GENERAL INFORMATION:

COURSE DESCRIPTION: An Introduction to the field of geographic information systems and related technologies such as remote sensing and global positioning systems. Includes discussion of principles and applications of GIS with a hands-on lab featuring a semester long project using regional data and the ArcVIEW GIS software program. The goal of this class is to gain a fundamental understanding of the power and purpose of geospatial technologies and how they can contribute to solving important societal problems. Skills in use of GIS technology will be imparted through a two hour per week lab. A team project will help build problem solving and team leadership and participatory skills. Factual knowledge will be imparted via lectures, videos, demonstrations of geospatial technologies and through presentations by guest speakers. The class is a 3 unit course with an associated 1 unit lab.

Meets: Lecture (CID # 4820) M-W-F 10:00-10:50 a.m. in Lee Drain Building (LDB) room 328. One of two labs is also required (except in special circumstances, by agreement of the instructor) the labs meet: Tu. 11-12:50 pm (CID # 4821), and W. 1:00-2:50, (CID# 4815) pm in LDB 328. Instructor: Dr. Mark Leipnik. Office Hours: M. 11-12 and Tu. 9:30-10:30 (in LDB 328, or in my office (LDB 313) by arrangement). Phone: Ex. 3698, email GEO_MRL@SHSU.EDU. Lecture notes are on my home page on the SHSU web site: shsu.edu\~geo_mrl. These notes may be brought into a word processing package, expanded to leave space for class notes and printed out and brought to class and used to prepare for exams, but should not substitute for attentive participation in class. Notes are being revised to add new topics and will be updated periodically during the semester.
TEXT: "Getting Started with GIS" by Keith Clarke, 4th Edition.

POLICIES:

GENERAL: Attendance in class and at either the Tuesday, or Wednesday labs is vital and many students consider it the most enjoyable part of the class. Attendance will be taken at the beginning of each class. Students that are more than 10 minutes late will be considered absent. The first two absences will not result in any loss of points, but for each absence thereafter, 25 points will be deducted.

EXAMS & GRADING: There will be one midterm and one cumulative final. The midterm will have matching or true/false, multiple choice and short answer questions and the final will have in addition a single essay question. The Midterm will be worth 200 points; it will be on **Sept. 28.** As this is writing enhanced course there will be a written individual research paper based on a visit with and interview of a GIS user/manager (or with approval of the instructor a paper on another GIS related topic) of 10 pages it will be due by **Dec 5.** Selection of who to interview must be made by **Sept. 21** and a draft research paper including date and contact information for interview will be due by **Oct. 31** each of these assignments earns 25 points toward the total research paper grade of 200 points. Maps and other graphics included in the research paper can count toward the page total. An updated list of names and contact info for GIS users and interview questions will be made available later in the semester. The individual research paper will be worth 200 (150 for the report, 25 for topic and 25 for outline) points and will be due on

Nov. 30. and the final, which will be **Dec. 10** from 11 am-1 pm and will be worth 300 points. The group semester long lab project will be worth 300 points, 100 for the group oral presentation made with power point and 200 for the final project report which will primarily consist of GIS generated maps.

GRADING SUMMARY:

900-1,000 points = A	750-900 points = B	600-750 points = C
500-600 points = D	less than 500 points = F	

THE GIS LAB: The Lab will consist of several exercises and a single multi-stage group project all using the ARCVIEW GIS software from ESRI. Project teams will consist of 2-3 members chosen at by alphabetical order; assignment of projects will also be based on an alphabetical selection. Team members who are not contributing their fair share to the lab work may receive fewer points, be asked to write a book report or end up working by themselves. The final lab deliverable will be a brief in class oral presentation using Power Point and a ten page written project report (**on either Nov. 28 or 30)** that will contain 1-2 pages of written sections with an introduction, a discussion of sources of data, methods, results of spatial analysis and recommendations, as well as a discussion of sources of error and uncertainty. The report will also contain 8-15 one page maps generated by the GIS covering a variety of themes and analytical methods. This report will be due at beginning of class meeting on **Dec. 5.** The members of each project team will attend the labs, but will divide work assignments among themselves. The members of each team should anticipate project related work outside the hours of the lab particularly toward the end of the semester; the lab will be frequently open outside of scheduled lab times. A 10-20 minute presentation will be made during one of the last lectures **(Nov. 28 or 30)** by one (or more) members of each project team. All members of each team will receive the same grade, which will reflect the work of the entire team. A separate lab assignment will be passed out later in the semester. More information on the lab will be provided subsequently.

MAKE-UPS: If the midterm exam is missed for a valid reason, it can be replaced by an extra credit book report of at least 20 pages. The final cannot be made-up. Missed classes can be made up by doing an extra credit report of five pages. All extra credit/make-up work must be approved by permission of the instructor and on a topic assigned or approved by the instructor.

ADDITIONAL INFORMATION:

FOR GRADUATE CREDIT: an additional book report or research paper of 20 pages in length will be required of graduate students enrolled in this class (this report will count for 20% of the lecture grade and the relative weight of other assignments will be adjusted accordingly).

ACADEMIC DISHONESTY:

All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in academic experiences both in and out of the classroom. Any student
found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives may initiate disciplinary proceedings against a student accused of academic dishonesty including, but not limited to, cheating on examinations or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials.

Plagiarism Policy This is writing enhanced class. The individual project will be conducted independently and all writing in the required report will be the work of the individual student. The student may site sentences and quote whole paragraphs of material written by others as long as properly referenced. Students may also turn it maps graphics and other materials created by others using GIS for partial credit. Students may not simply download articles from the internet and reformat them. A significant reduction in the grade awarded for the individual project will result from this form or any other form of plagiarism. At a minimum the student will receive a failing grade on the assignment in which dishonesty was involved, thus for a quiz worth 25 points copying of answers would result in the loss of those 25 points…

CLASSROOM RULES OF CONDUCT:

Students are expected assist in maintaining a classroom environment that is conducive to learning. Students will refrain from behavior in the classroom that intentionally or unintentionally disrupts the learning process and, thus, impedes the mission of the university. Cellular telephones and pagers must be turned off before class begins. Students are prohibited from eating or drinking in class, using tobacco products, making offensive remarks, reading newspapers, sleeping, talking at inappropriate times, wearing inappropriate clothing, or engaging in any other form of distraction. Inappropriate behavior in the classroom shall result in a directive to leave class. Students who are especially disruptive also may be reported to the Dean of Students for disciplinary action in accordance with university policy.

STUDENTS WITH A DISABILITY:

It is the policy of Sam Houston State University that no otherwise qualified disabled individual shall, solely by reason of his/her handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any academic or Student Life program or activity. Disabled students may request assistance with academically related problems stemming from individual disabilities by contacting the Director of the Counseling Center in the Lee Drain Annex or by calling (936) 294-1720. Any student seeking accommodations should go to the *Counseling Center and Services for Students with Disabilities* in a timely manner and complete a form that will grant permission to receive special accommodations.

VISITORS IN THE CLASSROOM:

Unannounced visitors to the classroom must present a current, official SHSU identification card to be permitted in the classroom. They must not present a disruption to the class by their attendance. If the visitor is not a registered student, it is at the instructor's discretion whether or not the visitor will be allowed to remain in the classroom. This policy is not intended to discourage occasional visiting of classes by responsible persons.

RELIGIOUS HOLIDAYS:

Students that are absent from class for the observance of a religious holy day are allowed to take an examination or complete an assignment scheduled for that day within reasonable time after the absence. The period of time during which assignments and exams will be excused includes travel time associated with the observance of the religious holy day. A student who wishes to be excused for a religious holy day must present the instructor of each scheduled class that he/she will be absent from class for religious reasons with a written statement concerning the holy day(s) and the travel involved. The instructor should provide the student with a written description of the deadline for the completion of missed exams or assignments. . In such cases, the student will be required to take the test or submit the assignment early—unless there are good reasons for not being able to do so and the instructor has agreed to those reasons.

COURSE OUTLINE & READING ASSIGNMENTS:
In order to be well prepared for class students should read the chapters in the text

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LECTURE 1: OVERVIEW.
Week 1. Lec. 1. First Class Meeting. (Handout syllabus, go over policies, provide general Overview). (Aug. 20).
READ: Chapter 1.

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PART I. LECTURES 2-16: GIS FUNDAMENTALS:
Week 1. Lec. 2. Mapping Concepts, (Aug. 22).
Lec 3. Coordinate Systems & Projection (Aug. 24).
READ: Chapter 2.
No lab meetings this week.

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Week 2. Lab #1. Cartographic Concepts & GIS demo, (Aug. 28 or 29).
Lec. 4. Origin & Development of GIS, (Aug. 27).
Lec. 5. Raster Based GIS, (Aug. 29).
Lec. 6. Vector Based GIS, (Aug. 31).
READ: Chapter 3.

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Week 3. Lab #2. Assign teams, overview project Watch "World in a Box" (Sept. 4 or 5).
Lec. 7. Data Capture, Conversion & Export (Sept. 5).
Lec. 8. Management of Attribute Data (Sept. 7).
READ: Chapter 4.

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Week 4. LAB #3. Overview of Vector GIS & ARCVIEW (Sept. 11 or 12).
Lec. 9. Use of GIS: View, Query & Measurement of Spatial Data (Sept. 10).
Lec. 10. Use of GIS: Spatial Analysis (Sept. 12).
Lec. 11. Use of GIS: Advanced spatial Analysis & Modeling. (Sept. 14).
READ: Chapter 5.

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Week 5. LAB #4. Overview of Group project. (Sept. 18, or 19).
Lec. 12. Visualization. (Sept. 17).
Lec. 13. Availability of Data. (Sept. 19).
Lec. 14. Accuracy and Precision of Data (Sept. 21).
DEADLINE: SELECTION OF INDIVIDUAL RESEARCH PAPER/INTERVIEW TOPIC (Sept 21).
READ: Chapter 6.

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Week 6. LAB #5: Availability of data (Sept. 25 or 26).
Lec. 15. GIS Hardware and Software, (Sept. 24).
Lec. 16. GIS Around the World, Review for Midterm (Sept 26).
READ Chapter 7.
Class meeting 17: MIDTERM EXAM: Sept 28.
REVIEW: Notes, any Handouts and Book Chapters 1-7.

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<u>**Part II. LECTURES 18-28: GIS APPLICATIONS & RELATED TECHNOLOGIES:**</u>

Week 7. LAB #6: Start work on group project; (Oct 2 or 3).
         Lec. 18. Return and go over midterm, Overview of applications. (Oct. 1).
         Lec. 19. GIS on the Internet. (Oct 3).
         Lec. 20. Demonstration & Evaluation of Interactive Web-based Mapping. (Oct 5).
         READ: Chapter 8.

Week 8. Lab #7. Work on Group Project, (Oct 9 or 10).
         Lec 21. GIS in Law Enforcement I: Crime Mapping (Oct. 8).
         Lec. 22. GIS in Law Enforcement II: Geographic Profiling, etc. (Oct. 10.).
         Lec. 23. Military Applications and Geo-Spatial Intelligence. (Oct. 12).
         READ: Chapter 9.

Week 9. Lab # 8. Work on Group Project (Oct. 16 or 17).
         Lec. 24. GIS for Water Resources Management (Oct. 15).
         Lec. 25. GIS for Environmental Assessment and Remediation. (Oct. 17).
         Lec 26. GIS in Forestry: Videos on Natural Resources Applications. (Oct. 19).

Week 10. Lab # 9. Work on Group Project (Oct. 23 or 24).
         Lec. 27. GIS for Comprehensive Planning (Oct 22).
         Lec. 28. GIS for Infrastructure & Facilities Management. (Oct 24).
         Lec. 29. Guest Speaker (Municipal or Regional GIS Analyst). (Oct 26).

Week 11. Lab #10. Work on group project (Oct. 30 or 31).
         Lec. 30. Visualization of the Subsurface/Mining Applications of GIS (Oct. 29.).
         Lec. 31. Oil and Gas Industry Applications (Oct. 31).
         Lec 32. Cadastral and Redistricting Applications. (Nov. 2)
         DRAFT RESEARCH PAPER/INTERVIEW DUE Oct 31.

Week 12. Lab #11: Work on group project (Nov. 6 or 7).
         Lec. 33. Geodemographics. (Nov. 5).
         Lec. 34. GIS for Business I: Market Research (Nov. 7).
         Lec. 35. GIS for Business II: Location, Location, Location (Nov 9.).
         READ: Chapter 10.

Week 13. PART III. RELATED TECHNOLOGIES: AERIAL PHOTOGRAPHY,
         REMOTE SENSING & GPS.
         Lab #12. Finish up work on Group Project/ (Nov. 13 or 14).
         Lec. 36. GPS: The Technology (Nov. 12.).
         Lec. 37. GPS: Applications (Nov. 14).
         Lec. 38. Remote Sensing I: Aerial Photography (Nov. 16).

Week 14. Nov 19-23. Thanksgiving Break No Labs this week. I will be available to help students on group projects and other matters Monday & Tuesday. Nov 19 & 20 if needed.

Week 15. Labs #13 Demonstration of Remote Sensing & GPS. (Nov. 27 or 28).
Lec. 39. Satellite Remote Sensing II. (Nov. 26).
Class Meeting 40. Group Presentations I. (Nov 28).
Class Meeting 41. Group Presentations II. (Nov 30).
INDIVIDUAL RESEARCH PAPER/INTERVIEW DUE (Nov. 30.)

Week 16. Lec 40. Future of Geospatial Technologies. (Dec. 3).
Lec 41. Careers in GIS & REVIEW FOR FINAL Note the topic of your essay will be revealed at this time so don't miss the review. (Dec 5).
NO LABS MEET THIS WEEK.
GROUP PROJECT REPORT DUE: (Dec 5).

Week 17.   Class meeting 42: FINAL. December 10, 11 am – 1pm.

KEY DATES & ASSIGNMENTS AND POINTS:

ASSIGNMENT	DATE	POINTS
Select individual project topic	Sept. 21.	25
MIDTERM	Sept. 28.	200
Individual Project Outline due	Oct. 31	25
Project Oral Presentations	Nov. 28 or 30	100
Project written report due	Dec. 5	200
Individual Project Reports due	Nov. 28.	150
FINAL	Dec. 10, 11 am-1ppm	300