Bachelor of Science in Space Studies

Prepare for the political, economic, legal, commercial, scientific, and technical challenges associated with human exploration in space with the Bachelor of Science in Space Studies.

Very few space studies academic programs match the breadth and scope of this innovative online program and its concentration options, including space entrepreneurship. This space studies program uses a curriculum initially designed by a former NASA astronaut. Many faculty include scientists and engineers currently working for NASA, the space industry, and national astronomical observatories.

You'll also have the opportunity to use the university's state-of-the-art, remote-controlled observatory, with a fully online 24-inch aperture telescope.

Degree Program Objectives

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

- Apply knowledge of mathematics, earth science, and space science to identify and solve space/earth studies problems.
- Conduct experiments, analyze, and interpret data.
- Communicate effectively with a range of audiences.
- Assess ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.
- Function on multidisciplinary teams.

Degree at a Glance

Code	Title	Semester Hours
General Education Requirements		30
Major Required		50
Select one of the following concentrations:		15
Aerospace Science (p. 2)		
Astronomy (p. 2)		
Earth Science (p. 3)		
Space Entrepreneurship (p. 3)		
Space Policy (p. 4)		
Final Program Requirements		3
Elective Requirements		22
Total Semester Hours		120

Degree Program Requirements

General Education Requirements (30 semester hours)

Code	Title	Semester Hours
Arts and Humanities (6 semester hours)		
PHIL202	Philosophy of Science	3
STEM270	Thinking and Acting Ethically	3
Civics, Political and Social Sciences (6 semester hours) [1]		
STEM280	Exploring Society and Cultures via Science Fiction	3
Select 1 course from the following:		3
ANTH100	Introduction to Anthropology	
ANTH202	Introduction to Cultural Anthropology	
CHFD220	Human Sexuality	
COMM211	Social Media and Society	
COMM240	Intercultural Communication	
ECON101	Microeconomics	
ECON102	Macroeconomics	
EDUC200	Humane Education: A Global Interdisciplinary Perspective	
GEOG101	Introduction to Geography	
HOSP110	Practical Food Safety and Awareness	
IRLS210	International Relations I	
LITR212	Forgotten America--Under Represented Cultures in American Literature	
LITR235	Four Points of the Compass: Culture and Society Around the World	
POLS101	Introduction to Political Science	
POLS210	American Government I	
PSYC101	Introduction to Psychology	
RELS250	Death and Dying	
RELS260	Race & Religion	
RELS270	Hope and Resilience	
SOCI111	Introduction to Sociology	3
SOCI212	Social Problems	
SOCI220	American Popular Culture	
Communication: Writing, Oral, and Multimedia (9 semester hours)		
COMM120	Information and Digital Literacy	3
ENGL110	Making Writing Relevant	3

ENGL221	Scientific Writing	3
History (3 semester hours)		
STEM185	The History and Context of STEM	3
Mathematics and Applied Reasoning (3 semester hours)		
MATH110	College Algebra	3
Natural Sciences (3 semester hours)		
CHEM180	Introduction to Chemistry	3
Total Semester Hours		33

[1] All literature courses require successful completion of ENGL101 - Proficiency in Writing or ENGL110 - Making Writing Relevant.

Major Required (50 semester hours)

Code	Title	Semester Hours
MATH111	College Trigonometry	3
Select 1 course from the following:		3
MATH112	Pre-Calculus	
MATH120	Introduction to Statistics	
MATH225	Calculus	
STEM100	Introduction to STEM Disciplines	3
SCIN133	Introduction to Physics with Lab	4
SCIN134	Introduction to Astronomy with Lab	4
SCIN137	Introduction to Meteorology with Lab	4
SCIN138	Introduction to Physical Geology with Lab	4
SPST200	Introduction to Space Studies	3
SPST201	Introduction to Space Flight	3
SPST203	History of Space Flight	3
SPST361	Planetary Science with Lab	4
STEM380	Coevolution of Society, Culture, and Technology	3
SPST435	Planetary and Space Exploration	3
SPST465	Space Weather	3
Select 1 course from the following:		3
STEM470	Cybersecurity, Surveillance, Privacy and Ethics	
STEM471	Analytics, Algorithms, AI, and Humanity	
Total Semester Hours		50

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

Concentration in Aerospace Science (15 semester hours)

The aerospace science concentration provides an in-depth study of space transportation systems. You take courses with comprehensive overviews of such topics as rocket propulsion, orbital mechanics, launch / reentry systems, and spacecraft design.

Objectives

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

- Solve the laws of orbital mechanics, including spacecraft maneuvers such as transfer orbits and rendezvous.
- Analyze liquid and solid rocket propulsion fundamentals including propellants, combustion principles, components, and general turbo-pump, and motor design.
- Assess the technology related to various launch and reentry systems.
- Synthesize the fundamentals of modern space transportation systems, from Apollo to NASA's new Space Launch System.

Concentration Requirements (15 semester hours)

Code	Title	Semester Hours
SPST305	Introduction to Orbital Mechanics	3
SPST310	Rocket Propulsion	3
SPST330	Launch and Reentry Systems	3
SPST425	Satellite and Spacecraft Systems	3
SPST445	Space Transportation Systems	3
Total Semester Hours		15

Concentration in Astronomy (15 semester hours)

The astronomy concentration is designed to prepare you for employment in the observatory, planetarium, or science center environment. A range of courses are offered that prepare you for graduate work in the space studies field. You'll acquire experience with the university's new 24-inch robotic telescope.

Objectives

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

- Demonstrate an in-depth understanding of operation of the modern observatory and planetarium.
- Analyze the celestial objects found within our Solar System and their study by space probe.
- Evaluate the importance of space weather and its potential harmful effects on our technological society.
- Synthesize celestial objects found beyond the Solar System, including stars, exoplanets, and galaxies.

Concentration Requirements (15 semester hours)

Code	Title	Semester Hours
SPST340	Tools of the Observatory	3
SPST341	Tools of the Planetarium	3
SPST342	Habitable Worlds	3
SPST440	Stars and Galaxies	3
SPST441	Cosmology	3
Total Semester Hours		15

Concentration in Earth Science (15 semester hours)

In this concentration, you will study the relationship between the physical, chemical, and biological processes operating in and on the Earth. You will learn about the history of the Earth and the evolution of systems such as the oceans and atmosphere, as well as detailed information about soils, streams, weather, and climate. The relationship between humans and the Earth is examined from multiple perspectives.

Objectives

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

- Use the scientific method and scientific tools to solve programs related to the Earth.
- Demonstrate a comprehensive understanding of the interrelated physical, chemical, and biological processes operating in the Earth system.
- Identify the process and features associated with the Earth's interior, landscapes, oceans, and atmosphere.
- Construct a history of the Earth, focusing on physical, chemical, and biological changes.
- Present earth science information clearly, in multiple formats (written, oral, graphically).
- Integrate knowledge of earth science into an understanding of societal issues and problems.
- Demonstrate good scientific ethics.
- Identify different earth materials, including those of economic value.

Concentration Requirements (15 semester hours)

Code	Title	Semester Hours
ERSC304	Remote Sensing and GIS for Earth Sciences	3
ERSC302	Geomorphology	3
ERSC305	Ocean and Atmospheric Dynamics	3
ERSC401	Natural Hazards and Society	3
ERSC402	Earth and Planetary Sustainability	3
Total Semester Hours		15

Concentration in Space Entrepreneurship (15 semester hours)

This concentration consists of five courses. The concentration provides the student with an array of study and course work in idea feasibility, the legal realm of entrepreneurship, funding the venture, marketing, prototyping, and technological innovation.

Objectives

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

- Determine feasibility of a business idea.
- Assess the legal requirements of being an entrepreneur.
- Analyze various methods necessary to grow an entrepreneurial business through funding options.
- Distinguish innovative technology from non-innovative technology for competitive advantage.

Concentration Requirements (15 semester hours)

Code	Title	Semester Hours
ENTR150	Idea Generation	3
SPST307	Space Policy	3
ENTR315	Financing a New Venture	3
SPST426	Space Habitats	3
SPST427	Space Resources	3
Total Semester Hours		15

Concentration in Space Policy (15 semester hours)

Space policy is designed to cultivate leaders in the space industry – both in NASA as well as the commercial space operations industry. This concentration is ideal if you have an administrative / business interest. Coursework considers space diplomacy, with extensive emphasis on space operations and organizations.

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.
- Synthesize 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 (15 semester hours)

Code	Title	Semester Hours
SPST304	National Space Organization	3
SPST306	Human Space Flight	3
SPST307	Space Policy	3
SPST415	Space Station Systems and Operations	3
SPST485	Space Wargaming	3
Total Semester Hours		15

Final Program Requirements (3 semester hours)

Code	Title	Semester Hours
SPST499	Senior Seminar in Space Studies (to be taken as the last course before graduation) [1]	3
Total Semester Hours		3

[1] Prerequisite: Senior Standing and completion of major courses prior to enrollment.

Elective Requirements (22 semester hours)

Code	Title	Semester Hours
Select any courses not already taken to fulfill the requirements listed above. Credits applied toward a minor or certificate in an unrelated field may be used to fulfill elective credit for the major.		22
Total Semester Hours		22