

GIS IN SOIL AND WATER SCIENCE -- SWS 4720C

Distance Education Section

INSTRUCTOR:

Mrs. Susan Curry, Educational Coordinator
Soil and Water Science Department, University of Florida
2176A McCarty Hall, PO Box 110290, Gainesville, FL 32611-0290.

CONTACT:

- Email: scurry@ufl.edu
- Phone: 352-392-1951 ext. 252
- Fax: 352-392-3902

TIMES: Fall, even and odd years

CREDIT HOURS: 3

ENROLLMENT CAP: 12

FORMAT: Lecture and labs

ONLINE MEETINGS / CHATS: To be determined by student schedules as needed.

DELIVERY MODE:

- Course material is provided via an Online Education Portal: <http://swsde.ifas.ufl.edu> (including annotated Power Point slides, reading material in pdf format, e-lectures, library of GIS video clips, quizzes, and hyperlinks)
- Email and message (bulletin) board are used for asynchronous communication
- Adobe Connect online meeting system is used for chats (synchronous communication): <http://mbreeze.ifas.ufl.edu/chat4720/>. Sessions: To be determined
- Required textbook comes with software and license: If there is a problem setting up the software, the virtual lab will be a back up for weekly assignments.
- Virtual computer lab is used for GIS project: <http://www.cals.ufl.edu/itservices/virtuallab>

The virtual computer lab provides 24/7 access to the ArcGIS software package and spatial datasets that will be used for the project.

PREREQUISITES:

Basic knowledge in Windows operating system and high-speed Internet access (e.g. DSL, cable modem, or satellite modem) and in geography, statistics, and soil science/land resources are expected.

COURSE OBJECTIVES:

To provide students with the basic concepts of geographic information systems and applications focused on soil and water resource management. To familiarize the students with the ESRI ArcView 9 software and provide guided practice.

Students who finish this class should be able to:

- Explain what a GIS is and what it can do.
- Work with and create GIS maps in ArcMap.
- Access and query a GIS database.
- Describe two common GIS data structures.
- Explain what geographic data is, how it is made, and where to get it.
- Explain what spatial analysis is and solve geographic problems using ArcGIS analysis tools.
- List common GIS tasks and identify which ArcGIS Desktop application is used for each task.
- Understand what the geodatabase offers for GIS data storage.
- Create, edit, and add data to a geodatabase.
- Control the appearance and display of data layers in ArcMap.
- Change the coordinate system and map projection used to display a dataset.
- Query and analyze GIS data.
- Create presentation-quality maps and graphs

SOFTWARE:

In this course the ArcGIS Vers. 9.3 (Environmental Systems Research Institute, Redlands, CA) software is used including the components ArcCatalog, ArcMap, ArcToolbox and ArcEditor. The following extensions will be used: Spatial Analyst and Geostatistical Analyst. Other supporting software packages available in the virtual computer lab include: ArcGIS Vers. 9.2, SGems, SPSSWIN, MS Office Suite-MS Word, Power Point, Excel and Access.

REQUIRED TEXTBOOK:

Gorr W. and Kristen Kurland. 2008. GIS Tutorial, Workbook for ArcView 9, third edition. ESRI Press. Redlands, California. ISBN 978-1-58948-205-0.

RECOMMENDED READING:

Bolstad P. 2008. GIS Fundamentals. Eider Press, White Bear Lake, Minnesota. ISBN 0-9717647-0-0.

GRADING:

Assignments (8 of 9 GIS assignments - ArcGIS)	120 points
2 Exams	140 points
Quizzes (best 7)	70 points
Project	70 points
Course participation	50 points
TOTAL POINTS	450 points

GRADING SCALE:

A 90 - 100

B+ 85 - 90

B 80 - 85

C+ 75 - 80

C 70 - 75

D+ 65 - 70

D 60 - 65

E < 60

COURSE MODULES:

Introduction: Course Mechanics. IFAS Virtual Lab.

Module 1: Principles of Geographic Information Systems (GIS)

Introduction to the basic components and structure of GIS. Geographic concepts, definitions and data formats will be introduced. Introduction to the ArcView software and its components (ArcMap, ArcCatalog and ArcToolbox).

Module 2: Data Models

Common spatial data models (vector, raster and TIN) and map basics. We will discuss the differences between raster and vector formats and the advantages and disadvantages when using these different formats.

Module 3: Map Projections

This module provides an overview of geographic coordinate systems and map projections. You will be introduced to basic geodesy, datums, coordinate systems, and map projections.

Module 4: Data Input

In this module you will be introduced to the different methods of collecting/digitizing data for GIS systems such as GNSS, GPS, aerial and satellite images.

Module 5: Database Concepts and Soil Information Systems

In this module you will learn about database management of spatial data, attribute tables and metadata.

Module 6: Basic Spatial Data Analysis

An overview of multiple vector-based and raster-based (local, focal, zonal and global) spatial operations will be provided. You will learn how to create new spatial datasets and how to edit existing spatial datasets.

Module 7: Topics in Raster Analysis

This module will introduce map algebra and local functions which can be used in a GIS analysis.

Module 8: Interpolations

You will learn how to interpolate point (site-specific) data using a variety of different methods. These methods generate continuous maps that show gradual changes in soils and other environmental properties.

Module 9: Standards, Data Quality and Errors

In this module you will learn about standards for spatial data and data quality such as precision, accuracy, and errors associated with GIS datasets.

Module 10: Project

In this module you will work as groups to develop a GIS project.

ACADEMIC HONESTY:

In fall 1995 the University of Florida student body enacted a new honor code and voluntarily committed itself to the highest standards of honesty and integrity. When students enroll at the university, they commit themselves to the standard drafted and enacted by the students:

Preamble: In adopting this honor code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the university community. Students who enroll at the university commit to holding themselves and their peers to the high standard of honor required by the honor code. Any individual who becomes aware of a violation of the honor code is bound by honor to take corrective action. A student-run Honor Court and faculty support are crucial to the success of the honor code. The quality of a University of Florida education is dependent upon community acceptance and enforcement of the honor code.

The Honor Code: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

Matters of violations of academic honesty are adjudicated by the Student Honor Court, the Health Center Student Conduct Standards Committee, the Student Conduct Committee, the College of Law Honor Committee and faculty.

See a current Undergraduate/Graduate Catalog for definitions of Plagiarism, Bribery, Misrepresentation, Conspiracy, and Fabrication.

UF COUNSELING SERVICES:

Students experiencing crisis or personal problems that interfere with their general well being are encouraged to utilize the university's counseling resources. Both the Counseling Center and Student Mental Health provide confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal or lacking clear career and academic goals, which interfere with their academic performance. The Counseling Center is located at 301 Peabody Hall (next to Criser Hall). Student Mental Health is located on the second floor of the Student Health Services in the Infirmary.

1. University Counseling Center, 301 Peabody Hall, 392-1575; personal and career counseling: www.counsel.ufl.edu

2. Student Mental Health, Student Health Care Center, 392-1171, personal counseling: www.hsc.ufl.edu/shcc/smhs.htm
3. Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual assault counseling
4. Career Resource Center, Reitz Union, 392-1601, career development Assistance and counseling.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES:

The Dean of Students Office coordinates the needed accommodations of students with disabilities. This includes the registration of disabilities, academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services, and mediating faulty-student disability related issues.

Dean of Students Office, 202 Peabody Hall, 392-7066, www.dso.ufl.edu.

SOFTWARE USE:

All faculty, staff and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.