

Remote Sensing and GIS
Environmental Studies 255
Fall, 2008

Prof. Charles Umbanhowar Jr.
Science Center 258, x3397, ceumb
Office Hours: Thursday 11-1, Wednesday 3:30-5
or by appointment

Text: Bolstad, P. 2008. GIS Fundamentals: A First Text on Geographic Information Systems. Eider Press. White Bear Lake, MN.

Introduction

This course will introduce you to many of the fundamental concepts behind remote sensing and Geographic Information Systems (GIS), and will attempt to place them in the context of information systems, cartography, and a variety of other supporting disciplines. We will explore both the potential and the limitations of remote sensing and GIS. We will learn the basics of ArcView, a powerful and popular desktop GIS package developed by ESRI, but the focus is on concepts.

Grading

Midterm Exams (100*2)	200
Labs and Homework	100
Final Project (Poster)	200
Participation	<u>25</u>
Total	525

A 5%/day reduction in grade will be assessed for missing any deadline unless you speak with me first. There will be no extra credit.

Midterm Exams

The midterms are scheduled for **October 8** and **November 17**. They will be non cumulative. The exams will be of a short answer and essay format and will cover material covered in class. Be prepared for each exam to include a take home section (to be completed by yourself by the date of the exam), and there is a possibility – announced several weeks ahead of time – that the second midterm will be entirely a take home. Both exams will include maps/images and in preparing for exams you should be ready to apply the material we have learned to new situations/ problems. Use your notes as a guide to the level of detail I expect you to have mastered.

Labs and Homework

Many of the things we need to learn will only make sense once you actually work them -- for example GPS, projection and file conversion, plotting. I will be assigning laboratory and classroom homework problems throughout the course of the semester. You should expect 1-2 of these assignments each week and you will have one week to complete each homework/lab exercise. Unless otherwise noted, all exercises will be turned in electronically via Moodle. Lab attendance is mandatory and an unexcused absence could result in a failing grade.

Projects

You will be assigned a project during the middle of the semester that will require you to apply many of the concepts that we have discussed as well as learn new and additional skills. If you look at the syllabus you will see that the last sessions of class in November and December are devoted to your working on this project. This year we may be working on a mix of projects which could include (a) working with local County Governments on trails or natural resources questions (b) documentation of the distribution of invasive species in the Cannon River Wilderness Area, (c) or documentation of changes in permafrost meltwater lakes in northern Manitoba. In completing the project, you will also be asked to create a poster (as a group of 3-4) describing your work. This poster will be due at the time of the Final (**December 12**) and will be displayed publicly in Regents.

Accommodations

If you have a documented disability for which accommodations may be required in this class, please contact Ruth Bolstad (bolstadr@stolaf.edu) or Connie Ford (ford@stolaf.edu) in the Academic Support Center (x3288) located in the Modular Village. If you already have documentation on file with Student Disability Services in the Academic Support Center you are required to present your letters to the professor within the first two weeks of class.

Disclaimer: This and associated schedule are not a contract and should be viewed as tentative.

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ES 255
Fall, 2008

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Tentative Syllabus

Month	Day	Topic(s)	Reading
Sept	8	Introduction and Google Earth	1
Sept	10	Maps, GIS, and Models of the World, <i>Intro to ArcGIS</i>	3,4
Sept	12	Maps, GIS, and Models of the World	3,4
Sept	15	GPS Basics	5
Sept	17	GPS Basics Continued, <i>GPS and Triangulation</i>	5
Sept	19	GPS Post-Processing	5
Sept	22	GPS and GIS	5
Sept	24	<i>Remote Sensing and Remote Sensing Imagery</i>	6
Sept	26	Remote Sensing Imagery	6
Sept	29	Remote Sensing Imagery and Classification	6
Oct	1	<i>Remote Sensing Imagery, Classification II</i>	6
Oct	3	Remote Sensing Imagery and Classification	6
Oct	6	Digital Data, DEMs and Terrain	7 (265-270),11
Oct	8	Midterm I , Digital Data, DEMs and Terrain, Watershed Analysis	11
Oct	10	Digital Data, DEMs and Terrain	11
Oct	13	Fall Break	
Oct	15	Fall Break	
Oct	17	Project Overview and Assignments	
Oct	20	Data, Metadata and Data Standards	7,8
Oct	22	<i>Vector Format and Data Tables</i>	8,9
Oct	24	Vector Format Operations Continued	
Oct	27	Vector Format Operations Continued	9
Oct	29	Raster Format Data and Basic Spatial Analyses	10
Oct	31	Raster Format Data and Basic Spatial Analyses	10
Nov	3	Spatial Estimation	12
Nov	5	<i>Spatial Estimation and Modelling</i>	12,13
Nov	6	Spatial Modelling	13
Nov	10	Spatial Modelling	13
Nov	12	<i>VBA and Scripting or the man behind the curtain</i>	handout
Nov	14	VBA and Scripting or the man behind the curtain	handout
Nov	17	Midterm Exam II	
Nov	19	Projects	
Nov	20	Projects	
Nov	24	Projects	
Nov	26	Thanksgiving Break	
Nov	28	Thanksgiving Break	
Dec	1	Projects	
Dec	3	Projects	
Dec	5	Projects	
Dec	8	Projects	
Dec	10	Projects	
Dec	12	Final Exam (Project Presentations), 9:00-11:00	