

SOILS (SOIL)

SOIL 120 Introduction to Water Science and Management (2 credits)

This course is an introduction to water science and management. The first part of the course will provide a basic scientific background for understanding water movement, occurrence, and behavior related to the nature of the water molecule that leads to its extraordinary but critical properties. The second part of the course will explore relationships between water, soils, plants, and the atmosphere. The third part of the course will introduce economic, legal, political, institutional, and engineering perspectives of water through a series of case-studies that simultaneously explore critical water issues and the wickedness of water management that is trying to address these needs. This course is designed to gradually transition from frontal lectures to discussions during the semester. Typically Offered: Fall.

SOIL 205 The Soil Ecosystem (3 credits)

General Education: Natural/Integrated Science
Introduction to the physical, chemical, and biological nature of soils.
Typically Offered: Fall and Spring.

Prereqs: CHEM 101 or CHEM 111 or Instructor Permission

SOIL 206 The Soil Ecosystem Lab (1 credit)

General Education: Natural/Integrated Science
Lab study relevant to SOIL 205. Experiments and demonstrations on basic and applied aspects of soil science. One 3-hour lab per week.

Coreqs: SOIL 205

SOIL 210 Introduction to Food Systems (3 credits)

Introduction to food systems including the historical development of our current global food system. Linkages among the production, marketing and transportation of food and food policy on human health will be explored. Students will complete a semester-long assessment of the local food system and its impacts on individual, school and community health and strategies to improve the food system. Typically Offered: Fall (Odd Years)

SOIL 299 (s) Directed Study (1-16 credits)

Credit arranged

SOIL 398 (s) Internship (1-6 credits, max 6)

Graded P/F.

Prereqs: Department Permission

SOIL 400 (s) Seminar (1-16 credits)

Credit arranged

SOIL 404 (s) Special Topics (1-16 credits)

Credit arranged

SOIL 409 Principles of Environmental Toxicology (3 credits)

Joint-listed with ENVS 509, FS 509, SOIL 509. Fundamental toxicological concepts including dose-response relationships, absorption of toxicants, distribution and storage of toxicants, biotransformation and elimination of toxicants, target organ toxicity and teratogenesis, mutagenesis, and carcinogenesis; chemodynamics of environmental contaminants including transport, fate, and receptors; chemicals of environmental interest and how they are tested and regulated; risk assessment fundamentals. Graduate students are required to prepare an additional in-depth report. Recommended Preparation: BIOL 102 or BIOL 115, CHEM 111, CHEM 112, CHEM 275, and STAT 251. Typically Offered: Varies.

SOIL 415 Soil and Environmental Physics (3 credits)

Joint-listed with SOIL 515

Physical properties of soils and their relationships to moisture, aeration, and temperature; plant-soil-atmospheric relationships; solute transport and soil salinity. Two lectures and one 3-hour lab per week. Recommended Preparation: SOIL 205, SOIL 206, and PHYS 111. SOIL 415 is a cooperative course available to WSU degree-seeking students. (Fall, alt/years)

SOIL 417 Market Garden Practicum (1-6 credits)

Experiential learning based course that covers all aspects of running a small acreage vegetable farm. Topics include farm planning, crop rotation, soil fertility and testing, weed management, and food systems. Students satisfy credit hours through participation in lecture/discussion, field work, and field trips. Class meets at the Plant Science Farm. Recommended preparation: SOIL 205.

SOIL 420 Soil and Plant Water Relations (3 credits)

Joint-listed with SOIL 520

The water use efficiency of plants is terrible. This course explores the journey of a water molecule from the atmosphere as it enters the soil, the root, travels through the vascular system and back into the atmosphere from a stomate. Fundamental principles of energy, flow and distribution are explored integrating soil physics and hydrology, plant physiology, and atmospheric sciences to understand the why and how plants utilize water. This course does not explore molecular biology but focuses on fundamentals as well as recent developments in rhizosphere sciences, precision and alternative agriculture, and the global climate. An additional project is required for graduate credit. Typically Offered: Spring.

SOIL 422 Environmental Soil Chemistry (3 credits)

Joint-listed with SOIL 521

Chemical processes in soil environment. Additional work required for graduate credit. Recommended Preparation: SOIL 205, SOIL 206, and CHEM 112. For 521 enrollment, students should have completed one or more chemistry-related courses, including physical chemistry, inorganic chemistry, organic chemistry, mineralogy, biochemistry, analytical chemistry, second semester general chemistry, or geochemistry. Typically Offered: Spring (Even Years). Cooperative: open to WSU degree-seeking students.

SOIL 425 Microbial Ecology (3 credits)

Joint-listed with SOIL 525

Biogeochemical activities and relationships of microorganisms in soil, water, plants, and animals. Extra oral and/or written assignments required for graduate credit. Recommended Preparation: MATH 143. (Spring alt/years)

Prereqs: EPPN 154 or BIOL 250

SOIL 427 Sustainable Food Systems (3 credits)

General Education: Senior Experience

Joint-listed with SOIL 527

The purpose of this course is to help students apply systems thinking and systems methodological problem solving skills to identify and describe current and future food system issues. Through lectures, case studies, and research, students will explore elements and behavior of food systems that impart sustainability. Additional readings, research, and presentations required for graduate credit.

Prereqs: FOR 221, REM 221, or SOIL 210; or Instructor Permission

SOIL 434 Landscape Nutrient Management (3 credits)

Joint-listed with SOIL 534

Fundamentals of elemental cycles in managed and natural terrestrial systems. The basis underlying nutrient and soil fertility recommendations is explored. Impacts of climate, lithology, and plant-soil feedbacks are discussed. Management at field to watershed scale is addressed. Extra oral and/or written assignments required for graduate credit.

Prereqs: SOIL 205 and SOIL 206

SOIL 436 Principles of Sustainability (3 credits)

Joint-listed with FS 536, SOIL 536

Presented as online doculectures, covering topics such as: Origins of Sustainability, Standards of Sustainability, Culture of Waste, Built Environment, Industrial Sustainability, Energy Sustainability, Water Resources, Measuring Sustainability, Sustainable Impact Assessment, and Our Sustainable Future. Readings and homework are assigned with each topic. Learning assessment will be from homework, exams and written papers. Additional work is required for graduate credit. Typically Offered: Fall and Spring.

Prereqs: Junior standing or higher

SOIL 438 Pesticides in the Environment (3 credits)

General Education: Senior Experience

Cross-listed with ENT 438, PLSC 438

Principles of pesticide fate in soil, water, and air; pesticide metabolism in plants, pesticide toxicology, and pesticide mode-mechanism of action; pest resistance to pesticides; biotechnology in pest control; regulations and liability; equipment application technology; pesticide transport, storage, and disposal; and social and ethical considerations. Recommended Preparation: CHEM 275.

SOIL 444 Water Quality in the Pacific Northwest (3 credits)

Cross-listed with ENVS 444

Joint-listed with ENVS 544 and SOIL 544

Qualitative aspects of water are covered in this class. Major topics are qualitative aspects of (1) surface water, (2) groundwater, (3) drinking water, (4) water in the oceans, and (5) the human waste stream. Concepts presented are relevant to world-wide water quality issues and concepts; however, however, an emphasis is placed on issues within the four Pacific Northwest states (ID, AK, OR, WA).

SOIL 446 Soil Fertility (3 credits)

Principles of soil fertility management; availability of plant nutrients and their relationship to plant growth and fertilization practices.

Recommended Preparation: SOIL 205 and 206. Typically Offered: Spring.

SOIL 448 Drinking Water and Human Health (3 credits)

Cross-listed with ENVS 448

Joint-listed with ENVS 548 and SOIL 548

Understand the characterization, testing, and treatment of chemical, microbial, and hazardous compounds and their impact on human health. Be familiar with drinking water standards, regulatory aspects, and protection of municipal, community, and private well systems. (Spring)

SOIL 450 Environmental Hydrology (3 credits)

Cross-listed with ENVS 450

Comprehensive understanding of the hydrologic processes associated with the environmental processes. Includes components of the hydrologic cycle, analysis of precipitation and run off, evapotranspiration, routing, peak flow, infiltration, soil and water relationships, snowmelt, and frequency analysis. Typically Offered: Spring.

Prereqs: MATH 143 or vertically related higher course

SOIL 452 Environmental Water Quality (3 credits)

Joint-listed with SOIL 552

Students are exposed to techniques, approaches and strategies to monitor and assess non-point pollution and its effects on beneficial uses in downstream water bodies. The class covers field lab and modeling approaches as applied to mixed forest, urban and agricultural watersheds. Students will learn approaches commonly used in TMDL assessment and the development of best management practices in implementation planning. Additional work required for graduate credit. Two lectures and one 3-hour lab a week. Recommended preparation: SOIL 205 and BIOL 250. Typically Offered: Varies.

Prereqs: CHEM 111 and CHEM 111L; SOIL 450 or ENVS 450 or FOR 462 or CE 325

SOIL 454 Pedology (3 credits)

Morphology, genesis, and classification of soils; distribution of soils as related to environmental processes and factors. Two lectures and one 4-hour lab per week. Recommended Preparation: SOIL 205 and SOIL 206. Cooperative: open to WSU degree-seeking students.

SOIL 456 North Idaho Field Trip (1 credit)

Joint-listed with SOIL 556

Soils and land use in northern Idaho ecosystems; emphasis on soil parent materials, soil formation and morphology, and soil-plant community relationships. Graded P/F. One 3-day field trip; additional class meetings and assignments before and after field trip. Cooperative: open to WSU degree-seeking students. Typically Offered: Fall.

Prereqs: SOIL 205 or Permission

SOIL 458 Soil and Site Evaluation (2 credits)

Description and evaluation of soils; emphasis on morphological features and properties that influence land use. Graded P/F. Two to four hours of lab per week (may include local field trips); one 3-day or one 6-day field trip. Recommended preparation: SOIL 205. Cooperative: open to WSU degree-seeking students.

SOIL 464 Food Toxicology (3 credits)

Cross-listed with FS 464

Joint-listed with FS 564, SOIL 564

General principles of toxicologic evaluation of chemicals, which intentionally or unintentionally enter the food chain. Toxicology of food additives, colors, preservatives, drugs, pesticides and natural toxins in foods and risk characterization. Additional projects/assignments required for graduate credit. Typically Offered: Fall.

Prereqs: BIOL 300 or BIOL 380 Cooperative: open to WSU degree-seeking students.

SOIL 499 (s) Directed Study (1-16 credits)

Credit arranged

SOIL 500 Master's Research and Thesis (1-16 credits)

Credit arranged

SOIL 501 (s) Seminar (1-16 credits)

Credit arranged

SOIL 502 (s) Directed Study (1-16 credits)

Credit arranged

SOIL 503 (s) Workshop (1-16 credits, max arranged)

Credit arranged. Selected topics in the conservation and management of natural resources.

Prereqs: Permission

SOIL 504 (s) Special Topics (1-16 credits)

Credit arranged

SOIL 509 Principles of Environmental Toxicology (3 credits)

Cross-listed with ENVS 509, FS 509

Joint-listed with SOIL 409

Fundamental toxicological concepts including dose-response relationships, absorption of toxicants, distribution and storage of toxicants, biotransformation and elimination of toxicants, target organ toxicity and teratogenesis, mutagenesis, and carcinogenesis; chemodynamics of environmental contaminants including transport, fate, and receptors; chemicals of environmental interest and how they are tested and regulated; risk assessment fundamentals. Graduate students are required to prepare an additional in-depth report. Recommended Preparation: BIOL 102 or BIOL 115, CHEM 111, CHEM 112, CHEM 275, and STAT 251. Typically Offered: Varies. Cooperative: open to WSU degree-seeking students.

SOIL 515 Soil and Environmental Physics (3 credits)

Joint-listed with SOIL 415

Physical properties of soils and their relationships to moisture, aeration, and temperature; plant-soil-atmospheric relationships; solute transport and soil salinity. Two lectures and one 3-hour lab per week.

Recommended Preparation: SOIL 205, SOIL 206, and PHYS 111. (Fall, alt/years)

SOIL 520 Soil and Plant Water Relations (3 credits)

Joint-listed with SOIL 420

The water use efficiency of plants is terrible. This course explores the journey of a water molecule from the atmosphere as it enters the soil, the root, travels through the vascular system and back into the atmosphere from a stomate. Fundamental principles of energy, flow and distribution are explored integrating soil physics and hydrology, plant physiology, and atmospheric sciences to understand the why and how plants utilize water. This course does not explore molecular biology but focuses on fundamentals as well as recent developments in rhizosphere sciences, precision and alternative agriculture, and the global climate. An additional project is required for graduate credit. Typically Offered: Spring.

SOIL 521 Environmental Soil Chemistry (3 credits)

Joint-listed with SOIL 422

Chemical processes in soil environment. Additional work required for graduate credit. Recommended Preparation: SOIL 205, SOIL 206, and CHEM 112. For 521 enrollment, students should have completed one or more chemistry-related courses, including physical chemistry, inorganic chemistry, organic chemistry, mineralogy, biochemistry, analytical chemistry, second semester general chemistry, or geochemistry. Typically Offered: Spring (Even Years). Cooperative: open to WSU degree-seeking students.

SOIL 525 Microbial Ecology (3 credits)

Joint-listed with SOIL 425

Biogeochemical activities and relationships of microorganisms in soil, water, plants, and animals. Extra oral and/or written assignments required for graduate credit. Recommended Preparation: MATH 143. (Spring alt/years).

Prereqs: EPPN 154 or BIOL 250

SOIL 527 Sustainable Food Systems (3 credits)

General Education: Senior Experience

Joint-listed with SOIL 427

The purpose of this course is to help students apply systems thinking and systems methodological problem solving skills to identify and describe current and future food system issues. Through lectures, case studies, and research, students will explore elements and behavior of food systems that impart sustainability. Additional readings, research, and presentations required for graduate credit.

SOIL 534 Landscape Nutrient Management (3 credits)

Joint-listed with SOIL 434

Fundamentals of elemental cycles in managed and natural terrestrial systems. The basis underlying nutrient and soil fertility recommendations is explored. Impacts of climate, lithology, and plant-soil feedbacks are discussed. Management at field to watershed scale is addressed. Extra oral and/or written assignments required for graduate credit.

Prereqs: SOIL 205 and SOIL 206

SOIL 536 Principles of Sustainability (3 credits)

Cross-listed with FS 536

Joint-listed with FS 436, SOIL 436

Presented as online doculectures, covering topics such as origins of sustainability, standards of sustainability, culture of waste, built environment, industrial sustainability, energy sustainability, water resources, measuring sustainability, sustainable impact assessment, and our sustainable future. Readings and homework are assigned with each topic. Learning assessment will be from homework, exams and written papers. Additional work is required for graduate credit. Typically Offered: Fall and Spring. Cooperative: open to WSU degree-seeking students.

SOIL 544 Water Quality in the Pacific Northwest (3 credits)

Cross-listed with ENVS 544

Joint-listed with ENVS 444, SOIL 444

Qualitative aspects of water are covered in this class. Major topics are qualitative aspects of (1) surface water, (2) groundwater, (3) drinking water, (4) water in the oceans, and (5) the human waste stream. Concepts presented are relevant to world-wide water quality issues and concepts; however, an emphasis is placed on issues within the four Pacific Northwest states (ID, AK, OR, WA). Typically Offered: Fall.

SOIL 548 Drinking Water and Human Health (3 credits)

Cross-listed with ENVS 548

Joint-listed with ENVS 448 and SOIL 448

Understand the characterization, testing, and treatment of chemical, microbial, and hazardous compounds and their impact on human health. Be familiar with drinking water standards, regulatory aspects, and protection of municipal, community, and private well systems. (Spring)

SOIL 552 Environmental Water Quality (3 credits)

Joint-listed with SOIL 452

Students are exposed to techniques, approaches and strategies to monitor and assess non-point pollution and its effects on beneficial uses in downstream water bodies. The class covers field lab and modeling approaches as applied to mixed forest, urban and agricultural watersheds. Students will learn approaches commonly used in TMDL assessment and the development of best management practices in implementation planning. Additional work required for graduate credit. Two lectures and one 3-hour lab a week. Recommended preparation: SOIL 205 and BIOL 250. Typically Offered: Varies.

SOIL 556 North Idaho Field Trip (1 credit)

Joint-listed with SOIL 456

Soils and land use in northern Idaho ecosystems; emphasis on soil parent materials, soil formation and morphology, and soil-plant community relationships. Graded P/F. One 3-day field trip; additional class meetings and assignments before and after field trip. Cooperative: open to WSU degree-seeking students.

Prereqs: SOIL 205 or Permission

SOIL 564 Food Toxicology (3 credits)

Cross-listed with FS 564

Joint-listed with FS 464, SOIL 464

General principles of toxicologic evaluation of chemicals, which intentionally or unintentionally enter the food chain. Toxicology of food additives, colors, preservatives, drugs, pesticides and natural toxins in foods and risk characterization. Additional projects/assignments required for graduate credit. Typically Offered: Fall. Cooperative: open to WSU degree-seeking students.

SOIL 598 (s) Internship (1-16 credits, max arranged)

Credit arranged. Graded Pass/Fail.

Prereqs: Permission

SOIL 599 (s) Research (1-16 credits, max arranged)

Credit arranged. Research not directly related to a thesis or dissertation.

Prereqs: Permission

SOIL 600 Doctoral Research and Dissertation (1-45 credits)

Credit arranged