# Syllabus

# ASEN 3036 Introduction to Human Space Flight

This course introduces students to the challenges and rewards of human space flight. Historical and current space programs and spacecraft will be discussed, along with the motivation, cost and rationale for human space exploration. An overview of the space environment will be presented in the context of what is needed to sustain human life and health, including physiological and psychological concerns, in a space habitat. Current events including space research will also be highlighted. Students will learn about the astronaut selection and training processes. Finally, anomalies, mission operations and future program directions, with some insight into career planning, will be covered. The emphasis on learning will be to understand the way humans approach the exploration of space and how such a bold endeavor affects us individually and as humans. Students will be encouraged to explore through readings and research different perspectives of spaceflight to include political, scientific, historical, economic, cultural, and social as well as to consider the impact on our future.

**Instructor:** Jim Voss, Former Astronaut, Scholar in Residence,

Email: *jim.voss@colorado.edu*

Office: Aerospace Building 317

**Prerequisites:** None, open to all majors at any level

**Space Minor:** This class is one of the elective courses for the CU Space Minor that is open to any undergraduate student from any major.

For more information on the CU Space Minor see: http://www.colorado.edu/spaceminor/learn-more

**Textbook** *Spacefaring - The Human Dimension*
Los Angeles, CA, 2001

**Grading Breakdown**: Homework (20%), Quizzes (30%), Project (15%), Exam 1 (15%), Exam 2 (20%)

**Required Readings:**

*Spacefaring - The Human Dimension*
Angeles, CA, 2001
Various articles and NASA reports provided on the course home page

**Suggested Readings:**

Physiological Effects and Countermeasures

Operational Space Medicine

Spaceflight Analogs and Human Factors

Life Support Systems

Administration for the class, background information

Philosophical perspective

Reasons for going to space

NASA and our national space policy

History of human spaceflight and U.S. Exploration plans (1 hour)

US Space Program goals and plans

History of human spaceflight

People

Programs

Spacecraft

Space environment (1 hour)

Hazards

Space operational medicine

Countermeasures

Physiological effects of spaceflight (1 hour)

Human response

Long term health

Biomedical aspects

Psychological and sociological aspects of human spac9s EMC /P <MCID 18>BDC q0.00000912 0 612 792 reW*

Life support systems (2-3 hours)

- Environmental control and life support systems
- Spacecraft systems examples

Human factors for spaceflight (1 hour)

Current and recent spacecraft overview and space flight analogs (3 hours)

- Space Shuttle
- International Space Station
- Russian Soyuz
- Commercial spacecra

- Astronaut Candidate training
- Crew training

Extra Vehicular Activity (2 hours)

- Physiology of space walking
- Space suit design

Robotics (1 hour)

- Human interface
- Autonomous vs. controlled

Surface Elements (1 hour)

- Human habitats
- Surface vehicles

Space mission accidents and anomalies (1 hours)

- Spaceflight case studies
- Apollo 1
- Challenger
- Columbia
- Russian mishaps
- Technical aspects
- Ethical and moral aspects
- Management decision making

Space Mission Operations and Planning (1 hour)

Space research (as required)

- Humans as subjects

Current topics

Space current events and projects (as required)

Space tourism (1 hour)

Past and current activities

Future

Future of Spaceflight (1 hour)

US future programs