

# Space Studies (SpSt)

<http://www.space.edu/>

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A minor in Space Studies is available to introduce students to the research, development, and operation of a wide array of space ventures. The multi-disciplinary nature of space activity immediately becomes evident, allowing the student to correlate the space experience with areas in a major field of study. Political, legal, and scientific aspects are dealt with extensively, and key technologies are introduced.

## John D. Odegard School of Aerospace Sciences

### Minor in Space Studies

Required 20 credits, including:

SPST 200	Introduction to Space Studies	3
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Remaining credits from:

SPST 220	Space Science and Exploration	3
SPST 270	History of the Space Age	3
SPST 300	The Case for Space	3
SPST 310	Introduction to Dinosaurs	3
SPST 360	NASA	3
SPST 405	Space Mission Design	3
SPST 410	Life Support Systems	3
SPST 425	Observational Astronomy	3
SPST 430	Earth System Science	3
SPST 435	Global Change	3
SPST 450	International Space Programs	3
SPST 460	Life in the Universe	3
SPST 470	Special Topics in Space Studies	1-3
SPST 480	Readings in Space Studies	1-3
SPST 491	Independent Study	2

Up to a maximum of 6 credits may also be obtained from the following:

AVIT 403	Aerospace Law	3
GEOG 374 & 374L	Environmental Remote Sensing and Environmental Remote Sensing Laboratory	3
GEOG 475	Digital Image Processing	3
PHYS 460	Introduction to Astrophysics	3
PHYS 461	Introduction to Astrophysics II	3

Total Available Credits

58-62

## Courses

### SPST 200. Introduction to Space Studies. 3 Credits.

An introduction to a range of topics in space studies including: an overview of planetary science, stellar evolution and the history of the universe; a brief view of the history of national and international activities, an examination of the fundamentals of space flight and human activity in space, a review of some current problems and issues in the space arena, and a projection of the future course of space activities in the coming decades. This is a required course for an undergraduate minor in space studies. F,S.

### SPST 220. Space Science and Exploration. 3 Credits.

Revolutionary advances that have occurred in astronomy, the earth sciences and planetary science as a result of our entry into space. This course surveys the manned and robotic space missions which have gathered data for this new view of the Universe. The course introduces current concepts in cosmological theory as well as an overview of planetary evolution, solar system dynamical processes and physical characteristics of the planets. Prerequisite: SPST 200. S.

### SPST 270. History of the Space Age. 3 Credits.

This course introduces students to the history of human endeavors in space. These include the development of rocketry, the influence of amateur societies and science fiction, the military development of ballistic missiles, and human and robotic spaceflight. Prerequisite: SPST 200 or HIST 102 or HIST 104. F.

### SPST 300. The Case for Space. 3 Credits.

This is a multidisciplinary course that will examine the rationales for a wide variety of space exploration and development activities. Topics will include human space flight, space science missions, military and commercial space activities, space resource utilization, and the benefits and problems that society derives from these activities. The socioeconomic, socio-political and multi-cultural impact of space activities--nationally and globally--will be discussed and debated with the goal of providing students with a broad perspective of the varying effects of space activities on modern society. Prerequisite: SPST 200. F, even years.

### SPST 310. Introduction to Dinosaurs. 3 Credits.

This course provides a broad introduction to dinosaurs and an examination of the extra-terrestrial influence that appears to have led to their extinction, and which thus redirected the evolution of life on Earth. Each of the major dinosaur groups (theropods such as T. rex, sauropods such as Brontosaurus (Apatosaurus), duckbills, armored dinosaurs such as Stegosaurus, horned dinosaurs such as Triceratops, etc.) is examined as well as their cousins in the air (pterosaurs) and sea (ichthyosaurs plesiosaurs). The course reviews our current models of their origin, evolution, lifestyles, diet, reproductive behavior, and physiology. We examine the data and reasoning that leads to and updates these models. The course also places the dinosaurs in the context of Earth as a geologically evolving planet. The various theories for the dinosaur extinction will be outlined and evaluated. Learning tools include videos (both scientific and popular), dinosaur fossils, and scale models. On demand.

### SPST 360. NASA. 3 Credits.

An examination of the National Aeronautics and Space Administration (NASA). NASA was formed in 1958 out of the existing National Advisory Committee on Aeronautics (NACA) and elements from the Army and Navy -- but not the Air Force -- space programs. This course will examine the technologies, the history and the politics involved in each of the NASA elements -- including the one "new" center not inherited from earlier organizations: the Johnson Space Center in Houston. The course will conclude with a picture of NASA today. Prerequisite: SPST 200 or consent of instructor. F.

### SPST 405. Space Mission Design. 3 Credits.

A team design project to develop the requirements for a space mission. The specific mission will vary from time to time. Design teams will work on selected portions of the mission. Accompanying lectures will provide background material. Prerequisite: SPST 200. S.

### SPST 410. Life Support Systems. 3 Credits.

A review of the physiological effects of living in space including a discussion of current and near-term life support systems equipment for the provision of oxygen, water, food, and radiation protection. In addition, a review will be made of the issues associated with the development of fully closed ecological life-support systems that will be essential to the long-term development of space. Prerequisite: SPST 200. On demand.

### SPST 425. Observational Astronomy. 3 Credits.

This course provides an introduction to observational astronomy and includes three segments: basic observing techniques and astronomical equipment (telescopes, CCDs); visual observing and the characteristics of the night sky; astrometric and photometric observing, data reduction, and interpretations; and image processing and color imaging techniques. Students will learn to operate a remotely controllable Internet telescope and CCD camera. A broadband Internet connection is recommended. Night observing is required. Course fee. Prerequisite: PHYS 110. On demand.

### SPST 430. Earth System Science. 3 Credits.

This course begins with a review of the physical sciences of geology, meteorology and oceanography to examine the coupled interactions between the land, atmosphere and oceans. Particular emphasis is placed on remote sensing techniques for global monitoring of biogeochemical processes. The role of human activities on Earth processes and the consequences of global environmental changes are discussed. The growing use of space-based data sets and the implications of Earth Observing System technologies, including research goals and hardware requirements, are examined. Prerequisite: SPST 200. On demand.

**SPST 435. Global Change. 3 Credits.**

The current human population represents something unprecedented in the history of the world. Never before has one species had such a great impact on the environment in such a short time and continued to increase at such a rapid rate. Human activities are therefore significantly influencing the Earth's environment in many ways in addition to greenhouse gas emissions and climate change. Anthropogenic changes to Earth's land surfaces, oceans, coasts, and atmosphere and to biological diversity, the water cycle and biogeochemical cycles are clearly identifiable beyond natural variability. This course investigates the many facets of global change issues, and attempts to provide an up-to-date introduction to the study of the Earth's environment. F, even years.

**SPST 450. International Space Programs. 3 Credits.**

This course will introduce students to the major governmental space programs around the world. The history, activities and future directions of the Russian/Soviet, European/ESA, Chinese, Japanese, Indian and other space programs will be explored. International collaborations between the various programs will also be studied. Prerequisite: SPST 200. On demand.

**SPST 460. Life in the Universe. 3 Credits.**

This course examines the nature and evolution of life on Earth from its origin to the present time in the context of cosmological evolution, chemical evolution, planetary evolution, biological evolution, and cultural evolution. The possibility of life elsewhere in the universe is considered based on the conditions under which life could arise and flourish. Human changes to the Earth are placed within this context. The future of life on Earth is discussed and the social and cultural implications arising from the discovery of extraterrestrial life are explored. On demand.

**SPST 470. Special Topics in Space Studies. 1-3 Credits.**

Lecture, discussion and readings on specific topics of current interest. May be repeated for credit if topic is different up to a total of 6 credits. Prerequisite: SPST 200. Repeatable to 6 credits. On demand.

**SPST 480. Readings in Space Studies. 1-3 Credits.**

Directed student readings designed to develop advanced knowledge in a specific area. A written report is required. May be repeated for a total of six credits. Prerequisite: SPST 200 or consent of instructor. Repeatable to 6 credits. F,S,SS.

**SPST 491. Independent Study. 2 Credits.**

An independent study project culminating in a paper on an approved topic in Space Studies. Requires regular meetings with the instructor. Prerequisites: SPST 200, senior standing, 15 hours of Space Studies, and consent of instructor. F,S,SS.