
BIO 4910/5910 – GIS & Ecology

Spring 2008

Description

This seminar will contain both a lecture and a lab. Lecture will cover such topics as GPS, remote sensing, GIS data, basic GIS operations, topographic and linear operations, temporal change, spatial interpolation, modeling, and its application to population, community, and landscape ecology. Labs will be an introduction to the programs in the ArcGIS package and how they may be applied to the study of ecology. Students will also design and implement independent projects utilizing GIS and will present the results of their projects at the end of the semester. This seminar will be limited to 20 students.

Objectives

1. Increase student awareness of GIS science and its application in ecology
2. Provide opportunities to process and analyze spatial data using ArcGIS, both in class and for a group research project (independent research project for graduate students)
3. Gain an appreciation for the complexity of data manipulation, analysis, and visualization at different scales of time and space.

Instructor

Dr. Chris Butler
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Class website: <http://www.biology.uco.edu/PersonalPages/CButler/BIO44910>

Lectures, notes, assignments are all posted on the course website.

Class meets

Tuesdays	8:00-10:50 AM
Thursdays	8:00-10:50 AM

From 8:00 – 8:50, class will meet in HOH 259. From 9:00 – 10:50, class will meet in HOH 319.

Required Reading

- ☐ Bolstad, P. 2005. GIS Fundamentals: A First Text on Geographic Information Systems, Second Edition. Eider Press: White Bear Lake. (required)
- ☐ 1 GB (or larger) flash drive (required)
- ☐ Campbell, J. 2000. Map Use & Analysis, 4th edition. McGraw-Hill: Boston. (recommended)

- Theobald, D. M. 2003. GIS Concepts and ArcGIS Methods. Conservation Planning Technologies: Fort Collins. (recommended)

Assignments and Grading

Attendance: 60 pts

Weekly Quizzes: 200 pts (best 10 out of 12 scores)

Assignments: 130 pts

Test 1: 200 pts

Project: 250 pts

Final: 200 pts

Total: 1040 pts

Extra Credit: Weekend Field Trips

There will be two weekend field trips (for extra credit) to McCurtain County, Oklahoma. The purpose of these trips will be to catch and band Yellow Rails and gather feathers to perform a stable isotope analysis in order to identify where the rails are coming from. We may also do some vegetation sampling on these trips. Each trip is worth 15 pts of extra credit.

During these trips, we will be staying at the OSU Forest Resources Center. You will need to bring food (for two days), appropriate footwear for wading in marshes (rubber boots are best), flashlights, and a sleeping bag.

The dates of the two trips are:

- 13-15 February
- 27-29 March

Course Calendar

13 January Introduction to the class / Intro to GIS (*.pptx) Introduction to GIS lab	15 January Introduction to Microcomputers (*.pptx) Sinking Pond exercise <i>Read Bolstad CH 1</i>
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20 January GIS Structure & Function (*.pptx) Request (and download) the latest aerial imagery for Oklahoma County. You will use this data next week for your in-class exercise. Quiz 1 (key) Independent research project discussion □ Format for proposals (use the example for BIO 131) □ Format for literature cited Read Bolstad - CH 2 Read Shaw, D. N. and S. F. Atkinson. 1990. An introduction to the use of Geographic Information Systems for ornithological research. Condor 92: 564-570.	22 January GPS (*.pptx) GPS exercise outside (dress warm!) Discussion of Shaw & Atkinson (1990)
27 January Introduction to maps (*.pptx) Creating polygons exercise Quiz 2 (key) Read Bolstad CH 3	29 January Guest lecture by Dr. Brooke Stabler Exercise 1 & 2 of quick-start tutorial
3 February Basic Mapping Processes (*.pptx) Transformations exercise Quiz 3 (key) Before class, read Gill - CH 4-5 Read Lurz, P. W. W., J. L. Koprowski, and D. J. A. Wood. 2008. The use of GIS and modelling approaches in squirrel population management and conservation: a review. Current Science 95: 918-922.	5 February Coordinate Systems (*.pptx) Exercise 3 & 4 of quick-start tutorial Discussion of Lurz et al. (2008)
10 February Guest lecture by Dr. Jeff Kelly Yellow Rail exercise Quiz 4 Read Hobson, K. A. 2005. Stable isotopes and determination of avian connectivity and seasonal interactions. Auk 122: 1037-1048.	12 February Remote sensing from air (*.pptx) Exercise 5 of quick-start tutorial Discussion of Hobson (2005) Read Bolstad CH 6
17 February Remote sensing from space (*.pptx) Oklahoma County LULC (due 10 March) Quiz 5	19 February Ecological Niche Modeling (*.pptx) Ecological Niche Factor Analysis exercise
24 February Geodatabase Design & Development (*.pptx) LULC exercise Quiz 6	26 February Basic GIS Operations (*.pptx) LULC exercise