Space Studies
Master of Science

The Department of Space Studies offers graduate studies leading to the Master of Science degree. Non-thesis and thesis options are available. The all-encompassing nature of space exploration requires people who possess broad backgrounds that link policy, business, law, science and engineering. The Department of Space Studies seeks to train this vital segment of the community through the non-thesis option. The goal is to integrate, rather than separate, traditional disciplines related to space. Specialized training is also an essential part of the space community and this is achieved through the thesis option that gives students the opportunity to specialize in an area of faculty research.

Our programs are designed to prepare students for futures in the academic, commercial, and governmental sectors of the rapidly growing field of space exploration and development.

The mission of the Department of Space Studies is to provide a comprehensive world-class education in the academic area of space. Key elements of this education are interdisciplinary and multidisciplinary breadth and disciplinary depth, delivered on-campus, and through innovative distance delivery methods. Our objectives focus on producing students that will become the decision and policy makers, managers, negotiators, engineers, technicians, educators and scientists of the space arena.

Facilities for Graduate Research
Our facilities include lab space for the investigation of terrestrial rocks and meteorites, reduction and analysis of terrestrial remote sensing and planetary reflectance spectral data, research into life support technologies and human factors in space, and an astronomical observatory.

The department manages the UND Observatory complex, which is located ten miles west of Grand Forks. The Observatory currently includes three remotely controllable optical telescopes (two 16-inch and one 10-inch aperture, respectively). UND Observatory telescopes support student thesis and non-thesis astrometric, broadband photometric, and stellar spectrographic research.

A Human Spaceflight Laboratory with several experimental planetary suits is available for student research, as well as a Space Simulators Facility with a vertical and horizontal Space Simulator to replicate different phases of suborbital and orbital flight. The lab also includes elements of a planetary base concept, consisting of an inflatable lunar habitat and pressurized electronic rover which is designed to connect externally to the space suits. A Space Life Sciences Laboratory is open to students specializing in long-term space physiology, life support scenarios and hardware design.

Admission Requirements
The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog. The deadlines for applying for admission for each semester are as follows: April 30 for the Fall semester; October 31 for the Spring semester; and February 28 for the Summer semester. Students who apply after these dates for a given semester are encouraged to do so under non-degree status. The requirements for admission to the Space Studies degree program are as follows:

1. Bachelor’s degree from an accredited college or university with an overall grade point average (GPA) of 2.75 or better, or a GPA of at least 3.0 for the junior and senior years of undergraduate work.
2. Three credits of coursework in statistics or algebra or calculus or computer science.
3. Six credits of coursework in the physical sciences, life sciences, or engineering.
4. Six credits of coursework in the social sciences, history, business, or law.
5. Three credits of coursework in English composition or technical writing.
6. Pre-requisite courses from 2 to 5 above must have been completed at the college level, preferably with a grade of B or higher.
7. The Graduate Record Examination (GRE) General Exam if you plan on seeking funding (GRAs, tuition waivers) via the department or a faculty member. Otherwise, it is not required for admission to the MS program.
8. Submission of a written statement of interest highlighting the candidate’s interest in space studies and motivation to undertake this program.
9. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

Financial Assistance
Graduate assistantships (GTA/GRA) are available from a variety of internal and external sources. These are awarded on the basis of academic merit and students’ abilities to contribute to departmental research and teaching. Students desiring...
graduate assistantships must take the GRE. The deadlines for applying for financial aid through the Department of Space Studies for a given semester are as follows: April 30 for the Fall semester; October 31 for Spring semester; and February 28 for Summer semester. Funding is renewable if progress toward the degree, research goals and teaching are satisfactory. Support is typically for two years on a nine-month basis. Summer funding may also be available.

Degree Requirements
All students are required to complete a minimum of 33 credits. The following plan should be used:

1. **SPST 501** Survey of Space Studies I and **SPST 502** Survey of Space Studies II (6 credits).
2. Students select either the non-thesis or thesis option and declare which social or technical area is their area of specialization. This is the area in which they do their **SPST 997** Independent Study Report or **SPST 998** Thesis.
3. Two (2) courses from designated social area courses outside the student’s area of specialization (6 credits).
4. Two (2) courses from designated technical area courses outside the student’s area of specialization (6 credits). Note: The choice of courses in the required social and technical areas outside the student’s area of specialization must take into account the breadth of disciplines, which is a critical part of Space Studies education. In order to meet the breadth requirements within the degree options, students are required to spread their courses as per guidelines outlined in the Department of Space Studies Graduate Student Handbook.
5. One credit of **SPST 590** Space Studies Colloquium (1 credit).
6. At least half of the total credit hours must be from classes at the 500-level and above.

**Non-Thesis Option:**
1. **SPST 997** Independent Study Report (2 credits).
2. Comprehensive Examination.
3. At least 4 elective courses (for distance students, the required Capstone course will count as one elective, so they only need 3).
4. Distance students must also complete **SPST 595** Space Studies Capstone (3 credits).

**Thesis Option:**
1. **SPST 593** Individual Research in Space Studies (1 to 3 credits).
2. **SPST 998** Thesis (6 credits).
3. At least 2 elective courses.

Approval of the thesis option will only be granted if a clear alignment of research interests between a faculty member and a student is demonstrated, and a faculty adviser has been identified and is available to supervise the research. Distance students who wish to complete the thesis option must satisfy the residence requirement. Interested students should consult the School of Graduate Studies or department.

**Faculty and Areas of Expertise**

- **Dr. James G. Casler:** Business and management, space commerce, quality engineering, space and planetary based manufacturing systems and new design;
- **Dr. Pablo de Leon:** Human spaceflight systems, planetary space suit research and development, history of the manned space program.
- **Dr. Ron Fevig:** Small spacecraft development, orbital mechanics, space mission design, high-altitude balloon and sounding rocket payload development, space communications and ground station operations;
- **Dr. Michael J. Gaffey:** Planetary geology; asteroids and meteorites; telescopic observations/spectroscopy; early solar system history; space resources; origins of life on Earth; dinosaurs, impacts, and extinctions.
- **Dr. Paul S. Hardersen:** Main-belt asteroids; visible and near-infrared astronomical spectroscopy; the early solar system; T Tauri stars; public outreach/education.
- **Dr. Vadim Rygalov:** Ecological biophysics; closed ecological systems; human/environment interaction; environmental design/control; low-P plant physiology; applied mathematical modeling.
- **Dr. Santhosh Seelan:** Remote sensing applications to environmental change detection, precision farming, groundwater targeting; global change; geospatial extension; Indian space program.
- **Dr. David Whalen:** Space history, space policy, space business, satellite communications, military space, orbital mechanics, relationships between technology, economic development, and public policy.

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