Space and Planetary Sciences (SPAC)

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Space and Planetary Sciences Website (http://spacecenter.uark.edu)

Degree Conferred:
M.S., Ph.D. in Space and Planetary Sciences (SPAC)

Program Description: The program provides advanced course work and research experience for persons seeking a career in the academic, government, private, or military sectors of space and planetary sciences or associated technologies.

Primary Areas of Faculty Research: Astronomical processes, geological processes on planetary surfaces, planetary atmospheres, mission instrumentation and design, astrobiology, applications to Mars, Venus, Pluto, and ice worlds.

M.S. in Space and Planetary Sciences

Admission to Degree Program: Students wishing to apply for admission to the graduate degrees in space and planetary sciences should contact the Space and Planetary Science Center's graduate coordinator. Applicants should prepare to have transcripts, two letters of recommendation, and a statement of purpose sent to the center. Applicants are encouraged to submit scores from the Graduate Record Examination, including the writing score.

Basic Requirements for the Master's Degree: At least 24 semester hours of courses plus at least six hours of SPAC 600V are required for a total of at least 30 hours beyond the baccalaureate degree. Students are required to take the following courses:

Non-Core Courses		
SPAC 5211	SPAC Proseminar	1
Core Courses		
Select three of the following:		3
SPAC 5033	Astrophysics I: Stars and Planetary Systems	
SPAC 5313	Planetary Atmospheres	
SPAC 5413	Planetary Geology	
SPAC 5553	Astrobiology	
SPAC 5613	Astronautics	
Space and Planetary Electives		
(see list below) - Must take at least three courses (10 hours). Substitutions may be made with the approval of the committee.		10
Other Electives		
SPAC 5161	Seminar (must take every semester)	4
Thesis		
SPAC 600V	Master's Thesis	6
Total Hours		**24**

NOTE: The student's committee consists of at least four faculty members; at least three of these must be from the space center faculty, drawn from three different departments, and these must include the graduate advisor and the chair of the committee. One member of the committee should be from outside of the space center.

Every student must register for a minimum of one credit hour of SPAC 600V or 700V in each term during which the student is away from campus and doing thesis or dissertation research. The number of 4000-level courses allowed in a program is limited to two and committee approval is required.

Students should also be aware of Graduate School requirements with regard to master's degrees (http://catalog.uark.edu/graduatecatalog/degreerequirements/#mastersdegreestext).

Ph.D. in Space and Planetary Sciences

Admission to Degree Program: Students wishing to apply for admission to the graduate degrees in space and planetary sciences should contact the Space and Planetary Science Center's graduate coordinator. Applicants should prepare to have transcripts, two letters of recommendation, and a statement of purpose sent to the center. Applicants are encouraged to submit scores from the Graduate Record Examination, including the writing score.

Requirements for the Doctor of Philosophy Degree: Students are required to take a minimum of 72 hours beyond the baccalaureate degree or 42 hours beyond the master's degree to include a minimum 33 hours of required course work and 18 hours of SPAC 700V. Course requirements are given below.

Non-Core Courses		
SPAC 5161	Seminar	8
SPAC 5211	SPAC Proseminar	1
SPAC 5123	Internship	3
Core Courses		
Select four of the following:		12
SPAC 5033	Astrophysics I: Stars and Planetary Systems	
SPAC 5313	Planetary Atmospheres	
SPAC 5413	Planetary Geology	
SPAC 5553	Astrobiology	
SPAC 5613	Astronautics	
Space and Planetary Electives		
Choose at least three courses from the list below. Substitutions may be made with the approval of the committee.		9
ASTR 5043	Astrophysics II: Galaxies and the Large-Scale Universe	
ASTR 5073	Cosmology	
BIOL 5003L	Laboratory in Prokaryote Biology	
BIOL 5263	Cell Physiology	
BIOL 5233	Genomics and Bioinformatics	
BIOL 5353	Ecological Genetics/genomics	
BIOL 5463	Physiological Ecology	
CHEM 5813	Biochemistry I	
CHEM 5843	Biochemistry II	
CSCE 5043		
ELEG 5273	Electronic Packaging	
ELEG 5553	Switch Mode Power Conversion	
ELEG 5903	Engineering Technical Writing	
GEOS 5113	Global Change	

GEOS 5253	Geomorphology	
GEOS 5273	Principles of Geochemistry	
GEOS 5293	Introduction to Global Positioning Systems and Global Navigation Satellite Systems	
GEOS 5363	Climatology	
GEOS 5563	Tectonics	
GEOS 5653	GIS Analysis and Modeling	
MEEG 5403	Advanced Thermodynamics	
MEEG 5833	Aerospace Propulsion	
PHYS 5363	Scientific Computation and Numerical Methods	
PHYS 5653	Subatomic Physics	
SPAC 5033	Astrophysics I: Stars and Planetary Systems	
SPAC 5313	Planetary Atmospheres	
SPAC 5413	Planetary Geology	
SPAC 5553	Astrobiology	
SPAC 5613	Astronautics	
Other courses may count as electives with the approval of the student's research adviser and committee.		
Dissertation		
SPAC 700V	Doctoral Dissertation	18
Total Hours		**51**

Additional Requirements: Students are required to complete a thesis or dissertation describing original research work in the space and planetary sciences that must be presented to and successfully defended before their committee. In addition, Ph.D. students must pass a candidacy examination.

The Ph.D. candidacy examination is administered by the student's committee and is designed to test the student's ability to assimilate, integrate and interpret material learned in the core required courses while at the same time having a depth of understanding in the area of the student's research. Thus, the candidacy examination will be in two parts:

1. A 2,500-word integrative essay on a theme chosen by the committee, and
2. An oral defense of the thesis before the committee.

Part 1 will be assigned six weeks before the candidacy defense and shall be presented to the committee two weeks before that defense. The defense will be held at a date determined by the committee but usually before the end of the student's second year in graduate school. The committee will judge the examination as pass/fail and in the case of failure — and at the discretion of the committee — a second attempt to pass the qualifying examination is permitted within a period of time determined by the committee.

Students should also be aware of Graduate School requirements with regard to doctoral degrees (http://catalog.uark.edu/graduatecatalog/degreerequirements/#phdandedddegreestext).

Aly, Mohamed H., Ph.D. (Texas A&M), M.S., B.S. (Zagazig University), Associate Professor, Department of Geosciences, 2013, 2020.
Boss, Steve K., Ph.D. (University of North Carolina at Chapel Hill), M.S. (Utah State University), B.S. (Bemidji State University), University Professor, Department of Geosciences, 1996, 2022.
Ceballos, Ruben M., Ph.D. (University of Montana), M.A. (University of Alabama-Birmingham), B.S.(University of Alabama-Huntsville), Assistant Professor, Department of Biological Sciences, 2016.
Chevrier, Vincent Francois, Ph.D. (CEREGE, Aix-en-Provence, France), M.E.S. (University Paris VII), B.S. (Academy of Versaille, France), Research Associate Professor, Department of Chemistry and Biochemistry, 2005.
Huang, Po-Hao Adam, Ph.D., M.S., B.S. (University of California-Los Angeles), Associate Professor, Department of Mechanical Engineering, 2006, 2012.
Ivey, Mack, Ph.D., B.S. (University of Georgia), Associate Professor, Department of Biological Sciences, 1992, 1998.
Kennefick, Daniel John, Ph.D., M.A. (California Institute of Technology), B.S. (University College Cork, Ireland), Professor, Department of Physics, 2003, 2021.
Kennefick, Julia Dusk, Ph.D. (California Institute of Technology), B.S. (University of Arkansas), Associate Professor, Department of Physics, 2003, 2014.
Kral, Timothy Alan, Ph.D. (University of Florida), B.S. (John Carroll University), Professor, Department of Biological Sciences, 1981, 2008.
Kumar, Pradeep, Ph.D. (Boston University), M.Sc. (Indian Institute of Technology, Mumbai, India), Associate Professor, Department of Physics, 2013, 2019.
Lehmer, Bret Darby, Ph.D. (Pennsylvania State University), B.S. (University of Iowa), Associate Professor, Department of Physics, 2015, 2021.
Lessner, Daniel J., Ph.D. (University of Iowa), B.S. (University of Wisconsin-Stevens Point), Professor, Department of Biological Sciences, 2008, 2020.
Mantooth, Alan, Ph.D. (Georgia Institute of Technology), M.S., B.S. (University of Arkansas), Distinguished Professor, Department of Electrical Engineering, Twenty-First Century Chair in Mixed-Signal IC Design and CAD, 1998, 2011.
Oliver, William, Ph.D., M.S. (University of Colorado-Boulder), B.S. (University of Arizona), Associate Professor, Department of Physics, 1992, 1998.
Roe, Larry, Ph.D. (University of Florida), M.S., B.S.M.E. (University of Mississippi), Associate Professor, Department of Mechanical Engineering, 1994, 2000.
Tullis, Jason A., Ph.D., M.S. (University of South Carolina), B.S. (Brigham Young University), Professor, Department of Geosciences, 2004, 2018.

Courses

SPAC 5033. Astrophysics I: Stars and Planetary Systems. 3 Hours.
Stellar structure and evolution, the properties of the solar system, and extrasolar planetary systems. (Typically offered: Fall Odd Years)
This course is cross-listed with ASTR 5033.

SPAC 5123. Internship. 3 Hours.
Internship for graduate students in the space and planetary sciences graduate degree programs and concentrations in the graduate programs in physics, biology, geosciences and mechanical engineering. Students conduct a phase of their research, normally for one month, at a national or industrial laboratory in North America or overseas. (Typically offered: Fall and Spring)

SPAC 5161. Seminar. 1 Hour.
Seminars organized by the Center for Space and Planetary Sciences covering topics on the cutting edge of research in the field for graduate students conducting research with a faculty member in the space and planetary sciences as part of their graduate degree programs or concentrations in the graduate programs in physics, biology, geology, geography and mechanical engineering. (Typically offered: Fall and Spring) May be repeated for up to 8 hours of degree credit.

SPAC 5211. SPAC Proseminar. 1 Hour.
Introductory course consisting of discourses and case studies in ethics, communications and public policy in the administration of space and planetary sciences. Prerequisite: Admission to program or instructor consent. (Typically offered: Spring)

SPAC 5313. Planetary Atmospheres. 3 Hours.
Origins of planetary atmospheres, structures of atmospheres, climate evolution, dynamics of atmospheres, levels in the atmosphere, the upper atmosphere, escape of atmospheres, and comparative planetology of atmospheres. (Typically offered: Irregular)

SPAC 5413. Planetary Geology. 3 Hours.
Exploration of the solar system, geology and stratigraphy, meteorite impacts, planetary surfaces, planetary crusts, basaltic volcanism, planetary interiors, chemical composition of the planets, origin and evolution of the Moon and planets. (Typically offered: Spring Even Years)

SPAC 5553. Astrobiology. 3 Hours.
Discusses the scientific basis for the possible existence of extraterrestrial life. Includes origin and evolution of life on Earth, possibility of life elsewhere in the solar system (including Mars), and the possibility of life on planets around other stars. Prerequisite: Instructor consent. (Typically offered: Spring Even Years)
This course is cross-listed with BIOL 5553.

SPAC 5613. Astronautics. 3 Hours.
Study of spacecraft design and operations. Prerequisite: Admission to program or instructor consent. (Typically offered: Irregular)

SPAC 600V. Master's Thesis. 1-10 Hour.
Master's thesis. (Typically offered: Fall, Spring and Summer) May be repeated for degree credit.

SPAC 700V. Doctoral Dissertation. 1-18 Hour.
Doctoral dissertation. (Typically offered: Fall, Spring and Summer) May be repeated for degree credit.