

**ASEN 6519**  
**HUMAN OPERATION OF AEROSPACE VEHICLES**

**Spring 2020**  
**Monday/Wednesday 11:30am-12:45pm**  
**Room AERO 114**

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Course Description

This 6000 level graduate student course is aimed at examining the fundamental issues associated with human operation of aerospace vehicles. The approach is a mixture of theoretical, quantitative, and experimental, emphasizing human-centered engineering principles. Topics range from theoretical models of human information processing and decisions, physiological limitations of the human (particularly spatial orientation illusions), the design of display and control interfaces, and the evaluation of those interfaces for human interaction with complex aerospace systems. Examples of operational applications and accidents/incidents resulting from human-automation interactions will be stressed throughout.

The course will begin with a theoretical background of human pilot information processing, signal detection theory, Bayes theory, and biases in naturalistic decision making. Next, physiological limitations, focusing on sensorimotor challenges and spatial disorientation, will be covered, ranging from sensory cues, integration, perceptual illusions, to adaptation to altered gravity environments. Given these limitations, practical and quantitative approaches for designing displays and control interfaces will be summarized including a review of manual control theory, display design principles, and multimodal displays. High-level supervisory control and vigilance of highly automated complex systems will be studied. Finally, state-of-the-art experimental and simulation approaches to evaluating human system designs will be covered. This includes design of experiments, workload, situational awareness, trust, and complacency measures, pilot performance and flight simulation. A secondary focus of this course is to improve both oral and written presentation skills.

Office Hours

Thursday from 11:30am-12:30pm or by appointment. In my office (AERO N301).

Textbook

[Engineering Psychology and Human Performance](#), Wickens and Hollands, ideally the Fourth Edition, but earlier versions should be fine.



Group Projects are due at the start of class *on the due date*. If you must miss class for an excused absence, you may submit early. **Late project submittals will be heavily penalized.**

Collaboration on Group Projects (within your group) is expected and encouraged. Working with other groups is allowed, but your submission must be your own group's effort. This means you may discuss the means and methods for solving the project problems and even compare answers, but you are not free to copy someone's work. **The Project you submit must be your group's own.**

Missed exams/presentation will not be made up unless acceptable arrangements are made *at least one week in advance* of the test date. Acceptable events are considered on a case-by-case basis. **Documented** medical conditions are allowed at any time.

Exams will cover all concepts/material in this course. This includes lecture slides, discussions in class, *readings*,]TJ 0.0a4ovs, (s co)6 (u<</M52 ( l)-2 (e)-1 (s)5)42e.9 (s )5 (i)1 (se.)1 ( T)2 (h)1 .yl(w)1 ( a)5 (l(i)-1 ()3 (i

sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the [Honor Code Office website](#).

*Sexual Misconduct, Discrimination, Harassment, and/or Related Retaliation:* The University of Colorado Boulder (CU Boulder) is committed to fostering a positive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct, intimate partner abuse (including dating or domestic violence), stalking, or protected-class discrimination or harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or [cureport@colorado.edu](mailto:cureport@colorado.edu). Information about the OIEC, university policies, [anonymous reporting](#), and the campus resources can be found on the [OIEC website](#).

Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

*Religious Holidays:* Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, please notify me at least one week in advance if you are unable to attend an exam or final presentation. Assignments will be due on Canvas, unless you have made prior arrangements with me.

See the [campus policy regarding religious observances](#) for full details.