

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

**Fall 2017**  
**Tuesday/Thursday 8:00-9:15am**  
**Room FLMG 103**

**Professor Torin K. Clark**  
*telephone: (303) 492-4015*  
*email: torin.clark@colorado.edu*  
*office: ECAE 100*

*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-

## Class Website

We will use Desire2Learn (D2L) for our class website: <https://learn.colorado.edu>

Please check regularly (or set up alerts!) as new material, assignments, etc. will be posted regularly.

---

## Topics (subject to potentially major revision)

Application of human operated aerospace vehicles

Case study 1

Case study 2

Theoretical considerations of human operation of aerospace vehicles

Information processing theory

Rational decision and signal detection theory

Information acquisition and Bayes theory

Judgement under uncertainty including biases in human naturalistic decision making

### **Exam 1 ~ September 21**

Physiological and cognitive limitations of humans in aerospace vehicles

Hypoxia

Gravity-induced Loss of Consciousness (G-LOC)

Introduction to vestibular system and orientation perception

Sensory integration

Common spatial disorientation illusions

Geographic disorientation and controlled flight into terrain (CFIT)

Sensorimotor impairment and motion sickness – spaceflight applications

### **Exam 2 ~ October 24**

Design of display and control interfaces

Manual control theory

Display design principles

Multimodal displays and pilot attention

Supervisory control and vigilance

### **Exam 3 ~ November 14**

Evaluating human system designs

Design of experiments

Usability testing and evaluation

Workload and situation awareness (background and experimental methods)

Trust, complacency, and over-automated systems

**Final ~ Saturday December 16, 7:30-10pm, 2017.**

*Will not have a for*

*for group project presentations.*

---

## Grading

45% on Homework/Group Projects, 45% from 3 Exams (15% each), 10% Participation (not just showing up...but actively engaging!)

Homework assignments and 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 homework or project submittals are not accepted** - this includes if it is slipped under my door after class has started. However, if you will not be attending class, you may submit your homework *prior to class* by slipping it under my door.

Group collaboration is permitted on homework, but efforts are individual. This means you may discuss the means and methods for solving problems and even compare answers, but you are not free to copy someone's work or the solutions manual. **The homework you submit must be your own.** *Keep in mind that solving problems reinforces learning the material.*

Collaboration on Group Projects (within your group) is expected and encouraged. Working with other groups is allowed, but analogous to individual homework, **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 lectu

*class and outside of class*, acts of sexual misconduct, discrimination, harassment or related retaliation against or by any employee or student. CU's Sexual Misconduct Policy prohibits sexual assault, sexual exploitation, sexual harassment, intimate partner abuse (dating or domestic violence), stalking or related retaliation. CU-Boulder's Discrimination and Harassment Policy prohibits discrimination, harassment or related retaliation based on race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Individuals who believe they have been subject to misconduct under either policy should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127. Information about the OIEC, the above referenced policies, and the campus resources available to assist individuals regarding sexual misconduct, discrimination, harassment or related retaliation can be found at the [OIEC website](#).

*Honor Code:* All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to [the academic integrity policy](#) of the institution. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access, clicker fraud, resubmission, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code Council ([honor@colorado.edu](mailto:honor@colorado.edu); 303-735-2273). Students who are found responsible of violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code Council as well as academic sanctions from the faculty member. Additional information regarding the academic integrity policy can be found at <http://honorcode.colorado.edu>.