SOIL SCIENCE (SS)

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SS Courses

SS 1120 Introductory Soil Science (4 units)
Term Typically Offered: F, SP
2026-28 or later catalog: GE Area 5A
2026-28 or later catalog: GE Area 5C
2020-26 catalogs: GE Area B1
2020-26 catalogs: GE Area B3
Sustainability Related

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. Fulfills GE Areas 5A and 5C (GE Areas B1 and B3 for students on the 2020-26 catalogs). Formerly SS 120.

SS 1130 Soils in Environmental and Agricultural Systems (3 units)
Term Typically Offered: TBD
2026-28 or later catalog: GE Area 5A
2020-26 catalogs: GE Area B1
Sustainability Focused

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 or SS 1120. 3 lectures. Fulfills GE Area 5A (GE Area B1 for students on the 2020-26 catalogs). Formerly SS 130.

SS 2221 Soil Health and Plant Nutrition (4 units)
Term Typically Offered: F, SP
Prerequisite: SS 120 or SS 1120.

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. Formerly SS 221.

SS 2270 Special Topics (1-4 units)
Term Typically Offered: TBD
Prerequisite: Consent of instructor.

Directed group study of special topics. The Class Schedule will list topic selected. Repeatable to 12 units. 1 to 4 lectures. Formerly ERSC/SS 270.

SS 3321 Soil Morphology (4 units)
Term Typically Offered: F, SP
Prerequisite: SS 120 or SS 1120.

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. Formerly SS 321.

SS 3444 Climate Smart Agriculture (3 units)
Term Typically Offered: SP
2026-28 or later: Upper-Div GE Area 2/5
2020-26 catalogs: Upper-Div GE Area B
Sustainability Focused
Prerequisite: Junior standing; completion of GE Area 1 with grades of C- or better (GE Area A for the 2020-26 catalogs); completion of GE Area 2 with a grade of C- or better (GE Area B4 for the 2020-26 catalogs); one of the following: BIO 114, BIO 1114, BOT 121, or BOT 1121; and SS 120 or SS 1120.

Contribution of the agricultural sector to climate change. Impacts of climate change on agriculture. Evaluation of climate change mitigation and adaptation strategies for sustainable crop production. Field and laboratory assessment of climate smart agricultural practices. Field trip required. 2 lectures, 1 laboratory. Crosslisted as PLSC/SS 3444. Fulfills GE Areas Upper-Division 2 or Upper-Division 5 (GE Area Upper-Division B for students on the 2020-26 catalogs).

SS 4400 Special Problems for Advanced Undergraduates (1-4 units)
Term Typically Offered: F, SP
Prerequisite: Consent of instructor.

Individual investigation, research, studies, or surveys of selected problems. Repeatable up to 12 units. Crosslisted as ERSC/SS 4400. Formerly ERSC/SS 400.

SS 4402 Soil, Compost, and Water Testing Enterprise (3 units)
Term Typically Offered: TBD
Prerequisite: SS 221 or SS 2221; and one of the following: CHEM 124, CHEM 125, CHEM 1120, or CHEM 1122.

Experience in soil, compost, and/or water testing. Sampling rationale and protocol. Analyses of soil, compost feedstocks, finished compost, and/or water. Theory and practice behind analytical instrumentation and quality assurance/quality control. Interpretation of results for soil, compost, and/or water management. Repeatable up to 6 units. Formerly SS 402.

SS 4421 Wetlands (4 units)
Term Typically Offered: TBD
Prerequisite: Completion of GE Area 1 (GE Area A for the 2020-26 catalogs); and SS 120 or SS 1120. Corequisite: One of the following: BIO 114, BIO 1114, BOT 121, or BOT 1121; and one of the following: CHEM 124, CHEM 125, CHEM 1120, or CHEM 1122.

Formation, characteristics, and functions of wetlands. Genesis of hydric soils. Plant adaptations to saturated soils. Wetlands as wildlife habitat. Policies and social issues associated with wetlands. Procedures of wetland delineations. Field trip required. 3 lectures, 1 laboratory. Crosslisted as NR/SS 4421. Formerly NR 421.

SS 4422 Soil Ecology (4 units)
Term Typically Offered: SP
Corequisite: CHEM 312 or CHEM 2240; and SS 221 or SS 2221; or graduate standing. Recommended: STAT 218 or STAT 1110.

Biogeochemical 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. Formerly SS 422.

SS 4423 Environmental Soil and Water Chemistry (4 units)
Term Typically Offered: F
Prerequisite: CHEM 124 or CHEM 1120; CHEM 312 or CHEM 2240; and one of the following: MATH 121, MATH 141, MATH 161, MATH 1261, or MATH 1264; or graduate standing.

Chemical processes governing weathering, soil mineral formation and stability, and common solubility equilibria. Chemical principles to explain soil surface chemistry and environmental problems in water and soil chemical systems. Preparation of professional reports based on laboratory data and library research. 3 lectures, 1 laboratory. Formerly SS 423.

SS 4424 Environmental Soil Physics (4 units)
Term Typically Offered: SP
Prerequisite: One of the following: CHEM 124, CHEM 128, or CHEM 1120; one of the following: MATH 141, MATH 161, MATH 221, MATH 1261, or MATH 1267; one of the following: PHYS 121, PHYS 141, PHYS 1121, or PHYS 1141; and SS 120 or SS 1120.

Capstone course on matter and energy in soils, with emphasis on physical properties and behavior of solids, flow of water and air, and transport of heat. Applications to agriculture, environmental engineering, earth science and environmental science. 3 lectures, 1 laboratory. Formerly SS 424.

SS 4431 Spatial Data Analysis and Environmental Mapping (4 units)
Term Typically Offered: F
Prerequisite: One of the following: GEOG 218, GEOG 2218, LA/NR 218, or LA/NR 2218; and one of the following: STAT 217, STAT 218, or STAT 1110.
Recommended: SS 321 or SS 3321.

Introduction to methods and applications in spatial data science. Use of computer programming and geographic information systems (GIS) to manipulate and analyze spatial data. Applied mapping of environmental, agricultural and natural resource data using modeling techniques. 2 lectures, 2 laboratories. Crosslisted as NR/SS 4431. Formerly SS 431.

SS 4440 Forest and Range Soils (3 units)
Term Typically Offered: TBD
Prerequisite: SS 321 or SS 3321.

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. Field trip required. 2 lectures, 1 laboratory. Formerly SS 440.

SS 4444 Soil Judging (2 units)
Term Typically Offered: F
Prerequisite: SS 321 or SS 3321.

Morphological description of soils in the field. Taxonomic determination of classifications and interpretive properties from soil descriptions. Participation in collegiate soil judging contests. Repeatable up to 4 units. Field trip required. 1 lecture, 1 laboratory. Formerly SS 444.

SS 4445 Advanced Soil Judging (2 units)
Term Typically Offered: SP
Prerequisite: SS 444 or SS 4444.

Advanced applications of field soil descriptions using professional standards in diverse geographic settings. Morphological description, classification, and interpretation of soils and landforms. Participation in national collegiate soil judging contests. Field trip required. Repeatable up to 4 units. 1 lecture, 1 laboratory.

SS 4470 Special Advanced Topics (1-4 units)
Term Typically Offered: TBD
Prerequisite: Consent of instructor.

Directed group study of special topics for advanced students. The Class Schedule list topic selected. Repeatable up to 12 units. 1 to 4 lectures. Crosslisted as ERSC/SS 4470. Formerly ERSC/SS 470.

SS 4471 Special Advanced Laboratory (1-4 units)
Term Typically Offered: TBD
Prerequisite: Consent of instructor.

Directed group laboratory study of special topics for advanced students. The Class Schedule will list topic selected. Repeatable up to 8 units. 1 to 4 laboratories. Crosslisted as ERSC/SS 4471. Formerly ERSC/SS 471.

SS 5500 Individual Study in Soil Science (1-12 units)
Term Typically Offered: F, SP, SU
Prerequisite: Consent of instructor.

Advanced independent study planned and completed under the direction of a member of the Natural Resources Management and Environmental Sciences faculty. Repeatable up to 12 units. Formerly SS 500.

SS 5522 Advanced Soil Fertility (2 units)
Term Typically Offered: TBD
Prerequisite: Senior standing and SS 221 or SS 2221; or graduate standing.

Current research frontiers in soil fertility. Evaluating soil testing philosophy and interpretation, recent developments in soil fertility management, soil health, soil carbon sequestration, soil-plant-microbiome interactions, soil salinity and sodicity, sensor-based technologies, and precision agriculture. 2 lectures. Formerly SS 522.

SS 5570 Special Advanced Topics (1-4 units)
Term Typically Offered: TBD
Prerequisite: Graduate standing and consent of instructor.

Directed group study of special topics for advanced students. The Class Schedule will list topic selected. Repeatable up to 12 units. 1 to 4 seminars. Formerly SS 570.

SS 5571 Special Advanced Laboratory (1-4 units)
Term Typically Offered: TBD
Prerequisite: Graduate standing and consent of instructor.

Directed group laboratory study of special topics for advanced students. The Class Schedule will list topic selected. Repeatable up to 8 units. 1 to 4 laboratories. Formerly SS 571.