

# **GEOGRAPHY 2426 – FUNDAMENTALS OF GIS**

## **SOUTHWEST TEXAS STATE UNIVERSITY, FALL 2001**

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**Office Hours:** 2:00pm – 3:00pm Mondays and Wednesdays or by appointment

**Class Time:** 9:00am – 9:50am Mondays and Wednesdays

**Classroom:** Evans Liberal Arts (ELA) Building, Room 311

**Course Line Number:** 218742

**Lab 1003:** 10:00am - 11:50am, Mondays and Wednesdays, ELA Lab 123;

T.A.: *Jeff Cook*, office: ELA 394, ph: 245-0326, email: jeffrey@swt.edu

**Lab 1004:** 12:00 noon - 1:50pm Mondays and Wednesdays, ELA Lab 123.

T.A.: *William Pugatch*, office: ELA 151, ph: 245-1344, email: wp1002@swt.edu,

### **COURSE DESCRIPTION**

This course is an introduction to Geographic Information Systems (GIS), including its development, hardware and software components, data types, data formats and sources. The course will examine the unique spatial data base system of GIS that incorporates geographic techniques to capture, manipulate, analyze, and display spatial data through lectures and hands-on work.

Geographic Information Systems (GIS) are powerful computer tools for managing and analyzing spatial data. GIS technology is growing in popularity as more and more people recognize the importance of understanding spatial relationships for rational decision-making. This course introduces you to the fundamentals of GIS as a tool for solving practical problems from a geographic perspective. Any GIS practitioner must have a basic understanding of core GIS techniques and concepts: data format and input, database design and management, output design, and system implementation. We will address these topics in the weeks ahead, yet with a firm eye on the G in GIS. I want you to approach using GIS with a geographer's imagination, intellect, and a sense of purpose. Thinking and working geographically with GIS means knowing how to ask geographic questions, acquire and analyze spatial data, and communicate your results persuasively, accurately, and creatively.

### **COURSE OBJECTIVES**

This course outlines the principles of Geographic Information Systems (GIS). Issues of data acquisition and the use of GIS for a range of real-world applications are emphasized. The purpose of the course is to provide class participants with a broad understanding of the concepts of GIS technology, development, and application. Toward this end, an integral part of this course will be both lectures and laboratory exercises. The laboratory exercises include hands-on application of GIS software packages performing a variety of problem-solving tasks to demonstrate the concepts covered in lecture.

## COURSE MATERIALS

Readings for this class will be from the textbook, Getting Started with Geographic Information Systems (3<sup>rd</sup> Edition, 2001) by K. Clarke. For the lab, projects will be taken directly from ArcView GIS Exercise Book (2<sup>nd</sup> Edition, 1997) by P. Hohl and B. Mayo. Students will also require a 100 or 250 MB ZIP disk (Iomega) for storage of their lab project materials. Also, A Manual for Writers of Term Papers, Theses, and Dissertations (Chicago Guides to Writing, Editing, and Publishing) by Kate L. Turabian (6th edition) is the department style manual used by all students--undergraduate, master's, and Ph.D. I will use this style manual when assessing assignments and papers. Each of these items should be available in the University Bookstore.

It is absolutely essential that you activate a university computer account at SWT if you have not already done so; we will be communicating questions and results through the Internet very frequently. Finally, each student will require a Geography Department computer account. To open a department account, see Joan Pasquali (ELA 135) to get permission to have an account, then Dan Hemenway (ELA 121a) to actually open the account.

## EVALUATION AND GRADING POLICIES

I will evaluate your performance and assign grades based on three major areas of work in this course. First, you will be asked to submit summary writeups for each laboratory exercise. Each will be graded individually and returned to you within a week at the latest. Also, I will assess your knowledge of the lecture material with two examinations (a midterm and a final).

All students are expected to take exams at the scheduled time. In the event this is impossible you must contact the instructor as far in advance as possible to determine if other arrangements will be permitted. Make up exams may or may not be permitted at the discretion of the instructor and, if permitted: 1) the format of the exam may be changed, and 2) the possible points earned may be significantly reduced. If exams are not taken at the scheduled time, the following policies apply.

***Situation 1, Anticipated Absence During a Scheduled Exam.*** Personally notify the instructor as far in advance as possible to determine if the reason is acceptable and a make up exam will be permitted. Failure to notify the instructor in advance will result in forfeiture of make up privilege. Examples of acceptable excuses include documented illness and doctor appointments that cannot be scheduled at any other time. Examples of unacceptable excuses include attending social functions and early departures for holidays.

***Situation 2, An Extreme, Unavoidable Catastrophe Occurs Immediately Preceding the Scheduled Exam Which Makes it Impossible to Take the Exam.*** Examples include being involved in an automobile accident, or other unexpected circumstances beyond the student's control. In such cases, notify the instructor as soon as possible and bring in documentation of the incident so that the instructor may make arrangements for a make up as soon as possible. ***Situation 3, No Acceptable Excuse Exists – No Shows = No Make Up.***

Finally, the course culminates in full-fledged GIS analysis of a problem identified by a group of students. This project will require data collection, analysis, and reporting by the small group in a short class presentation and a written report. There is a maximum of 1000 points for all of the assignments, projects exams, and participation activities for this class. The basis for grading will be as follows: 45% for the laboratory assignments (3% each for the 15 labs), 30% for lecture exams (15% each for 2 exams), 20% for the

completed GIS project, and 5% for course participation. The grades will be determined based on the following rules:

A	≥90% (≥900 points)
B	≥80% and <90% (800 – 899 points)
C	≥70% and <80% (700 – 799 points)
D	≥60% and <70% (600 – 699 points)
F	<60% (< 600 points)

If you are dissatisfied with any grade you receive in this course, you can resubmit your work for a reassessment up to one week after the original work was returned. In this way, you can revise your work for possible additional credit. I believe grading should be constructive, not punitive. Please do not abuse this policy: aside from a miscalculation, I will not entertain disputes over grades if you did not consult with me on the assignment prior to turning it in. In accordance with university regulations, grades will not be posted.

### **ATTENDANCE POLICY**

Good attendance in lecture and lab is key to your success in this course. For this reason, I am including attendance as part of the 5% “participation” portion of your grade. First, the exams will be based on lecture material. Second, the lab schedule is fairly rigorous, and you will quickly fall behind if you repeatedly miss labs. If you have an unexcused absence on an exam day or the day an assignment is due, you will receive a zero on that exam or assignment. Furthermore, you will lose your privilege for revising work if you have unexcused absences.

If you must miss class or an exam because of an illness, a personal emergency, or some other extenuating circumstance, please contact me as soon as possible so I can make alternative arrangements for you (this is key). Of course, good attendance means more than just showing up for class. Please read and adhere to the policy on classroom etiquette that appears below. These codes of conduct will allow everyone to participate equally as learners. Thank you for your cooperation.

### **LAB POLICIES**

The following guidelines are designed to protect the resources of this department and to ensure the availability of computer resources for students enrolled in other geography lab courses. Failure to abide by these rules may result in termination of computing privileges.

- 1) Food and drink are prohibited in labs.
- 2) Report any problems with equipment to the department computer laboratory coordinator. Leave computer and printer covers closed.
- 3) Do not remove items from the labs. This includes computers, monitors, printers, keyboards, mice, mouse pads, speakers, manuals, etc.
- 4) Software may be installed only with the permission of the computer laboratory coordinator.
- 5) Do not change or modify computer or network configurations. Such changes may interfere with the next student using the computer.
- 6) Log on using you account only. If someone has forgotten to log out, please log them off.
- 7) Making personal copies of copyrighted software or data is illegal.
- 8) Do not download illegal programs or print inappropriate materials.

- 9) ***Printer usage is monitored and metered.*** Each student has been assigned a credit limit for printouts. When the limit is reached, printing will not be possible until the limit is increased. Increases will be made in \$5.00 increments. Color prints will cost more than black and white. Use your printer resources wisely.

### **CODE OF CONDUCT**

In the Department of Geography, instructors strive to create an atmosphere of mutual trust and respect in which learning, debate, and intellectual growth can thrive. Creating this atmosphere, however, requires that instructors and students work to achieve a classroom in which learning is not disrupted. At the most basic level, this means that everyone should attend class, be prepared with readings and assignments completed, and that students pay attention. This means no conversations with friends, reading the newspaper, coming late, or leaving early. Such behavior is disruptive to the instructor and to your fellow classmates.

### **STUDENTS WITH DISABILITIES**

Students having special needs/disabilities that require accommodations for successful completion of this course must notify both SWT's Office of Disability Services and the course instructor by no later than the end of the first week of classes. Failure of the student to do so may result in the necessary accommodations not being made.

### **SWT ACADEMIC HONESTY POLICY**

Learning and teaching take place best in an atmosphere of intellectual fair-minded openness. All members of the academic community are responsible for supporting freedom and openness through rigorous personal standards of honesty and fairness. Plagiarism and other forms of academic dishonesty undermine the very purpose of the university and diminish the value of an education. Specific sanctions for academic dishonesty are outlined in *SWTexan*.

### **OUTLINE OF TOPICS FOR THE SEMESTER**

<b><u>Week</u></b>	<b><u>Date</u></b>	<b><u>Topics</u></b>
1	August 29	Overview, What is GIS? <i>Lab: none</i>
2	September 3	No class (labor Day) <i>Lab: none</i>
	September 5	GIS and related technologies <i>Lab: GIS Applications Exercise</i>
3	September 10	Thinking Spatially <i>Lab: Chapter 1: Exploring the ArcView Interface</i>
	September 12	Geographic Data Collection <i>Lab: Chapter 2: Working with Views and Themes</i>
4	September 17	Map Projections <i>Lab: Chapter 3: Working with Tables and Charts</i>

- September 19 Coordinate Systems  
*Lab: Chapter 4: Symbology and Layouts*
- 5 September 24 Introduction to Spatial Data Models  
*Lab: Chapter 5: Theme-on-theme Selection 1*
- September 26 Raster, Vector, Object  
*Lab: Chapter 5: Theme-on-theme selection 2*
- 6 October 1 Data Input  
*Lab: Chapter 6: Data Prep for Trade Area Analysis 1*
- October 3 Data Input  
*Lab: Chapter 6: Data Prep for Trade Area Analysis 2*
- 7 October 8 Editing and Checking for Errors  
*Lab: Chapter 7: Trade Area Analysis*
- October 10 Projections and Rubber Sheeting  
*Lab: Chapter 8: Site Selection*
- 8 October 15 Exam Review  
*Lab: Overview of the GIS group projects*
- October 17 Midterm Examination  
*Lab: Open Lab*
- 9 October 22 Spatial Analysis  
*Lab: Chapter 9: Proximity Analysis*
- October 24 Point Patterns  
*Lab: Chapter 10: Geocoding*
- 10 October 29 More on Points  
*Lab: Chapter 11: Spatial and Aspatial Queries*
- October 31 Lines  
*Lab: Chapter 12: Hot Links*
- 11 November 5 Shortest Path Analysis  
*Lab: Chapter 13: Application Deployment*
- November 7 No Lecture (I will be in Boston)  
*Lab: Chapter 14: Network Analyst*
- 12 November 12 Polygons  
*Lab: Chapter 15: Spatial Analyst*
- November 14 Classification, Filters  
*Lab: Open Lab*
- 13 November 19 Digital Elevation Models  
*Lab: Open Lab*
- November 21 No class (Thanksgiving break)  
*Lab: None*

