SOIL SCIENCE (SS)

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Prerequisites:

- SS 120 or SS 130
- SS 221

SOIL SCIENCE (SS)

SS 120. Introductory Soil Science. 4 units
2020-21 or later catalog: GE Area B1
2020-21 or later catalog: GE Area B3
2019-20 or earlier catalog: GE Area B3
2019-20 or earlier catalog: GE Area B4

Biological, chemical, physical and genetic properties of soils. Application of scientific principles to solving land use, water management, and soil conservation problems. Interpretation of soils data for making environmental decisions, applying management practices, and sustainable food production. 3 lectures, 1 laboratory. Fulfils GE Areas B1 and B3 (GE Areas B3 and B4 for students on the 2019-20 or earlier catalogs). Formerly SS 121.

SS 130. Soils in Environmental and Agricultural Systems. 4 units
2020-21 or later catalog: GE Area B1
2020-21 or later catalog: GE Area B3
2019-20 or earlier catalog: GE Area B3
2019-20 or earlier catalog: GE Area B4

Soils' ecological functions; soil and the water cycle; soil in production of food, fiber, and forest materials; techniques and reports of soil analyses with agricultural and environmental applications; soil quality; introductory overview of soils and civilizations. Not open to students with credit in SS 120. 3 lectures, 1 laboratory. Fulfills GE Areas B1 and B3 (GE Areas B3 and B4 for students on the 2019-20 or earlier catalogs). Formerly SS 131.

SS 221. Soil Health and Plant Nutrition. 4 units
Prerequisite: SS 120 or SS 121.

Plant nutrient requirements in the context of soil health. Composition, value, and use of fertilizer materials, conditioners and agricultural minerals for sustainable crop production and environmental quality. 3 lectures, 1 laboratory.

SS 270. Selected Topics. 1-4 units
Prerequisite: Consent of instructor.

Directed group study of selected topics. The Class Schedule will list topic selected. Total credit limited to 12 units. 1 to 4 lectures. Crosslisted as ERSC/SS 270.

SS 321. Soil Morphology. 4 units
Prerequisite: SS 120 or SS 121.

Identification of soil morphological and site properties. Correlation of soil physical and chemical properties with soil taxonomy and land use. Techniques of interpretations for agriculture, forest lands, wetlands, range lands and urban development. 3 lectures, 1 laboratory.

SS 322. Soil Plant Relationships. 4 units
Prerequisite: one of the following: AEPS 120, BOT 121, or SS 120; and CHEM 124 or CHEM 127.

Investigation and evaluation of soil functions. Nutrient supplying ability, conditions and processes involved in the delivery of soil functions. Effects of cultural treatments on soil fertility. Diagnostic techniques and data interpretation in soil health. 3 lectures, 1 laboratory.

SS 339. Internship in Environmental Earth and Soil Sciences. 1-12 units
CR/NC
Prerequisite: Consent of internship instructor.

Selected students will spend up to 12 weeks with an approved firm or agency engaged in work and study related to their major. A detailed written proposal and written interim and final reports required. One unit of credit may be allowed for each full week of internship. Credit/No Credit grading. Crosslisted as ERSC/SS 339.

SS 400. Special Problems for Advanced Undergraduates. 1-4 units
Prerequisite: Consent of instructor.

Individual investigation, research, studies or surveys of selected problems. Total credit limited to 12 units. Crosslisted as ERSC/SS 400.

SS 402. Soil, Compost, and Water Testing Enterprise. 3 units
Prerequisite: CHEM 111, CHEM 125 or CHEM 128; SS 221; and junior standing.

Experience in soil, compost, and water testing. Sampling rationale and protocol. Analyses of compost feedstocks and finished compost; monitoring for consistency. Theory and practice in use of analytical instrumentation. Interpretation of results for soil, compost, and water management. Total credit limited to 6 units for SS or ERSC majors. Total credit limited to 3 units for Soil Science minor.

SS 421. Wetlands. 4 units
Prerequisite: BOT 121 or BIO 162; CHEM 127; and SS 120 or SS 130. Recommended: one of the following: BIO 327, BOT 313, BOT 326, MSCI 300, NR 305, or NR 306.


SS 422. Soil Ecology. 4 units
Prerequisite: CHEM 212, CHEM 312, or CHEM 313; and SS 221; or graduate standing.

Biochemical activities, ecology and environmental implications of soil organisms. Effects on the formation, characteristics, and productivity of soils. Methods of studying soil organisms. 3 lectures, 1 laboratory.

SS 423. Environmental Soil and Water Chemistry. 5 units
Prerequisite: CHEM 129; CHEM 212, CHEM 216, CHEM 312, or CHEM 316; ERSC 223; MATH 118, MATH 141, or MATH 161; or graduate standing.

Chemical processes governing weathering, soil mineral formation and stability, common solubility equilibria. Use of chemical principles to explain surface chemical properties of soils and environmental problems in water and soil chemical systems. Preparation of professional quality reports based on laboratory data and library research. 3 lectures, 1 laboratory, 1 activity.
SS 424. Senior Project - Environmental Soil Physics. 5 units
Prerequisite: CHEM 125 or CHEM 128; MATH 141 or MATH 161; PHYS
121 or PHYS 141; SS 120; NR 363; or graduate standing.

Matter and energy in soils, with emphasis on properties and behavior
of solids, water, air, and heat. Applications to agriculture, forestry, range
management, engineering, and environmental sciences. Preparation
of professional reports based on laboratory data and library research.
Satisfies senior project requirement. 3 lectures, 1 laboratory, 1 activity.
Formerly SS 432.

SS 431. Digital Soil Mapping. 4 units
Prerequisite: GEOG 318 or LA/NR 218; SS 321; STAT 217 or STAT 218; or
graduate standing.

Development and production of digital soil surveys for interpretive
purposes. Use of soil taxonomy, land classification systems, geographic
information system (GIS) software, and geostatistics to evaluate land for
best management practices. 2 lectures, 2 laboratories.

SS 440. Forest and Range Soils. 4 units
Prerequisite: SS 120 or SS 121; and SS 321.

Ecosystem approach to chemical, biological, physical and mechanical
properties of forest and range soils. Site quality, nutrient cycling, erosion
and mass movement, fire effects. Preparation of soil management
reports similar to those required by various land management
organizations. Overnight field trips. 3 lectures, 1 laboratory.

SS 444. Soil Judging. 2 units
Prerequisite: SS 321.

Morphological description of soils in the field. Taxonomic determination
of classifications and interpretive properties from soil descriptions.
Participation in collegiate soil judging contests. Total credit limited to 12
units. 1 lecture, 1 laboratory.

SS 463. Undergraduate Seminar. 2 units
Prerequisite: SS 461.

Review of current research, experiments, and problems related to the
student's major field of interest. Preparation and presentation of reports
on problems or research activities. 2 seminars.

SS 470. Selected Advanced Topics. 1-4 units
Prerequisite: Consent of instructor.

Directed group study of selected topics for advanced students. Open
to undergraduate and graduate students. The Class Schedule list topic
selected. Total credit limited to 12 units. 1 to 4 lectures. Crosslisted as
ERSC/SS 470.

SS 471. Selected Advanced Laboratory. 1-4 units
Prerequisite: Consent of instructor.

Directed group laboratory study of selected topics for advanced students.
Open to undergraduate and graduate students. The Class Schedule will
list topic selected. Total credit limited to 8 units. 1 to 4 laboratories.
Crosslisted as ERSC/SS 471.

SS 500. Individual Study in Soil Science. 1-6 units
Prerequisite: Consent of instructor.

Advanced independent study planned and completed under the direction
of a member of the Earth and Soil Sciences faculty. Total credit limited to
6 units.

SS 508. Environmental Assessment for Erosion Control. 3 units
Prerequisite: SS 120 or SS 121; and graduate standing.

Assessment techniques for the development of soil erosion control and
the dispersal of surface runoff water on urban, agriculture, riparian, and
rangelands. Development of a water quality management plan for a
specific land use. 3 lectures.

SS 522. Advanced Soil Fertility. 3 units
Prerequisite: SS 322, graduate standing or consent of instructor.

Current research frontiers in soil fertility. Evaluating soil testing
philosophy, theories and interpretation. Optimizing soil conditions for
maximizing crop production. Consequences of environmental pollution,
trace elements and organic amendments. Chemical reactions including
solubility and chelate equilibria, adsorption phenomena, nutrient mobility,
soil mineralogy and weathering. Use of foliar fertilization. Radioisotopes
in soil fertility. 3 lectures.

SS 570. Selected Topics in Soil Science. 1-4 units
Prerequisite: Graduate standing or consent of instructor.

Directed group study of selected topics for advanced students. Open to
undergraduate and graduate students. The Class Schedule will list topic
selected. Total credit limited to 12 units. 1 to 4 seminars.

SS 571. Selected Advanced Laboratory. 1-4 units
Prerequisite: Graduate standing or consent of instructor.

Directed group laboratory study of selected topics for advanced students.
Open to undergraduate and graduate students. The Class Schedule will
list topic selected. Total credit limited to 8 units. 1 to 4 laboratories.

SS 582. GIS in Advanced Land Management. 3 units
Prerequisite: Graduate standing, NR/LA 318, or consent of instructor.

Development of plans and practices for the management of crop, range,
urban and wood land. 2 seminars, 1 laboratory.

SS 599. Thesis. 1-6 units
Prerequisite: Graduate standing and consent of instructor.

Individual research in soil science under faculty supervision, leading to
a scholarly written presentation exhibiting originality, clarity, critical
and independent thinking, proper analysis of data, appropriate organization
and format, and accurate and thorough documentation. Six units required
for the M.S. degree.