ENVR 6203, Remote Sensing & GIS
&
PSSC 6543, Advanced GIS

Arkansas State University
Departments of Biological Sciences and Plant and Soil Sciences

Instructors

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Course Description and Objectives

This class will utilize ESRI ArcView as the GIS for development of a research project. Data files available from internet sources will be reviewed. Selected data sources related to research work will then be used to assess the information related to project goals. A research project will be the main focus of this class. This project can be part of your graduate thesis or dissertation. In fact, it is strongly encouraged with the hope that this class will leave you with some supporting materials that will help in the assessment phase of your research work.

Text

For ENVR 6203:

Required:

Bettinger, P., and M. G. Wing. 2004. Geographic Information Systems: applications in forestry and natural resource management. McGraw-Hill, New York, New York.

Recommended:

Savitsky, B. G., and T. E. J. Lacher, editors. 1998. GIS methodologies for developing conservation strategies: tropical forest recovery and wildlife management in Costa Rica. Columbia University Press, New York, New York.

For PSSC 6543:

No text is required for this course. A recommended book would be "Using ArcMap" by Michael Minami published Environmental Systems Research Institute (www.esri.com). Other supporting materials will be made available throughout the semester.

Attendance and Missed Assignments

See ASU Undergraduate Bulletin at http://registrar.astate.edu/bulletin.htm. Attendance is mandatory for exams. In case of illness, feel free to contact me via email or call me at 870.972.2087. If you participate in class, you will find me to be very helpful and patient. I expect you to be involved with every class. Absence from class may result in a deduction of your course participation grade. Missed assignments must be accompanied with documentation detailing the reason(s) unless arrangements have been made prior to the assignment due date. Assignments missed due to bad weather will, in most instances, be given extended deadlines. **All assignments are due by the end of class.**

PLAGIARISM:

Plagiarism is the act of taking and/or using the ideas, work, and/or writings of another person as one's own.

1. To avoid plagiarism give written credit and acknowledgment to the source of thoughts, ideas, and/or words, whether you have used direct quotation, paraphrasing, or just a reference to a general idea.

2. If you directly quote works written by someone else, enclose the quotation with quotation marks and provide an appropriate citation (e.g., footnote, endnote, bibliographical reference).

3. Research, as well as the complete written paper, must be the work of the person seeking academic credit for the course. (Papers, book reports, projects, and/or other class assignments)

Discipline: Faculty members may respond to cases of plagiarism in any of the following ways:

1. Return the paper or other item for rewriting; the grade may be lowered.

2. Give a failing grade on the paper or other item—"F" if a letter grade is used or zero if a numerical grade is used.

3. Give the student who plagiarized a failing grade in the course.

4. Recommend sanctions, including disciplinary expulsion from the university. All cases should be referred to the student conduct system.

CHEATING:

Cheating is an act of dishonesty with the intention of obtaining and/or using information in a fraudulent manner.

1. Observing and/or copying from another student's test paper, reports, computer files and/or other class assignments.

2. Giving or receiving assistance during an examination period. (This includes providing specific answers to subsequent examinees and/or dispensing or

receiving information that would allow the student to have an unfair advantage in the examination over students who did not possess such information.)

3. Using class notes, outlines, and other unauthorized information during an examination.

4. Using, buying, selling, stealing, transporting, or soliciting, in part or in whole the contents of an examination or other assignment not authorized by the professor of the class.

5. Using for credit in one class a term paper, book report, project, or class assignment written for credit in another class without the knowledge and permission of the professor of the class.

6. Exchanging places with another person for the purpose of taking an examination or completing other assignments.

Discipline: Faculty members may respond to cases of cheating in any of the following ways:

1. Allow the testing to progress without interruption, informing the offending student about the offense—and award a failing grade on the test—"F" if a letter grade is used or zero if a numerical grade is used.

2. Seize the test of the offending student and give a failing grade on the paper.

3. Give the offending student a failing grade in the course.

4. Recommend sanctions, including disciplinary expulsion from the university. All cases should be referred to the student conduct system.

INCLIMATE WEATHER POLICY:

The university remains open for academic classes and all other services during inclement weather except in extreme circumstances determined solely by the president of the university. Regional and local news media will publicize the closing**. Commuter students are encouraged to use good judgment in deciding whether to drive to campus under this policy, it is the responsibility of the student to immediately contact each of his/her professors upon return to explain the circumstances and to determine the need to complete any missed assignments.** The student is responsible for all missed assignments during inclement weather within a time frame to be determined by the professor. See notes about makeup policies and inclement weather below.

Special Assistance

Students who require academic adjustments in the classroom due to a disability must register with ASU Disability Services. Within the first few weeks of class, please contact me to discuss appropriate academic accommodations. Appropriate arrangements will be made to ensure equal access to this course.

Grading

	Points
Exam 1	100
Exam 2	100
Final report	100
Assignment 1	20
Assignment 2	20
Assignment 3	20
Assignment 4	20
Assignment 5	20
Project Presentation	100
	500

Final grading is a follows…

Total	500 to 450	A
	449 to 400	B
	399 to 350	C
	349 to 300	D

Course Outline

Week 1: 22 August 2005

Introduction and class format

Concept of the original research project required for this class – identify data needed support research project goals.

- Installing ArcGIS
- Setting up the Windows XP environment
  - My Computer – Tools - Options
    - Unhiding file extensions
    - Viewing full path names
    - Viewing file details
    - Extracting (Unzipping) files
- File Types
  - Vector Data - Shape files
  - Raster Data - Image files and the World file needed for georeferenced image data
- Data Quality Objectives – Quality assurance
  - Data source integrity
  - Project scale
    - Feature (shape file) data scale
    - Image resolution
    - Time of year
    - Historical data
  - Project life
  - Computer file storage
    - Major and sub-folder naming
    - Naming data and document files
  - Project data backup

Assignment 1: Set up folders for storing research project data – turn in as power point handout.

Week 2: 29 August 2005

Information sources on the web

Become familiar with the procedure for obtaining data from CAST, the various image file formats, and projection systems.

- USGS Data Gateway
- Data Source in Other States
- Geostor – U of A Center for Advanced Spatial Technologies (CAST)
  - GeoSurf –
    - setting up an account password
    - downloading data using filters
    - image file type and projection

Week 3: 5 September 2005

Labor Day – No Classes

Week 4: 12 September 2005

Aerial image data for use as a base map – Geostor continued

Learn to download 1m color infrared aerial photos and the utility of these data as a base map and beginning site assessment.

- Digital orthophotoquarterquad (DOQQ) coverage
  - USGS quadrangle sheets and names
  - Finding the DOQQ name – using quadrangle shape file in Arc 9 and GPS
- Geostor– U of A Center for Advanced Spatial Technologies (CAST)
  - FTP –
    - DOQQ metadata
    - DOQQ color infrared aerial images
    - DOQQ file type and projection
      - DOQQ world file

Assignment 2: Turn in a concise power point presentation of the research project supporting literature as handouts. Include supporting illustrations from these sources.

Week 5: 19 September 2005

Beginning Arc 9

An overview of a few of some of basic functions in Arc Map.

- Arc Map Work Area
  - Menus
  - Tools
  - Table of Contents – Layers
- Adding Data
  - Shape files
  - CIR Aerial image (DOQQs) files
  - Setting the projection

Assignment 3: Turn in a concise instructions for using Geostor.

Week 6: 26 September 2005

Working with Arc 9

A quick run through of some of the main features of ArcMap and ArcCatalog.

- Starting ArcMap
  - Opening a map
  - Using the table of contents
  - Moving around the map
- Tool bars
  - Extensions
  - Layout View
    - Inserting arrow, scale, legend
  - Arc Catalog
    - Creating a new shape file
    - Creating and editing metadata

Week 7: 3 October 2005

Mid Term, Exam 1

Week 8: 10 October 2005

- Map projections
  - *Knowing the coordinate system and datum of the project and the data utilized is the very heart of the GIS system and the root of most problems.*
    - Datum – the shape of the earth
    - Spherical coordinate systems
      - Unprojected Geographic – lat, lon
    - Projected coordinate systems
      - UTM, Stateplane

Week 9: 17 October 2005

- Creating a new shape file
  - *All vector data, most commonly shape files, is made up of points, lines or polygons. This section will provide the basic information needed to create and modify vector data in a shape file format.*
    - Shape file –
      - Types of shape files
      - Creating a new shape file - ArcCatatlog
      - Editing a shape file – the drawing tool
    - Coverages, geodatabases, and CAD
    - Managing layers
      - Changing a layer's text description
      - Using data frames to organize layers
      - Repairing broken data links

Assignment 4: Turn in a concise power point presentation of the research project methods and materials as handouts.

Week 10: 24 October 2005

- Creating maps with tabular data
  - Using NotePad to create an x,y text file
    - Adding X,Y data
    - XTools
      - Setting up the xtools environment – projection system
      - Calculating acres/hectars
      - Adding x.y coordinates to the attribute file
    - Tool box
      - Subseting and joining data (geoprocessing wizard)
      - Converting the coordinate system of a shape file
  - Using an IPac GPS and ArcPad
    - Setting up the IPac – activesync
    - Installing ArcPad
    - Using ArcPad
      - Adding data
  - Marking a point in ArcPad

Week 11: 31 October 2005

- Using Spatial Analysis and Georeferencing extensions
  - The concept of data interpolation
  - Interpolating a surface using spatial analyst
  - Georeferencing an image

Assignment 5: Turn in a concise instructions for using ArcPad.

Week 12: 7 November 2005

- Data queries
  - Opening a layer's attribute table
    - Arranging columns
    - Sorting records
    - Adding and deleting fields
    - Editing attributes
  - Query
    - by feature
    - by attributes
    - SQL expressions
  - Creating a buffer
  - Geocoding adresses
  - Making a project potable

From this point on, the research project becomes the main focus. It should be simple and informative project that will hopefully enhance your current thesis or dissertation work. All work will be presented in an informal seminar format. A written report will also be expected and will serve as the final exam.

Week 13: 14 November 2005

- Water Resource GIS Applications
- Conservation GIS and Remote Sensing - Measuring Landcover Change and Its Impact on Endangered species

Week 14: 28 November 2005

- Project Presentations

Week 15: 5 December 2005

- Project Presentations

Week 16: 13 December 2005 from 5:00 – 7:00 pm

- **Final Exam**
- **Research report due**