

Master of Science in Space Studies

The Master of Science in Space Studies is an interdisciplinary degree with concentrations in aerospace science, astronomy, or space policy. The curriculum for this online space studies program – originally designed by former NASA astronaut Dr. James Reilly, veteran of three shuttle missions and five spacewalks – offers in-depth research projects and prepares you to meet the challenges associated with humankind’s exploration and usage of space.

This master’s program is taught by experienced astronomy and aerospace leaders who are practitioners in their fields. Knowledge obtained from this program is useful preparation for a career as an aerospace operations engineer/technician, observatory telescope operator, planetarium astronomer, space industry administrator, space journalist, or military space systems specialist. And, because the program offers 18 hours of graduate credits in the discipline, it will prepare you to teach at a college level.

Degree Program Objectives

In addition to the institutional and degree level learning objectives, graduates of this program are expected to achieve these learning outcomes:

- Develop an appreciation of the foundations and importance of space studies in the role of human space exploration/ understanding of the cosmos.
- Analyze quantitative and qualitative research and statistical data related to the support of aerospace science, astronomy, or space policy concepts.
- Assess the history, chronology, and concepts for placing manned and unmanned vehicles in space.
- Evaluate the importance of remote sensing satellites used to observe our Earth and other celestial bodies in the Solar System.
- Synthesize the psychological and physiological elements necessary to support human life in the space environment, including spacesuit design/development.

Degree at a Glance

Code	Title	Semester Hours
	Core Requirements	15
	Select one of the following concentrations:	18
	Aerospace Science (p. 1)	
	Astronomy (p. 2)	

Space Policy (p. 2)	
Final Program Requirements	3
Total Semester Hours	36

Degree Program Requirements

Core Requirements (15 semester hours)

Code	Title	Semester Hours
SPST501	Introduction to Space Studies ¹	3
SPST500	Research Methods in Space Studies	3
	Select 3 courses from the following:	9
SPST503	Chronology of Space	
SPST504	Remote Sensing Satellites	
SPST619	The Psychology and Physiology of Space	
SPST690	Independent Study: Space Studies	
Total Semester Hours		15

¹ Required as the first course in this program.

Students must choose a concentration for this degree program and may select from the Concentration in Aerospace Science, Concentration in Astronomy, or Concentration in Space Policy.

Concentration in Aerospace Science (18 semester hours)

Provides an in-depth study in the discipline, with emphasis in both aircraft and spacecraft design/operations. Students take courses with comprehensive overviews of such topics as aircraft propulsion, aerodynamics and, aircraft design in addition to learning about orbital mechanics, rocket propulsion, and spacecraft design.

Objectives

Upon successful completion of this concentration, the student will be able to:

- Categorize the laws of orbital mechanics -- calculate and illustrate the effects that gravity has on two-body mechanics including spacecraft maneuvers such as transfer orbits and rendezvous.
- Apply scientific principles and calculate problems related to aircraft propulsion systems.
- Examine liquid and solid rocket propulsion fundamentals including propellants, combustion principles, components, and general turbo-pump, and motor design.
- Assess the development, technology, and importance of satellite communications in our modern technological society.

- Synthesize the fundamentals of aerodynamics and aircraft / spacecraft design, building upon past and current technology to shape innovations for the future.

Concentration Requirements (18 semester hours)

Code	Title	Semester Hours
SPST502	Introduction to Orbital Mechanics	3
SPST611	Aircraft Propulsion Systems	3
SPST612	Rocket Propulsion	3
SPST613	Satellite Communications	3
SPST615	Aerodynamics	3
SPST616	Aircraft Design	3
Total Semester Hours		18

Concentration in Astronomy (18 semester hours)

Prepares you for employment in the observatory, planetarium, or college classroom. A diverse range of courses provide an inclusive synopsis of astronomy – from the Solar System to stars and galaxies. You will learn about astronomical instrumentation, with the opportunity to access the university’s observatory and the PlaneWave CDK24 robotic telescope.

Objectives

Upon successful completion of this concentration, the student will be able to:

- Demonstrate an in-depth understanding of Solar System -- including planets, comets, asteroids, and meteorites.
- Analyze the celestial objects found beyond our Solar System: stars, exoplanets, galaxies, and possible extraterrestrial life.
- Evaluate the geology of the Moon and Mars as related to their significance for near future human exploration of the Solar System.
- Critique the various configurations of telescopes and their use in the exploration of all types of electromagnetic radiation – from radio waves to gamma rays.
- Synthesize the history of astronomy, from ancient Greece to our modern cosmological model of the universe.

Concentration Requirements (18 semester hours)

Code	Title	Semester Hours
SPST630	Planetary and Solar System Studies	3
SPST631	Astrophysical Studies	3
SPST632	Lunar Geology	3

SPST633	Astronomical Instrumentation	3
SPST634	Comets, Asteroids and Meteorites	3
SPST635	History of Astronomy	3
Total Semester Hours		18

Concentration in Space Policy (18 semester hours)

Cultivates leaders in the space industry, not only in NASA, but in the commercial realm of space operations. This concentration is ideal if you already have an administrative or business background. Coursework includes space diplomacy and law, space operations and organizations, as well as the historical, political, economic, legal, commercial, scientific, and technical challenges comprising this complex and rapidly changing discipline.

Objectives

Upon successful completion of this concentration, the student will be able to:

- Examine the political and commercial significance of major national and international space missions, projects, and operations.
- Evaluate organizations that are critical to the success of the technological advance of space infrastructure in the United States.
- Assess the status of space cooperation and diplomacy between various space faring nations.
- Synthesize space laws and how the governing institutions affect applications, such as remote sensing, communications, navigation, launch services, satellite exports, and arms control.

Concentration Requirements (18 semester hours)

Code	Title	Semester Hours
SPST621	Current and Emerging Space Powers	3
SPST622	Space Policy	3
SPST623	National Space Organization	3
SPST628	Space Operations Structure and Design	3
SPST640	Space Cooperation and Diplomacy	3
SPST671	Space Law	3
Total Semester Hours		18

Final Program Requirements (3 semester hours)

Code	Title	Semester Hours
Select 1 course from the following:		3
SPST695	Space Studies Capstone Portfolio ¹	
SPST699	Space Studies Capstone ¹	
Total Semester Hours		3

¹ Taken once all other requirements have been met.