

# Biological Applications of Geographic Information Systems Biology 854-80 Fall 2011

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Office Hours: M, W, F 1:00 to 2:00 pm, or by appointment

Texts: GIS Tutorial 1: Basic Workbook, ESRI Press, Gorr and Kurland

ISBN: 978-1-58948-259-3

## **Class Objectives:**

The following are objectives for this course:

- Understanding basic cartographic principles needed to use GIS software and online data sources
- Understanding of function, concepts, and use of GPS receivers
- Become proficient in the use of Environmental Systems Research Institute (ESRI)'s ArcGIS software specifically:
  - Handling, organizing, and displaying geographic data layers
  - Understanding of data structures, file types, images
  - Ability to create, edit, and use data in ArcGIS
  - Understanding efficient workflows in GIS projects
- Introduction to Google's Google Earth software
- Conceive, create, and present a GIS project

## **Class Structure:**

This class has two components. The first part is learning about computers, maps, GPS, and GIS software. The second component is completing a GIS project.

There are usually two lectures per week, and you will be reading the text and working on your own with the GIS software provided. These lectures are posted on the UNK Blackboard website for this class – they are large video files that you need to download. Then you can put them on your computer, video player, iPod, or any other digital device you wish. Adobe Shockwave will be needed to view the lecture videos. I also supply Adobe Acrobat files of all the PowerPoints I use in the lectures.

Discussion of the work is a key part of the class, and I will use the Blackboard Discussion Board function for this. I want to see three unique, original, meaningful posts each week to Blackboard from each person. This means posts that are questions or observations on class

material. The posts should be complete, clear thoughts, with references if needed to books or websites.

**Exams and Grading:**

Grading in this class will be based on tests, participation, and the Final Project. The tests will focus on of your knowledge of GIS concepts and your ability to complete operations with the software such as adding tables, importing files, reprojecting themes, data mining, and reclassifying displays. I have found out repeatedly that running the software without the book exercises to tell you what to do is one of the most difficult parts of the entire class. The keys are: knowing how ArcGIS names things (files, images, data, tools, buttons), what those things are, and how to use those things when they need to be. I will typically ask you to do an operation outlined in the book, with different data than you did in the book exercise.

On later quizzes, I will ask you to figure out what needs to be done to get to a certain result. This is not easy. Please think about this as you read the books, do not just “do the exercises” without thinking about what purpose the exercises are serving and why one step comes after another.

**Grading:**

Class Quizzes (20 pts * 12 quizzes, lowest dropped)	220 pts
Participation (10 pts * 12 weeks, wks 2-13)	120 pts
Final Project Proposal	25 pts
Final Project Phase I	25 pts
Final Project Phase II	50 pts
Project Phase III (Final Exam)	80 pts
<b>Total Possible</b>	<b>520 points</b>

Assignments need to be uploaded to Blackboard

Quizzes will be one of two types: assignments from the textbook, or assignments that I create. Tests that I create will be posted the week they are due. I will open Blackboard Friday around 5:00 pm Central Time and remain open until Monday night allowing you to upload the files you need to. Occasionally I may have a timed test which will be open during the same time period, but will have a time of about an hour. You must finish these tests once you start them within that hour.

Class grades will be assigned on the standard scale adopted by the UNK Biology Department:

- A (90-100%), B+ (88-89%), B (80-87%), C+ (78-79%), C (70-77%),
- D+ (68-69%), D (60-67%), F (Below 60%)

### **Class Expectations:**

Let me reiterate from above: *“The tests will focus on of your knowledge of GIS concepts and your ability to complete operations with the software such as adding tables, importing files, reprojecting themes, data mining, and reclassifying displays. I have found out repeatedly that this is one of the most difficult parts of the entire class.”*

Working through exercises in a textbook is truly a ‘baby steps’ phenomena. When I ask you to go back to these same exercises and do something different with them you may feel the free-fall of not have the steps written out for you. I recommend reading each exercise twice: once to just get through the procedures given in the book, the second time for understanding of what was done and why. Part of the final project grade will be based on how demanding the technical issues were that each student faced. So there is incentive to learn the procedures well.

A major difficulty with this class is the “Frustration Factor”. ArcGIS is unforgiving software, and it can be trying. There are also concepts and technical specifications that must be mastered. This can make learning a struggle. In a sense you must learn definitions and accept how things work until you have enough points of knowledge to begin drawing connections between them. Then you can build the larger framework of concept and themes in the software and the GIS discipline.

On-line discussion boards will be important in this class. Please make preparations to be online – and I require that you have access to high-speed internet. You do not need this in your home, but at least through a library, work computer, or internet café. You will need to download lectures and I recommend take quizzes this way. Your computer must also be able to run the ArcGIS software (no Mac version exists for instance).

I would like to post the results of some of your Final Projects on the UNK GIS webpage. Everyone will be graded on the quality of their Projects. This will include evaluation of the data, metadata, and cartographic skills. These projects will need to be mailed to me on a CD that you burn. Probably. Most projects are too large for you to mail or for me to receive. This is not always true, but generally once a project gets over 10 Mb in size things get more difficult.

### **Extra Credit:**

This is usually not worth it, the time spent on the ‘extra’ credit could be spent working on class material and hopefully better grades of upcoming assignments.

# Biology 854-80 Syllabus

## Fall 2011

This is the planned lecture schedule there may be deviations from this schedule, but the order of lectures will be the same.

Week/ Date	Lectures	Chapters in GIS Tutorial 1	Graded material
1-Aug 22	01 Introduction		
	02 Concepts		
	03 Chapter 1	1 Introduction	<b>Quiz 1</b>
2-Aug 29	04 Chapter 2	2 Map Design	
			<b>Quiz 2</b>
3-Sept 5	<b>Labor Day</b>		
	05 Chapter 3	3 GIS Outputs	
	06 Biology I		<b>Quiz 3</b>
4-Sept 12	07 Chapter 4	4 File Geodatabase	
	08 Metadata		
			<b>Quiz 4</b>
5-Sept 19	09 Chapter 5	5 Spatial Data	
	10 Projections		
			<b>Quizzes 5, 6</b>
6-Sep 26	11 Chapter 6	6 Digitizing	
	12 GIS Imagery		
			<b>Quizzes 7,8</b>
7-Oct 3	13 Projects		
	14 GPS		
			<b>Quizzes 9, 10</b>
8-Oct 10	15 GIS Data Retrieval		
	16 Database Society		
			<b><u>Project Proposals Due</u></b>
9-Oct 17	17 Chapter 8	8 Geoprocessing	
	<b>Fall Break UNK</b>		
			<b>Quiz 11</b>
10-Oct 24	18 Project Phase 1		
			<b><u>Project Phase I Due</u></b>

Week/ Date	Lectures	Chapters in GIS Tutorial 1	Graded material
11-Oct 31	19 Chapter 10	10 ArcGIS 3D Analyst	
			<b>Quiz 12</b>
12-Nov 7	20 Chapter 11	11 ArcGIS Spatial Analyst	
			<b>Quiz 13</b>
13-Nov 14	21 GIS jobs and Projects again		
			<b><u>Project Phase II Due</u></b>
14-Nov 21	<b>Thanksgiving Week</b>		
15-Nov 28	23 Preparing Projects		
16-Dec 5	Projects		
17-Dec 12	<b>Finals Week</b>	Final Exam Due Noon Wed. Dec 14 <sup>th</sup>	<b><u>Final Exam: Project Phase III Due</u></b>

### Students with Disabilities

Students with disabilities are encouraged to contact me for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska at Kearney to provide flexible and individualized reasonable accommodation to students with documented disabilities. To receive accommodation services, students must be registered with UNK Disabilities Services Coordinator, David Brandt, in the Academic Success Office, 163 Memorial Student Affairs Building, 308-865-8214 or by email [brandtdl@unk.edu](mailto:brandtdl@unk.edu).

# Orientation to Albrecht Blackboard Use

## Version 1.4 Fall 2010

### UNK Biology Department

#### **Introduction:**

The UNK Biology Distance Master's program has a number of faculty participating. Part of the experience and challenge of the program is that, as in other professional situations are different. Different lecture styles, different discussion board expectations, different grading priorities, and even different methods to deliver class material. I realize this might be frustrating for people, but hopefully the various methods will demonstrate what works and what does not for you in your own future careers. Please read this section as I try to clarify how I use Blackboard in this class.

Please contact me with any questions; note that the UNK e-Campus website does provide both Video Tutorials and Atomic Learning Tutorials on using Blackboard, Lotus notes, and MS Word see [this page](#).

#### **A note about Expectations:**

I approach this program with the goal of providing, as closely as possible, the level of experience I was fortunate enough to experience in my graduate career at some of the best universities in the country. This means that generally my expectations are high. I will do my best to find, present, and interpret material I think is important and appropriate for the subject area of the class. I will also do my best to explain how the process of science works including experimental design, statistical testing, writing, and thought processes. I will also work to be as available as possible, and turn around Blackboard, emails, and graded work as quickly as possible.

There is responsibility on your part as well to meet both the letter and spirit of assignments. It is my hope and expectation that everyone in this program is here because they enjoy biology and wish to become more knowledgeable and proficient at teaching or researching in this area.

Let me provide some examples of what this means to me, based on my experience as a graduate student:

1. **Have I prepared for class?** Have I read the material, not just once but twice? Have I looked up authors, concepts, or words I was not familiar with before attending class? Do I understand how this reading fits into the discipline in general, and why it was assigned? Have I noticed the author, date, and institution of the paper in addition to the data, statistical tests, and concepts supported in the paper?

2. Before asking an entire class what a word means **have I tried to look it up?** Did I try to find the word from appropriate, professional, recognized sources – not just a general dictionary?
3. Is the work I am turning in **reflective of me** as the student I am trying to be? Have I proofread the document for grammatical, factual, spelling, and formatting errors? Do I know what formatting is desired by the professor? Is this paper well-researched? Do I have all the important concepts present in the paper? Is the organization of the paper clear and useful? Have I put in thought and work to figures, tables to make them clear and referenced? Do I have text transitions between sections and paragraphs that are clear, clean, and direct?

### **Blackboard:**

The Blackboard Classroom software suite is the main portal for the class work in the UNK Biology Distance Master's program. Being familiar with this program is helpful for success in the program. To be more precise, the following components are the ones I use the most:

#### 1. Course Documents:

- a. This is where I place pdf files and wmv files that are the lectures for classes
  - i. You do need to be able to view pdf and wmv files therefore, to see the PowerPoint content and lectures I have prepared
- b. These files should be downloaded for viewing or printing out at your leisure
- c. These files are not large but should be downloaded only on 1 Mb/sec or faster internet connections to be easy to get quickly
- d. I may post other papers here as well as book sections or links to other sites I think are useful to the class or are class materials themselves - such as resources for scientific writing

#### 2. Discussion Board:

- a. This section of Blackboard is how you will communicate with me and each other
- b. In my classes Discussion Board is an important part of the class experience, there are significant points associated with participation on Discussion Board as I think communication with others is an important part of the learning process
- c. Grading of participation will be done on the basis of the quality and quantity of participation
  - i. I am looking for at least three (3) useful postings each week, not on the same day
  - ii. *The quality of your contribution.* This is a somewhat subjective category, but the more insightful your comments the better the quality of discussion will be. Your comments should generally consist of at least a short paragraph. Conciseness and clarity are necessary to keep the work load for this class to a reasonable level, i.e.: page long postings are discouraged. Your comments should be supported with specific details, file attachments or web sites, and should be relevant to the current topic

of discussion. Saying “I agree” is supportive, but not meaningful contribution to the ongoing discussion.

- iii. *How well you interact as classmates.* Your responses should demonstrate that you are aware of the discussion that has been taking place. Go beyond either “agreeing” with someone or “disagreeing” with someone by stating your reasoning. But be polite and constructive in your responses.

### 3. Assignments:

- a. Many, if not all the assignments in the class will appear here, so please find this area of Blackboard
- b. There are two types of assignment functions I use most:
  - i. Tests: these are timed tests, typically multiple choice tests that are available for a limited amount of time (typically a few days) and are completed online within a time limit (e.g. 30 minutes) once started.
  - ii. Papers: I use the ‘assignment function’, confusing name unfortunately to create a link through which you can upload your documents. This system has the distinct advantage over ‘digital dropbox’ (another function in Blackboard) or email in that your papers do directly to a space that is yours alone and you will see a red exclamation point in the Gradebook for the assignment when you have uploaded the documents. This function also can be set to be available for a limited amount of time.

### 4. Gradebook:

- a. This is the area of Blackboard where grades are recorded and displayed, these are the actual grades I use, so keep an eye on these for any problems
- b. A red exclamation point means different things:
  - i. for a test it means either the test failed part way through or there is an essay section I have not graded yet
  - ii. for a paper this means the documents have been uploaded (though corruption is possible) but not graded yet

### 5. Announcements:

- a. These are the text entries you see just below the title for the class when you enter Blackboard
- b. I will post class information here, such as changes to the syllabus or answering a question that is coming up repeatedly
- c. Please check this area several times a week on your way to Discussion Board, Assignments, or Gradebook

### 6. Other Features:

- a. There are other features of Blackboard that I use from time to time, such as Virtual Classroom, External Links, and SafeAssignment - so please look around at the program and let me know if you have any questions

### 7. Scientific Writing

- a. I will include documents in Blackboard/Course Documents section to help with scientific writing



# Dr. Albrecht Class Policies

Version 1.4 Fall 2011

## Introduction:

Every institution has its rules and policies, and UNK and the Biology Department do have them. Because of the distance education situation, the degree of communication between me and you can be difficult, and misunderstandings do happen. Please keep in mind talking over the computer is not the same as face to face – lots of signals are lost. Please be patient and allow more time than you might otherwise to get the solution you need. To try to help get ahead of some questions here policies that will be in place for this class.

## Policies:

### 1. Plagiarism:

- a. Go to this page and complete [this page](#) - I will assume *everyone* in the class has visited this site. The reason? So everyone knows *exactly what* plagiarism is. ALL sources *in anything* turned in for this class must be cited, including figures and anything taken from class texts every time they should be, this includes problem sets – reference the text and any software used for example
- b. Also see the [UNK Student Handbook](#) for UNK policy statement on plagiarism
- c. I consider plagiarism a scourge and a stain on science and detrimental to the progress of humans. I will treat any plagiarism seriously including giving zeros on questions, or entire tests (which often drops a student one letter grade or more), or failing the class outright in addition to letters in the permanent file here at UNK
- d. For more information see the Graduate Outline document in the Online Master's Blackboard Group. This group should appear at the lower right of your Blackboard login page; contact UNK Helpdesk if you do not see this group.
- e. Citation information for APA style is given at the UNK eCampus website [here](#)
- f. A quick rule: more than 3 words in a row from any source must be referenced

### 2. Late work/technical difficulties:

- a. Late work is subject to the following grade reductions:
  - i. 10% reduction of grade for any work submitted after stated deadline until 24 hours after the stated deadline
  - ii. A further 10% grade reduction for each 24 hour period past the stated deadline until five calendar days later, when a zero will be given.
- b. I understand that online classes demand attention to deadlines on top of those already present. However, this graduate program is not a self-paced one. This program is structured to academic terms and time frames (such as breaks) as the brick and mortar University of Nebraska system. In general I am impressed at the dedication of students in this program and hope this tradition continues.

- c. Technical difficulties are part of the reality of the online world. Given that truism, do NOT wait to submit assignments until the last minute or hour of a deadline. I cannot be responsible for failures of power, computers, computer network, or even Blackboard. I try to push to make sure none of these happen on my end, you have to do the same on your end. Be careful and flexible.
- d. Important: please do install and run (not all of them run automatically) the following on your computers, if you do not, please do not claim technical problems with your computers:
  - i. Microsoft Security Essentials
  - ii. PC Tools Spyware Doctor 2010 running
  - iii. AVG (free) or similar anti-virus software, run weekly
  - iv. Backup software (e.g. built in to Windows Vista), run monthly
  - v. Defragment hard drives (built into Windows I know, also available in below packages), run monthly, can be scheduled to run automatically
  - vi. (optional): other maintenance software such as System Mechanic (my favorite), Symantec System Works, run monthly at least

### 3. Online etiquette:

- a. Please be respectful of others in the class, and your instructor. It is easy to be more confrontational via electronic post than in person. I understand conversations may become heated, and irony, even sarcasm may at times be used to make a point; however, please try to remain civil at all times.
- b. Posts I deem as offensive or inflammatory will be removed from the discussion boards. If this becomes a continuing problem, grade reductions may result.

### 4. Withdraw (W) and Incomplete (I) Grades:

- a. Until the conclusion of the 10th week of the semester, you may withdraw from any class and receive a grade of "W." This grade does not count toward your grade point average and merely indicates that you withdrew from (or "dropped") the class. No instructor can withdraw a student from the roster; that is, if you stop coming to class the instructor cannot withdraw you from the class. The instructor will be forced to assign you a failing ("F") grade for the class. Withdrawing from a class involves filling out a simple form that the instructor and student both sign and returning this form to the registrar's office by the withdraw deadline.
- b. Under very unusual circumstances, a grade of incomplete ("I") may be issued. An incomplete is not a substitute for a "W" (withdraw), and it is not a substitute for a poor or failing grade. An incomplete is issued if circumstances beyond the student's control prevent the student from completing the required work for the class by the end of the semester (example: student is hospitalized during final exam week). If you qualify for an incomplete grade, it is expected that you will receive this grade in all your classes. An incomplete grade will give you an extension to complete outstanding work only; it is not an opportunity to "start over" in the class. All outstanding work must be completed within one year or the "I" grade automatically converts to a failing ("F") grade. An incomplete grade

will be considered only during the final six weeks of the semester, after the deadline for receiving a "W" has passed.

5. Other problems:

- a. If problems or concerns arise during class, please contact me. Yes, me, I have enough years and classes under my belt at this point I will not be offended - and can be pretty objective I think - about any issues. It does bother me however when people feel they must contact someone else who then has to come talk to me about the problem. We are all adults here, we can talk.
- b. If you do feel you wish talk to someone else about a class issue I would recommend Dr. Shaffer or Dr. Hertner as the places to start.
- c. One hint, contact me more than once - I get so many messages and emails more than one reminder may be needed for me to get moving.