

# ENVIRONMENTAL SCIENCE (ES)

<b>ES 514 Environmental Risk Assessment</b>	<b>3 Credit hours</b>	
<b>Attributes:</b> No Textbook Required		
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 550 Environmental Law &amp; Policy</b>	<b>3 Credit hours</b>	
Introduction to major federal environmental legislation and related state programs, judicial review, and practical effects, and to processes for formulation and development of environmental policy.		
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 554 Watershed Protection</b>	<b>3 Credit hours</b>	
This course reviews key components of watershed structure and functions before investigating and applying concepts for managing and restoring aquatic ecosystems.		
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 575 Intro to Environmental Science</b>	<b>3 Credit hours</b>	
The principles of chemistry, geology and mathematics used in pollution control. Topographic maps, environmental regulations, field testing and compliance. Economics of use of pollution control devices.		
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 582 Special Topics</b>	<b>1-4 Credit hours</b>	
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 583 Special Topics</b>	<b>1-4 Credit hours</b>	
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 585 Independent Study</b>	<b>1-4 Credit hours</b>	
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 586 Independent Study</b>	<b>1-4 Credit hours</b>	
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 587 Independent Study</b>	<b>1-4 Credit hours</b>	
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 588 Independent Study</b>	<b>1-4 Credit hours</b>	
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 602 Study of WV Environment</b>	<b>3 Credit hours</b>	
An overview of the diversity of the local natural environment, including the plants, insects, amphibians, reptiles, other wildlife, and the impact of human activities on the local environment.		
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 603 Seminar In Current Envr Issues</b>	<b>3 Credit hours</b>	
The influence of environmental laws, common law, contract law, tort law, and regulatory interpretations, as well as the impact of citizens' groups, professional societies, and trade associations on current practice. (PR: Consent)		
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 604 Air Pollution</b>	<b>3 Credit hours</b>	
Major air pollution sources; meteorological concepts; physical and chemical characterization; effects on plant and animal life; and development of air pollution laws, with emphasis on West Virginia regulations. (PR: Consent)		
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 605 Analy Prin Environ Sampling</b>	<b>3 Credit hours</b>	
Identifying and measuring contaminants in air, water, soil, and sludge. Methods of analysis including gas chromatography nuclear magnetic resonance, colorimetry, infrared absorption ultraviolet absorption, atomic absorption, and mass spectroscopy. (PR: Chemistry and ES 600, or equivalent experience)		
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 609 Topics in Bioscience Education</b>	<b>1-6 Credit hours</b>	
Selected topics of interest to teachers of biology. (PR: Consent)		
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 610 Envr Sampling Practice</b>	<b>3 Credit hours</b>	
Current practice in environmental testing and monitoring. Traditional wastewater tests, bioassay analysis, aquatic toxicity. Current procedures in gas chromatographic analysis, mass spectrometry. Sample preservation, quality control, and quality assurance. (PR: analytical chemistry and instrumental methods, or ES 605)		
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 620 Environmental Management Sys</b>	<b>3 Credit hours</b>	
EMS principles and elements; environmental, health and safety regulatory issues; ISO 14000 EMS specifications and guidelines; environmental auditing; environmental performance evaluation; life cycle assessment and environmental labeling.		
<b>Attributes:</b> No Textbook Required		
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 626 Remote Sensing &amp; Map Use</b>	<b>3 Credit hours</b>	
Introduction to topographic, soil, and geologic maps and aerial and satellite photography as sources of environmental information. Application of various data sources to specific types of environmental problems.		
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 630 Environmental Site Assessment</b>	<b>3 Credit hours</b>	
Site inspection and investigation, emphasizing the "due diligence" clause of Saction 107 of the Comprehensive Environmental Response Compensation Liability Act of 1980, site remediation, and data analysis and reporting.		
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 640 Groundwater Princ &amp; Monitoring</b>	<b>3 Credit hours</b>	
Introduction to groundwater hydrogeology; including porosity hydraulic conductivity, aquifers, groundwater flow, well hydraulics, groundwater geology, and water chemistry. (PR: A background in environmental science or geology is recommended)		
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 645 Applied Hydrogeology</b>	<b>3 Credit hours</b>	
The fundamentals of hydrogeology are utilized to implement a case study investigation of a contaminated groundwater site from the planning stage through a final report. (PR: ES 640 or equivalent experience)		
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 646 Dynamics of Ecosystems</b>	<b>3 Credit hours</b>	
Species interaction; population, community and ecosystem ecology; productivity; nutrient cycling; physiological ecology, population dynamics; pollution and conservation; and aquatic, marine, and terrestrial ecosystems. (PR: Consent)		
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 648 Vegetation of West Virginia</b>	<b>3 Credit hours</b>	
<b>Grade Mode:</b> Normal Grading Mode		
<b>ES 651 Environmental Microbiology</b>	<b>3 Credit hours</b>	
<b>Grade Mode:</b> Normal Grading Mode		

**ES 652 Special Topics 1-4 Credit hours**

**Grade Mode:** Normal Grading Mode

**ES 655 Environmental Ethics 3 Credit hours**

Introduction to the subject of ethics, environmental ethical theory, moral reasoning, free market regulation, right to know, proprietary information, product liability cost-benefit analysis, risk assessment, waste disposal, and resource depletion. (PR: Consent)

**Grade Mode:** Normal Grading Mode

**ES 656 Prep Eval Environ Impact State 3 Credit hours**

A practical course designed to provide students with the ability to prepare and evaluate impact statements. The course is based on the concepts of the environment as a single interrelated system.

**Grade Mode:** Normal Grading Mode

**ES 660 Environmental Law I 3 Credit hours**

Introduction to major federal environmental legislation and related state programs, including policy issues, judicial review, and practical effects. Includes CERCLA, RCRA, Clean Water Act, NEPA, ESA and SDWA.

**Grade Mode:** Normal Grading Mode

**ES 661 Environmental Regulations 3 Credit hours**

Practical applications and concentrated study of regulations under all major federal environmental programs, including permitting, reporting, and other compliance issues. Includes discussion of procedures used in development of regulations.

**Grade Mode:** Normal Grading Mode

**ES 663 Environmental Law II 3 Credit hours**

Course covers three general topic areas: environmental assessment and biodiversity assessment (NEPA and ESA), risk management and the regulation of toxic substances (TSCA, FIFRA, and SDWA), and international environmental law.

**Pre-req:** ES 660.

**Grade Mode:** Normal Grading Mode

**ES 665 Water Resources Management 3 Credit hours**

Course surveys the processes that govern the earth's hydrologic cycle and the human activities which effect that cycle. It seeks to provide an integrated science/managment/policy approach to water resource issues.

**Grade Mode:** Normal Grading Mode

**ES 670 Sustainable Energy 3 Credit hours**

The course focuses on the technological and cost fundamentals of what is generally considered sustainable energy technologies, including solar, wind, biomass and other energy sources.

**Grade Mode:** Normal Grading Mode

**ES 674 Epidemiological Hlth Res Tech 3 Credit hours**

An introduction to techniques of epidemiological health research. The primary focus will be health problems in the industrial setting.

**Grade Mode:** Normal Grading Mode

**ES 675 Brownfields Management 3 Credit hours**

Environmental management and development of abandoned, idoled or underused industrial or commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination.

**Grade Mode:** Normal Grading Mode

**ES 680 Thesis 1-6 Credit hours**

Students completing ES 680 must defend their thesis in an oral examination.

**Attributes:** No Textbook Required

**Grade Mode:** Credit/No Credit Grade Only