SOIL SCIENCE, BS

REQUIREMENTS

UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (http://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudytext) section of the *Guide*.

General Education

- Breadth—Humanities/Literature/Arts: 6 credits
- Breadth—Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits
- Breadth—Social Studies: 3 credits
- Communication Part A Part B *
- Ethnic Studies *
- Quantitative Reasoning Part A Part B *

* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

COLLEGE OF AGRICULTURAL AND LIFE SCIENCES REQUIREMENTS

In addition to the University General Education Requirements, all undergraduate students in CALS must satisfy a set of college and major requirements. Courses may not double count within university requirements (General Education and Breadth) or within college requirements (First-Year Seminar, International Studies, Science, and Capstone), but courses counted toward university requirements may also be used to satisfy a college and/or a major requirement; similarly, courses counted toward college requirements may also be used to satisfy a university and/or a major requirement.

COLLEGE REQUIREMENTS FOR ALL CALS BS DEGREE PROGRAMS

Code	Title	Credits
Quality of Work: Students must maintain a minimum cumulative grade point average of 2.000 to remain in good standing and be eligible for graduation.		
Residency: Students must complete 30 degree credits in residence at UW–Madison after earning 86 credits toward their undergraduate degree.		
First year seminar (http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#CALSFirstYearSeminarCourses)		1
International studies (http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#CALSInternationalStudiesCourses)		3
Physical science fundamentals		4-5
CHEM 103	General Chemistry I	
or CHEM 108	Chemistry in Our World	
or CHEM 109	Advanced General Chemistry	
Biological science		5
Additional science (biological, physical, or natural)		3
Science breadth (biological, physical, natural, or social)		3
CALS Capstone Learning Experience: included in the requirements for each CALS major (see "major requirements") (http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#CALSCapstoneRequirement)		

MAJOR REQUIREMENTS

Courses may not double count within the major (unless specifically noted otherwise), but courses counted toward the major requirements may also be used to satisfy a university requirement and/or a college requirement. A minimum of 15 credits must be completed in the major that are not used elsewhere.

Code	Title	Credits
Mathematics and Statistics		
Select one of the following courses:		3-5
MATH 112	Algebra	
MATH 114	Algebra and Trigonometry	
MATH 171	Calculus with Algebra and Trigonometry I [1]	
Select one of the following courses:		3-4
STAT 371	Introductory Applied Statistics for the Life Sciences (recommended)	
STAT/F&W ECOL/ HORT 571	Statistical Methods for Bioscience I	
Chemistry		
Select one of the following options:		5-9
Option 1:		
CHEM 103 & CHEM 104	General Chemistry I and General Chemistry II	
Option 2:		
CHEM 109	Advanced General Chemistry	
Biology		
Select one of the following options:		10
Option 1 (recommended):		
BOTANY/ BIOLOGY 130	General Botany [2]	
ZOOLOGY/ BIOLOGY 101	Animal Biology	
ZOOLOGY/ BIOLOGY 102	Animal Biology Laboratory	
Option 2:		

BIOLOGY/ BOTANY/ ZOOLOGY 151	Introductory Biology	
BIOLOGY/ BOTANY/ ZOOLOGY 152	Introductory Biology	
Option 3:		
BIOCORE 381	Evolution, Ecology, and Genetics	
BIOCORE 382	Evolution, Ecology, and Genetics Laboratory	
BIOCORE 383	Cellular Biology	
BIOCORE 384	Cellular Biology Laboratory	
Core		
SOIL SCI 301 & SOIL SCI 302	General Soil Science and Meet Your Soil: Soil Analysis and Interpretation Laboratory	4
Select one of the following courses:		3
SOIL SCI 321	Soils and Environmental Chemistry	
SOIL SCI 621	Soil Chemistry	
SOIL SCI/ AGRONOMY/ HORT 326	Plant Nutrition Management	
SOIL SCI/ BOTANY/ HORT 626	Mineral Nutrition of Plants	
Select one of the following courses:		3
SOIL SCI 327	Environmental Monitoring and Soil Characterization for Earth's Critical Zone	
SOIL SCI 622	Soil Physics	
Select one of the following courses:		3
SOIL SCI/ PL PATH 323	Soil Biology	
SOIL SCI/ MICROBIO 425	Environmental Microbiology	
SOIL SCI/ MICROBIO 523	Soil Microbiology and Biochemistry	
Focus Areas		
Students must complete 1 of 3 focus areas: 1. Environmental Soil Science 2. Soil and Food Systems 3. Turf and Grounds (see below)		29-44
Capstone		
Select one of the following courses:		3-4
SOIL SCI 499	Soil Management [3]	
ENVIR ST/ SOIL SCI 575	Assessment of Environmental Impact	
F&W ECOL/ A A E 652	Decision Methods for Natural Resource Managers	
Total Credits		**66-89**

[1] Note that MATH 171 & MATH 217 must be taken as a sequence.
[2] BOTANY/BIOLOGY 130 is required by the Turf and Grounds focus area.
[3] SOIL SCI 499 capstone required for Turf and Grounds focus area.

FOCUS AREAS WITHIN THE MAJOR

Environmental Soil Science

Code	Title	Credits
Mathematics		
Select one of the following courses:		5
MATH 211	Survey of Calculus	
MATH 221	Calculus and Analytic Geometry 1	
MATH 217	Calculus with Algebra and Trigonometry II	
Physics		
Select one of the following courses:		4-5
PHYSICS 103	General Physics (recommended)	
PHYSICS 104	General Physics	
PHYSICS 207	General Physics	
PHYSICS 208	General Physics	
Chemistry		
Select one of the following options:		4-8
Option 1:		
CHEM 311	Chemistry Across the Periodic Table	
CHEM 327	Fundamentals of Analytical Science	
or CHEM 329	Fundamentals of Analytical Science	
Option 2:		
CHEM 341 & CHEM 342	Elementary Organic Chemistry and Elementary Organic Chemistry Laboratory	
Option 3:		
CHEM 343 & CHEM 344 & CHEM 345	Organic Chemistry I and Introductory Organic Chemistry Laboratory and Organic Chemistry II	
Physical Environment		**6**
Select one course from the following:		
ATM OCN 100	Weather and Climate	
ATM OCN 101	Weather and Climate	
ATM OCN/ SOIL SCI 132	Earth's Water: Natural Science and Human Use	
GEOG/ ENVIR ST 120	Introduction to the Earth System	
GEOG/ ENVIR ST 127	Physical Systems of the Environment	
GEOSCI/ ENVIR ST 106	Environmental Geology	
GEOSCI 202	Introduction to Geologic Structures	
SOIL SCI 131	Earth's Soil: Natural Science and Human Use	
SOIL SCI 321	Soils and Environmental Chemistry	
SOIL SCI/ AGRONOMY/ HORT 326	Plant Nutrition Management	
Select at least one course from the following:		
GEOG/CIV ENGR 320	Geomorphology	
ATM OCN/ GEOG 323	Science of Climate Change	

SOIL SCI/ ENVIR ST 324	Soils and Environmental Quality
SOIL SCI/ F&W ECOL/ HORT 524	Urban Soil and Environment
SOIL SCI 621	Soil Chemistry
SOIL SCI 622	Soil Physics
SOIL SCI/ BOTANY/ HORT 626	Mineral Nutrition of Plants
AGRONOMY/ATM OCN/SOIL SCI 532	Environmental Biophysics
F&W ECOL/ LAND ARC/ ZOOLOGY 565	Principles of Landscape Ecology
GEOG 578	GIS Applications

Living Environment **11**

Select one course from the following:

AGRONOMY 100	Principles and Practices in Crop Production
AGRONOMY 300	Cropping Systems
GEOG/ ENVIR ST 309	People, Land and Food: Comparative Study of Agriculture Systems
ZOOLOGY/ ENVIR ST 315	Limnology-Conservation of Aquatic Resources
HORT 345	Fruit Crop Production
HORT 370	World Vegetable Crops
AGROECOL 400	Study Abroad in Agroecology
SOIL SCI/ AGRONOMY/ BOTANY 370	Grassland Ecology
SOIL SCI/ MICROBIO 425	Environmental Microbiology
SOIL SCI/ MICROBIO 523	Soil Microbiology and Biochemistry

Select one course from the following:

BOTANY/F&W ECOL/ZOOLOGY 460	General Ecology
F&W ECOL 550 & F&W ECOL 551	Forest Ecology and Forest Ecology Lab
GENETICS 466	Principles of Genetics
BOTANY 500	Plant Physiology
SOIL SCI/ MICROBIO 523	Soil Microbiology and Biochemistry
GENETICS 545	Genetics Laboratory
BOTANY/ PL PATH 563	Phylogenetic Analysis of Molecular Data
SOIL SCI/ BOTANY/ HORT 626	Mineral Nutrition of Plants
SOIL SCI/ CIV ENGR/ M&ENVTOX 631	Toxicants in the Environment: Sources, Distribution, Fate, & Effects

Select one of the following options:

Option 1:

MICROBIO 101 & MICROBIO 102	General Microbiology and General Microbiology Laboratory

Option 2:

MICROBIO 303 & MICROBIO 304	Biology of Microorganisms and Biology of Microorganisms Laboratory

Option 3:

BOTANY 330 & BOTANY/ PL PATH 332	Algae and Fungi

Environmental Policy, Management, and Analysis **9**

Select one of the following courses:

SOIL SCI/ENVIR ST 101	Forum on the Environment
ENVIR ST 112	Environmental Studies: Social Science Perspectives
ENVIR ST 113	Environmental Studies: Environmental Humanities
ENVIR ST/ILS 126	Principles of Environmental Science
ENVIR ST/GEOG 127	Physical Systems of the Environment
A A E/F&W ECOL 652	Decision Methods for Natural Resource Managers
SOIL SCI/ENVIR ST 575	Assessment of Environmental Impact
GEOG/ SOIL SCI 526	Human Transformations of Earth Surface Processes

Select one of the following courses:

A A E 101	Introduction to Agricultural and Applied Economics
ECON 101	Principles of Microeconomics
ECON 111	Principles of Economics-Accelerated Treatment
A A E/ ENVIR ST 244	The Environment and the Global Economy
A A E 319	The International Agricultural Economy

Select one of the following courses:

ENVIR ST/ F&W ECOL/ G L E/GEOG/ GEOSCI/ LAND ARC 371	Introduction to Environmental Remote Sensing
ENVIR ST/ F&W ECOL/ G L E/GEOG/ GEOSCI/ LAND ARC 372	Intermediate Environmental Remote Sensing
ENVIR ST/LAND ARC/SOIL SCI 695	Applications of Geographic Information Systems in Natural Resources

Total Credits **39-44**

Soil and Food Systems

Code	Title	Credits
Physical Environment		**8-10**
Select one of the following courses:		
ATM OCN 100	Weather and Climate	
SOIL SCI/ ATM OCN 132	Earth's Water: Natural Science and Human Use	
ATM OCN 101	Weather and Climate	
ATM OCN/ GEOG 323	Science of Climate Change	
GEOG/ ENVIR ST 120	Introduction to the Earth System	
GEOG/ ENVIR ST 127	Physical Systems of the Environment	
GEOSCI 100	Introductory Geology: How the Earth Works	
GEOSCI/ ENVIR ST 106	Environmental Geology	
SOIL SCI/ ENVIR ST 324	Soils and Environmental Quality	
SOIL SCI 321	Soils and Environmental Chemistry	
SOIL SCI/ AGRONOMY/ HORT 326	Plant Nutrition Management	
SOIL SCI/ F&W ECOL 451	Environmental Biogeochemistry	
SOIL SCI/ F&W ECOL/ HORT 524	Urban Soil and Environment	
Select one of the following courses:		
F&W ECOL/ ZOOLOGY 565	Principles of Landscape Ecology	
GEOG/CIV ENGR 320	Geomorphology	
GEOG 578	GIS Applications	
GEOG 579	GIS and Spatial Analysis	
SOIL SCI 131	Earth's Soil: Natural Science and Human Use	
SOIL SCI/ F&W ECOL 451	Environmental Biogeochemistry	
SOIL SCI/ MICROBIO 523	Soil Microbiology and Biochemistry	
SOIL SCI 621	Soil Chemistry	
SOIL SCI 622	Soil Physics	
SOIL SCI/ BOTANY/ HORT 626	Mineral Nutrition of Plants	
Select one of the following courses:		
ENVIR ST/ F&W ECOL/ G L E/GEOG/ GEOSCI/ LAND ARC 371	Introduction to Environmental Remote Sensing	
ENVIR ST/ F&W ECOL/ G L E/GEOG/ GEOSCI/ LAND ARC 372	Intermediate Environmental Remote Sensing	
ENVIR ST/LAND ARC/SOIL SCI 695	Applications of Geographic Information Systems in Natural Resources	
Economics and Food Management		**6-8**
Select one of the following courses:		
ACCT I S 100	Introductory Financial Accounting	
ACCT I S 211	Introductory Managerial Accounting	
ACCT I S 300	Accounting Principles	
ACCT I S 301	Financial Reporting I	
ACCT I S 329	Taxation: Concepts for Business and Personal Planning	
A A E 101	Introduction to Agricultural and Applied Economics	
A A E 320	Agricultural Systems Management	
A A E 322	Commodity Markets	
A A E 323	Cooperatives and Alternative Forms of Enterprise Ownership	
A A E 419	Agricultural Finance	
A A E/ECON 421	Economic Decision Analysis	
A A E/ECON 474	Economic Problems of Developing Areas	
M H R 305	Human Resource Management	
M H R 610	Compensation: Theory and Administration	
M H R 611	Strategic Talent Management	
M H R 612	Labor-Management Relations	
Select one of the following courses:		
ECON 101	Principles of Microeconomics	
ECON 111	Principles of Economics-Accelerated Treatment	
ACCT I S 100	Introductory Financial Accounting	
ACCT I S 211	Introductory Managerial Accounting	
ACCT I S 300	Accounting Principles	
ACCT I S 301	Financial Reporting I	
ACCT I S 329	Taxation: Concepts for Business and Personal Planning	
A A E 320	Agricultural Systems Management	
A A E 322	Commodity Markets	
A A E 323	Cooperatives and Alternative Forms of Enterprise Ownership	
A A E 419	Agricultural Finance	
A A E/ECON 421	Economic Decision Analysis	
A A E/ECON 474	Economic Problems of Developing Areas	
SOIL SCI/ MICROBIO 425	Environmental Microbiology	
SOIL SCI/ MICROBIO 523	Soil Microbiology and Biochemistry	
M H R 305	Human Resource Management	

M H R 610	Compensation: Theory and Administration	
M H R 611	Strategic Talent Management	
M H R 612	Labor-Management Relations	
Specialized Sciences (complete all)		
AGRONOMY 100	Principles and Practices in Crop Production	3-4
or HORT 120	Survey of Horticulture	
AGRONOMY 300	Cropping Systems	3
or AGRONOMY 302	Forage Management and Utilization	
or HORT 345	Fruit Crop Production	
AGRONOMY/HORT/ SOIL SCI 326	Plant Nutrition Management	3
PL PATH 300	Introduction to Plant Pathology	3-4
or ENTOM 351	Principles of Economic Entomology	
A A E 101	Introduction to Agricultural and Applied Economics	4
or A A E/ ENVIR ST 244	The Environment and the Global Economy	
or A A E 319	The International Agricultural Economy	
or A A E/ AGRONOMY/ NUTR SCI 350	World Hunger and Malnutrition	
Total Credits		**30-36**

Turf and Grounds

Code	Title	Credits
Physical Environment		
Select one of the following courses:		3
ATM OCN 100	Weather and Climate	
ATM OCN 101	Weather and Climate	
SOIL SCI/ ATM OCN 132	Earth's Water: Natural Science and Human Use	
GEOG/ ENVIR ST 120	Introduction to the Earth System	
GEOG/ ENVIR ST 127	Physical Systems of the Environment	
GEOSCI 100	Introductory Geology: How the Earth Works	
GEOSCI/ ENVIR ST 106	Environmental Geology	
Core Turf and Grounds Sciences (complete all)		
ACCT I S 300	Accounting Principles	3
BOTANY/ BIOLOGY 130	General Botany (also counts for Soil Science Biology requirement)	5
HORT/PL PATH 261	Sustainable Turfgrass Use and Management	2
M H R 305	Human Resource Management	3
PL PATH 300	Introduction to Plant Pathology	4
HORT/SOIL SCI 332	Turfgrass Nutrient and Water Management	3
Specialized Sciences		7
Select 7 credits from the following courses:		
BOTANY/F&W ECOL 402	Dendrology: Woody Plant Identification and Ecology	
HORT/ LAND ARC 263	Landscape Plants I	
BSE 243	Operating and Management Principles of Off-Road Vehicles	
BSE 301	Land Information Management	
ENTOM 351	Principles of Economic Entomology	
HORT 120	Survey of Horticulture	
HORT/ PL PATH 262	Turfgrass Management Laboratory	
Total Credits		**30**

HONORS IN THE MAJOR

Students admitted to the university and to the College of Agricultural and Life Sciences are invited to apply to be considered for admission to the CALS Honors Program.

Admission Criteria for New First-Year Students:

- Complete program application including essay questions

Admission Criteria for Transfer and Continuing UW-Madison Students:

- UW-Madison cumulative GPA of at least 3.25
- Complete program application including essay questions

HOW TO APPLY

The application is available on the CALS Honors Program website (https://cals.wisc.edu/academics/undergraduate/current-students/honors-program/). Applications are accepted at any time.

New first-year students with accepted applications will automatically be enrolled in Honors in Research. It is possible to switch to Honors in the Major in the student's first semester on campus after receiving approval from the advisor for that major. Transfer and continuing students may apply directly to Honors in Research or Honors in the Major (after approval from the major advisor).

REQUIREMENTS

All CALS Honors programs have the following requirements:

- Earn at least a cumulative 3.25 GPA at UW-Madison (some programs have higher requirements)
- Complete the program-specific requirements listed below
- Submit completed thesis documentation to CALS Academic Affairs

HONORS IN THE MAJOR REQUIREMENTS

To earn Honors in the Major, students are required to take at least 20 honors credits. In addition, students must take SOIL SCI 681 Senior Honors Thesis and SOIL SCI 682 Senior Honors Thesis when completing their thesis project; please see the Honors in Major Checklist (http://www.cals.wisc.edu/academics/undergraduate-programs/get-involved/honors-program/honors-in-the-major/) for more information.

UNIVERSITY DEGREE REQUIREMENTS

Total Degree	To receive a bachelor's degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.
Residency	Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. "In residence" means on the UW–Madison campus with an undergraduate degree classification. “In residence” credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.
Quality of Work	Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.