

SOIL SCIENCE

Soil and water are our most important resources. They provide the food, fiber and foundation of our existence. Soil science is the study of the soil as a component of natural and man-made systems. Soil science is the key factor in food production and is at the forefront of environmental and natural resource issues such as land use, soil contamination, groundwater quality and waste disposal.

The Program

Soil science is a major offered as a four-year Bachelor of Science degree in the School of Natural Resource Sciences. Soil science is an earth science that combines the studies of the atmosphere, surface and subsurface waters, mineral earth deposits and biological ecosystems. This natural science emphasizes the real world applications of biology, chemistry, physics and mathematics. Each student designs a program according to his or her personal abilities, interests and career goals. Soil science graduates gain an appreciation of agriculture production, environmental concerns and natural resource issues.

Research in the Department of Soil Science is basic and applied. Several faculty lead the nation and world in environmental earth sciences, remediation and soil fertility. This research expands our understanding of pollutant movement in soils, the maintenance and reconstruction of disturbed soils, and the production of crops from soybeans to sugar beets.

Many students from natural resources management and students enrolled in other majors across campus pursue a soil science minor. A student minoring in soil science is eligible to receive the status of soil scientist with the USDA and other government agencies.

Career Opportunities

Graduates in soil science obtain positions in environmental science, production agriculture, conservation, consulting, research, teaching, extension and natural resource management. Agencies and businesses that hire soil science graduates include soil and plant testing labs, the Natural Resources Conservation Service, colleges of agriculture, the Extension Service, the U.S. Forest Service, agricultural experiment stations, the Bureau of Land Management, departments of health, the Public Service Commission, departments of natural resources and a variety of consulting firms and agribusiness companies. Soil scientists work in a variety of activities that apply soil science knowledge. A soil scientist's job may involve:

- Conducting general and detailed soil surveys;
- Studying soil hydrology and ecology of wetlands;
- Recommending soil management;
- Monitoring the effects of farm, ranch or forest activities on soil productivity;
- Managing soils for crop production, forest products and erosion control management;
- Evaluating nutrient and water availability to crops;
- Managing soils for landscape design, mine reclamation and site restoration;
- Assessing application of wastes including non-hazardous process wastes (residue and sludge management);

- Conducting studies on soil stability, moisture retention or drainage, sustainability and environmental impact; and
- Assessing environmental hazards, including hazardous waste sites that involve soil investigation techniques, evaluation of chemical fate and transport phenomena and remediation alternatives.

Well-trained soil scientists are in high demand for a wide array of professional positions with public agencies or private firms. Some specific examples of positions currently held by our soil science graduates over the past 10 years include:

- Water quality specialist, North Dakota Department of Health;
- Environmental specialist, Minnesota Environmental Services Department;
- Soil conservationist, USDA-NRCS;
- Staff scientist/engineer, NASA Hydrological Sciences Branch;
- Soil consultants, self-employed;
- Senior resources scientist, environmental firm;
- Manager, crop protection firm;
- Environmental specialist (wetlands), Iowa Department of Transportation;
- District conservationist;
- Hydrologist, North Dakota State Water Commission;
- Soil scientist, USDA-NRCS; and
- Professional soil scientist, an environmental consulting firm.

The bachelor's degree also prepares students for advanced training. The department offers master's and doctoral degrees. Starting salaries with a bachelor's degree are between \$30,000 and \$40,000.

Financial Aid and Scholarships

The Department of Soil Science provides ten scholarships each year, ranging from \$300 to \$2,300 each. Part-time employment during the school year and summer is available. An internship program leading to full-time employment is available with the Natural Resources Conservation Service. Other scholarship opportunities are possible through the College of Agriculture, Food Systems, and Natural Resources.

The Faculty

The Department of Soil Science has 13 faculty involved in teaching, research and extension. They provide expertise in the following specialized areas: (1) environmental soil science; (2) soil genesis, morphology and classification; (3) soil fertility, fertilizers and plant nutrition; (4) soil chemistry; (5) soil physics and hydrology; (6) soil management and conservation; and (7) soil health. Student learning is enhanced by the incorporation of current research into classroom learning.

Soil Science Plan of Study

Please note this is a sample plan of study and not an official curriculum. Actual student schedules for each semester will vary depending on start year, education goals, applicable transfer credit, and course availability. Students are encouraged to work with their academic advisor on a regular basis to review degree progress and customize an individual plan of study.

Freshman			
Fall	Credits	Spring	Credits
AGRI 189 Skills for Academic Success	1	SOIL 217 Introduction to Meteorology & Climatology	3
AGRI 150 Agriculture Orientation	1	ENGL 120 College Composition II	3
ENGL 110 College Composition I	4	MATH 105 Trigonometry	3
BIOL 150 General Biology I	3	GEOL 105 Physical Geology	3
BIOL 150L General Biology I Laboratory	1	GEOL 105L Physical Geology Lab	1
MATH 103 College Algebra	3	Gen Ed Wellness	2
Gen Ed Humanities & Fine Arts	3		
	16		15
Sophomore			
Fall	Credits	Spring	Credits
SOIL 210 Introduction to Soil Science	3	SOIL 264 Natural Resource Management Systems	3
PHYS 211 College Physics I	3	SOIL 322 Soil Fertility and Fertilizers	3
PHYS 211L College Physics I Laboratory	1	BIOL 151 or PHYS 212 General Biology II or College Physics II	3
CHEM 121 General Chemistry I	3	BIOL 151L or PHYS 212L General Biology II Laboratory	1
CHEM 121L General Chemistry I Laboratory	1	or College Physics II Laboratory	
MATH 146 or 165 Applied Calculus I or Calculus I	4	COMM 110 Fundamentals of Public Speaking	3
		Ag Science Elective	3
	15		16
Junior			
Fall	Credits	Spring	Credits
SOIL 351 Soil Ecology	3	SOIL 410 Soils and Land Use	3
PLSC 110 World Food Crops	3	PLSC 380 Principles of Plant Physiology	3
CHEM 240 Survey of Organic Chemistry (or BIOC 260 Elements of Biochemistry; or MICR 202 & MICR 202L Intro Microbiology/Lab; or MICR 350 & MICR 350L General Microbiology/Lab)	3-5	PLSC 225 or RNG 136 Principles of Crop Production or Introduction to Range Management	3
ENGL 321, 324, or 459 Writing in the Technical Professions Writing in the Sciences, or Researching and Writing Grants and Proposal	3	CHEM 122 General Chemistry II	3
GEOG 455 or RNG 452 Introduction to Geographic Information Systems or Geographic Information Systems in Range Survey	4	CHEM 122L General Chemistry II Laboratory	1
		Gen Ed Humanities & Fine Arts/ Gen Ed Cultural Diversity	
	16-18		16
Senior			
Fall	Credits	Spring	Credits
SOIL 433	3	SOIL 462	3
SOIL 444	3	STAT 330	3
Ag Science Elective	3	Ag Science Elective	3
Gen Ed Social & Behavioral Sciences/Gen Ed Global Perspectives Elective	3	Gen Ed Social & Behavioral Sciences	3
	2		
	14		12
Total Credits: 120-122			

View NDSU equivalencies of transfer courses at: www.ndsu.edu/transfer/equivalencies

For Further Information	
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