 - Automation
 - *Situation awareness in aviation*
- November 7th, 2018 Ch. 18
- Selection & Training
- November 14th, 2018
- **CECA Professionalism and Resume Workshop**
- November 21st, 2018
- **Test 2**
- November 28th, 2018
- Student Presentations of Human Factors Consulting Project

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

Intellectual Property:

Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo. Intellectual property includes items such as:

- Lecture content, spoken and written (and any audio/video recording thereof);
- Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
- Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
- Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights.

Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

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>. ENV 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 5 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, the Faculty of Environment and our Departments/Schools consider 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: Students need 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 for one month after term grades become official in quest. After that time, they will be destroyed in compliance with UW’s [confidential shredding procedures](#).

Communications with Instructor and Teaching Assistants:

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.

Turnitin: Text matching software (Turnitin®) may 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.

Recording lectures:

- o Use of recording devices during lectures is only allowed with explicit permission of the instructor of the course.
- o If allowed, video recordings may only include images of the instructor and not fellow classmates.
- o Posting of videos or links to the video to any website, including but not limited to social media sites such as: facebook, twitter, etc., is strictly prohibited.

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 WaterlooWorks) should there be a need to verify class absence due to co-op interviews.

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

AVIA 310: Aviation Human Factors Consultancy

Description

The *Aviation Human Factors Consultancy project* is worth 30 % of your final mark. It entails working in groups of 4 to research a human factors issue that affects an aviation organization, and creating educational materials and a training plan to address the issue.

The final project deliverables will include:

- A 2 to 3-page pamphlet that applies scientific research to a human factors issue that is important to your partner's organization.
- Materials for a 15-minute lesson, which teaches your partner's crews about the human factors issue.

You will be assigned to a team of 4 students. Your team will be required to choose one person to serve as team lead. The instructor will then assign your team an industry partner to work with. From that point forward, the project will follow these phases:

- **Project Scope Meeting** (October 12th 2018) - Meeting between students and organization to confirm: project scope, topic ideas, communication styles, and important dates.
- **Student Proposal** (October 24th 2018) - Discussion with students, where their ideas about what the project will focus on are described to the organization. The organization will give feedback and then approve the student groups to move forwards.
- **Pamphlet Due** (November 7th 2018) - Student groups submit their pamphlets to the organization.
- **Training Materials Due** (November 21st 2018) - Student groups submit their final training materials to the organization. Student groups will also deliver their presentations in-class on campus on November 28th between 11:20am and 2:20pm, and organizations are invited (though not required) to attend.

In order to complete this project, your class will be using the services of **Riipen**.

What is Riipen?

Riipen is a Canadian company that connects students with industry partners, to facilitate students gaining valuable industry work experience. Participating industry partners present students with a project – often a problem to solve – that is relevant to their organization.

How Does it Work?

Riipen provides a platform to facilitate student-to-industry partner connections.

Students who use this platform create a Riipen student account, which they use to connect with their assigned industry partner and to retrieve project details. Students complete and submit the project to both their assigned industry partner (via Riipen) and to LEARN.

Industry partners also have a Riipen account through which they can track student progress on their projects and provide feedback and ratings to students on their work.

Appendix 1 – Riipen Project Outline

Lastly, instructors too have a Riipen account, through which they can view progress on their students' assigned projects.

Once a project is completed, students may choose to link feedback and ratings to a resume or business/employment social networking service.

Privacy and Intellectual Property

Non-disclosure

When you are assigned an industry partner to work with, it is expected that you will maintain confidentiality in all matters that relate to your work with them. Your industry partner may ask you to sign a non-disclosure agreement (NDA).

The NDA is an agreement between the student and the industry partner. Due to the nature of this arrangement, the University is not directly involved in providing legal advice to students. We would advise students seek independent legal counsel if there are concerns about the agreement.

Intellectual property

Students own their work product and the intellectual property they produce. By providing their work to the industry partners through the Riipen project, they grant that partner unrestricted use of their work product.

Riipen student account

When you sign up for a student account with Riipen, Riipen stores your name, email address, and any supplemental profile data that you provide, such as your skills and interests. This information is used to create your public-facing Riipen profile page. Please note:

- You are not required to provide supplemental profile data to Riipen.
- You may set your Riipen profile status to **Private**.

For further information, please see Riipen's [Privacy Policy](#) and [Terms and Conditions](#).

IMPORTANT: If you have any concerns about creating a student account with Riipen, intellectual property, or working with an industry partner through Riipen, please inform your instructor **BEFORE** the Opt-Out deadline (see Course Schedule), to discuss alternatives. Otherwise, please read on for further instructions.

Instructions for Completing the Project

Please read these instructions carefully to gain a full understanding of this project and its requirements. There are a number of steps to complete, with deadlines, over the duration of the course.

Create a Riipen account and join the University of Waterloo portal

IMPORTANT: This step must be completed by the deadline set out in the Course Schedule.

Create your Account with Riipen using your University of Waterloo email address. **Important:** Please use the form `WatiAMusername@uwaterloo.ca` (your WatiAM username is what you use to log in to LEARN and Quest).

You will receive an email from Riipen with a link to confirm.

[Join the portal](#) for University of Waterloo, using the access token **9F5D0584**.

You will now have access to an overview of the *Aviation Human Factors Consultancy Project*.

At this point, you may explore the Riipen website further, or simply log out.

Connect with your team and with your assigned industry partner

Your instructor will provide you with further instructions regarding which team you are on, and which industry partner you will be working with, by the deadline set out in the Course Schedule.

Your team must designate a team lead, who will serve as the main point of communication with the assigned industry partner.

The team lead must [start the project on Riipen](#) by the deadline set out in the Course Schedule. During this step, a wizard takes the team lead through:

- Inviting their other team members to join (team members will then receive an email from Riipen, and will need to accept the invitation)
- Composing an introductory message to the assigned industry partner (cc-ing the team members as well).

If you are not a team lead, and do not receive a Riipen invitation to join a team, please contact your instructor.

Work on the Project

Once your team lead has introduced your team to your assigned industry partner, the industry partner should take the next step of responding and working out, with the team lead, a method of communication. The team lead should contact your instructor if this has not happened by the end of September.

Submit Project Milestones

The project has a number of milestones which must be completed by the team and submitted by the team lead by the due dates given on the Riipen platform. Please see: [What are milestones and how do I complete milestones as a student?](#)

Submit Your Final Project

IMPORTANT: Your *Aviation Human Factors Consultancy project* must be submitted **both** to LEARN **and** to Riipen. Each submission must be completed by the particular deadline set out in the Course Schedule.

Submitting to LEARN

Your team lead must submit your assignment to the appropriate dropbox within the LEARN platform.

Submitting to Riipen

Your team lead is responsible for submitting your project to Riipen.

Team Leads only: To submit your team's project to Riipen, follow the instructions in: [How do I submit my work to a project?](#)

How Your Project Will Be Graded

Pamphlet: The goal of this assignment is to present human factors research in an interesting and understandable way. The 2-3 page pamphlet should be geared towards an aviation audience, as you might find within your partner organization. You must incorporate information from at least 5 peer-reviewed journal articles per group member into the pamphlet, yet ensure that the pamphlet is still readable and engaging.

Materials for a 15-minute presentation: Based on the research you completed for your pamphlet, you will also prepare materials for a 15 minute presentation. These materials should take the form of slides with speaking notes (and any required handouts). Your presentation will be graded by your course instructor, based on your delivery of the presentation in the final week of classes. Your industry partner will grade the materials and have the option of attending our final week of class to observe your presentations.

Appendix 1 – Riipen Project Outline

To submit this assignment:

In LEARN:

- Submit a presentation copy of the pamphlet, 2-3 pages long, attractively organized and designed.
- Submit a text-based version that clearly indicates all of the in-text citations of external sources and a complete reference list.
- Submit your slides and any handouts for the final presentation (instructor will grade your presentation live during the final week of class).

Grades from the course instructor will be out of 100% and based upon the presentation, content, use of academic references, and overall effectiveness of the pamphlet and presentation.

In Riipen

Your project submission to Riipen will receive a rating and feedback from your industry partner. This rating and feedback will be a part of your course grade and may be used by you as described earlier on this page. Note that the partner organization's assessment will evaluate the quality of your work and your team's professionalism (the partner will rate you based on a 5-star system – 5 stars = 100%, 4 stars = 80%, 3 stars = 60%, 2 stars = 40%, 1 star = 20%). You are required to submit on Riipen:

- A presentation copy of the pamphlet, 2-3 pages long, attractively organized and designed.
- Slides with speaker notes and any required handouts for the final presentation.

AVIA 310: Riipen Project Schedule

Steps	Platform	Due Date
<p>Create Riipen Account and join portal OR Inform Instructor of Opt-Out – see Riipen Project document</p>	<p>Riipen Email to Instructor</p>	<p><i>September 19, 2018</i></p>
<p>Teams will be created by your instructor, through the LEARN platform. Each team will choose a team name, a team lead, and inform the instructor of who the team lead is.</p>	<p>LEARN will list teams Once team lead is chosen, this must be communicated to instructor via EMAIL</p>	<p><i>September 27, 2018</i></p>
<p>Team leads will “start the project” on Riipen.</p>	<p>Riipen</p>	<p><i>September 28, 2018</i></p>
<p>Other team members will check their UWaterloo email for an invitation from Riipen to join their team, and then accept this invitation.</p>	<p>UWaterloo email (and confirm in Riipen)</p>	<p><i>September 29, 2018</i></p>
<p>Team Leads: Submit Milestones</p>	<p>Riipen</p>	<p><i>Please check assignment on Riipen for each Milestone due date. The initial ‘scope’ meeting</i></p>

		<i>must occur before October 12, 2018. Other milestones listed within Riipen.</i>
Team Leads: Submit final project to LEARN	LEARN	<i>Pamphlets must be submitted November 7th, 2018. Presentation materials must be submitted November 21st, 2018.</i>
Team Leads: Submit final project to Riipen	Riipen	<i>Pamphlets must be submitted November 7th, 2018. Presentation materials must be submitted November 21st, 2018.</i>