

## 2009-11 Cal Poly Catalog

### Earth and Soil Sciences Department

#### SS–SOIL SCIENCE

##### SS 110 Orientation in Earth and Soil Sciences (1) (CR/NC)

Understanding the depth and breadth of earth and soil sciences. Examine potential career opportunities. Introduction to both student and professional organizations. Credit/No Credit grading only. 1 activity. *Crosslisted as ERSC/SS 110.*

##### SS 121 Introductory Soil Science (4)

GE B5

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. Prerequisite: College chemistry and passing score on ELM examination, or an ELM exemption, or credit in MATH 104. Fulfills GE B5.

##### SS 200 Special Problems for Undergraduates (1–2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Consent of department head.

##### SS 221 Fertilizers and Plant Nutrition (4)

Plant nutrient requirements. Composition, value, and use of fertilizer materials, conditioners and agricultural minerals. Methods of manufacturing, distributing, and applying fertilizers. 3 lectures, 1 laboratory. Prerequisite: SS 121.

##### SS 270 Selected Topics (1–4)

Directed group study of selected topics. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 lectures. Prerequisite: Open to undergraduate students and consent of instructor.

##### SS 301 Soils Practicum (2) (CR/NC)

Supervised practice in technical, educational, professional, and operational applications related to soil science. Students participate in faculty-supervised group or individual activities that support educational and professional goals. Credit/No Credit grading only. 2 activities. Prerequisite: SS 110 or SS 121.

##### SS 310 Urban Soils (4)

Management and manipulation of soils in urban environments. Measurement and interpretation of morphological, physical and chemical properties. Selection and treatment of soil materials for interior and exterior plantings. 3 lectures, 1 laboratory. Prerequisite: SS 121.

##### SS 321 Soil Morphology (4)

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. Prerequisite: SS 121.

##### SS 322 Soil Plant Relationships (4)

Investigation and evaluation of the nutrient supplying ability of soils. Conditions and transformations involved in the transfer of mineral nutrients from soils to plants. Effects of cultural treatments on soil fertility. Diagnostic techniques and data interpretation in soil and plant analysis. 3 lectures, 1 laboratory. Prerequisite: SS 221, CHEM 111 or CHEM 128.

##### SS 339 Soil Science Internship (1–12) (CR/NC)

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. Prerequisite: Consent of internship instructor.

##### SS 345 Soil Interpretations and Management (4)

Calculate, graph, and interpret physical, chemical, and microbiological data from soils and reports. Apply laboratory results to field conditions. Debate efficacy of soil management and environmental practices considering social, economic and political implications of soil science. 2 lectures, 2 activities. Prerequisite: SS 121, CHEM 129, MATH 119 or MATH 141, PHYS 121 or PHYS 131, or consent of instructor.

##### SS 400 Special Problems for Advanced Undergraduates (2–4)

Individual investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Consent of department head.

##### SS 421 Wetlands (4)

The 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. The procedures of wetland delineations. 3 lectures, 1 laboratory. Prerequisite: CHEM 128, BOT 223, SS 321. *Crosslisted as BIO/NR/SS 421.*

##### SS 422 Soil Microbiology and Biochemistry (4)

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. Prerequisite: SS 221 and SS 345, CHEM 313, or consent of instructor.

##### SS 423 Soil and Water Chemistry (5)

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. Prerequisite: SS 223, SS 345, CHEM 129, CHEM 212/312, or CHEM 216/316, MATH 118 or MATH 141.

##### SS 431 Soil Resource Inventory (4)

Development and production of soil surveys for interpretive purposes. Use of soil taxonomy and land classification systems to evaluate land for best management practices. 2 lectures, 2 laboratories. Prerequisite: SS 223; SS 321.

##### SS 432 Soil Physics (5)

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. 3 lectures, 1 laboratory, 1 activity. Prerequisite: SS 121, SS 345, PHYS 121 or PHYS 131, CHEM 129, MATH 118 or MATH 141, or consent of instructor.

##### SS 433 Land Use Planning (3)

Development of plans and practices for management of agricultural, recreational and urban land use by evaluating the soil capabilities through the use of Soil Survey Reports. 2 lectures, 1 laboratory. Prerequisite: SS 121.

##### SS 440 Forest and Range Soils (4)

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. Prerequisite: SS 121, SS 321 or consent of instructor.

##### SS 442 Soil Vadose Zone Remediation (4)

Redox transformations and removal or immobilization of inorganic pollutants. Microbial degradation and elimination of organic contaminants. Monitoring and predicting management strategies for vadose zone enhancement. Reclamation of disturbed lands. 3 lectures, 1 activity. Prerequisite: CHEM 212/312 or CHEM 216/316, GEOL 201, SS 121 or consent of instructor.

##### SS 444 Soil Judging (2)

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. Prerequisite: SS 321 or consent of instructor.

##### SS 453 Tropical Soils (4)

Nature and properties of soils occurring in the tropics, their origin, morphology, classification, fertility, management and conservation. Examination of social implications in international agriculture. 3 lectures, 1 laboratory. Prerequisite: SS 121, CHEM 111 or CHEM 128.

##### SS 461 Senior Project I (1)

Senior project topic selection and contract development with project advisor. Statement of problems, subproblems, assumptions, objectives, hypothesis, methods of analysis and statistical design. Development of literature review and budget of time and finances. Proper format and presentation of tabular and graphic information. 1 activity. Prerequisite: MATH 118 or MATH 131, STAT 211 or STAT 321 or CRSC 411.

**SS 462 Senior Project II (3)**

Implementation of materials and methods. Collection, analysis and interpretation of data. Completion of formal written report under advisor supervision. Minimum 90 hours. Prerequisite: SS 461.

**SS 463 Undergraduate Seminar (2)**

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)**

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 lectures. Prerequisite: Consent of instructor.

**SS 471 Selected Advanced Laboratory (1–4)**

Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 laboratories. Prerequisite: Consent of instructor.

**SS 500 Individual Study in Soil Science (1–6)**

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. Prerequisite: Consent of department head, graduate advisor and supervising faculty member.

**SS 501 Research Planning (4)**

Problem solving and research planning for agriculture, natural resources and related sciences. Preparation of study plans that identify problems, review appropriate literature, formulate objectives, develop methods and provide for presentation and interpretation of results. Oral reports. 4 lectures. Prerequisite: Graduate standing or consent of instructor.

**SS 508 Environmental Assessment for Erosion Control (3)**

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. Prerequisite: Introductory soils course and graduate standing, or consent of instructor.

**SS 522 Advanced Soil Fertility (3)**

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. Prerequisite: SS 322, graduate standing or consent of instructor.

**SS 570 Selected Topics in Soil Science (1-4)**

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list title selected. Total credit limited to 12 units. 1 to 4 seminars. Prerequisite: Graduate standing or consent of instructor.

**SS 571 Selected Advanced Laboratory (1–4)**

Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1-4 laboratories. Prerequisite: Graduate standing or consent of instructor.

**SS 581 Graduate Seminar in Soils (3)**

Current research, experiments and problems related to soil science. Total credit limited to 3 units. 3 seminars. Prerequisite: Graduate standing or consent of instructor.

**SS 582 GIS in Advanced Land Management (3)**

Development of plans and practices for the management of crop, range, urban and wood land. 2 seminars, 1 laboratory. Prerequisite: Graduate standing, NR/LA 318, GEOG 318, or equivalent; SS 433.

**SS 599 Thesis (1–6)**

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. Prerequisite: Graduate standing and consent of instructor.