

Westminster College
Spring, 2003

Introduction to Geographic Information Systems

BIO/ES 251

INSTRUCTOR Dr. Ann Throckmorton, Associate Professor of Biology

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Office

Hours: Monday, Friday 11:30 - 12:30

Tuesday, Thursday 8:10 - 9:20

or by appointment

LECTURE Tuesday, Thursday 9:20 - 10:50
McElree Computer Lab, Hoyt Science Center

Attendance in class is expected. If you miss class, it is your responsibility to find out what you have missed and to make arrangements for getting lecture notes and making up assignments. If you know ahead of time that you will be absent during lecture, you should contact me so that we can make arrangements to make up what you will miss.

REQUIRED MATERIAL Textbook: *Getting to know ArcView GIS*, by the Environmental Systems Research Institute, 1999, 3rd edition, ESRI, Inc.

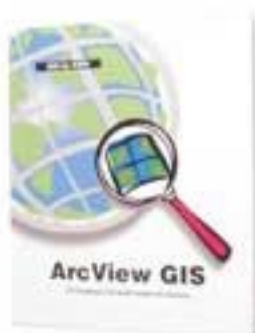
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PURPOSE OF THIS COURSE

A geographic information system (GIS) is an immensely powerful computer-based tool for mapping and analyzing spatial data. GIS technology allows users to integrate various types of spatial data and to perform common database operations such as query and statistical analysis. This is useful in a wide variety of fields, including biology, environmental science, computer science, geology, social sciences, and business, where professionals are often required to answer questions and solve problems that involve presenting data and information *graphically* and interpreting them *geographically*. This course is designed to introduce the fundamental concepts of GIS, and to provide you with experience in using one of the most popular desktop GIS packages -- ArcView, from the Environmental Systems Research Institute (ESRI). The course emphasizes hands-on experience with GIS software, utilizing real-world data to illustrate how GIS technology can be used to answer questions and address problems in a wide variety of situations.

In this course, you will:

1. discover how a GIS functions and how it can be used to visualize and analyze spatial data;
2. become aware of the nature and characteristics of spatial data and objects, including how such information can be obtained using GPS;
3. identify and describe various applications of GIS;
4. list and define typical GIS operations;
5. create and manipulate GIS files and databases;
6. become aware of various sources of data that can be graphed and analyzed using a GIS;
7. identify the types of output produced by a GIS;
8. gain hands-on experience with Arcview 3.3, the industry-standard desktop GIS software.



COURSE POLICY ON EXAMS AND ASSIGNMENTS

Unless otherwise stated, assignments should be turned in by 5:00 p.m. on the day that they are due. Late assignments will be accepted but a late penalty will apply; the number of points that are subtracted will vary in proportion to the time elapsed since the due date.

There are three ways that assignments may be submitted: 1) a hard copy given to me or placed under my office door; 2) an attachment on e-mail; 3) saved in the Assignment folder on the course r-drive. Many of the assignments, quizzes, and tests can be turned in electronically, which is preferred. If you save materials on the r-drive, the name of the file must include your last name and the name of the assignment (e.g., Smith, Assignment #1).

All tests and quizzes should be taken at the scheduled time. You will not be allowed to take a make-up test unless you have notified me in person of your absence prior to the test.

I expect students to work independently on exams and assignments that are not specifically labeled as group assignments. Plagiarism on assignments or cheating on assignments, quizzes, or exams will earn you an automatic 0.

GRADING

Grades will be based on assignments, a mid-course exam, and a final exam, weighted as follows:

Assignments	40% of final grade
Quizzes	15% of final grade
Individual project	30% of final grade
Final exam	15% of final grade

Your final grade will be based on the following scale:

Above 93%: A	87% - 90%: B+	77% - 80%: C+	67% - 70%: D+
90% - 93%: A-	83% - 87%: B	73% - 77%: C	63% - 77%: D
	80% - 83%: B-	70% - 73%: C-	60% - 73%: D-
			Below 60%: F

METHODS OF INSTRUCTION

1. Assignments: most assignments will involve hands-on activities to help you become familiar with ArcView as a tool for carrying out GIS analysis. During the first half of the semester, most of your time will be spent doing exercises from your textbook, *Getting to Know ArcView GIS*. Occasionally, you will be given assignments designed to teach fundamental concepts of GIS, GPS, and mapping and to show you how to access and manage different types of GIS data. The assignments are worth 40% of your final grade.
2. Quizzes: quizzes will be given after you have completed a number of sections in your textbook. They will be practical, requiring you to use GIS to apply the skills that you have learned by completing the assignments. I will make additional data sets and practice exercises available to you so that you can practice before each quiz. The quizzes are worth 15% of your final grade.
3. Final exam: Saturday, May 10, 8:00 a.m.. The largest part of the final exam will be practical. You will be required to locate, manipulate, and analyze data using ArcView. You should be able to apply all of the skills that you learned in the assignments and that you were previously quizzed on. A shorter written portion of the exam will test your knowledge of basic information related to GIS, GPS, and mapping. The final exam is worth 15% of your final grade.
4. Individual project: the last part of the semester will be spent working on projects that you will design and complete. This will be your chance to apply GIS to a topic which holds special interest for you. The projects may take many different forms: development of a GIS project using data from commercial or governmental agencies, construction of maps using data that you have gathered, learning a new ArcView extension, development or redesign of a GIS database, development of an on-line GIS using Java or Visual Basic, etc. During the last two weeks of the semester, everyone will be given the opportunity to present their project to the other members of the class. The project is worth 30% of your final grade. Of that, 25% will be based on the quality of the project that you turn in, 5% will be based on your presentation.

TENTATIVE SCHEDULE OF TOPICS

The course will follow the schedule below, with lots of latitude for amplification and digression. All exercises are in your textbook, *Getting to Know ArcView GIS*.

DATE	TOPIC	READING
01/21	Introduction to the course; What is GIS?	
01/23	Quiz #1, What is GIS? Fundamentals of desktop GIS systems Map features	chapter 1 chapter 2
01/28	Attributes Presenting information	chapter 3 chapter 4
01/30	Coordinate systems (latitude, longitude, UTM)	
02/04	GPS exercises Spatial data Using desktop GIS	chapter 5 chapter 6
02/06	Quiz #2, chapters 1-6	
02/11	Basics of ArcView GIS Getting data into ArcView	chapter 7 chapter 8
02/13	Themes: classifying and displaying Themes: symbolizing	chapter 9 chapter 10
02/18	Working with spatial data	chapter 11, 12
02/20	Quiz #3, chapters 7-12	
02/25	Querying data	chapter 13, 14
02/27	Managing tabular data	chapter 15, 16
03/04	Review chapters 13-16	
03/06	Finding spatial features nearby Finding spatial features within polygons	chapter 17 chapter 18
03/18	Finding intersecting spatial features Spatially joining tables	chapter 19 chapter 20
03/20	Quiz #4, chapters 13-20	
03/25	Presenting information	chapter 21, 22

03/27	Creating shapefiles Editing shapes in a theme	chapter 23 chapter 24
04/01	Creating themes from coordinate files	chapter 25
04/03	Address geocoding	chapter 26
04/08	Quiz #5, chapters 21-26	
04/10	Introducing Avenue Introducing ArcView network analyst	chapter 27 chapter 28
04/15	Introducing ArcView spatial analyst	Chapter 29
04/17	Quiz #6, chapters 27-29	
04/22	Project presentations	
04/24	Project presentations	
04/29	Project presentations	
05/01	Project presentations	
05/10	Final Exam, 8:00 a.m.	

