

SOIL SCIENCE (SOIL)

SOIL 101, INTRODUCTION TO CROP, SOIL, AND INSECT SCIENCE, 1 Credit

Introduces students with interests in crop, soil, and insect sciences to educational and professional opportunities in these disciplines. Speakers will discuss opportunities in research and academia as well as in the applied professional job market. CROSSLISTED as CROP 101/ENT 101/SOIL 101.

Equivalent to: CROP 101, ENT 101, HORT 101

Available via Ecampus

SOIL 199, SPECIAL TOPICS, 1-16 Credits

Equivalent to: SOIL 199H

This course is repeatable for 16 credits.

SOIL 199H, SPECIAL TOPICS, 1-16 Credits

Attributes: HNRS – Honors Course Designator

Equivalent to: SOIL 199

This course is repeatable for 16 credits.

SOIL 205, SOIL SCIENCE, 3 Credits

Introduction to the chemical, physical and biological nature of soils. Examines how soils function in terms of plant growth, nutrient supply, the global carbon cycle, ecological habitat, and water purification. Community-based learning projects provide hands-on experience with fundamental soil science principles and the impact of human activities on soil quality and sustainability. Lec. (Bacc Core Course if taken with SOIL 206 or FOR 206)

Attributes: CPBL – Core, Pers, BioSci Attached Lec; CPPL – Core, Pers, PhySci Attached Lec

Prerequisite: SOIL 206 (may be taken concurrently) with D- or better or FOR 206 (may be taken concurrently) with D- or better

Equivalent to: CSS 205, CSS 305

SOIL 206, *SOIL SCIENCE LABORATORY FOR SOIL 205, 1 Credit

Students will gain hands-on experience with soil science concepts and applications. Laboratory exercises and field trips will help students develop proficiency in the methods/tools for analyzing soil chemistry, biology, morphology, physical properties, and soil forming factors. Skills will be taught in the context of soils' social, economic, and environmental importance. (Bacc Core Course if taken with SOIL 205)

Attributes: CPBS – Core, Pers, Biological Science; CPPS – Core, Pers, Physical Science

Corequisites: SOIL 205

SOIL 299, SPECIAL TOPICS, 1-16 Credits

Equivalent to: SOIL 299H

This course is repeatable for 16 credits.

SOIL 299H, SPECIAL TOPICS, 1-16 Credits

Attributes: HNRS – Honors Course Designator

Equivalent to: SOIL 299

This course is repeatable for 16 credits.

SOIL 316, NUTRIENT CYCLING IN AGROECOSYSTEMS, 4 Credits

Nutrient forms, transformations, and cycling. Diagnosis and correction of nutrient deficiencies, pH and salinity. Impact of nutrient management practices on crop production, soil health, nutrient use efficiency, and environmental quality. Organic and inorganic fertilization. Labs include soil sampling and testing procedures, data collection on soil and plants, computer applications for soil fertility management, and field trips. Lec/lab.

Prerequisite: (CH 121 with D- or better or CH 231 with D- or better) and (SOIL 205 [C] or CSS 205 [C] or CSS 305 [C])

SOIL 325, ^AG AND ENVIRONMENTAL PREDICAMENTS: A CASE STUDY APPROACH, 3 Credits

Analyze controversial agricultural and environmental issues, synthesize information from diverse sources, and apply scientific knowledge to recommend specific courses of action to solve real world problems. Develop oral and written communication skills through individual and group work. CROSSLISTED as CROP 325/SOIL 325/SUS 325. (Writing Intensive Course)

Attributes: CWIC – Core, Skills, WIC

Equivalent to: CROP 325, SUS 325

SOIL 360, SOIL MANAGEMENT FOR ORGANIC PRODUCTION, 3 Credits

This is a skills-based soil management course that is part lecture and part student-centered learning. Significant class time will be devoted to making field-scale management decisions. The course includes individual and group work, presentation, and discussion. The intent is to prepare students for real-world application of soil management decisions in certified organic systems. Using the National Organic Program as a starting point as well as farm system descriptions with extensive long-term data sets, we will interpret soil nutrient analyses, cover cropping systems, and organic amendments, to design soil management plans for two model cropping systems (annual and perennial).

Prerequisite: (SOIL 205 with C or better and (SOIL 206 [C] or FOR 206 [C])) or CSS 205 [C]

Recommended: Introductory soil science course with lab

Available via Ecampus

SOIL 366, ECOSYSTEMS OF WILDLAND SOILS, 3 Credits

Focuses on soils that occur in relatively undisturbed ecosystems such as forests and rangelands. Topics covered include properties and processes specific to understanding and managing the soil resource in these areas. An overview of US Soil Taxonomy will also be given.

Prerequisite: SOIL 205 with D- or better or CSS 205 with D- or better or CSS 305 with D- or better

Recommended: An understanding and appreciation of environmental chemistry, biology, ecology, and physics

Available via Ecampus

SOIL 388, SOIL SYSTEMS AND PLANT GROWTH, 4 Credits

Introduces soils as providers of critical resources for plant growth. Explains how soils supply water, air, thermal energy and nutrients to plants. Shows that sustainable management of soil resources requires substantial understanding of their role in the functioning of natural, forest, and agricultural systems. Explains controls on stocks and availabilities of individual soil resources and mechanisms making these resources plant-available.

Prerequisite: ((SOIL 205 with D- or better and (SOIL 206 [D-] or FOR 206 [D-])) or CSS 205 [D-]) and (CH 121 [D-] or CH 231 [D-]) and (BOT 220 [D-] or (BI 204 [D-] or BI 205 [D-] or BI 206 [D-]) or (BI 211 [D-] or BI 212 [D-] or BI 213 [D-]) or (BI 211H [D-] or BI 212H [D-] or BI 213H [D-]) or (BI 221 [D-] or BI 222 [D-] or BI 223 [D-]) or (BI 221H [D-] or BI 222H [D-] or BI 223H [D-]))

Available via Ecampus

SOIL 395, *^WORLD SOIL RESOURCES, 3 Credits

The properties, global distribution, and agricultural productivity of major world soil groups are described. Potentials for human-accelerated soil degradation are introduced for each soil group, and reasons for conflicting assessments of degradation are discussed. Offered via Ecampus only. (Bacc Core Course) (Writing Intensive Course)

Attributes: CSST – Core, Synthesis, Science/Technology/Society; CWIC – Core, Skills, WIC

Prerequisite: CH 121 with D- or better or CH 122 with D- or better or CH 123 with D- or better or CH 201 with D- or better or CH 202 with D- or better or CH 231 with D- or better or CH 231H with D- or better or CH 232 with D- or better or CH 232H with D- or better or CH 233 with D- or better or CH 233H with D- or better

Equivalent to: CSS 395

Recommended: One term of chemistry

Available via Ecampus

SOIL 399, SPECIAL TOPICS, 1-16 Credits

This course is repeatable for 16 credits.

SOIL 401, RESEARCH, 1-16 Credits

Equivalent to: CSS 401

This course is repeatable for 16 credits.

SOIL 403, THESIS, 1-16 Credits

Independent, original study and preparation of a senior thesis.

Equivalent to: CSS 403

This course is repeatable for 16 credits.

SOIL 405, READING AND CONFERENCE, 1-16 Credits

Equivalent to: SOIL 405H

This course is repeatable for 16 credits.

SOIL 405H, READING AND CONFERENCE, 1-16 Credits

Attributes: HNRS – Honors Course Designator

Equivalent to: SOIL 405

This course is repeatable for 16 credits.

SOIL 407, SEMINAR, 1 Credit

Equivalent to: CROP 407, HORT 407

Available via Ecampus

SOIL 408, WORKSHOP, 1-16 Credits

Evaluation and judging of soils in Oregon and other states; directed studies of soil morphology, soil survey, soil fertility, soil physics, soil chemistry, soil biology, and soil information systems.

Equivalent to: CSS 408

This course is repeatable for 16 credits.

SOIL 409, PRACTICUM, 1-16 Credits

This course is repeatable for 16 credits.

SOIL 410, INTERNSHIP, 1-6 Credits

Professional work experience previously approved and supervised by the department, written report required.

Equivalent to: CSS 410

This course is repeatable for 12 credits.

SOIL 435, ENVIRONMENTAL SOIL PHYSICS, 3 Credits

Covers principles of soil physical properties and processes as they relate to agricultural, hydrological and environmental problems. Lec/lab. Offered odd years.

Prerequisite: CSS 205 with D- or better or CSS 305 with D- or better or SOIL 205 with D- or better

Equivalent to: CSS 435

Recommended: CH 123 and MTH 241 and PH 201

Available via Ecampus

SOIL 445, ENVIRONMENTAL SOIL CHEMISTRY, 3 Credits

Structural chemistry of clay minerals and organic matter, cation and anion exchange, and soil solution equilibria of soils. Ion exchange, mineral-solution equilibria, and adsorption reactions of silicate clays, oxides, and organic matter are emphasized. Covers the sorption behavior of environmental contaminants and the weathering reactions that govern the transport of reactive solutes through soils. Lec/rec. Offered odd years.

Equivalent to: CSS 445

SOIL 455, BIOLOGY OF SOIL ECOSYSTEMS, 4 Credits

A detailed study of the organisms that live in the soil and their activities in the soil ecosystems, soil as a habitat for organisms, taxonomy and biology of soil organisms, fundamentals of nutrient cycles, special topics in soil biology, review basis of soil microbial and ecological principles. Lec/rec/lab.

Equivalent to: CSS 455

Recommended: (CSS 305 or CSS 205 or SOIL 205). Courses in chemistry, physics, and microbiology

SOIL 466, SOIL MORPHOLOGY AND CLASSIFICATION, 4 Credits

Observation and description of soil properties in the field; writing soil profile descriptions; evaluating criteria that define features used to classify soils; using soil classification keys. Lec/lab.

Prerequisite: SOIL 205 with D- or better or CSS 205 with D- or better or CSS 305 with D- or better

Equivalent to: CSS 466

Available via Ecampus

SOIL 468, SOIL LANDSCAPE ANALYSIS, 4 Credits

Principles of soil geomorphology, soil stratigraphy, and surficial processes as applied to understanding the soil system and landscape scales. Emphasis on field observations of soils, geomorphic surfaces, and environment. Field project entails design of soil survey map units, field mapping and GIS cartographic techniques. Lec/lab. Offered even years.

Prerequisite: SOIL 466 (may be taken concurrently) with D- or better or CSS 466 (may be taken concurrently) with D- or better

Equivalent to: CSS 468

Available via Ecampus

SOIL 499, SPECIAL TOPICS, 1-16 Credits

Equivalent to: SOIL 499H

This course is repeatable for 16 credits.

SOIL 499H, SPECIAL TOPICS, 1-16 Credits

Attributes: HNRS – Honors Course Designator

Equivalent to: SOIL 499

This course is repeatable for 16 credits.

SOIL 501, RESEARCH AND SCHOLARSHIP, 1-16 Credits

This course is repeatable for 16 credits.

SOIL 503, THESIS/DISSERTATION, 1-16 Credits

This course is repeatable for 999 credits.

SOIL 505, READING AND CONFERENCE, 1-16 Credits

This course is repeatable for 16 credits.

SOIL 506, PROJECTS, 1-16 Credits

This course is repeatable for 16 credits.

SOIL 507, SEMINAR, 1-16 Credits

This course is repeatable for 16 credits.

SOIL 508, WORKSHOP, 1-16 Credits

Evaluation and judging of soils in Oregon and other states; directed studies of soil morphology, soil survey, soil fertility, soil physics, soil chemistry, soil biology, and soil information systems.

Equivalent to: CSS 508

This course is repeatable for 16 credits.

SOIL 509, PRACTICUM IN TEACHING, 1-3 Credits

Developing skills and competence in teaching under staff supervision; organization and presentation of instructional material by assisting in laboratory, recitation, and lectures. CROSSLISTED as CROP 509/ENT 509/PBG 509/SOIL 509.

Equivalent to: CROP 509, ENT 509, PBG 509

This course is repeatable for 9 credits.

SOIL 510, INTERNSHIP, 1-6 Credits

Professional work experience previously approved and supervised by the department, written report required.

This course is repeatable for 6 credits.

SOIL 511, SOIL: A NATURAL AND SOCIETAL RESOURCE, 3 Credits

Serves degree- and non-degree-seeking graduate learners wanting soil science knowledge but having minimal science background. Understanding soil physical, chemical, and biological properties promotes informed soil management while supporting individual to global societal values. Established curriculum facilitates graduate degrees or certificates, continuing education, professional certification, and self-improvement goals. A highly interactive social media framework supports weekly student-student and instructor-student learning interactions.

Available via Ecampus

SOIL 512, METHODS OF SOIL ANALYSIS - FIELD, 1 Credit

Recognition and quantitative description of soil properties in agroecosystems. Assessments of soil environments used for crop production in Oregon. Demonstration and practice of volumetric and bulk soil sampling techniques as well as the application of pedotransfer functions. Each participant will be responsible for analyzing at least one soil sample in the chemical level. Five-day duration with four overnight stays at campgrounds. Participants will use their own or borrowed camping equipment.

Recommended: SOIL 205 with a minimum grade of C

SOIL 514, METHODS OF SOIL ANALYSIS - LABORATORY, 2 Credits

Provide the theoretical background, as well as practical experience needed to plan, select, execute, and interpret soil chemical and physical analyses such as those typically used for nutrient management recommendations. Individual and group activities involve classroom presentations, as well as hands-on work in a teaching laboratory. Samples processed are those collected in SOIL 512, Methods of Soil Analysis - Field. Duration is five full work days.

Prerequisite: SOIL 512 (may be taken concurrently) with C or better

Recommended: SOIL 205 and successful completion of EH&S Laboratory

SOIL 515, SOIL FERTILITY MANAGEMENT, 3 Credits

Management of plant nutrients in agronomic systems; diagnosis of nutrient availability and prediction of crop response to fertilizers; interactions between nutrient response and chemical, physical and biological properties of soils.

Equivalent to: CSS 515

Recommended: CSS 315 and courses in statistics, chemistry and plant physiology.

SOIL 523, PRINCIPLES OF STABLE ISOTOPES, 3 Credits

An introduction to the theory and use of stable isotopes. Applications of stable isotopes to soil science, plant physiology, hydrology, and ecosystem studies. Offered even years.

Equivalent to: CSS 523

SOIL 525, MINERAL-ORGANIC MATTER INTERACTIONS, 3 Credits

Studies the fundamental properties of the mineral-organic interface and the mechanisms of interaction between mineral and organic soil properties.

Equivalent to: CSS 525

Recommended: CSS 305 or CSS 205 or SOIL 205

SOIL 530, ORGANIC SOIL AND CROP MANAGEMENT, 3 Credits

Overview of organic soil and crop management, organic soil system management, soil microbiology under organic systems, cropping systems, organic cereal production systems, organic forage production system, organic horticultural systems management, organic field and horticulture cropping systems; recent research and case studies.

CROSSLISTED as CROP 530/SOIL 530.

Equivalent to: CROP 530

Recommended: (SOIL 525, CROP 200 and SOIL 205 or introductory biology) and completion or concurrent enrollment in AGRI 520

Available via Ecampus

SOIL 535, SOIL PHYSICS, 3 Credits

Theoretical elements of soil physical properties and processes related to agricultural, hydrological and environmental problems. Offered fall term in even years.

Equivalent to: CSS 535

Recommended: CSS 305, CSS 205, SOIL 205, MTH 241, CH 123, PH 201

SOIL 536, VADOSE ZONE HYDROLOGY LABORATORY, 1 Credit

Experimental elements of soil physical properties and processes allowing practical experience in the measurement and analysis of soil physical processes related to agricultural, hydrological and environmental problems. Weekly laboratory. Offered even years.

Equivalent to: CSS 536

Recommended: CH 123 and PH 201

SOIL 545, ENVIRONMENTAL SOIL CHEMISTRY, 3 Credits

Structural chemistry of clay minerals and organic matter, cation and anion exchange, and soil solution equilibria of soils. Ion exchange, mineral-solution equilibria, and adsorption reactions of silicate clays, oxides, and organic matter are emphasized. Covers the sorption behavior of environmental contaminants and the weathering reactions that govern the transport of reactive solutes through soils. Lec/rec. Offered odd years.

Equivalent to: CSS 545

SOIL 547, NUTRIENT CYCLING, 3 Credits

Reviews and discusses ecosystem-level biogeochemical concepts for terrestrial and freshwater ecosystems, primarily by reading and discussing classic and current literature to determine the state-of-knowledge and uncertainties associated with it. Topics include root nutrient uptake mechanisms, soil chemical and biochemical transformations in different soil and ecosystems, measuring soil solution and watershed fluxes, soil organic matter formation and structure, the meaning of sustainability, the concept of N saturation in terrestrial ecosystems, and the use of natural abundance and tracer isotopes in ecosystem biogeochemistry. While forest biogeochemical processes will be emphasized, desert, aquatic, wetland, and prairie ecosystems will also be explored. CROSSLISTED as BOT 547/SOIL 547.

Equivalent to: BOT 547, FS 547

Recommended: College-level chemistry and biology and one class in ecology (eg. BI 370) and/or soils (eg. SOIL 205)

SOIL 555, BIOLOGY OF SOIL ECOSYSTEMS, 4 Credits

A detailed study of the organisms that live in the soil and their activities in the soil ecosystems, soil as a habitat for organisms, taxonomy and biology of soil organisms, fundamentals of nutrient cycles, special topics in soil biology, review basis of soil microbial and ecological principles.

Lec/rec/lab.

Equivalent to: CSS 555

Recommended: CSS 305 or CSS 205 or SOIL 205. Courses in chemistry, physics, and microbiology

SOIL 566, SOIL MORPHOLOGY AND CLASSIFICATION, 4 Credits

Observation and description of soil properties in the field; writing soil profile descriptions; evaluating criteria that define features used to classify soils; using soil classification keys. Lec/lab.

Equivalent to: CSS 566

Recommended: CSS 305 or CSS 205 or SOIL 205

SOIL 568, SOIL LANDSCAPE ANALYSIS, 4 Credits

Principles of soil geomorphology, soil stratigraphy, and surficial processes as applied to understanding the soil system at landscape scales. Emphasis on field observations of soils, geomorphic surfaces, and environment. Field project entails design of soil survey map units, field mapping and GIS cartographic techniques. Lec/lab. Offered odd years.

Prerequisite: CSS 566 (may be taken concurrently) with C or better or SOIL 566 (may be taken concurrently) with C or better

Equivalent to: CSS 568

SOIL 599, SPECIAL TOPICS, 1-16 Credits

This course is repeatable for 16 credits.

SOIL 601, RESEARCH, 1-16 Credits

This course is repeatable for 16 credits.

SOIL 603, THESIS/DISSERTATION, 1-16 Credits

This course is repeatable for 999 credits.

SOIL 605, READING AND CONFERENCE, 1-16 Credits

This course is repeatable for 16 credits.

SOIL 606, PROJECTS, 1-16 Credits

This course is repeatable for 16 credits.

SOIL 607, SEMINAR, 1-16 Credits

This course is repeatable for 16 credits.

SOIL 608, WORKSHOP, 1-16 Credits

This course is repeatable for 16 credits.

SOIL 609, PRACTICUM IN TEACHING, 1-3 Credits

Developing skills and competence in teaching under staff supervision; organization and presentation of instructional material by assisting in laboratory, recitation, and lectures. Graded P/N.

Equivalent to: CROP 609, ENT 609, PBG 609

This course is repeatable for 9 credits.

SOIL 635, ADVANCED SOIL PHYSICS, 3 Credits

Explores theoretical development of a key topic in soil physics. Topics may include evaporation from porous media, multiphase fluid movement, soil deformation, and soil salinization, with respect to either historical development, present day understanding or future needs of the field. Course structure incorporates lectures and discussion requiring intensive student participation. Offered odd years.

Prerequisite: CSS 535 with C or better or SOIL 535 with C or better

Recommended: A working knowledge of soil physics and a passing grade in a graduate-level soil physics course

SOIL 645, SOIL MICROBIAL ECOLOGY, 3 Credits

An advanced treatment of current topics in soil microbiology, with an emphasis on the ecology of soil microorganisms. Topics include the size, composition, diversity, and activity of soil microbial communities, linkage of microbial community structure to ecosystem functions, and applications of molecular biology to soil microbiology. Offered even years.

Equivalent to: CSS 645

Recommended: SOIL 455 or CSS 455 or MB 448

SOIL 684, GLOBAL BIOGEOCHEMICAL CYCLES, 4 Credits

An in-depth treatment of global biogeochemical cycles, focusing on cycles of carbon, oxygen, nitrogen, phosphorus, and sulfur in the atmosphere, hydrosphere, and lithosphere. CROSSLISTED as GEO 684/SOIL 684.

Equivalent to: GEO 684

Recommended: One year of college-level physics and chemistry, including introductory biology. One year of graduate coursework in soil, earth, ocean, atmospheric or forest science

SOIL 699, SPECIAL TOPICS, 1-16 Credits

This course is repeatable for 16 credits.