

# Environmental Science (ENV SCI)

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## Courses

### **ENV SCI 505. Environmental Systems. 4 Credits.**

Physical and chemical aspects of natural environmental processes. The movement, transformation, and fate of materials and contaminants.

P: gr st.

Fall Only.

### **ENV SCI 518. Pollution Control. 3 Credits.**

Government regulations, manufacturing processes, waste minimization, pollution prevention methods and pollution control techniques of major industries.

P: gr st.

Fall Only.

### **ENV SCI 520. The Soil Environment. 4 Credits.**

The physical, chemical and biological properties and principals of soils; formation, classification and distribution of major soil orders; function and management of soils in natural, agricultural and urban environments. Includes field and laboratory experiences.

P: gr st.

Fall Only.

### **ENV SCI 523. Pollution Prevention. 3 Credits.**

Emphasizes principles of pollution prevention and environmentally conscious products, processes and manufacturing systems. Also addresses post-use product disposal, life cycle analysis, and pollution prevention economics.

P: gr st.

Spring Odd.

### **ENV SCI 530. Hydrology. 3 Credits.**

Qualitative study of the principal elements of the water cycle, including precipitation, runoff, infiltration, evapotranspiration and ground water; applications to water resource projects such as low flow augmentation, flow reregulation, irrigation, public and industrial water supply and flood control.

P: gr st.

Fall Only.

### **ENV SCI 535. Water and Waste Water Treatment. 3 Credits.**

Water and waste water treatment systems, including both sewage and potable water treatment plants and their associated collection and distribution systems. Study of the unit operations, physical, chemical and biological, used in both systems.

P: gr st.

Spring.

### **ENV SCI 537. Environmental GIS. 2 Credits.**

This is a project based course where students conduct geospatial data manipulation, analysis and management with a suite of GIS software tools and web-based GIS interfaces. Students will learn about a range of applications of remotely sensed and other geospatial data to natural science problems. Through the course project, students will create a functional GIS to study or model an environmental phenomena or problem.

P: Graduate status and previous GIS experience

Fall and Spring.

### **ENV SCI 601. Stream Ecology. 4 Credits.**

The goal of this course is to develop a profound understanding of the abiotic and biotic processes responsible for shaping the ecosystem in running waters. Focus will be on ecological processes, but nutrient dynamics and fluid mechanics are also important issues as well as the fauna associated to the streambed, mainly macro invertebrates and their ecological role. Theory will be combined with hands on experience providing the student with a tool to manage a stream based on ecological principles.

P: gr st.

Fall Even.

### **ENV SCI 603. Limnology. 4 Credits.**

Limnology is a broad sub-discipline of ecology that is the study of the structural and functional interrelationships of organisms of inland waters as they are affected by their dynamic physical, chemical and biotic environments. In this course, we will examine the dominant organizing principles and the current conceptual advances in the field of limnology focusing on lakes.

P: graduate status

Fall Odd.

### **ENV SCI 615. Solar and Alternate Energy Systems. 3 Credits.**

Study of alternate energy systems which may be the important energy sources in the future, such as solar, wind, biomass, fusion, ocean thermal, fuel cells and magneto hydrodynamics.

P: gr st.

Spring Even.

**ENV SCI 621. Geoscience Field Trip. 1-3 Credits.**

Intensive three or four-day field study tour of the geology, soils, and landscapes of Wisconsin and/or surrounding states. Each offering will focus on a different geological theme and will focus on a specific region. Cost of transportation, guidebook, meals, and lodging borne by student. Course is repeatable if topics differ; may be taken 6 times for a total of 9 credits.

P: graduate status

Fall and Spring.

**ENV SCI 624. Hazardous and Toxic Materials. 3 Credits.**

The handling, processing, and disposal of materials which have physical, chemical, and biological properties that present hazards to human, animal, and plant life; procedures for worker safety and for compliance with regulations. The metals and nonmetals, carcinogens, radioactive materials, and pathogenic human, animal, and plant wastes.

P: Graduate status

Spring Odd.

**ENV SCI 625. Global Climate Change. 3 Credits.**

Examines changes in global climate with emphasis on the processes by which climate change occurs. Focuses on the recent changes in the concentration of atmospheric greenhouse gases and their impact on the earth's global energy budget. Examines the potential environmental impact of a changed climate.

P: Graduate Standing

Spring.

**ENV SCI 632. Hydrogeology. 3 Credits.**

Introduction to the geological and physical principles governing ground water flow. Description of aquifer properties, chemical processes, equation of flow, well hydraulics, and environmental concerns.

P: gr st.

Spring.

**ENV SCI 633. Ground Water: Resources and Regulations. 3 Credits.**

An overview of the geology, properties, flow, and pollution of ground water systems. Techniques of aquifer characterization and water quality monitoring are introduced and evaluated. Regulatory and policy approaches to moderate use and ensure adequate high quality supplies of this valuable resource in the future are also reviewed.

P: graduate status

Fall Even.

**ENV SCI 634. Environmental Chemistry. 3 Credits.**

Physical, chemical, and biological processes affecting the composition of air and water. Chemical reactions in polluted, and unpolluted environments; dispersal processes and methods of control for various pollutants.

P: graduate status

Fall Only.

**ENV SCI 660. Resource Management Strategy. 3 Credits.**

Application of the principles of systems analysis to the sustainable use of material and energy resources. Emphasis on use of analytical tools of economics (e.g. costs-benefit, cost-effectiveness, and risk-benefit analysis) and the process of public policy making and implementation.

P: gr st.

Fall and Spring.

**ENV SCI 664. Atmospheric Pollution and Abatement. 3 Credits.**

This course will provide students an understanding of atmospheric processes and weather patterns and how they affect pollutant transport. Sources, sinks, environmental effects, and abatement technologies for air pollutants will be addressed. Atmospheric reactions that create pollution or deplete stratospheric ozone will be included.

P: Graduate status

Fall Odd.

**ENV SCI 669. Conservation Biology. 4 Credits.**

Overview of the major issues and ecological principles underlying the field of conservation of biology, including patterns and measurement of biological diversity from genetic to community scales.

P: graduate status

Fall Only.

**ENV SCI 699. Travel Course. 1-6 Credits.**

Travel courses are conducted to various parts of the world and are led by one or more faculty members. May be repeated to different locations.

P: cons of instr & prior trip arr & financial deposit.