

Science Studies, BS

Science studies provides preparation in more than one discipline of science; a consideration of science from a philosophical, historical, and sociological perspective; an introduction to applied science (technology); and an education sequence.

Program planning in science studies requires the cooperation and involvement of a variety of university departments and colleges. Most of the program's requirements are drawn from courses offered by these varied academic units.

Learning Outcomes

Students who major in science studies gain:

- knowledge in two or more areas of science;
- a specified proficiency in mathematics as a tool of science (with more mathematics study required for the physical science emphases than for the biological ones);
- a view of science from a historical, philosophical, and cultural perspective; and
- experience with the application of scientific knowledge.

Research

Each faculty member in science studies is responsible for one or more areas of research. Major interests include studies of effective teaching and learning, science through writing, philosophy and sociology of science, individualized learning, social issues in science and technology, curriculum planning and development, professional development, intellectual development related to teaching and learning science, studies of effective use of hands-on activities, and evaluation and assessment of science instruction and programs.

Programs and Projects

A wide range of funded programs provides ample opportunity for students to be involved in innovative development and research in science studies.

Science studies faculty members collaborate on a number of international research projects in many countries. Activities include faculty exchanges and cross-national studies.

International students enrich the opportunities for graduate studies in science studies. New international collaborative efforts are underway each year.

Requirements

The Bachelor of Science with a major in science studies (awarded by the College of Liberal Arts and Sciences) requires a minimum of 120 s.h., including at least 48 s.h. of work for the major. Students must maintain a grade-point average of at least 2.00 in all courses for the major and in all UI courses for the major. They must also complete the College of Liberal Arts and Sciences GE CLAS Core.

The major in science studies is interdisciplinary. It is intended for students interested in education; it is not intended to prepare students for advanced study in one area of science. When graduates of the science studies program elect to pursue graduate study in a specific area of science, they often must complete additional coursework in that discipline after they are admitted to the Graduate College.

The science studies curriculum includes courses offered by science departments in the College of Liberal Arts and Sciences, science applications courses, and courses in the history, philosophy, and sociology of science.

The major offers five emphasis areas: all-science, biology, chemistry, earth science, and physics. The all-science emphasis area is open only to students who will earn teacher licensure and would like equal preparation in biology, chemistry, earth science, and physics. Students who choose the all-science emphasis area do not choose a secondary emphasis area. They must complete all requirements for teacher licensure in order to graduate in the all-science emphasis area.

Students who do not choose the all-science emphasis area may elect whether or not to earn teacher licensure. They choose a primary and a secondary emphasis area from biology, chemistry, earth science, and physics, acquiring depth in the primary emphasis area equivalent to six semesters of sequential study and preparation in the secondary area equivalent to four semesters of sequential study.

All science studies students must complete the requirements for their emphasis area(s) plus the broad field science block. Those who wish to earn teacher licensure must also complete the College of Education's Teacher Education Program (TEP), including the 47 s.h. professional education sequence; see the section titled "Teacher Licensure."

Special Rules

The Science Studies Program may involve many faculty advisors and more than one college or department. Consequently, the following special rules apply to science studies students.

- At least 10 s.h. of graded credit in science must be earned at the University of Iowa.
- No credit from the CLEP Natural Science General Examination may be applied toward the major in science studies.
- Courses for the major may not be taken pass/nonpass. Grades from all courses applied toward the science studies major are used in computing a student's grade-point average in the major, both at the University of Iowa and overall.

Since mathematics forms an integral part of so many aspects of modern science, all-science emphasis area education students are urged to complete appropriate advanced courses in both pure and applied mathematics (including statistics and computer science) so that they may be qualified to do graduate work and quantitative research later.

The BS with a major in science studies requires the following coursework.

All-Science Emphasis Area

Students who choose the all-science emphasis area do not choose a secondary emphasis area. They complete a minimum of 48 s.h. for the major, including at least 36 s.h. in the following coursework (at least 9 s.h. in each of the four science disciplines—biology, chemistry, earth science, and physics), and 12 s.h. in the broad field science block. They must also complete all requirements for teacher licensure (see the section titled "Teacher Licensure").

Biology

Course #	Title	Hours
At least 9 s.h. from these:		
BIOL:1411	Foundations of Biology	4
BIOL:1412	Diversity of Form and Function	4
BIOL:2211	Genes, Genomes, and the Human Condition	3
BIOL:2673	Ecology	3
BIOL:3172	Evolution	4
HHP:3500	Human Physiology	3

Chemistry

Course #	Title	Hours
At least 9 s.h. from these:		
CHEM:1110	Principles of Chemistry I	4
CHEM:1120	Principles of Chemistry II	4
CHEM:2021	Fundamentals of Chemical Measurements	3
CHEM:2210	Organic Chemistry I	3
CHEM:2220	Organic Chemistry II	3

Earth Science

Course #	Title	Hours
At least 9 s.h. from these:		
SEES:1030	Introduction to Earth Science	3-4
SEES:1040	Evolution and the History of Life	3-4
SEES:1050	Introduction to Geology	4
SEES:1080	Introduction to Environmental Science	3-4
SEES:3070	Marine Ecosystems and Conservation	3

Physics

At least 9 s.h. chosen as follows.

Course #	Title	Hours
At least one of these:		
ASTR:1070	Stars, Galaxies, and the Universe	3-4
PHYS:1200	Physics of Everyday Experience	3
No more than one of these:		
PHYS:1511	College Physics I	4
PHYS:1611	Introductory Physics I	4
PHYS:1701	Physics I	4
No more than one of these:		
PHYS:1512	College Physics II	4

PHYS:1612	Introductory Physics II	4
PHYS:1702	Physics II	4

Broad Field Science Block

Students complete 12 s.h. from the following.

Course #	Title	Hours
This course:		
SIED:4135	The Nature of Science	4
At least two of these:		
SIED:4102	Societal and Educational Applications of Earth Science and Environmental	4
SIED:4103	Societal and Educational Applications of Biological Sciences	4
SIED:4105	Societal and Educational Applications of Physical Sciences	4
SIED:4106	Societal and Educational Applications of Chemical Concepts	4
SIED:4110	Exploring the Geology, Mining History, and Environmental Issues of the Colorado Rockies	4

Biology Emphasis Area

Students who choose biology as their primary emphasis area complete a minimum of 50 s.h. for the major, including 25 s.h. in the following biology coursework plus at least 15 s.h. in a secondary emphasis area (chemistry, earth science, or physics) and 12 s.h. in the broad field science block. With their advisor's permission, students may include a science applications course in their secondary emphasis area.

Course #	Title	Hours
All of these:		
BIOL:1411- BIOL:1412	Foundations of Biology - Diversity of Form and Function	8
BIOL:2512	Fundamental Genetics	4
BIOL:3172	Evolution	4
One of these:		
BIOL:2374	Biogeography	3
BIOL:2673	Ecology	3
One of these:		
BIOL:3343	Animal Physiology	3
HHP:3500	Human Physiology	3
One of these:		
BIOL:2723	Cell Biology	3

BIOL:3233	Introduction to Developmental Biology	3
BIOL:3363	Plant Developmental Biology	3
BMB:3110	Biochemistry	3
And all of these:		
Coursework in a secondary emphasis area (chemistry, earth science, or physics)		15
Coursework listed under "Broad Field Science Block-Biology Emphasis Area"		12

Broad Field Science Block—Biology Emphasis Area

Students complete 12 s.h. from the following.

Course #	Title	Hours
This course:		
SIED:4135	The Nature of Science	4
At least two of these:		
SIED:4102	Societal and Educational Applications of Earth Science and Environmental	4
SIED:4103	Societal and Educational Applications of Biological Sciences	4
SIED:4105	Societal and Educational Applications of Physical Sciences	4
SIED:4106	Societal and Educational Applications of Chemical Concepts	4
SIED:4110	Exploring the Geology, Mining History, and Environmental Issues of the Colorado Rockies	4

Chemistry Emphasis Area

Students who choose chemistry as their primary emphasis area complete a minimum of 50 s.h. for the major, including 23 s.h. in the following chemistry coursework plus at least 15 s.h. in a secondary emphasis area (biology, earth science, or physics) and 12 s.h. in the broad field science block. With their advisor's permission, students may include a science applications course in their secondary emphasis area.

Course #	Title	Hours
All of these:		
CHEM:1110 & CHEM:1120	Principles of Chemistry I-II	8
CHEM:2210	Organic Chemistry I	3
CHEM:2220	Organic Chemistry II	3
CHEM:2410	Organic Chemistry Laboratory	3

CHEM:3250	Inorganic Chemistry (spring)	3
One of these:		
BMB:3110	Biochemistry	3
CHEM:3110	Equilibria and Electrochemistry	3
CHEM:4431	Chemical Thermodynamics	3
And all of these:		
Coursework in a secondary emphasis area (biology, earth science, or physics)		15
Coursework listed under "Broad Field Science Block- Chemistry Emphasis Area"		12

Broad Field Science Block—Chemistry Emphasis Area

Students complete 12 s.h. from the following.

Course #	Title	Hours
This course:		
SIED:4135	The Nature of Science	4
At least two of these:		
SIED:4102	Societal and Educational Applications of Earth Science and Environmental	4
SIED:4103	Societal and Educational Applications of Biological Sciences	4
SIED:4105	Societal and Educational Applications of Physical Sciences	4
SIED:4106	Societal and Educational Applications of Chemical Concepts	4
SIED:4110	Exploring the Geology, Mining History, and Environmental Issues of the Colorado Rockies	4

Earth Science Emphasis Area

Students who choose earth science as their primary emphasis area complete a minimum of 48 s.h. for the major, including at least 21 s.h. in the following earth science coursework plus at least 15 s.h. in a secondary emphasis area (biology, chemistry, or physics) and 12 s.h. in the broad field science block. With their advisor's permission, students may include a science applications course in their secondary emphasis area.

Course #	Title	Hours
Both of these:		
SEES:1040	Evolution and the History of Life	3-4
SEES:1080	Introduction to Environmental Science	3-4

One of these:		
SEES:1030	Introduction to Earth Science	3-4
SEES:1050	Introduction to Geology	4
One of these:		
SEES:2831	Geologic Field Methods	3
SEES:3330	Sedimentary Geology	4
SEES:3840	Structural Geology	4
One of these:		
SEES:3020	Earth Surface Processes	3
SEES:3210	Principles of Paleontology	3
SEES:3360	Soil Genesis and Geomorphology	3
One of these:		
SEES:1290	Energy and the Environment	3
SEES:4010	Field Methods in Physical Geography	3
One of these:		
SEES:3070	Marine Ecosystems and Conservation	3
SEES:3080	Introduction to Oceanography	2
And all of these:		
Coursework in a secondary emphasis area (biology, chemistry, or physics)		15
Coursework listed under "Broad Field Science Block-Earth Science Emphasis Area"		12

Broad Field Science Block—Earth Science Emphasis Area

Students complete 12 s.h. from the following.

Course #	Title	Hours
This course:		
SIED:4135	The Nature of Science	4
At least two of these:		
SIED:4102	Societal and Educational Applications of Earth Science and Environmental	4
SIED:4103	Societal and Educational Applications of Biological Sciences	4
SIED:4105	Societal and Educational Applications of Physical Sciences	4
SIED:4106	Societal and Educational Applications of Chemical Concepts	4

SIED:4110	Exploring the Geology, Mining History, and Environmental Issues of the Colorado Rockies	4
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Physics Emphasis Area

Students who choose physics as their primary emphasis area complete a minimum of 47 s.h. for the major, including at least 20 s.h. in the following physics coursework plus at least 15 s.h. in a secondary emphasis area (biology, chemistry, or earth science) and 12 s.h. in the broad field science block. With their advisor's permission, students may include a science applications course in their secondary emphasis area.

Course #	Title	Hours
One of these sequences:		
PHYS:1511- PHYS:1512	College Physics I-II (if physics is a secondary emphasis area)	8
PHYS:1611- PHYS:1612	Introductory Physics I-II	8
PHYS:1701- PHYS:1702	Physics I-II	8
One of these:		
PHYS:2703	Physics III	4
PHYS:3710	Intermediate Mechanics	3
One of these:		
ASTR:1070	Stars, Galaxies, and the Universe (if physics is a secondary emphasis area)	3-4
ASTR:1080	Exploration of the Solar System (if physics is a secondary emphasis area)	4
ASTR:1771	Fundamental Astronomy I: The Solar System and Exoplanets	4
One of these:		
PHYS:3811	Electricity and Magnetism I	3
PHYS:3850	Electronics	4
This course:		
PHYS:1200	Physics of Everyday Experience	3
And all of these:		
Coursework in a secondary emphasis area (biology, chemistry, or earth science)		15
Coursework listed under "Broad Field Science Block-Physics Emphasis Area"		12

Broad Field Science Block—Physics Emphasis Area

Students complete 12 s.h. from the following.

Course #	Title	Hours
This course:		
SIED:4135	The Nature of Science	4
At least two of these:		
SIED:4102	Societal and Educational Applications of Earth Science and Environmental	4
SIED:4103	Societal and Educational Applications of Biological Sciences	4
SIED:4105	Societal and Educational Applications of Physical Sciences	4
SIED:4106	Societal and Educational Applications of Chemical Concepts	4
SIED:4110	Exploring the Geology, Mining History, and Environmental Issues of the Colorado Rockies	4

Teacher Licensure

Students interested in teaching in elementary and/or secondary schools should seek admission to the Teacher Education Program (TEP) in the College of Education.

To qualify for licensure in secondary teaching, students in the TEP complete a degree in education as well as a related College of Liberal Arts and Sciences degree. See Apply on the College of Education website for details on requirements and deadlines for applying to the College of Education and about TEP choices of majors leading to licensure.

Honors

Honors in the Major

The science studies program offers outstanding students the opportunity to graduate with honors in the major. Honors students must maintain a cumulative University of Iowa grade-point average of at least 3.33 and fulfill other requirements; contact the Science Education program for more information about graduating with honors in the science studies major.

University of Iowa Honors Program

In addition to honors in the major, students have opportunities for honors study and activities through membership in the University of Iowa Honors Program. Visit Honors at Iowa to learn about the university's honors program.

Membership in the UI Honors Program is not required to earn honors in the science studies major.

Career Advancement

The Pomerantz Career Center offers multiple resources to help students find internships and jobs.

Academic Plans

Four-Year Graduation Plan

The Four-Year Graduation Plan is not available to students majoring in science studies.

Sample Plans of Study

Sample plans represent one way to complete a program of study. Actual course selection and sequence will vary and should be discussed with an academic advisor. For additional sample plans, see MyUI.

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Biology Emphasis

This sample plan is currently being reviewed and will be added at a later date.

Chemistry Emphasis

This sample plan is currently being reviewed and will be added at a later date.

Earth Science Emphasis

This sample plan is currently being reviewed and will be added at a later date.

Physics Emphasis

This sample plan is currently being reviewed and will be added at a later date.