Interdisciplinary Sciences (IS) – Atmospheric Sciences

Career Profile

The atmospheric sciences (ATM) specialization is designed to provide a well-rounded background in meteorology and atmospheric sciences. By working with knowledgeable School of Mines faculty, students are able to pursue careers in the National Weather Service, U.S. Bureau of Reclamation, U.S. Geological Survey, and private industry, as well as prepare for continued education at the master's and doctoral levels.

Accreditation

The South Dakota School of Mines and Technology is accredited by the Higher Learning Commission of the North Central Association of Colleges and Secondary Schools, the recognized accrediting agency for the north central states.

Labs and Facilities

The School of Mines is home to the Institute of Atmospheric Sciences (IAS), whose mission is to study the physical, chemical, and biological processes that affect the Earth's atmosphere. The IAS has modern laboratory facilities that analyze and measure atmospheric components that have the potential to affect the balance of the earth system. It is also home to the Black Hills Advanced Visualization Laboratory, a modern scientific immersive and tracked visualization facility, and the Biogeochemistry Core Facility, a laboratory that analyzes key constituents of terrestrial and aquatic ecosystems.

Faculty

Faculty members from many departments across campus teach courses in the interdisciplinary sciences degree track, giving students a wide perspective in many areas of study.

Features and Strengths

The interdisciplinary sciences program provides students with the high-quality science education the School of Mines is known for, but with the added benefit of flexibility in a wide range of study. Individual degree design and the opportunity to study natural sciences, social sciences, humanities, and liberal arts from a broad perspective result in a well-rounded education.

Working with faculty members from the Department of Atmospheric Sciences, students can take course work to satisfy federal guidelines (e.g., for National Weather Service, U.S. Bureau of Reclamation and U.S. Geological Survey) for the title of meteorologist.

Program Overview

Students take a broad range of courses in the natural and physical sciences including physics, chemistry, math and computer science, and, of course, meteorology and related earth sciences. The atmospheric sciences specialization allows students to prepare for careers in earth sciences, meteorology, computational studies, and scientific visualization of the earth system. Atmospheric Science students also participate in research and weather-related activities such as forecasting competitions and summer internships.

Outcomes

- 100 percent of 2007-08 School of Mines interdisciplinary sciences graduates were placed in their field or entered a graduate program within a year of graduation.
- School of Mines interdisciplinary science graduates received salary offers that average more than $37,000.
- 75 percent of graduates gain real-life experience through internships and co-ops.

Student Organizations

Students at the School of Mines also have a variety of opportunities for extra-curricular activities that

range from music, intramurals, and drama to ski and snowboarding, and more than 75 other clubs and professional student organizations. These are important activities for students and they are encouraged to take full advantage of out-of-classroom events.

The Center for Advanced Manufacturing and Production (CAMP) is designed to teach students engineering, science, and design skills, as well as the ability to work in teams. Team members design, build, market, and raise the money for their projects. All students are welcome to work on CAMP projects.

Research

A senior capstone experience allows students to study with researchers from the South Dakota School of Mines' renowned Institute of Atmospheric Sciences and the National Weather Service.

Research in the atmospheric sciences department includes 3-D modeling studies of lightning-produced nitric oxide, funded by NASA; surface conditions of lake-effect systems, funded by the National Science Foundation; a carbon sequestration partnership, funded by the United States Department of Energy; and more.

Curriculum Listing

http://catalog.sdsmt.edu

Specialization in Atmospheric Sciences Curriculum/Checklist

Freshman Year

First Semester

CHEM 112	General Chemistry I	3
CHEM 112L	General Chemistry I Lab	1
ENGL 101	Composition I	3
IS 110	Explorations	2
MATH 123[2]	Calculus I	4
Gen. Ed. Humanities/Social Science Elective		3
TOTAL		**16**

Second Semester

CHEM 114	General Chemistry II	3
CHEM 114L	General Chemistry II Lab	1
CSC 150/L[2]	Computer Science I/Lab	3
MATH 125[2]	Calculus II	4
PE	Physical Education	1
Gen. Ed.. Humanities/Social Science Elective		3
TOTAL		**15**

Sophomore Year

First Semester

ATM 301	Intro. to Atmospheric Science	3
ENGL 279	Technical Communications I	3
MATH 225[2]	Calculus III	4
PE	Physical Education	1
PHYS 211	University Physics I	3
Gen. Ed. Humanities/Social Science Elective		3
TOTAL		**17**

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Second Semester

ENGL 289	Technical Communications II	3
IS 201	Introduction to Science, Technology, and Society	3
PHYS 213	University Physics II	3
PHYS 213L	University Physics II Lab	1
ATM/SCI/MATH/ENG Elective		3
Gen. Ed. Humanities/Social Science Elective		3
TOTAL		**16**

Junior Year

First Semester

ATM 404	Atmos. Thermodynamics	3
ATM 450/L	Synoptic Meteorology I/Lab	3
BIOL 311	Principles of Ecology	3
ATM/SCI/MATH/ENG Elective		3
Upper Division HU/SS Elective		3
TOTAL		**15**

Second Semester

ATM 406	Global Environ. Change	3
ATM/SCI/MATH/ENG Electives		10
Upper Division HU/SS Elective		3
TOTAL		**16**

Senior Year

First Semester

ATM/SCI/MATH/ENG Electives[1]		11
IS 401	Writing and Research in the Interdisciplinary Sciences	3
Upper Division HU/SS Elective		3
TOTAL		**17**

Second Semester

ATM/SCI/MATH/ENG Electives		10
IS 498	Undergrad. Res./Scholarship	3
Upper Division HU/SS Elective		3
TOTAL		**16**

128 credits required for graduation

[1] All IS specializations require a minimum of 30 semester hours of natural sciences, including a minimum of 3 semester hours in chemistry, 3 semester hours in biology, 6 semester hours in a science sequence, and 12 semester hours at the upper division. The atmospheric sciences/meteorology specialization requires one year of general chemistry with labs, one year of university physics with lab, and one semester of BIOL 311: Principles of Ecology. Students should consult with their advisors to determine additional science courses appropriate for their career paths.

[2] All IS specializations require Math 123 or a math course requiring Math 123 as its prerequisite. Atmospheric sciences/meteorology requires CSC 150/150L and additional math course work beyond Math 123. Math 102 and Math 120 may be used toward graduation requirements.

Students should consult with their atmospheric sciences/interdisciplinary sciences advisors on the most appropriate ATM/science/math/engineering electives for their career paths.