

GEOL 4385: Introduction to GIS (CRN 14432)
GEOL 5321: Introduction to GIST (CRN 16161)
3 Credits, Fall 2018
Department of Geological Sciences

Meeting times:

Lecture: Monday 1:30 pm – 3:20 pm Old Main 214

Lab: Wednesday 1:30 pm – 3:20 pm Geol 409

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Office hours: Before class or by appointment

TA: Manuel Moncada - mmoncadagutierrez@miners.utep.edu

Course Description

This course is an introduction to Geographic Information Science and Technology (GIST). Geographic Information Systems (GIS) are tools for integrating and analyzing spatial data to visualize relationships, seek explanations, and develop solutions to real world problems. The foundations and theory of GIS will be emphasized in relation to its applicability and use in the sciences and other fields. Students will demonstrate knowledge about the history of GIS; acquisition of data; data quality and ethics; data classification; mapping; interpretation and analysis of data; applications of GIS, GIS data models, data visualization, and basic interpolation, among others. The course includes a lab component in which all students will have access to computers with the Environmental Systems Research Institute (ESRI) ArcGIS Desktop software. In the lab, students will perform a variety of problem-solving tasks that connect with concepts covered in the lecture. Other key skills practiced in lectures and/or labs include: connecting hands-on GIS work to GIS theory, written communication, planning and organization, and interpersonal communication.

Learning outcomes/course objectives

Students successfully completing this introductory GIS course will be able to:

- List sources of geospatial data and understand some common data limitations, as well as technological and theoretical limitations, and strengths of GIS
- Outline the various aspects of data within ArcGIS Desktop, such as data structures, data types, and methods of data collection and input
- Discuss the cartographic design process in a GIS and learn how to communicate spatial information
- Articulate the importance of projections, coordinate systems, distance, area, and scale
- Describe how spatial relationships are analyzed and demonstrate methods of querying data using ArcGIS
- Appreciate the concept of uncertainty and how it affects GIS, and recognize legal and ethical issues
- Understand the potential uses of some advanced techniques in ArcGIS Desktop, and how these might be used to plan and execute a project in one's area of interest
- Summarize selected GIS journal articles (paper critiques) (for graduate students only)

How to complete this course successfully

The structure of this 3 credit-hour course is based on active learning. Students are therefore expected to complete all assigned activities that include readings, lab exercises, exams, a group project and presentations. In addition, graduate students taking this course will write critiques of selected GIS journal articles. These activities will include working on course material outside of each classroom session, and students are expected to treat the course seriously in order to attain a passing grade.

Course Materials

Required Text

Price, Maribeth. 2016. Mastering ArcGIS, 7th Edition. New York, NY: McGraw-Hill Higher Education. ISBN: 13 9780078095146. The book Mastering ArcGIS (Price) is a combined textbook and software manual that will walk you step-by-step through the ArcGIS software. It is available online from sites such as Amazon, or at the UTEP bookstore. A list of other recommended readings will be provided in class.

Optional Text

De Smith, M.J., Goodchild, M.F. and Longley, P., 2007. Geospatial analysis: A comprehensive guide to principles, techniques and software tools. 5th Edition. Winchelsea Press, Winchelsea, UK. Available for free at <http://www.spatialanalysisonline.com/HTML/index.html>

Other Materials

You will need to purchase a mobile USB storage device (i.e. flash drive/ memory stick), or portable external drive for saving the files you create during your GIS lab sessions. Saving your GIS files on your allocated UTEP mSpace is also highly recommended. Please consult with the UTEP IT Helpdesk at the Library if you are not sure how to access your mSpace.

Grading

A total of 700 (graduate credit) or 650 (undergraduate credit) points may be earned in this course, and up to 200 points of the total achievable may be earned for the collaborative group projects that will be presented by all student teams towards the end of the Semester.

Component	Points
Lab Assignments	200
Course Project	200
Exams	200
Research paper critiques (graduate students only)	50
Attendance and in-class participation	50
Total possible points	700
Total points/ Percentage	Grade
90–100	A
80-89.9	B
70-79.9	C
60-69.9	D
59.9 and below	F

Student Responsibilities / Course Policies and Expectations

It is the responsibility of students to read the course syllabus and all course communication such as emails, and to do what has to be done to fulfil the course requirements. Failure to regularly check and read emails containing important course announcements will not be a valid excuse for failing to submit assignments timely.

Course Project

Students will complete one collaborative GIS project that is due at the end of the semester (final version), worth 200 points. Teams are free to choose a project based on a mutually agreed topic of interest, but the teams will be formed in consultation with the instructor. The group project builds on skills and concepts learned throughout the entire course but certain components (such as project “outline” and identified data sources”) will be due at various times throughout the semester (see the Course Schedule for due dates). Although class time is allotted for this project, students should expect to invest additional time, especially for data collection and the project write-up. More specific details on the project guidelines will be provided in class. Students should expect to spend time outside of scheduled hours to complete the course project. Each team is expected to use a minimum of 5 GIS layers in their analysis, but groups containing graduate students are expected to come up with more rigorous projects involving 6 data layers or more.

Lab Assignments

The GIS lab is an important component of GIS training that provides students with hands-on experience in GIS in order to consolidate their understanding of basic GIS theoretical concepts and analytical techniques. Esri's ArcGIS Desktop version 10.5.1 and ArcGIS Online are the primary software tools that will be utilized in implementing various spatial data analytical techniques and methods. Students will be introduced to other related software during the course of the Semester, including Google Earth and some open source software. A total of 10 labs worth 200 points will be completed, and additional details will be provided during the first lab. Most lab work coincides with skills and concepts learned in lecture and readings, and the instructor will first lead students through the steps necessary to complete an exercise. It is therefore vital for students to attend class so that they understand assigned exercises and complete them on time. You will have time to complete most of lab assignments during scheduled class meetings, but some will require time outside of class. Lab assignments must be turned in via Blackboard by the due date specified in the lab document, and the submitted assignment must be your own work. Work must be submitted in the form of a Word document attachment under the "Assignments" section of Blackboard, or in any other format specified for that assignment. You should use your class time devoted to GIS lab activities wisely and you should not expect to leave class early. You are welcome to ask the Instructor or course Teaching Assistant (TA) for help outside of class, as long as you are making an effort to work while in class. Do not expect to miss lab time and to get extra outside class help to compensate.

The lab is open from 8 am to 5 pm and is divided into a teaching area and an outer ring area. The outer ring area does not provide viewing access to the whiteboard or projector, and allows students who are not attending an ongoing class to use the lab, provided they do not disturb the class that will be in session. You are free to come in and use the lab from 8 am to 5 pm, but use only the outer ring area whenever a class is in session in the teaching area. Access codes to the lab will be provided for students wishing to do their lab work after hours.

Do not leave trash in the lab and take care not to spill drinks on the computers, all students are expected to conduct themselves professionally in this regard to avoid the withdrawal of certain privileges in the lab. The lab telephone extension is 747-8682, please do not install any software on the lab machines!

Exams

There will be 2 equally weighted exams in this class, worth 100 points each. The exams will be a combination of multiple choice, definition, short essay, and lab application questions. Questions will be based off the lectures, readings, and completed labs. There will be no final exam during finals week. Instead, you will write-up, present, and turn in your final collaborative group project report.

Additional work for graduate students

Graduate students taking this course for credit will be required to write critiques of 5 selected journal articles, worth 10 points each. The journal articles will be assigned during the course of the semester, and guidelines for writing the paper critiques will be posted on Blackboard. Each research paper assignment will be your own original work, 2 full pages, double space with indented paragraphs (not spaces between paragraphs), including your name, and the critiqued research paper properly cited in any referencing style of your choice. Additional details may be provided through the Blackboard course platform. In addition, more rigorous course projects will be expected from teams that have graduate student members, as described under the Course Project section above.

Computer Skills

Instruction in using ArcGIS Desktop and ArcGIS Online software will be provided during the lab sessions, but students taking this class are expected to have basic competence in the Windows operating system as well as Microsoft Excel, Power Point, and Word. Students should take initiative to learn additional details about these software applications so that they can solve problems as they arise. If you need help with computer skills, you should seek assistance at the Liberal Arts Center for Instructional Technology (LACIT) (Liberal Arts Building, Room 405, Tel. (915) 747-5375. LACIT staff provides workshops open to all students Fridays in Room 405 at the Liberal Arts Building. To attend just bring your current UTEP ID. If

you plan to attend you should call LACIT beforehand to receive confirmation. Email the Instructor if you would like a one-year ArcGIS software student license for installation on your personal computer for your own convenience, but note that it is your responsibility to make sure that your personal computer meets the required minimum software specifications.

Attendance and in Class Participation

Attendance will be taken every class and lab meeting, and a total of 25 points may be earned at the end of the Semester, to encourage and reward your commitment to this course. Participation is an essential part of the course and will be assessed based on in-class activities – short collaborative or individual activities that occur during the class period. They are designed to enhance your learning and provide you with an opportunity for reflection, elaboration, and/or application. In-class activities will occur occasionally throughout the semester, and may or may not be announced in advance. They are usually graded on a credit/no-credit basis. In-class activities cannot be made-up or turned in late, unless you have a documented excuse.

Blackboard Course Management System and Email Communication

This class uses Blackboard learning platform that you can access through your my.utep.edu portal (use your e-mail address and password to sign in). For this class all communication will be via the regular UTEP email system, so avoid using the Blackboard email function. As a requirement of this class, you must regularly check your UTEP email for posts that include announcements and personal messages to students. You are responsible for reading all your emails, so not having seen or read an email containing important course-related announcements will not be an acceptable excuse for failure to complete assignments on time, unless there is a verifiable technical issue. Please do not use your private email addresses for course-related communication.

Late and Missing Work, and Extra Credit

Late work submissions are accepted but **3** points will be deducted for each day after an assignment deadline. Make-up assignments or late submissions can only be allowed in the event of a documented medical or family emergency. If you do encounter an emergency, you must notify me on or before the day of the assignment or exam due date. Documentation could include a note from a physician, hospital admittance slip, or correspondence from an academic advisor or the Dean of Students. Foreseeable excused absences such as participation in university-sanctioned athletic or academic events also require documentation as well as notifying the Instructor at least one week in advance. In the case of foreseeable absences, you must turn in work early rather than late. In each of these situations it is the student's responsibility to communicate and keep the Instructor informed. No extra credit assignments will be available at the end of the Semester. Opportunities to earn bonus points on assignments will be available as the Semester progresses, and these will be sufficient for students to take advantage of and boost their final grades.

Academic Honesty

Academic honesty is fundamental to the activities and principles of the University. Students are encouraged to share ideas, but you must do your own work (except in the case of collaborative group assignments). Cheating, plagiarism, and collusion, for example, **will not be tolerated**. Academic dishonesty has grave consequences that range from probation, expulsion, and failing the course. If you are found to be cheating, plagiarizing, or colluding, you will be subject to disciplinary action per UTEP catalog policy. Refer to <http://sa.utep.edu/osccr/academic-integrity/> for further information.

Classroom Conduct

Unprofessional behavior (e.g., sleeping, talking, and reading material unrelated to class) will not be tolerated. Students who arrive late run the risk of being locked out of the building. All cell phones and other electronic devices must be turned off or switched to silent mode during class to avoid distractions. If a student is acting unprofessionally, he/she will be required to leave class for the day.

Students with Disabilities

UTEP is committed to equity in the provision of educational services to students with disabilities. If you have (or suspect you have) a disability that requires accommodations or may affect your performance in this course, tell the professor so that we can work with the Center for Accommodations and Support Services (CASS) to meet your needs. You can contact CASS at (915) 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.

Help with Writing

The University Writing Center (UWC) (Library Building, 2nd [ground] floor, Room 227 [adjacent to the Collaborative Learning Center], Tel. 747-5112) provides walk-in assistance with writing to all UTEP students at no cost. If you struggle with writing, the tutors at the UWC can help you! Check the website – <http://uwc.utep.edu/> for a tutoring schedule.

Class Format

There will be two types of lectures in this class: (1) Theoretical concept (mostly Power Point) deliveries on Mondays where students are expected to take notes, and (2) a walk-through covering hands-on lab sessions on Wednesdays using ArcGIS Desktop or ArcGIS Online software, where you should be dividing your attention between the Instructor or TA and your own computer. Labs are an important aspect of the course where students learn how to “do GIS” through practical, hands-on sessions. These practical exercises will often begin with a short lecture or demonstration. The TA will be available during all practical sessions to assist you with the lab assignments, tutorials, and other questions that you may have. You must be present in the lab during this time to gain the most from the practical sessions.

Course Schedule

The Instructor reserves the right to make changes to the course schedule and any other material in this course syllabus as the Semester progresses. Changes will be announced in class, by email, or posted via Blackboard. Students are responsible for adhering to any changes made during the Semester.

Date	Topic	Text Chapters	Assignment Due
Week 1 (Aug 27-31)			
Mon 27-Aug	Introduction: Syllabus & course logistics		
Wed 29-Aug			
no lab			
Week 2 (Sept 03-07)			
Mon 3-Sep	Labor Day – University Closed		
Wed 5-Sep			
Get access to lab – check connectivity			
Week 3 (Sept 10-14)			
Mon 10-Sep	Overview of GIS; Terminology & Definitions	Ch.1	
Wed 12-Sep			
Lab #1			
Week 4 (Sept 17-21)			
Mon 17-Sep	Managing GIS Data	Ch. 2	
Wed 19-Sep			
Lab #2			
Lab #1			
Week 5 (Sept 24-28)			
Mon 24-Sep	Coordinate Systems	Ch.3	Research paper Critique 1
Wed 26-Sep			
Lab #3			
Lab #2			

Week 6 (Oct 01-05)			
Mon 1-Oct	Presenting & Mapping GIS Data	Ch.4, Ch.5	Research paper Critique 2
Wed 3-Oct	Lab #4		Lab #3
Week 7 (Oct 08-12)			
Mon 8-Oct	Attribute Data, Querying Data; Spatial Joins	Ch.6, Ch.8, Ch.9	Research paper Critique 3
Wed 10-Oct	Lab #5		Lab #4
Week 8 (Oct 15-19)			
Mon 15-Oct	<u>Exam 1</u>		
Wed 17-Oct	Team assignments, Project idea & outline; Research paper Critique 4		
Week 9 (Oct 22-26)			
Mon 22-Oct	Map Overlay & Geoprocessing	Ch. 10	
Wed 24-Oct	Lab #6		Lab #5
Week 10 (Oct 29-Nov 02)			
Mon 29-Oct	Raster Data Analysis	Ch. 11	
Wed 31-Oct	Lab #7		Lab #6
Week 11 (Nov 05-09)			
Mon 5-Nov	Introduction to Geodatabases & Network Analysis	Ch. 13	Research paper Critique 5
Wed 7-Nov	Lab #8		Lab #7
Week 12 (Nov 12-16)			
Mon 12-Nov	Metadata & Legal/ Ethical Issues in GIS	Ch. 14	
Wed 14-Nov	Internet/ Web GIS		Lab #8
Week 13 (Nov 19-23)			
Mon 19-Nov	<u>Exam 2</u>		Group Project draft for troubleshooting
Wed 21-Nov	Work on final projects		
Week 14 (Nov 26-30)			
Mon 26-Nov	Presentation Day: Final project Power Points and Posters		
Wed 28-Nov	Presentation Day: Final project Power Points and Posters	Final Project Posters and Power Point Presentations	
Week 15 (Dec 3-7) Finals Week- No Classes			
Mon 3-Dec	Turn-in Semester Project Written Reports	Final Semester Project Written Reports due by 9 am, Dec 3rd	

** Changes to the schedule will be announced on blackboard and via e-mail with enough time. Remember to check your email regularly.