

**NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
GIS 230 – APPLICATIONS IN ENVIRONMENTAL SCIENCE (3 CR.)**

Course Description

Introduces Global Positioning Systems (GPS) and Geographic Information Systems (GIS) hardware and software and applies the principles of GPS and GIS to Forest Science and Environmental Science. Includes: Natural Disasters; Pest Control; Water Quality; Prescribed Burning; Identifying Sources of Pollution. This course covers the same content as ENV 230. Credit will not be granted for both courses. Lecture 2 hours. Laboratory 2 hours. Total 4 hours per week.

General Course Purpose

Principles of Environmental Modeling and Environmental Change Analysis are explored using GIS (IDRISI Andes, Land Change Modeler). Two anthropogenic impacts are examined at length in an ecological context using GIS—urbanization in less-developed and more-developed regions, and deforestation. Students also apply of GIS as a tool to assess habitat suitability, species range, and biodiversity. Students will learn to use GIS as an analytical tool to support study of more specific environmental science (biology, chemistry, physics, geology, geography).

Course Prerequisites/Corequisites

Prerequisites: ENG 4 under the COMPASS test, or successful completion of ENF 2, or placement recommendation for ENF 3 under the Virginia Placement Test, GIS 200 and competency in Math Essentials Units MTE 1–3 as demonstrated through placement and diagnostic test, or by completion through unit 3 in an MTT course

Course Objectives

Upon completing the course, the student will be able to:

- Describe use of GIS as a practical tool for modeling environmental issues
- Define the data needed to develop a GIS environmental model
- Implement a simple GIS environmental model
- List instances in which GIS would assist in investigating/forecasting environmental disruption
- Discuss the use of tools such as GIS, GPS, remote sensing in studying environmental science

Major Topics to be Included

- a. GPS as a data source
- b. Modeling as an Environmental Analysis Tool
- c. Remote Sensing, Classification, Indices
- d. Natural Disasters: Hurricane Katrina & GIS
- e. Pest Control: Invasive Species; The Gypsy Moth
- f. Modeling Anthropogenic Effects on an Ecosystem
- g. "Natural" Disasters?: Mudslides
- h. Forecasting Anthropogenic Effects on an Ecosystem
- i. Urbanization & Deforestation
- j. Validating Forecast Anthropogenic Effects on an Ecosystem
- k. Development & Water Quality
- l. Dynamic Variables in an Environmental Model
- m. GIS & Habitat Assessment (Change and Gap Analysis)
- n. GIS & Species Range Refinement/Habitat Suitability
- o. Using GIS for Analysis of Biodiversity