ENVIRONMENTAL SCIENCE (ENVS)

Courses

ENVS 101 Introduction to Environmental Science-GTSC2 3 Credits
Impact of resource use and pollution on the earth's environment and biota. Scientific approach to solving environmental problems and the impacts of values upon global environmental decisions examined. General environmental awareness and literacy emphasized.
Essential Learning Categories: Natural Sciences
Colorado Guaranteed Transfer (GT) Pathways General Education Curriculum
Terms Typically Offered: Fall, Spring, Summer.

ENVS 104 Environmental Science: Global Sustainability 3 Credits
Examination of local to global environmental issues. Includes human population dynamics and impact of agriculture on the environment, ecosystem function, energy use and sustainable development, air, water and soil pollution, climate change, and environmental policy. Critical evaluation of readings from historical and modern environmental topics supplement lectures.
Prerequisites: Declared ENVS major or minor.
Terms Typically Offered: Fall, Spring.

ENVS 105 Readings in Environmental Science 1 Credit
Critical readings and discussions in environmental science.
Prerequisites: ENVS 101.
Terms Typically Offered: Spring.

ENVS 196 Topics 1-3 Credits
Course may be taken multiple times up to maximum of 15 credit hours.

ENVS 204 Introduction to Ecosystem Management 3 Credits
Scientific management of natural resources in a changing environment. Problem solving emphasized in a case study approach to ecosystem management. Theories of ecology, economics, fisheries and wildlife management, biology, and sociology to solve problems using realistic and complex landscape scenarios.
Prerequisites: ENVS 101 or ENVS 104.
Corequisites: ENVS 204L.
Terms Typically Offered: Fall.

ENVS 204L Introduction to Ecosystem Management Laboratory 1 Credit
Scientific management of natural resources in a changing environment. Problem solving emphasized in a case study approach to ecosystem management. Theories of ecology, economics, fisheries and wildlife management, biology, and sociology to solve problems using realistic and complex landscape scenarios.
Prerequisites: ENVS 104 or ENVS 101.
Corequisites: ENVS 204.
Terms Typically Offered: Fall.
Fees: Yes.

ENVS 212 Environmental Health and Safety 2 Credits
Examination of environmental health and safety issues associated with hazardous materials. Includes basic toxicology, threat assessment, and control strategies. Meets 40-hour OSHA training requirement for hazardous waste operations.
Prerequisites: ENVS 221.

ENVS 221 Science and Technology of Pollution Control 3 Credits
Introduction to scientific, engineering, and technical elements of pollution control. Includes pollutant characteristics, investigation and cleanup of contaminated sites, waste treatment (air emissions, wastewater discharges, hazardous waste), waste minimization, life cycle analysis, and industrial ecology. Lab focuses on site investigation skills, design and operation of selected treatment technologies, and waste minimization audits.
Prerequisites: ENVS 104; mastery of high school algebra; CHEM 121 or CHEM 131 recommended.
Corequisites: ENVS 221L.

ENVS 221L Science and Technology of Pollution Control Laboratory 1 Credit
Lab component for ENVS 221.
Prerequisites: ENVS 101 or ENVS 104; mastery of high school algebra; CHEM 121 or CHEM 131 recommended.
Corequisites: ENVS 221.
Fees: Yes.

ENVS 296 Topics 1-3 Credits
Course may be taken multiple times up to maximum of 15 credit hours.

ENVS 301 Environmental Project Management 2 Credits
Basic practices of effective project management, including proposal preparation, planning, scheduling, cost estimating, cost and progress tracking, and team building.
Prerequisites: Any one of the following: ENVS 204, ENVS 221, ENVS 331, ENVS 340.

ENVS 304 Environmental Science for Outdoor Recreation 3 Credits
Introduction to major western ecosystems, their historical and current management, and relevant environmental problems. Examines the effects of outdoor recreation on ecosystems. Topics include the effects of climate change on both ecosystems and outdoor recreation.
Prerequisites: ENVS 101.
Terms Typically Offered: Spring.

ENVS 312 Soil Science and Sustainability 3 Credits
Physical, chemical and biological properties of soils. Function of soils emphasized. Application of soil science to sustainable use of soils in natural and agricultural settings.
Prerequisites: CHEM 121 or higher and ENVS 204/ENVS 204L, or permission of instructor.
Corequisites: ENVS 312L.

ENVS 312L Soil Science and Sustainability Laboratory 1 Credit
Lab component required for ENVS 312.
Prerequisites: CHEM 121 or higher and ENVS 204/ENVS 204L, or permission of instructor.
Corequisites: ENVS 312.
Fees: Yes.

ENVS 315 Mined Land Rehabilitation 2 Credits
Principles and practices of mined land reclamation. Topics include mining techniques, disturbances caused by mining, regulations, closure of mine features, soil preparation, revegetation, and monitoring.
Prerequisites: ENVS 455 or ENVS 312/ENVS 312L (may be taken concurrently).
Fees: Yes.

ENVS 318 Applied Programming in R for Natural Sciences 3 Credits
Introduction to applications of the R programming language to the natural science fields. Concepts such as data types, techniques for manipulation, and how to implement fundamental programming tasks are covered. Course emphasizes how to prepare and manipulate data structures for future analyses and uses real data in the natural sciences.
Prerequisites: MATH 113.
Terms Typically Offered: Fall.

ENVS 321 Environmental Risk Analysis 3 Credits
Assessment, management, and control of risk from toxic substances in the environment. Topics include basic elements of toxicity testing and epidemiology, chemical fate in the environment, exposure assessment, uncertainty in risk estimates, approaches to risk management, and risk communication.
Prerequisites: ENVS 221/ENVS 221L, and MATH 113.

ENVS 331 Water Quality 3 Credits
Physical, chemical, and biological properties of aquatic systems. Includes movement of water in the watershed, stream classification and stability, lake circulation, aquatic ecology, chemistry and biology of natural and polluted waters, water quality monitoring, regulation and protection of surface water, and watershed assessment and management. Lab focuses on practical skills and field measurements culminating in assessment of a local watershed.
Prerequisites: CHEM 121 or higher; and STAT 200.
Corequisites: ENVS 331L.
Terms Typically Offered: Fall.

ENVS 331L Water Quality Laboratory 1 Credit
Physical, chemical, and biological properties of aquatic systems. Includes movement of water in the watershed, stream classification and stability, lake circulation, aquatic ecology, chemistry and biology of natural and polluted waters, water quality monitoring, regulation and protection of surface water, and watershed assessment and management. Lab focuses on practical skills and field measurements culminating in an assessment of a local watershed. Lab component required for ENVS 331.
Prerequisites: CHEM 121 or higher; and STAT 200.
Corequisites: ENVS 331.
Terms Typically Offered: Fall.
Fees: Yes.

ENVS 337 Stream Biomonitoring 3 Credits
Examination of the structure and organization of macroinvertebrate assemblages in streams and rivers. Topics include sample collection, sample preservation, sample identification, and analysis using the State of Colorado Multimetric Index for assessing water quality.
Prerequisites: ENVS 204/ENVS 204L or BIOL 105/BIOL 105L.
Corequisites: ENVS 337L.
Terms Typically Offered: Fall.

ENVS 337L Stream Biomonitoring Laboratory 1 Credit
Examination of the structure and organization of macroinvertebrate assemblages in streams and rivers. Topics include sample collection, sample preservation, sample identification, and analysis using the State of Colorado Multimetric Index for assessing water quality.
Prerequisites: ENVS 204/ENVS 204L or BIOL 105/BIOL 105L.
Corequisites: ENVS 337.
Terms Typically Offered: Fall.

ENVS 340 Applied Atmospheric Science 3 Credits
Examination of the atmosphere and air pollution. Includes physical and chemical properties of the atmosphere, meteorology, air pollutant sources and effects, monitoring, pollutant dispersion, emission inventory, management of emissions, and regulation of air quality.
Prerequisites: CHEM 121 or CHEM 131.

ENVS 350 Ecology and Management of Shrublands and Grasslands 3 Credits
Examination of ecological principles in determining the structure, function, and management of North American grasslands and shrublands. Three one-hour lectures and one three-hour lab per week. Two Saturday labs may be required.
Prerequisites: STAT 200 and ENVS 204/ENVS 204L.
Corequisites: ENVS 350L.

ENVS 350L Ecology and Management of Shrublands and Grasslands Laboratory 1 Credit
Lab component required for ENVS 350.
Prerequisites: STAT 200 and ENVS 204/ENVS 204L.
Corequisites: ENVS 350.
Fees: Yes.

ENVS 354 Forest Ecology and Management 3 Credits
Examination of the structure and function of trees and forests. Topics include forest stand development, carbon cycling, nutrient cycling, forest disturbances, and basic practices of sustainable forest management.
Prerequisites: ENVS 204/ENVS 204L.

ENVS 360 Fire Ecology 3 Credits
Examination of the ecological effects of fire on forests, shrublands, and grasslands. Includes fire effects on plants, animals, soil, and water, as well as using fire as a restoration tool.
Prerequisites: STAT 200 and ENVS 204/ENVS 204L.
Corequisites: ENVS 360L.

ENVS 360L Fire Ecology Laboratory 1 Credit
Field experience examining the ecological effects of fire on forests, shrublands, and grasslands of the Colorado Plateau. Includes field and lab studies that test the effects of fire on plants, animals, soil, and water. One 3-hour lab per week. May require 2 Saturday labs.
Prerequisites: STAT 200 and ENVS 204/ENVS 204L.
Corequisites: ENVS 360.
Fees: Yes.

ENVS 370 Renewable Energy 3 Credits
Introduction to renewable energy resources from a technical perspective with an emphasis on sustainability. Includes concepts of energy and power, units of measure, sources and forms of energy, uses of energy, energy efficiency, electricity, solar thermal and photovoltaics, bioenergy, hydropower, tidal power, wave power, wind power, geothermal, hydrogen, efficient building design, and integration of renewables with current energy supplies.
Prerequisites: MATH 113 or higher.
Equivalent Course(s): GEOL 370
Terms Typically Offered: Fall.

ENVS 373 Climate Change Adaptation 3 Credits
Climate change vulnerability and adaptation strategies in natural resource management. Includes the scientific basis of climate change and assessing the exposure, sensitivity, and adaptive capacity of species and ecosystems to climate change.
Prerequisites: ENVS 204.
Terms Typically Offered: Spring.

ENVS 374 Sustainable Building 3 Credits
Principles and practices of "green" building. Topics include philosophy of sustainable design, site development, passive heating and cooling, innovative structural systems and materials, energy supply and conservation, water and waste water management, indoor air quality, and case studies.

ENVS 376 Ecological Design and Technology 3 Credits
Examination of ecosystem-based technology to benefit both humans and the environment. Topics covered include the philosophy of ecological design and technology, relevant ecological principles, and ecological technologies including treatment wetlands, anaerobic digesters, algal flow ways, ecological treatment systems, rain gardens, green walls, and green roofs.
Prerequisites: CHEM 121/CHEM 121L, ENVS 204, and MATH 113.
Terms Typically Offered: Fall.

ENVS 377 Systems Thinking in Environmental Science 3 Credits
Exploration of systems thinking as an approach to environmental issues. Topics covered include the meaning of systems and systems thinking, examining systems using the “triple P” framework (people, planet, profit), drawing system diagrams, conducting life cycle assessment and eMergy analysis to quantify environmental impacts, and modeling systems.
Prerequisites: ENVS 204 and MATH 113.
Terms Typically Offered: Spring.
Fees: Yes.

ENVS 378 Permaculture Design 3 Credits
Practical application of ecology to design of sustainable human and agricultural systems. Topics include permaculture principles, design strategies, sustainable agriculture, natural building, cooperative economics, and neighborhood design. Students work in teams to complete a design project for a local site.
Corequisites: ENVS 378L.
Terms Typically Offered: Fall, Summer.

ENVS 378L Permaculture Design Laboratory 1 Credit
Practical application of ecology to design of sustainable human and agricultural systems. Topics include permaculture principles, design strategies, sustainable agriculture, natural building, cooperative economics, and neighborhood design. Students work in teams to complete a design project for a local site.
Corequisites: ENVS 378.
Terms Typically Offered: Fall, Summer.

ENVS 394 Natural Resources of the West 1 Credit
Seminars covering topics related to natural resources including water, soil, land, mineral and energy resources in the western United States. Guest speakers are invited from the academic community, industry or government agencies to give formal oral presentations following by informal discussion with students and faculty.
Equivalent Course(s): GEOL 394
Course may be taken multiple times up to maximum of 4 credit hours.

ENVS 395 Independent Study 1-3 Credits
Course may be taken multiple times up to maximum of 6 credit hours.

ENVS 396 Topics 1-3 Credits
Course may be taken multiple times up to maximum of 15 credit hours.

ENVS 396L Topics: 1-3 Credits
Course may be taken multiple times up to maximum of 15 credit hours.

ENVS 410 Environmental Regulatory Compliance 3 Credits
Examination of regulatory requirements pertaining to air pollution, water pollution, hazardous materials, and radioactive materials. Additional topics include enforcement, compliance management systems, compliance auditing, and innovative approaches to regulation.
Prerequisites: ENVS 221, and junior or senior standing.

ENVS 413 Environmental Fate and Transport of Contaminants 3 Credits
Physical, chemical, and biological factors influencing the persistence and migration of chemicals in the environment. Includes consideration of air, surface water, soil, and ground water. Emphasis on quantitative problem solving.
Prerequisites: CHEM 121 or CHEM 132; and MATH 119, MATH 119A and MATH 119B, MATH 131, or MATH 151.
Terms Typically Offered: Spring.

ENVS 420 Pollution Investigation & Monitoring 3 Credits
Survey of field sampling and analytical methods for study of environmental systems. Topics include sampling design, regulatory issues, quality assurance, quality control, data interpretation, and reporting. Three one-hour lectures and one three-hour laboratory per week.
Prerequisites: CHEM 121 or CHEM 131, and STAT 200; ENVS 221/ENVS 221L recommended.
Corequisites: ENVS 420L.

ENVS 420L Pollution Investigation & Monitoring Laboratory 1 Credit
Examination of strategies and techniques for investigating contaminated sites and monitoring environmental pollutants. Topics include Phase I assessments, development and implementation of sampling and monitoring plans, quality assurance, methods of analysis, and data interpretation and presentation.
Prerequisites: CHEM 121 or CHEM 131, and STAT 200; ENVS 221/ENVS 221L recommended.
Corequisites: ENVS 420.
Fees: Yes.

ENVS 431 Water and Wastewater Treatment 3 Credits
Examination of water and wastewater treatment processes including physical, chemical, and biological treatment technologies. Emphasis on unit process design and modeling.
Prerequisites: ENVS 331.

ENVS 433 Restoration of Aquatic Systems 3 Credits
Principles and practices of restoring the functions and values of streams, ponds, and wetlands. Addresses physical, chemical, and biological aspects of these aquatic systems.
Prerequisites: ENVS 331/ENVS 331L.

ENVS 455 Restoration Ecology 3 Credits
Examination of principles and techniques for restoration of community characteristics and ecosystem functions to disturbed lands. Lecture and lab emphasize practical application of ecological principles to restoration culminating in an independent project of designing a restoration project for a local area.
Prerequisites: ENVS 204 and ENVS 312, or permission of instructor.
Corequisites: ENVS 455L.

ENVS 455L Restoration Ecology Laboratory 1 Credit
Lab component required for ENVS 455.
Prerequisites: ENVS 204 and ENVS 312, or permission of instructor.
Corequisites: ENVS 455.
Fees: Yes.

ENVS 460 Fire Management 3 Credits
Examination of principles and current topics in fire management, including fire behavior, prescribed fire/smoke management, fuels/fuels management, wildfire control, fire in the wildland-urban interface, and fire policy.
Prerequisites: ENVS 360/ENVS 360L, STAT 200, one semester of biology.
Corequisites: ENVS 460L.

ENVS 460L Fire Management Laboratory 1 Credit
Field, lab, and computer modeling experience in predicting fire behavior, planning prescribed burns, managing hazardous fuels, and assessing wildfire risk in the wildland-urban interface.
Prerequisites: ENVS 360/ENVS 360L, STAT 200, one semester of biology.
Corequisites: ENVS 460.
Fees: Yes.

ENVS 475 Experimental Design and Statistical Analysis in Environmental Science 3 Credits
Examination of principles and techniques for designing experiments and analyzing data in environmental sciences. Emphasis on practical application of analysis techniques using environmental data with computer applications.
Prerequisites: ENVS 204 or ENVS 221, STAT 200, and 6 upper division credits; or permission of instructor.

ENVS 492 Capstone in Environmental Science and Technology 3 Credits
Small-group environmental projects for outside organizations. Preparation of project proposals, project planning and implementation, project reports, and oral presentations to clients. Exit exams for the Environmental Science and Technology major are administered as part of this course.
Prerequisites: Senior standing.
Terms Typically Offered: Fall, Spring.

ENVS 495 Independent Study 1-3 Credits
Course may be taken multiple times up to maximum of 6 credit hours.

ENVS 496 Topics 1-3 Credits
Course may be taken multiple times up to maximum of 15 credit hours.

ENVS 497 Structured Research 1-3 Credits
Research in environmental science under the direct guidance of a faculty member. Designed for junior and senior level students.
Prerequisites: Permission of instructor.
Course may be taken multiple times up to maximum of 6 credit hours.

ENVS 499 Internship 1-4 Credits
Work experience for a non-academic organization on environmental projects. Requires 45 contact hours per credit hour, a final report, and oral presentation. Available as an elective for Environmental Science & Technology majors.
Prerequisites: Junior or senior standing in the Environmental Science & Technology program or permission of instructor.
Course may be taken multiple times up to maximum of 15 credit hours.

ENVS 596 Topics 1-3 Credits
Course may be taken multiple times up to maximum of 15 credit hours.