ENVIRONMENTAL SCIENCE (ENS)

ENS 113 Introduction to Environmental Science (4 credits)
The course will be an introduction to environmental principles emphasizing the interrelationships between human cultures, organisms, and their environments. Specifically, this course will examine environmental interrelatedness, environmental ethics, energy sources and issues, and human influences on ecosystems.
Lab Required.

ENS 202 Environmental Issues (2 credits)
The course is a writing intensive course that will examine controversial issues that will inevitably shape future environmental legislation and the way we view the environment in which we live. The Environmental Issues course will address environmental controversies from both ends of the continuum and allow students to form their own opinions on where they stand regarding the environment as it relates to economics, legislation, technology and human rights.

ENS 211 Introduction to GIS/GPS (3 credits)
This course will teach students to use Geographical Information System software and Global Position System (GPS) technology. Students will learn to collect waypoints using GPS technology and will download the waypoint data onto GIS mapping software. Students will develop maps and enter attribute data to correspond to maps that are created. This course will serve as a thorough introduction to GIS software and GPS technology.
Prerequisite/s: CSCI 101, and MATH 103

ENS 216 Wildlife Management & Conservation (4 credits)
The course will be an introduction to the management principles of wildlife as well as expose students to conservation practices that are used to enhance wildlife populations. Predation, wildlife diseases, carrying capacity, and a history of wildlife management are topics that will be studied in depth throughout the semester. The laboratory section of the course will allow students to use a hands-on approach to learning wildlife conservation principles.
Lab Required.

ENS 225 Environmental Sampling (4 credits)
The course will expand on introductory courses in environmental science and ecology. Field samplings will allow students to understand the environment around them by using a hands-on approach. Specifically, this course will allow students to examine water, air, and soil quality, as well as introduce students to the concepts of soil stratification, soil profiles, and examine how drinking water distribution systems operate.
Prerequisite/s: ENS 113, and CHEM 115, and ENS 113, and BIOL 224, and ENS 113, and CHEM 121

ENS 240 Environmental Statistics (3 credits)
The course will introduce students to statistical methods that are important in ecological and environmental research. Quantitative analysis of data sets will be the primary focus of the course. Students will use actual data sets, utilizing statistical computer software, to calculate and interpret central tendencies, standard deviation, variance t-tests, chi square, confidence intervals, linear regression.

ENS 260 Environmental Research Project I (2 credits)
This course will be an expansion of Introduction to Environmental Science (ENS 113) and General Ecology (BIOL 224). Students will learn the scientific method of research using a hands-on approach. Students that have chosen a concentration area in the Environmental Science Program will conduct an undergraduate research study that will be designed by the student with help from their major advisor.
Prerequisite/s: BIOL 224, and ENS 113

ENS 261 Environmental Research Project II (2 credits)
This course will be an expansion of Environmental Research Project I (ENS 260). Students that have chosen a concentration area in the Environmental Science Program will conduct an advanced undergraduate research study that will be designed by the student with help from their major advisor. This course should be a culmination of all environmental science courses that the student has taken in their concentration area.
Prerequisite/s: ENS 260

ENS 297 Environmental Science Internship (3 credits)
This provides the student with the opportunity to experience environmental science in the work place in conjunction with their program of study. The internship experience will be conducted at an advisor-approved location that will provide the student with a quality educational and practical encounter in the field of environmental science.

ENS 301 Hydrology (3 credits)
This course will examine the hydrologic cycle and how it functions to transport water across Earth. The study of surface flow and of groundwater flow will make up the major concentration of this course. Quantitative methods will be used to determine water infiltration into soil, surface runoff rates, precipitation measurements, and water pressure. Students will gain valuable knowledge in all areas of water transport through the environment.
Prerequisite/s: CHEM 115, and ENS 113, and MATH 103, and ENS 113, and MATH 103, and CHEM 121

ENS 311 Introduction to GIS/GPS (3 credits)
This course will teach students to use Geographical Information System software and Global Position System (GPS) technology. Students will learn to collect waypoints using GPS technology and will download the waypoint data onto GIS mapping software. Students will develop maps and enter attribute data to correspond to maps that are created. This course will serve as a thorough introduction to GIS software and GPS technology.
Prerequisite/s: CSCI 101, and MATH 103

ENS 321 Environmental Chemistry (3 credits)
This course will examine the chemical nature of air, water, and soil. Some of the specific topics covered will include: the ozone layer and ozone depletion, greenhouse effect, nutrient cycles, radiation, and acid rain. The fate of chemicals in the environment will be studied.
Prerequisite/s: CHEM 115, and ENS 113, and MATH 103, and CHEM 121, and ENS 113, and MATH 103

ENS 331 Wildlife Conservation (3 credits)
This course is an advance study of the conservation and management of wildlife populations. Students will learn about population growth, population estimation, density effects, predation, conservation genetics and threats to wildlife species. Emphasis will be on how to use population and genetic data to manage wildlife. Emphasis will also be on habitat management and conservation.
Prerequisite/s: BIOL 224

ENS 422 Environmental Toxicology (3 credits)
This course will examine factors that influence the transport of contaminants and pollutants through environmental media of water, soil, and air. The effects of chemical compounds on living organisms, particularly humans, will form the foundation of the course. Routes of entry into organisms, as well as detoxification and toxin removal from living organisms will be discussed. Methods of obtaining human exposure limits, and risk assessment will be examined.
Prerequisite/s: BIOL 150, and CHEM 115, and MATH 103, and BIOL 150, and MATH 103, and CHEM 121

ENS 432 Aquatic Ecosystems (3 credits)
This course is designed to give students the basic understanding of the principles of aquatic ecosystems. The ecological functioning, and the chemical and biological processes occurring in aquatic ecosystems will make up the main focus of the course. Human impacts on aquatic ecosystems will be addressed in the course.
Prerequisite/s: BIOL 224, and CHEM 115, and MATH 103, and ENS 113, and BIOL 224, and CHEM 121, and ENS 113, and MATH 103

ENS 433 Solid Waste Management (3 credits)
This course will survey common biological, thermal, chemical, and physical waste stream methods. A brief overview of the laws and regulations governing the treatment, storage, and disposal of solid waste, including hazardous waste, will be presented. Some of the tools used to identify, track, minimize, and prevent solid waste generation will be discussed. Case studies of selected waste minimization treatment and disposal techniques will be presented.
Prerequisite/s: CHEM 115, or CHEM 121

ENS 434 Air Pollution (3 credits)
The course will examine and explore current air pollution issues from a balanced perspective, along with history, regulatory development, air pollution sources and air pollution control. Areas of emphasis will include the cutting-edge regulatory developments of greenhouse gas/global climate change, Clean Air Transport and control technology regulations, and health effects of pollutants. The course will allow for class participation and discussion of current controversies.
Prerequisite/s: CHEM 115, and ENS 113, and CHEM 121, and ENS 113

ENS 445 Applying Dakota/Lakota Culture to Environmental Science (3 credits)
Students will learn more about Native American perspectives on environmental issues and natural resource management. Students will discuss the traditional and contemporary relationships between Native Americans and the environment. Focus will be on Dakota and Ochethi Sakowin culture.

ENS 452 Science Literature (3 credits)
This course will prepare students to read scientific literature in an objective manner. The interpretation of research published in journals will be the focal point of the course. In addition, students will learn methods of writing research papers for publication.
Prerequisite/s: BIOL 150, and BIOL 224, and ENGL 110, and MATH 103, and ENS 240, and BIOL 150, and BIOL 224, and MATH 103, and MATH 210

ENS 453 Environmental Law & Policy (3 credits)
This course examines major federal, state, and tribal laws that are in place to regulate activities that impact the environment. Students will study the methods by which environmental laws are formed. Students will be trained to use the Federal Register and the Code of Federal Regulations to conduct research related to environmental issues. Students will become familiar with the major environmental acts passed by the United State Congress that impact environmental decisions across the U.S. Tribal law addressing environmental issues will be reviewed.
Prerequisite/s: ENS 202

ENS 493 Senior Research (3 credits)
This course will be a capstone for all senior students. Students will learn methods of conducting undergraduate research in the field of science. This course will expand on the 200-level research courses that student completed in the Associate of Science degree plan. Statistical analysis of data collected will be incorporated into this course. A final presentation to a board of SBC employees will be required of each student completing their research project.

ENS 500 Graduate Research Seminar (2 credits)
In this seminar the student will prepare, present, and critique scientific presentations. The student will present research proposals, talks for research conferences, and a practice thesis defense. Graduate students and faculty will lead seminar in discussion of various scientific topics.

ENS 511 Advanced Experimental Design (3 credits)
This course, designed for first year graduate students, is an intensive lecture course to prepare students for conducting independent research. The focus will be on the development of a quality research question, hypothesis testing, experimental design, and application of statistical methods. Short-term research mini-projects will be conducted throughout the semester and used for demonstration of research methodologies.

ENS 515 Advanced Statistics (3 credits)
An advanced examination of statistics used in environmental science. Emphasis on specific applications and underlying assumptions, design of experiments, and observational schemes for research project. Linear, non-linear, and multivariate statistical analyses will be studied. Extensive computer analysis is employed, including Program-R and SAS.

ENS 520 Advanced Techniques in GIS (3 credits)
This course will study the application and analysis of advanced techniques and principles of Geographic Information Systems and mapping to fully address spatial and time related problems related to resource management, urban site characterizations, hydrologic analyses, risk assessment, policy making, public health planning, disaster response, strategic defense techniques, range composition and condition, plant productivity, agriculture, and other applied fields.
Prerequisite/s: ENS 311

ENS 522 Advanced Remote Sensing & Digital Image Processing (3 credits)
This course will introduce Remote Sensing and Image processing platforms. The application of the principles of Remote Sensing to integrate multiple interrelated data to map and analyze variations in spectral indices, electromagnetic energy and other remotely collected data will be emphasized. Remote sensing mapping and analysis will be used to solve temporal and spatial variation on surficial features. Remote sensing capabilities to address issues associated with spectral reflectance of vegetation, soil and water analysis, seasonal variability, and pollution issues will be addressed.
Prerequisite/s: ENS 311

ENS 530 Limnology (3 credits)
This course will examine the physical, chemical, geological, and biological processes that occur within aquatic systems. Lake and wetland origins, classifications, and habitats will be discussed in depth. Natural and anthropogenic successional processes within aquatic systems will be covered.

ENS 532 Watershed Analysis (3 credits)
This course is a conceptual and quantitative analysis of watershed processes with an emphasis on modeling surface water hydrology and water resources management. The course will emphasize critical analysis of current hydrologic computational methods and hands-on use of watershed models.

ENS 542 Environmental Policy & Resource Management (3 credits)
This course will examine a comprehensive analysis of the relevant environmental theories and their application to the design of natural resources policy. The course will provide a presentation of principles, practices and key policy issues of natural resources management and planning.

ENS 545 Applying Dakota/Lakota Culture in Environmental Science (3 credits)
Students will learn more about Native American perspectives on environmental issues and natural resource management. Students will discuss the traditional and contemporary relationships between Native Americans and the environment. Focus will be on Dakota and Ochethi Sakowin culture.

ENS 550 Conservation Biology (3 credits)
This course will examine the fundamental principles of ecology, evolution, and environmental sciences in the conservation, management and restoration of organisms and ecosystems. Students learn will about the five main threats to biodiversity and how to protect biodiversity from these specific threats.

ENS 552 Avian Ecology (3 credits)
This course will focus on the ecology and conservation of bird species and avian communities. Students will learn how avian behavior, life history strategies, and species interactions affect bird populations and communities. Students will learn how modern environmental change affects bird populations and what conservation measures can be taken to protect bird communities. Focus will be on local grassland, wetland, and forest bird communities.

ENS 554 Grassland Ecology (3 credits)
This course will focus on factors such as soils, climate, and disturbance that developed the habitats of the Great Plains region. Students will study the biodiversity, plant ecology, animal ecology, and ecosystem processes of North American grasslands. Students will evaluate threats to grasslands such as invasive species, climate change, and habitat loss. Conservation and restoration efforts in grasslands will also be examined.

ENS 556 Ecology of Invasive Species (3 credits)
This course will address the effects invasive, or nonindigenous, species have on ecosystems and economies. Invasive species are a growing threat to global biodiversity and negatively affect agriculture. Students will study the cause of invasions, ecological impacts, and evolutionary impact of invasive species. Students will examine possible solutions for the control and eradication of invasives. Focus will be on invasive species that impact local natural resources, cultural resources, and economies.

ENS 558 Restoration Ecology (3 credits)
This course reviews ecosystem structure and function, and community and population processes in intact systems, along with the effects of major disturbances on natural systems. Restoration amendments will be discussed in terms of their effects on ecosystem structure and function. The course includes case studies, and focuses on plant, animal, and soil systems. Focus will be on grassland, riparian, and wetland restoration.

ENS 560 Advanced Water & Soil Biogeochemistry (3 credits)
This course is an advanced coverage of aqueous geochemistry in terrestrial and aquatic systems including various chemical processes. Applications of these principles will be demonstrated. Recitation will focus on current literature, applied problems, and case studies.

ENS 562 Microbial Ecology (3 credits)
This course will examine the ecological function of micro-organisms in the environment. Emphasis will be put on the relationships between microbes and the physical, chemical, and biotic components of their environments. The role of microbes in nutrient cycling, bioremediation, bio-control, biological waste treatment, fuel production, and energy recovery will be studied.

ENS 570 Climate Change (3 credits)
This course will examine the basic processes of the climate system. The course will study changing climate with emphasis on anthropogenic climate change. Various models for predicting future climate change will be presented, including the assumptions and uncertainties embedded in each model. The regional climate impacts and impacts on subsystems will be examined, including changes in rainfall patterns, loss of ice cover and changes in sea level. The possible ecological effects of these predicted changes will also be examined.

ENS 572 Environmental Water Quality (3 credits)
This is a general course introducing the topic of water quality. The topics covered include a history of water quality management, global water resources and how they are used, developing standards, classification and environmental quality assessment, water and the hydrologic cycle, rivers and streams, groundwater, coastal zone water, lakes, wetlands, effects of land use. Management of water quality in different landscapes will be covered.
Lab Required.

ENS 580 Advanced Water Sampling Techniques (3 credits)
This course focuses on water quality sampling, laboratory assessment, and data analyses. It includes surface water, groundwater, and pore water aspects. The course provides real-world, applied information for planning, evaluating, and implementing a water quality program. The course will emphasize critical analysis of current hydrologic computational methods and hands-on use of water quality models.

ENS 600 Graduate Research & Thesis (6 credits)
Student will work on research proposal or on research project. Number of credits taken each semester will be determined by graduate advisor and committee.