

SOCI 5381-001: Cartography and Visualization
Mapping Social Data with GIS
Summer Session I, 2022
Course Syllabus

Time: June 6 to July 5, 2022

Place: Blackboard Ultra: 100% online

Virtual Office Hours: On *Blackboard Collaborate* via email appointment

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Maps are an integral component of many academic disciplines because they are powerful tools for recording and communicating information about features on the earth's surface, as well as characteristics of people and places. This course is an introduction to the concepts and techniques of thematic cartography and the visualization of digital geographic data, using geographic information systems (GIS) software. Students are expected to develop skills necessary for creating and designing maps and evaluating cartographic representations of information. As important as a familiarity with computer technology is these days, this class will emphasize principles of map design that transcend technology. Technology is always changing, forcing us to keep re-training in order to take advantage of it. However, the core concepts and principles of cartography that lead to the creation of effective and well-designed maps remain unchanged.

The course has two major goals: (1) to provide a general introduction to the principles and techniques of computer cartography, with a specific focus on thematic map design; and (2) to provide hands-on, map-making experience using desktop GIS software. It is intended primarily for students in the social sciences with no GIS experience, although it will benefit all students who need to fulfill elective requirements for the GIST Certificate and other graduate programs. For students who have taken GIS-related courses before, there could be some overlap with the material covered early in this course. But it is important to remember that GIS courses vary substantially in terms of the topics covered, how they are taught, and their emphasis on cartographic principles or mapping techniques.

Course Objectives

- Introduce fundamental concepts and principles of cartography, as well as key concepts and components of GIS.
- Learn how to use a popular desktop mapping/GIS software program (*ArcGIS Desktop*).
- Understand key conventions of thematic map design, map symbology, and typography.
- Learn and apply contemporary thematic mapping techniques such as dot mapping, proportional symbol mapping, choropleth mapping, and multivariate mapping.
- Gain experience with downloading and mapping U.S. Census and American Community Survey data.
- Provide adequate preparation for more advanced courses on GIScience, cartographic modeling, and/or geospatial analysis.

Course Organization

This online course is partitioned into 10 individual learning units that are organized into two phases (5 units per phase). The first phase of the course (Units 0-4) provides an overview of fundamental concepts such as types of maps, map scale, projections, and coordinate systems, and introduce students to desktop GIS/mapping software. It then covers the key principles of thematic map design, symbology, and typography. The second phase of the course (Units 5-9) focuses on learning and applying a variety of widely used thematic mapping techniques such as dot density mapping, graduated/proportional symbol mapping, choropleth mapping, and multivariate mapping. It will also examine public data sources for thematic cartography, including the U.S. Census and the American Community Survey, and how to use their data downloading/mapping tools. Concurrently with theoretical and conceptual issues, students will be implementing these methods in actual mapping applications using ESRI's *ArcGIS Desktop*, a general-purpose mapping and GIS software. Students completing this course will not only gain valuable experience with *ArcGIS Desktop (ArcMap)* software, but also be prepared adequately for more advanced courses on GIScience, cartographic modeling, and geospatial analysis.

There are no formal prerequisites for this class. The only requirements are an interest in learning how to create thematic maps, and willingness to spend adequate time learning how to use *ArcGIS Desktop* software to design various kinds of thematic maps using demographic and/or socioeconomic data. No prior acquaintance with mapping and GIS software is necessary. However, prior knowledge of basic statistical concepts and/or GIS could be helpful in understanding some of the topics covered.

There are also no textbooks for this course. All lectures, tutorials, software demonstrations, exercises, datasets, and the final exam are available for viewing and/or downloading in appropriate folders (numbered by learning unit) on the Blackboard website for this course. The course material comes from many different sources: cartography and GIS textbooks, papers published in academic journals, newspaper articles, and my own map collections. The introductory PowerPoint lecture (Unit 0) provides more information on texts that can be used as a reference for this course. Several lectures and assignments are also borrowed from GIScience and mapping-related courses that I have taught before in other institutions.

Course Requirements and Evaluation

This is a 100 percent online class which requires you do all required work on your own, with set due dates. All course requirements have been classified into 10 learning units that can accessed through the Blackboard course website. Unit 0 includes the course syllabus and an introductory lecture on key terms and definitions used in this course. Each subsequent learning unit (Unit 1 to 9) is organized as follows:

1. *Lecture*: This includes a narrated PowerPoint presentation on the topic associated with the unit (MP4 video format). Make sure that you watch/listen to this lecture first, before you begin the software tutorial or assignment. The PowerPoint slides used in the lecture and software tutorial are also provided as a PDF document.
2. *Tutorial*: The lecture is followed by a software tutorial document (PDF format) and/or video demonstration (MP4 format) that illustrates how you can apply concepts and

methods related to this topic using *ArcGIS Desktop* software. You are expected to follow along on your own computer and go through the steps demonstrated in the software tutorial using *ArcGIS Desktop* software. This work will not be submitted or graded, but will help you learn and practice the steps necessary to complete the assignment.

3. *Data*: The ArcGIS data files you need for the software tutorial and/or assignment associated with the unit will be provided in a compressed or zipped folder. You are required to unzip (extract) files from this folder and save them in a convenient location on your own computer before you begin the tutorial and/or assignment.
4. *Assignment*: Each unit ends with an exercise (Units 1-8) or a final mapping project (Unit 9) provided as a Microsoft Word document that you need to complete and upload before the posted deadline. Information and steps necessary to complete this assignment can be found in the corresponding lecture and software tutorial.

There will also be a final exam (open-book/open-notes) that students will need to complete and submit after finishing all units in the course. You are welcome to seek help or discuss your mapping exercises with other students in the class, but the exam must be completed *on your own* without consulting others.

All assignments and the final exam must be uploaded through the appropriate links provided on the Blackboard course website. *Due dates and times for completing assignments will be adhered to rigidly!!* Any work that is submitted late will not be graded, except in highly unusual circumstances or documented emergencies. Computer hardware and/or software problems are unacceptable excuses for not completing assignments or submitting them after the deadline. Both my lectures and software tutorials are vital to a proper understanding of the course material. You must complete the 10 learning units and submit assignments in the exact order they are assigned. Cartographic and GIS software knowledge is cumulative, and any gaps in the early material will have serious negative consequences later. Since this course follows an incremental learning process, you will encounter problems with completing an assignment if you have not finished the previous one. Since this only a four-week course, you will not have sufficient time to catch up if you fall behind and there are also no teaching assistants to help you.

It is important to keep in mind that this not just a course or workshop on how to use *ArcGIS Desktop* software, although we will devote much of our time to learning how to use *ArcMap* for designing and producing various types of thematic maps. A major emphasis will be placed on critiquing and interpreting maps you will design, as well as including a written assessment with almost every mapping exercise. This course also assumes that all students will take active roles in their own learning and are fully prepared to commit a substantial amount of time to complete all assignments and the exam. The final course grade* will be awarded on the basis of the following: 8 exercises (65%); a final project (15%); and final exam (20%).

*A= 90%-100% / B= 80%-89% / C= 70%-79% / D= 60%-69% / F= 59% and lower.

See the *Course Calendar and Schedule* on page 5 of this document for more details and information.

Important Course Information

- Remember that this is a fully online (asynchronous) class which requires you to complete all learning units on your own and submit assignments before the posted deadlines. *Time management is essential* since: (1) this is only a four-week semester; and (2) you will not receive the same assistance or guidance compared to a face-to-face class that met in a GIS lab. You will need to be proactive, punctual, and contact me if you run into any problems. I will try to post announcements regularly reminding you of the due dates and providing suggestions on where you should be and what you should be working on.
- You will need to install and run *ArcGIS Desktop (ArcMap)* version 10.8.1 or 10.8.2, on your own Windows computer. Information on downloading and installing a free student version of this software, as well as system requirements, are available on the Blackboard course website. You will need a computer running the Windows 10 (at least Windows 8.1) operating system. Minimum requirements for *ArcGIS Desktop* software include at least 4 GB of RAM (8 GB recommended) and 4 GB of disk space (6 GB recommended). You are responsible for acquiring or accessing a Windows-based computer that meets these and other software/hardware requirements posted on the course website.
- You must have access to reliable and high-speed internet service for the duration of this course. Your computer must also be capable of downloading and playing videos in MP4 format. Please contact me if this video format will not work for you.
- All lectures, software tutorials, and videos are intended only for individual use of students who have enrolled in this course. You are NOT permitted to send or share these files with anyone else. It is illegal to post any course-related documents or videos on the Internet. No notes, recordings, or copies of course materials from this class can be used for purposes of sale.

Course Communication

Since this is an online class, we are not going to meet or see each other in the ways you may be accustomed to. However, there are several ways through which we can keep the communication channels open. These are listed below:

- **Email:** UTEP e-mail is the easiest and quickest way to reach me. If you contact me via email at jchakraborty@utep.edu, I will make every attempt to respond within 24 hours of receipt. When e-mailing me, make sure to email from your UTEP student account and please put the course number in the subject line. In the body of your e-mail, clearly state your question. At the end of your e-mail, be sure to include your first and last name. You need to send me an email to schedule an appointment for a meeting via phone or *Blackboard Collaborate Ultra*.
- **Virtual meeting:** One-on-one online (virtual) meetings with me can be scheduled for any questions related to the course via email. These will be held on the course website via *Blackboard Collaborate*. *Blackboard Collaborate* runs in your browser, so no additional software is needed. It is also accessible via your mobile device. If you want to be heard and/or seen, you will need a microphone and/or webcam. Click [here](#) for "Collaborate

Ultra Help for Participants." To participate in a virtual meeting, click on the *Blackboard Collaborate* link on our Blackboard course website and then simply "Join" the session.

- **Announcements and Home Page:** You are required to check posted 'Announcements' as well as the 'Home Page' of our Blackboard course website frequently for important course-related messages, reminders, and updates.

Course Calendar and Schedule

Unit	Topic	Assignment	Points	Deadline	
0	Course introduction				
1	Mapping basics & ArcGIS introduction	Exercise 1	4	9-Jun	Thu
2	Map projections & coordinate systems	Exercise 2	6	13-Jun	Mon
3	GIS basics & database query	Exercise 3	7	16-Jun	Thu
4	Map design & typography	Exercise 4	8	20-Jun	Mon
5	Dot density mapping	Exercise 5	10	22-Jun	Wed
6	Proportional/graduated symbol mapping	Exercise 6	10	24-Jun	Fri
7	Choropleth mapping	Exercise 7	10	27-Jun	Mon
8	Multivariate mapping	Exercise 8	10	29-Jun	Wed
9	Thematic mapping data sources	Project	15	5-Jul	Tue
		Final Exam	20	5-Jul	Tue

- All assignments must be submitted on or before **11:00 pm** on the dates indicated above.
- I will attempt to grade and return assignments (with my comments and suggestions) on the Blackboard course website within 24 hours of the posted deadlines.
- All assignments (8 exercises & 1 final project) require the use of *ArcGIS Desktop (ArcMap)* software. Discussions with other students in the class are permitted, but not required.
- For all map-related exercises, you should try to incorporate my comments and feedback on your graded map to improve your next map. Additional points will be deducted if you ignore this feedback and repeat the same errors in a subsequent mapping exercise.
- Give yourself sufficient time to learn concepts and software applications. Do not begin any Unit or exercise on the same day the corresponding assignment is due. If this is your first GIS course and/or if you are not familiar with *ArcGIS Desktop* software, please make sure that you devote adequate time learning the material covered in the first three units.
- The final exam will consist of a combination of multiple-choice and short answer (open-ended) questions. You are not allowed to consult anyone else for answering questions.
- Try to upload exercises and the exam well before the posted deadlines to avoid last minute errors and problems. You are welcome to submit all class assignments before July 5, if you wish to complete the course early.

Supplementary Course Information

Academic Dishonesty: All work in this course must be completed by the individual student. No credit will be given for any duplicated or plagiarized work, or on an exam in which a student has consulted with other students in the class.

Academic dishonesty is prohibited. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, or falsifying data on maps. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another person as one's own. Collusion involves collaborating with another person to commit any academically dishonest act. It is expected that UTEP students will understand and subscribe to the ideal of academic integrity and that they will be willing to bear individual responsibility for their work. Materials (written or otherwise) submitted to fulfill academic requirements must represent a student's own efforts. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. Violations will be taken seriously and will be referred to the Dean of Students Office for possible disciplinary action, as per UT Board of Regents' Rules and Regulations and UTEP's Handbook of Operating Procedures. Students may be suspended or expelled from UTEP for such actions. Refer to <https://www.utep.edu/student-affairs/osccr/student-conduct/index.html> for more info.

Late and Missing Work: Assignments will be allowed to be turned in late only in the event of a documented medical or family emergency. If you do encounter an emergency, you must notify the instructor *before* the due date. Documentation could include a note from a physician, a hospital admittance slip, or correspondence from an academic advisor or the Dean of Students. Foreseeable excused absences also require documentation as well as notifying the instructor in advance. In the case of foreseeable absences, you must turn work in early rather than late. In each of these situations it is the student's responsibility to communicate with the instructor.

Incomplete Grades: Incomplete grades (I) will not be given except under exceptional circumstances, based on written documentation, and at the discretion of the instructor.

Special Facilities: Individuals who have any disability, either permanent or temporary, which might affect their ability to perform in this class, must inform the instructor at the start of the semester. Adaptations of methods, materials, or testing may be made as required for equitable participation.