Environmental Science (ENVS)

ENVS 1010. Intro to Environmental Science (PS). 3 Hours.
Fulfills General Education Physical Science requirement. Introduction to the field of environmental science, focusing on how an understanding of the natural world around us and the application of scientific method can help us address problems facing our planet. Subject areas include environmental policy, natural resources, energy, and human impact to the environment. Inclusive Access Course Material (electronic book) fees may apply, see Fees tab under each course section for details. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Demonstrate knowledge of basic fundamental laws, concepts, and theories in the physical sciences. 2. Explain and apply the scientific method. 3. Demonstrate knowledge of the process of science by being able to interpret data in the form of tables, graphs, and charts and communicate those finding in oral and/or written form. 4. Describe a variety of environmental problems and solutions in a scientific context. 5. Evaluate environmental issues using a scientific approach. FA, SP, SU.

ENVS 1099. Environmental Science Recitation for Majors. 1 Hour.
This course provides students with an opportunity to deepen their understanding of fundamental concepts of environmental science. Students will work collaboratively to explore topics such as ecology, biodiversity, human population dynamics, environmental health and quality, and human/environmental conflict from a multidisciplinary perspective. This course supports newly declared ENVS majors by building upon knowledge and skills developed in ENVS 1010. **COURSE LEARNING OUTCOMES (CLOs)** At the successful conclusion of this course students will: 1.Evaluate the physical and natural world using multidisciplinary science principles. 2. Develop analytical and critical thinking skills to evaluate interconnections between humans and the environment. 3. Critically explore, analyze, graph, and interpret environmental data sets. Prerequisites: ENVS 1010 Introduction to Environmental Science (Grade C- or higher). Corequisites: ENVS 1215 Introduction to Environmental Science Laboratory. FA, SP.

ENVS 1210. Principles of Environmental Science. 3 Hours.
A scientific foundation in Environmental Science with exploration of the social and political aspects that may impact implementation of policies. Topics include ecology, biodiversity, sustainable practices, environmental health and quality, and threats to current environmental conditions. Inclusive Access Course Material (electronic book) fees may apply, see Fees tab under each course section for details. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Evaluate the physical and natural world using scientific principles. 2. Develop analytical and critical thinking skills. 3. Evaluate the "big questions" regarding sustainable practices, resources, and biodiversity. 4. Critique and communicate the impact of possible solutions to environmental issues from multiple perspectives. 5. Synthesize potential approaches to combat global effects of climate change. Corequisites: ENVS 1215. FA, SP.

ENVS 1215. Principles of Environmental Science Laboratory. 1 Hour.
Introduction to Environmental Science Lab is a multidisciplinary course within chemistry, ecology, basic hydrology, energy and environment. It includes laboratory exercises and filed trips. Lab exercises give the students an opportunity to make scientific observations, design experiments and gather data with emphasis on the local issues. Field trips are the fundamental part of learning about the complexity of environmental problems. As a part of Introduction to Environmental Science Lab 2000 field trips, students will be taken to local natural areas, conservation features as well as treatment facilities. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Identify and explain local and national environmental issues. 2. Give examples of basic scientific techniques and tools to analyze and address the environmental science issues. 3. Collaborate with other students to explore and analyze environmental concerns and solutions. 4. Explain and discuss findings from experiments and observations. 5. Use supporting evidence to identify solutions to environmental issues. Course fee required. Corequisite: ENVS 1210. FA, SP.

ENVS 2000R. Field Experience: Environmental Science (LAB). 1 Hour.
Fulfills General Education Laboratory Sciences requirement. Provides an opportunity for students to meet each other in a field-research setting and discuss a major environmental issue. The class will be held over a 3-4 day weekend (overnight stays required). Each semester the class will focus on a particular issue related to the environment that is of interest to the region where the class is being held. Repeatable up to 2 credits. Offered on sufficient student need. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1.Demonstrate knowledge of basic fundamental laws, concepts, and theories in the physical sciences. 2. Explain and apply the scientific method. 3. Demonstrate knowledge of the process of science by being able to utilize data in the form of tables, graphs, and charts through interpretation and then communicate those finding in oral and or written form. 4. Analyze a variety of environmental problems and solutions in a scientific context. 5. Demonstrate basic scientific literacy. Course fee required.

ENVS 2099R. Special Topics in Environmental Science. 1-3 Hours.
Special Topics in Environmental Science. 1 hour. Open to all students. This course will focus on a specific environmental science topic of interest to faculty and students that is not represented in the main curriculum. It can be taught as seminars, standard lectures, guest speakers, laboratory exercises, or other traditional or nontraditional instruction methods. ***COURSE LEARNING OUTCOMES (CLOs)*** At the successful conclusion of this course, students will be able to: 1) Find and evaluate scientific publications on a specific topic of interest; 2) write or present a synthesis of the information gathered with proper citations; and 3) discuss conclusions of the semester's research.

ENVS 2210. Environmental Pollution and Remediation Techniques. 3 Hours.
The environmental Pollution and Remediation Technique course gives the students the skills to diagnose land and groundwater pollution issues. In this course students will learn about the common types of land (soil) and groundwater pollutants and the remediation methods currently employed by remediation industry. This course uses case studies of the local environment to take an in-depth look at the real and local pollution issues. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Identify common types of land and groundwater pollutants. 2. Apply the fundamental principles of remediation to remove and/or process pollution. 3. Devise protocols to minimize and mitigate pollution to avoid remediation processes. 4. Evaluate the key indicators for sustainable remediation approaches. Prerequisites: ENVS 1210; and ENVS 1215 (both grade C- or higher); and MATH 1050 or higher (Grade C- or higher) or a placement score qualifying for enrollment in MATH 1060; and CHEM 1210; and CHEM 1215 (Both may be taken concurrently). SP.

ENVS 2700R. Field Methods in Environmental Science. 1 Hour.
A preparatory course for undergraduate participation in collaborative research projects in environmental science. Repeatable for a maximum of 3 credits. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Develop skills in collecting and organizing scientific data from field investigations. 2. Consider how concepts and skills acquired in coursework can be developed through interdisciplinary research.. 3. Develop a hypothesis for a research project in the environmental or related sciences, and devise a protocol to test that hypothesis. Course fee required. Prerequisite: ENVS 1210 and ENVS 1215 (Both grade C- or higher). SP (even).

ENVS 2990R. Career Seminar in Environmental Science. 1 Hour.
Seminar course aimed to help students who have declared an environmental science major prepare for future careers in their field. Seminar and workshop activities will include potential career paths in the environmental sciences, professional development and research experience opportunities, preparing cover letters and resumes/CVs, and the process of applying to graduate programs and jobs. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Identify potential opportunities as a environmental science degree graduate. 2. Prepare and evaluate professional materials that will be needed to apply for summer and post-graduate jobs and programs. 3. Discuss and collaborate with faculty, peer students, and guest speakers in a professional setting. 4. Develop professional skills for interviews and collaborative settings. FA.

ENVS 3110. Scientific Writing. 3 Hours.
Augments research, writing, and communication skills of science majors. On successful completion, students will be able to effectively use scientific literature databases; find, read, understand, and critically assess primary scientific literature; write in a clear, concise, scientific style that will be required in upper-level science classes, including Senior Thesis, and in graduate study or future professions. In order to enter ENVS 3110 with the needed experience in scientific writing, students are required to have completed or be currently enrolled in a natural sciences course that requires an original, student-designed research project and paper or must obtain instructor permission before enrolling. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Employ use scientific literature databases. 2. Analyze and assess primary scientific literature effectively and efficiently. 3. Develop clear, concise, scientific context for all types of communication that you will be required to do in upper-level science classes (including senior thesis) and in your professional life (e.g., research reports for publication in primary literature and for corporate distribution). Prerequisites: ENGL 2010 and ENVS 3410 or ENVS 3510 or BIOL 3040 or GEO 3400. FA, SP.

ENVS 3210. Soil Science. 3 Hours.
This course takes a multidisciplinary approach to soil science by exploring the physical, chemical, and biological composition of soils. Students will develop skills to assess and characterize soils for quantitative analysis and evaluation. Topics covered include soil morphology and classification, USDA soil taxonomy, soil chemistry and nutrient cycling, and soil pollution. **COURSE LEARNING OUTCOMES (CLOs)** At the successful completion of this course students will: 1. Understand soil properties and the processes and factors that control soil formation. 2. Develop skills to characterize and classify different soil types. 3. Describe and analyze interactions between soils, plants, water, and biogeochemical cycles. 4. Identify problems in soil management and evaluate strategies to mitigate these issues. Prerequisites: CHEM 1210 (Grade C- or higher). SP (even).

ENVS 3280. Environmental Law, Management and Policy. 3 Hours.
This course offers an interdisciplinary approach that allows students from diverse backgrounds to gain a foundational understanding of current environmental laws and regulations within a policy context. It explores real-world environmental challenges, providing insights on how to effectively address critical environmental issues in the United States. By blending these core concepts, this course enables students to actively create a dynamic learning environment that mirrors the collaborative skills needed for applied environmental planning. Furthermore, this interdisciplinary foundation prepares students for the demands of today's job market, creating professionals who can bridge disciplinary gaps. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Identify and explain environmental laws and regulations from a policy perspective. 2. Evaluate and critique national and local environmental policies and management. 3. Survey and analyze current high-profile environmental planning projects, with a focus on environmental impact statements and resource management plans. 4. Develop and improve communication skills through collaborative speaking and engaging the public on environmental issues.

ENVS 3410. Air Quality and Control Technologies. 3 Hours.
The Air Quality & Control Technologies course is a multidisciplinary course consisting of math, physics and chemistry. Topics include sufficient information on major chemical compounds cause outdoor and indoor air pollution; health and environmental effects of air pollution; pollution prevention; and theory and practice of air pollution control technologies to reduce particulate matter, volatile organic compound (VOC), nitrogen oxide emissions, and sulfur dioxide emissions. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will able to: 1. Distinguish the elements and mechanisms of air pollution. 2. Describe current air pollution issues at different scales (from local to global). 3. Survey the adverse effects of primary and secondary air pollutants on human health and the environment. 4. Evaluate methods for control, and prevention of air pollution to meet desired needs within realistic constraints such as economic, environmental, political, health and safety, and sustainability. 5. Assess the mechanisms responsible for the performance effectiveness of each air quality control technology. Prerequisite: ENVS 2210 and CHEM 1210 (Both grade C- or higher). SP (even).

ENVS 3510. Waste Management. 3 Hours.
This course is an in-depth course in waste management. Waste Management 3510 talks about the generation, prevention, characterization, monitoring, treatment, handling, reuse and disposal of solid wastes. In this course students will learn about the integrated sustainable waste management strategies including recycling, landfilling and energy recovery. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will able to: 1. Identify environmental problems caused by waste mismanagement. 2. Categorize sources, types and compositions of solid wastes. 3. Evaluate methods for solid waste collection, transportation, and disposal. 4. Describe and analyze current and proposed waste collection systems. Prerequisites: ENVS 2210 and GEO 2050 (Both grade C- or higher). SP (odd).

ENVS 3910. Biodiversity and Conservation in Costa Rica. 3 Hours.
An interdisciplinary course that is focused on biodiversity and conservation in Costa Rica. The course will meet for an hour a week during the semester, then the participants will travel to Costa Rica for a 2-week study abroad experience. The students will live and study at field research stations in Costa Rica. Pre-trip preparation will include weekly lectures and selected scientific readings to prepare students to understand their experiences in Costa Rica. Lectures and laboratory/field experiences will focus on incorporating this information into observations and experiences while in Costa Rica. The fee covers most costs while in Costa Rica, airfare is not included. Offered upon sufficient student need. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Identify evidence that meets the criteria of science in recognizing and differentiating hypotheses, theories and/or laws related to biodiversity and conservation in Costa Rica. 2. Collect and organize scientific data from field investigations. 3. Consider how concepts and skills acquired in coursework can be developed through interdisciplinary research.

ENVS 3920. Biodiversity and Conservation in the Peruvian Amazon. 3 Hours.
An interdisciplinary course that is focused on biodiversity and conservation in the Peruvian Amazon. The course will meet for an hour a week during the semester, then the participants will travel to the Peruvian Amazon for a 2-week study abroad experience. The students will live and study at field research stations in the Amazon. Pre-trip preparation will include weekly lectures and selected scientific readings to prepare students to understand their experiences in Peru. Lectures and laboratory/field experiences will focus on incorporating this information into observations and experiences while in Peru. The fee covers most costs while in Peru, airfare is not included. Offered upon sufficient student need. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Identify evidence that meets the criteria of science in recognizing and differentiating hypotheses, theories and/or laws related to biodiversity and conservation in the Peruvian Amazon. 2. Collect and organize scientific data from field investigations. 3. Consider how concepts and skills acquired in coursework can be developed through interdisciplinary research.

ENVS 3930. Biodiversity and Conservation in South Africa. 3 Hours.
An interdisciplinary course that is focused on biodiversity and conservation in South Africa. The course will meet for an hour a week during the semester, then the participants will travel to South Africa for a 2-week study abroad experience. The students will live and study at field research stations in South Africa. Pre-trip preparation will include weekly lectures and selected scientific readings to prepare students to understand their experiences in South Africa. Lectures and laboratory/field experiences will focus on incorporating this information into observations and experiences while in South Africa. The fee covers most costs while in South Africa, airfare is not included. Offered upon sufficient student need. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Identify evidence that meets the criteria of science in recognizing and differentiating hypotheses, theories and/or laws related to biodiversity and conservation in South Africa. 2. Collect and organize scientific data from field investigations. 3. Consider how concepts and skills acquired in coursework can be developed through interdisciplinary research.

ENVS 4080. Environmental Monitoring and Characterization. 4 Hours.
Environmental Monitoring and Characterization course emphasizes on the fundamental principles used in the environmental assessment processes. In this course students will learn the theoretical and practical knowledge in various sector of environmental monitoring. Upon completion of this course, students should be able to describe significant environmental regulations, current sampling and laboratory techniques and quality control measures. ***COURSE LEARNING OUTCOMES (CLOs)*** At the successful conclusion of this course, students will be able to: 1. Explain the principles of environmental assessment and monitoring including characterizing the sampling sites, developing sampling plans for the collection of various media and selecting the contaminant transportation method. 2. Demonstrate standard field and laboratory sampling techniques and safety. 3. Apply data handling methods to interpret results from monitoring and characterization sites. 4. Apply knowledge of environmental sciences to implementation of laws, regulations, and policies. Prerequisites: ENVS 2700R (grade C- or higher). SP (odd).

ENVS 4099R. Special Topics in Environmental Science. 1-3 Hours.
Open to all students. This course will focus on a specific environmental science topic of interest to faculty and students that is not represented in the main curriculum. It can be taught as seminars, standard lectures, guest speakers, laboratory exercises, or other traditional or nontraditional instruction methods. **COURSE LEARNING OUTCOMES (CLOs)*** At the successful conclusion of this course students will: 1. Discuss issues associated with selected scientific topics. 2. Demonstrate an ability to critically read, reflect upon, and summarize scientific information. 3. Summarize and synthesize scientific information on a specific subject related to the course topic in a paper and/or oral presentation.

ENVS 4800R. Independent Research. 1-3 Hours.
An independent research course that allows the students to explore science through the scientific method, and allows close interaction between the student and faculty member to address scientific problems through experiment design and execution. Projects are at the discretion of the faculty member, in line with the student's interests in the various scientific areas. Repeatable up to 6 credits subject to graduation and program restrictions. Variable credit: 1-3. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Use the scientific method to develop hypothesis for a research project in the environmental sciences, design experiments or identify resources from which to collect data, and draw conclusions from results. 2. Design and modify experiments throughout the progress of a research project. 3. Complete research projects independently while also interacting with other students and faculty that are engaged in the project. 4. Utilize outside resources (scientific databases, literature, etc) to interpret results and compare to existing and previous work in the field of your research project. FA, SP, SU.

ENVS 4890R. Environmental Sciences Internship. 1-3 Hours.
For students who are granted and accept an internship with an approved employer, or a governmental, non-profit, or private agency, that provides an extensive learning experience in the field of Environmental Science. Students must be supervised by an agency representative and a faculty advisor. Written contracts of expectations and terms and permission of the Earth and Environmental Sciences Department Chair are required. No more than 6 credits in any combination of internship, independent research, or senior thesis can count toward Environmental Science degree requirements. Variable credit: 1.0 - 3.0. Repeatable up to 8 credits subject to graduation and program restrictions. Offered based upon sufficient student need. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will: 1. Acquire work experience and an insight as to the type of career possible by observing a qualified provider. 2. Employ proficient writing skills by producing a summary paper at the conclusion of the internship. 3. Demonstrate collaborative team skills while participating in the internship experience. Prerequisites: Instructor Permission required. SU.

ENVS 4910. Senior Seminar. 1 Hour.
A seminar course where students will share their research results or literature searches with fellow students and faculty in written and oral formats. **COURSE LEARNING OUTCOMES (CLOs) At the successful conclusion of this course, students will be able to: 1. Use the scientific method to develop hypotheses, search literature or utilize results from experimentation, and defend in an oral presentation to faculty and students. 2. Discuss relevant scientific topics in oral presentations in a scientific group setting. 3. Collaborate with other environmental science students and faculty that are engaged in scientific research to analyze data, results, and varying perspectives, and participate in scientific discussions. 4. Utilize outside resources (scientific databases, literature, etc.) to help interpret results and compare to existing and previous work in the field. 5. Prepare written reports that effectively summarize a chosen scientific topic related to the environmental sciences using the vast literature and compiled data. SP.