

Interdisciplinary Sciences B.S.



Contact Information

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The bachelor of science degree in interdisciplinary sciences (IS) is a science degree program that seeks to serve the needs of students whose goals cannot be met within the other science departments. IS students choose from three areas of specialization: atmospheric sciences; pre-professional health sciences; and science, technology, and society. The IS degree program allows students to enroll in a wide variety of math and science courses, as well as carefully chosen electives in the humanities, fine arts, and social sciences.

The Interdisciplinary Sciences degree is especially appropriate for the following individuals.

- Students pursuing pre-professional and health services careers, including but not limited to law, medicine, physical therapy, and radiography.
- Students whose educational and career goals require courses in several departments and the integration of knowledge from diverse fields.

The benefits of the interdisciplinary sciences degree include

- Flexibility in a wide range of study;
- Individual design allowing the student to help select the content of the degree; and
- The opportunity to study natural sciences, social sciences, humanities, and liberal arts from a broad perspective, thus providing a well-rounded program.

Areas of Specialization

Interdisciplinary sciences majors choose from three areas of specialization that will prepare them for graduate and professional programs.

- Atmospheric Sciences
- Pre-Professional Health Sciences
- Science, Technology, and Society

1. Atmospheric Sciences:

The atmospheric sciences specialization is designed for students whose career goal is meteorology or atmospheric research. Working with faculty from the Department of Atmospheric Sciences, students can take course work to satisfy federal guidelines (e.g., for National Weather Service, US Bureau of Reclamation and US Geological Survey) for the title of meteorologist. This specialization also serves as excellent preparation for graduate study in meteorology, atmospheric sciences, and adjacent fields. Courses range from those in traditional operational meteorology to those in earth system sciences. All students entering under the 2010 Catalog and later satisfy the United States Government's requirements to qualify as a Meteorologist for federal employment.

2. Pre-Professional Health Sciences:

A strong background in science will prepare students in the pre-professional health sciences specialization for entry into a variety of graduate and professional programs, including medical and dental schools, physical and occupational therapy programs, physician assistant and chiropractic programs, optometry and ophthalmology specialties, and radiography programs. Internships in the community and complementary course work in the humanities and social sciences are included to help students meet the admissions requirement of the professional schools.

Students planning to enter these professions should consult the programs of study of the schools they plan to attend. Working closely with their advisor, they will select the courses needed to fulfill the graduation requirements for the IS degree and to meet the entrance requirements for the professional schools in health science.

Radiologic Technology (RT):

The School of Mines has an articulation agreement with Rapid City Regional Hospital, which has a fully certified RT program. Students take prerequisite course work for RT at the School of Mines before applying to the program. Upon completion of the RT program, students may elect to complete the requirements for the IS degree, thus graduating with both a bachelor's degree in IS and the RT certification. A number of the courses needed to complete the RT program count toward the IS degree. Note: Faculty and staff from the School of Mines and the IS degree program are not involved in the selection of candidates for the RT program. School of Mines students are not guaranteed admission to the RT program.

3. Science, Technology, and Society:

The science, technology, and society specialization combines a strong science background with a firm grounding in environmental, social, and science policy issues. Students pursue a science concentration, such as environmental science, or a minor in a science field, which is complemented by studies in areas such as political science, history, humanities, English, and philosophy. Course work will prepare students for additional study in law school, in science policy or public policy programs, or in graduate programs in science. Careers can include positions in community and government agencies, in science and technology companies, in the military, or as science lobbyists.

Interdisciplinary Sciences Program Admission Policy

After successful completion of at least 64 credit hours and at least one year prior to the intended graduation date, the student must apply for admission to the degree program by filing a

plan of study with the IS Steering Committee. The plan of study must be approved by the steering committee before a student will be formally admitted to the program. This plan of study consists of (1) a Letter of Intent stating the career goals to which the IS degree course work is to be applied and (2) an IS worksheet showing the courses already taken and the courses to be completed prior to graduation. The Letter of Intent and worksheet must be reviewed and approved by the student's IS advisor before submission to the Steering Committee. The Letter of Intent form and worksheet are available from the IS office or may be accessed on the IS website.

The deadlines for submitting the Letter of Intent and worksheet to the IS office: For May graduates — April 30 of the preceding year; for August graduates — July 30 of preceding year; for December graduates — November 30 of preceding year. Students must have an approved Letter of Intent and IS worksheet on file in the IS office before registering for IS 498, the senior capstone project.

General Requirements for Graduation

For all interdisciplinary sciences specializations, students are responsible to check with their advisors for any program modifications that may occur after the publication of this catalog.

I. IS Core Courses (IS 110, IS 201, IS 401, IS 498)	11 credits
II. English sequence (ENGL 101, 279, 289)	9 credits
III. Math, Computer Science, Sciences	
Math and Computer Sciences ¹	min. 12
Biology ²	min. 3
Chemistry ²	min. 3
Additional Natural Sciences ³	min. 24
Other Math, CSC, Science	min. 18
SUBTOTAL	60

IV. Humanities and Social Sciences	
Humanities general education	6
Humanities upper division	6
Social Sciences general education	6
Social Science upper division	6
SUBTOTAL	24
V. Physical Education	2
VI. Program Approved Electives ⁴	22

128 credits required for graduation

¹All IS specializations require MATH 123 Calculus I and a minimum of 3 credit hours in computer science.

²Chemistry must be at the CHEM 112 level or higher. Biology must be at the BIOL 121 level or higher. Some specializations require additional course work in chemistry and biology.

³All IS specializations require a minimum of 30 credit hours in the natural sciences, including 6 hours in sequence (e.g., BIOL 151/BIOL 153) and 12 hours at the upper division.

⁴Engineering courses may be counted toward graduation as electives only.

Thirty-six of the required 128 credits must be at the junior or senior level (courses numbered 300 and above.)

Interdisciplinary Sciences Core Courses

All IS students take a sequence of four core courses, spread out over the course of four years:

- IS 110: Explorations in the freshman year;
- IS 201: Introduction to Science, Technology, and Society in the sophomore year;
- IS 401: Writing and Research in the Interdisciplinary Sciences in the first semester of the senior year; and
- IS 498: Undergraduate Research/Scholarship (senior project) in the second semester of the senior year.

Science Minors available to IS Students

When possible, students pursuing the IS

specializations are strongly encouraged to complete a minor in another science field at School of Mines as part of their 128 total credits. Minors are available in computer science, geology, geospatial technology, mathematics, physics, or occupational safety. Students should consult the policy on minors and the specific courses required for each minor, provided elsewhere in the catalog. The IS degree is not available as a minor.

Transfer Studies

Students who reside in local communities can achieve considerable savings in their education costs by completing a portion of their studies close to home before transferring to another institution to complete their desired major. Students who do not intend to pursue a degree offered at the School of Mines are encouraged to take courses appropriate for the two-year associate of arts (A.A.) degree in general studies. Through this program of access and transfer, students still experience the excellent educational environment found on the School of Mines campus. Students should consult the programs of study for the school from which they plan to graduate and then work closely with their A.A. advisor to select courses with the highest likelihood of transferability. Completion of the A.A. degree will fulfill the general education requirements for a baccalaureate degree at the other state universities of South Dakota (BHSU, DSU, NSU, SDSU, and USD).

Pre-law/Pre-medicine Study at School of Mines

While the IS specializations in pre-professional health sciences and science, technology, and society (STS) are especially designed to help students meet the entrance requirements for medical or law school, a particular baccalaureate degree is not required for admission into most law and medical programs. Graduates from the School of Mines with degrees in several of the science and engineering programs have successfully completed these professional programs. Students are encouraged to consult the admissions requirements and policies for those law and medical schools to which they intend to apply.

Pre-Nursing Study at Mines

The IS degree program does not include a pre-nursing track. Students interested in earning a nursing degree from SDSU (four-year B.S.N.) or USD (two-year A.D.N.) should apply to the degree-granting university. Upon acceptance to SDSU or USD, students can take courses offered by School of Mines that meet pre-nursing requirements. For more information visit <http://sdmines.sdsmt.edu/nursing>.

Teaching Opportunities and Certification

Students who are interested in teaching science at the secondary education level should contact education programs at the other state universities for information on the auxiliary courses required for certification. Project SELECT, an intensive one-year certification program offered through the Black Hills State University College of Education, may be of interest to students completing the IS and other science degrees at the School of Mines. Information on this BHSU program can be obtained from the Humanities/Social Sciences office.

Minor in Geospatial Technology

Geospatial technology is a rapidly expanding field that covers the management and analysis of spatial data from many sources, such as satellites, airborne remote sensing, geographic information systems (GIS), global positioning systems (GPS), surveying, and more. Students in interdisciplinary sciences may find this minor a useful complement to their studies. Complete information on the requirements is given in the Geology B.S. section.

Minor in Entrepreneurial Studies

A 25-credit minor in entrepreneurial studies is available to all School of Mines students through collaboration with the Black Hills State University College of Business and Technology. The requirements for the minor are BADM 406 or ACCT 210/ACCT 211, BADM 336, BADM 438, BADM 334, BADM 360, BADM 370, BADM 474, and BADM 489. The minor must be approved by the student's major department. Contact the Humanities/Social Sciences office for

more information.

Interdisciplinary Sciences

(Upper level courses are in bold print)

IS 110¹, 191, 192, 201¹, 291, 292, **380, 391, 392, 401¹, 491, 492, 498¹, 691, 692**

¹IS degree core courses.

Specialization in Atmospheric Sciences: Curriculum/Course Checklist

Course sequences vary by student entry year, math/science placements, availability of ATM courses, and career objectives. Students should consult with an atmospheric sciences / interdisciplinary sciences advisor for a more personalized course of study based on career goals within the atmospheric sciences.

Freshman Year

First Semester

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

Second Semester

CHEM 114	General Chemistry II ¹	3
CHEM 114L	General Chemistry II Lab ¹	1
CSC 150/L	Computer Science I/Lab ²	3
MATH 125	Calculus II ²	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	Calculus III ²	4
PE	Physical Education	1
PHYS 211	University Physics I	3
Gen Ed Humanities/Social Science Elective		3
TOTAL		17

Second Semester

ENGL 289	Technical Comm II	3
IS 201	Introduction to Science, Technology, and Society	3
MATH 321	Differential Equations ²	4
PHYS 213	University Physics II ¹	3
PHYS 213L	University Physics II Lab ¹	1
Gen Ed Humanities/Social Science Elective		3
TOTAL		17

Junior Year

First Semester

ATM 450/L	Synoptic Meteorology I/Lab	3
ATM 460	Atmospheric Dynamics I	3
BIOL 311	Principles of Ecology ¹	3
ATM/SCI/MATH/ENG Elective ³		3
Upper Division HU/SS Elective		3
TOTAL		15

Second Semester

ATM 530	Radar Meteorology	3
ATM 555/L	Synoptic Meteorology II/Lab	3
ATM/SCI/MATH/ENG Electives ³		9
Upper Division HU/SS Elective		3
TOTAL		18

Senior Year

First Semester

ATM 401	Atmospheric Physics	3
IS 401	Writing and Research in the Interdisciplinary Sciences	3
ATM/SCI/MATH/ENG Electives ³		6
Upper Division HU/SS Elective		3
TOTAL		15

Second Semester

ATM 404	Atmospheric Thermodynamics	3
ATM 406	Global Environmental Change	3
ATM/SCI/MATH/ENG Electives ³		3
IS 498	Undergrad Res/Scholarship	3
Upper Division HU/SS Elective		3
TOTAL		15

128 credits required for graduation

Curriculum Notes

¹All 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.

²All 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.

³Students should consult with their atmospheric sciences/interdisciplinary sciences advisors on the most appropriate ATM/science/math/ engineering electives for their career paths. See also p. 61.

Specialization in Pre-Professional Health Sciences

Curriculum/Course Checklist

Students should consult with their advisors for a more personalized course of study based on career goals within the health sciences. Course requirements vary according to professional program, e.g., medical school, radiographic technology, physical therapy. Course sequence may also vary by student entry year, math/science placements, course availability, and career objectives.

Freshman Year

First Semester

BIOL 121/121L	Human Anatomy & Lab	4
ENGL 101	Composition I	3
IS 110	Explorations	2
Math/CSC Elective ¹		3
Gen Ed Humanities/Social Science Elective		3
TOTAL		15

Second Semester

BIOL 123/123L	Basic Physiology and Lab	4
CHEM 112/112L	Gen Chemistry I and Lab	4

Math/CSC Elective	3
PE Physical Education	1
Gen Ed Humanities/Social Science Elective	3
TOTAL	15

Sophomore Year

First Semester	
BIOL 151/151L Gen Biology I and Lab	4
CHEM 114/114L Gen Chemistry II and Lab	4
ENGL 279 Technical Comm I	3
IS 201 Introduction to Science, Technology, and Society	3
Gen Ed Humanities/Social Science Elective	3
TOTAL	17

Second Semester	
BIOL 153/153L Gen Biology II and Lab	4
ENGL 289 Technical Comm II	3
Math/CSC Elective	3
Gen Ed Humanities/Social Science Elective	3
Electives ²	4
TOTAL	17

Junior Year

First Semester	
Math/CSC Elective	3
Upper Division Science Elective	3
Upper Division HU/SS Elective	3
Electives	7
TOTAL	16

Second Semester	
Science Electives	4
Upper Division HU/SS elective	3
Upper Division Science Elective	3
Electives	7
TOTAL	17

Senior Year

First Semester	
IS 401 Writing and Research in the Interdisciplinary Sciences	3
Science Elective	4
Upper Division HU/SS Elective	3
Upper Division Science Elective	3
PE Physical Education	1
Electives	1
TOTAL	15

Second Semester	
IS 498 Undergrad Res/Scholarship	3
Science Electives	4
Upper Division HU/SS Elective	3
Upper Division Science Elective	3
Electives	3
TOTAL	16

128 credits required for graduation

Curriculum Notes:

¹All IS specializations require Math 123 or a math course requiring Math 123 as its prerequisite. Math 102 and Math 120 may be used toward graduation requirements. Students should consult with their advisors on the most appropriate math/computer science courses for their career paths.

²Elective credits may include additional course work at the 100 level or above in math, computer science, natural and physical sciences, humanities, social sciences, business, military science, or engineering as needed to meet the required minimums or to meet admissions requirements for professional programs in health science. Students should consult with their advisors on the most appropriate courses for their career goals.

Science, Technology, and Society: Curriculum/Course Checklist

Course sequence may vary by student entry year, math/science placements, course availability, and career objectives. Students should consult with their advisors for a more personalized course of study based on career plans.

Freshman Year

First Semester	
ENGL 101 Composition I	3
IS 110 Explorations	2
Math/CSC Elective ¹	3
Science Elective ²	4
Gen Ed Humanities/Social Science Elective	3
TOTAL	15

Second Semester		
Math/CSC Elective		3
PE	Physical Education	1
Science Electives		7
Gen Ed Humanities/Social Science Elective		3
Elective ³		3
TOTAL		17

Sophomore Year

First Semester		
ENGL 279	Technical Comm I	3
IS 201	Introduction to Science, Technology, and Society	3
PE	Physical Education	1
Science Elective		4
Gen Ed Humanities/Social Science Elective		3
Elective		3
TOTAL		17

Second Semester		
ENGL 289	Technical Comm II	3
Math/CSC Elective		3
Science Elective		4
Gen Ed Humanities/Social Science Elective		3
Elective		3
TOTAL		16

Junior Year

First Semester		
Math/CSC Elective		3
Science Electives		7
Upper Division HU/SS Elective		3
Elective		3
TOTAL		16

Second Semester		
Science Electives		7
Upper Division HU/SS elective		3
Elective		6
TOTAL		16

Senior Year

First Semester		
IS 401	Writing and Research in the Interdisciplinary Sciences	3
Science Electives		8
Upper Division HU/SS Elective		3
Elective		1

TOTAL **15**

Second Semester		
IS 498	Undergrad Res/Scholarship	3
Science Electives		7
Upper Division HU/SS Elective		3
Elective		3
TOTAL		16

128 credits required for graduation

Curriculum Notes

¹All IS specializations require Math 123 or a math course requiring Math 123 as its prerequisite. Math 102 and Math 120 may be used toward graduation requirements. Students should consult with their advisors on the most appropriate math/computer science courses for their career paths.

²All IS specializations require a minimum of 30 semester hours of natural sciences including a minimum of 3 semester hours in chemistry at the CHEM 112 level or higher, 3 semester hours in biology at the BIOL 121 level or higher, 6 semester hours of a science sequence, and 12 semester hours at the upper division level. Students pursuing the science, technology, and society specialization are expected to choose a science concentration. A minor in a science field (e.g., atmospheric science, computer science, geology, geospatial technology, mathematics, physics, occupational safety) is highly encouraged. Students should consult with their advisors to determine the most appropriate science courses and sequence for their career paths.

³ Elective credits may include additional college course work at the 100 level or above in math, computer science, sciences, humanities, interdisciplinary sciences, social sciences, business, military science, or engineering as needed to meet the required minimums or to qualify for a science minor. Students should consult with their advisors to determine the most appropriate elective courses for their career goals. This information and additional information on the IS degree program can be found at: <http://is.sdsmt.edu>.