

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

e

Suggested Readings:

xO'Neill, G. K., *The High Frontier - Human Colonies in Space* Space Studies Institute Press, Princeton, NJ, 1989

xHurt, H., *For All Mankind* The Atlantic Monthly Press, New York, NY, 1988

xKranz, G. *Failure Is Not an Option*, Simon and Schuster, New York, NY, 2000

xBurrough, B., *Dragonfly- NASA and the Crisis Aboard Mission 1* Harper Collins, New York, NY, 1998

xJones, T., *Sky Walking An Astronaut's Memoir* Harper Collins, New York, NY, 2006

xMullane, M., *Riding Rockets – The Outrageous Tales of a Space Shuttle Astronaut* Scribner, New York, NY, 2006

xAny science fiction by H.G. Wells, Jules Verne, Isaac Asimov, Robert Heinlein, Arthur C. Clark

Essay / Project / Case Study:

Students will research and write about topics associated with human spaceflight and the social, political, and technical implications. Essays or case study format is used to explore complex human space

Space Accidents and Anomalies
Working in Space
Robotics
Extra Vehicular Activity -Physiology and Space Suits
Special Topic – Guest Lecture
Mission Operations and Planning
Surface Elements
Space Research
Space Tourism
Next Human Spacecraft Systems
Space Future – Settlements, Migration
Space Career Planning
Space Policy and Funding

ASEN 3036 Detailed Lecture Topics:

- Introduction and Why space? (1 hour)
 - 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 (2 hour)
 - Human response
 - Long term health
 - Biomedical aspects
- Psychological and sociological aspects of human spaceflight (2 hours)
 - Crew interactions and international crew aspects
 - Habitability
 - Group dynamics
 - Stress and coping
- 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 spacecraft
 - Analogues for space and interplanetary destinations
- Living in space (2 hours)
 - Hygiene
 - Recreation
 - General performance factors
 - Living and working on the ISS
- Space Programs (1 hour)
 - NASA
 - International programs
 - Programmatic structure
 - Historical perspectives

- Philosophical considerations
- Astronaut selection and training (2 hours)
 - Selection process and advice
 - 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 (1 hour)

S4Tj 0001 Tc -0.001 Tw 3 0 Td [(H)3 (u)-4 (m)9 (an)1 (i)-1 (nsec)tecTJ 0 T

Invited lecturers from NASA, aerospace companies, former astronauts
Examples: Chief Scientist USAF Space Command and NASA International
Space Station manager, Astronaut, Under Secretary of the AF for Space
Industry executives
Lectures on special topics of current interest