

GEOG 591 Fall 2022 – Making Maps

W 5:10-7:30pm, Kingsbury N134

Instructor: Tu Lan, PhD

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Office Hours: T 2-3 or by appointment via Zoom only

Course Description

Introduces how to make a map from start to finish, designed for students with no background in computer technology. Covers basic knowledge and skills in geographic information system, graphic design, and computer visualization. Walks through some of the most popular apps for map making.

Learning Objectives

1. Develop an understanding of the world's quickly growing spatial data infrastructure (public and commercial databases) and of how to put it to work for making maps.
2. Identify the relevant spatial characteristics of diverse application areas (public health, economic growth, income distribution, election, natural hazards, energy, and more) enabling professionals to integrate spatial thinking and GIS analysis into their careers.
3. Have an ability to use geospatial technologies (spatial analysis, network analysis and raster GIS) to gain a significant advantage in the information technology field.

Required Texts

Gorr, Wilpen L., and Kristen S. Kurland. [*GIS Tutorial for ArcGIS Pro 2.8*](#). Redlands, California: Esri Press, 2021. Since it's a heavy book, digital version is recommended.

[Textbook resources site](#) has all the resources you need including tutorials and assignments.

Course Format

This course is heavily built on hands-on projects. Students should expect to spend a substantial amount of time, typically 3 to 4 hours per week, on computer-based homework after class.

Hardware Requirements

- Computer: Though not required, a PC laptop is highly recommended since ArcGIS Pro only runs on Windows OS. Your computer must meet [minimal hardware requirements](#) for ArcGIS Pro. If you only have a Mac, you need to install Windows [either in Boot Camp or a virtual machine](#). For details, ask the library tech reference. Be aware that in the past, students usually had a hard time configuring ArcGIS on Mac OS.
- Flash driver: Unless you save everything on a cloud storage, you are required to have a flash driver with at least 64GB storage. You will save your data on the flash driver throughout the semester.
- Geospatial Service Center (GSC): The GSC is in Room 337, which has computers dedicated to GIS and will be staffed by specialists during [help hours](#) throughout the semester.

Grading Components

Three components contribute to the final grade of the course: participation, assignments and course project. Lecture notes, tutorials, and instructions will be posted on Canvas.

- **Participation:** Participation in in-class activities is required in this class. There are tutorials every week, which often end up with online submission of results. Submissions must be made in class or if not possible, on the same date of the class. Participation is worth 20% of the final grade.
- **Assignments:** There are in total 6 assignments throughout the semester. Lowest grade will be dropped. Assignments in total are worth 50% of the final grade.
- **Course project:** There is a course project which begins with a research question and ends with one or several story maps. The project must be done by individuals or pairs depending on the size of the class. There are two steps in the project. In the first step, students must complete a Project Proposal identifying the research question, geographic scope, and sources of data. The instructor will review the proposal and give feedbacks. The second step is the project itself, which should include the project files with geodatabase, story maps uploaded onto arcgis.com, process log with major steps, and a final presentation given to the class. There will be a mini-competition of the maps at the end of the class voted by the students. Champion and runner-up will receive extra points. The project is worth 30% of the final grade.

Component	Percentage
Participation	20%
Assignments (6, drop the lowest one)	50%
Course Project	30%
Total	100%

- **Final grade:** there will be *no round-ups*. All lines are hard and non-negotiable. Following is the grade scheme:

A	100 – 94	A-	<94 – 90
B+	<90 – 87	B	<87 – 84
B-	<84 – 80	C+	<80 – 77
C	<77 – 74	C-	<74 – 70
D+	<70 – 67	D	<67 – 64
D-	<64 – 61	F	<61 – 0

- **Late Work:** Every 24 hours past due will be penalized by 10% of the grade of that assignment. I understand that issues come up and you all have more than one class to work on. Should you have any problem submitting your work on time, please let me know at least *24 hours before* the deadline.
- **Class Notes:** After each lecture (not before), I will upload the slides onto myCourses. I do so because I do not want you to write down every word I say in class. Even though these notes are important for the quizzes and exams, try to be a smart notes taker. In fact, the questions I post

before each class should become your guideline of taking notes. If you miss a class, it is *your responsibility* to borrow notes from your peers.

- **Classroom Behavior:** To insure a climate of learning for all, disruptive or inappropriate behavior (repeated outbursts, disrespect for the ideas of others, etc.) may result in exclusion (removal) from this class. As a reminder, cell phone/PDA, etc. use, including text messaging, is not permitted in this class by Faculty Senate rule unless by instructor permission. Laptops and tablets are allowed to be used only for the purpose of learning. Using laptops and tablets for any other reasons will be seen as a violation of the class policy. Each time of violating the electronic devices policy will result in *1% from your final grade*.
- **Make-ups:** There will be *no make-up* for exercises since we already allow dropping the lowest grades. If you expect to miss more than one test AND you have a college/university approved activity, such as an athlete or band travel, please notify me *before the class*. You must also have your notice signed off by your coach or other representative of your team. Otherwise, travel needs do not qualify for make-ups. Any kind of emergency including the medical ones must be reported to the college. The college will inform all your professors and so you do not need to deal with each of us individually.
- **University Academic Honesty Statement:** The University does not tolerate any kind of academic dishonesty. When you are working on a writing assignment, do not cut and paste from other sources. Be sure to quote and cite any words that are not your own and be sure to attribute ideas to their original source even when paraphrasing. You may fail the class by not following the rules. If you are not sure about what constitutes academic misconduct, ask the instructor or see the university's Students Rights, Rules and Responsibilities handbook, available at <http://www.unh.edu/student/rights/>
- **Emotional and Mental Health Distress:** Your academic success in this course is very important to me. If during the semester, you find emotional or mental health issues are affecting that success, please contact the University's Counseling Center (3rd floor Smith Hall: 603-862-2090/TTY:7-1-1) which provides counseling appointments and other mental health services. You may find more information about UNH Conseling Center at <http://www.unh.edu/counseling-center/homepage>
- **Special accommodations:** The University is committed to providing students with documented disabilities equal access to all university programs and facilities. If you think you have a disability requiring accommodations, you must register with Student Accessibility Services (SAS). If you have questions about the process, please contact SAS at (603) 862-2607 or sas.office@unh.edu. If you are registered with SAS, and eligible for accommodations that you would like to utilize in this course, please forward that information to me in a timely manner so that we can meet privately in my office to review those accommodations. For more information, please visit <https://www.unh.edu/studentaccessibility>.

ADDITIONAL REGULATIONS DURING COVID:

In alignment with our #unhtogether commitment to the ongoing health and safety of our community during the COVID-19 pandemic, there are several changes in classroom expectations.

All students are required to wear masks in class and in any other indoor spaces where people will be close to one another for more than a few minutes unless a medical exception is made through an accommodation process. It is your responsibility to obtain a mask before coming to class. For information on proper use of masks, acceptable mask types, and other PPE and social distancing guidelines visit (<https://www.unh.edu/coronavirus>). Students wishing to request a medical accommodation should contact the Student Accessibility Services (<https://www.unh.edu/studentaccessibility>). Failure to comply with PPE or any other UNH COVID protocols is a violation of the Student Rights, Rules, and Responsibilities. If you refuse to comply, you will be asked to leave class immediately and you may also be reported to the Office of the Dean of Students and your associate dean.

1. Your instructor or TA may be wearing a face shield without a mask during instruction and only while maintaining at least a 6-foot distance from any student.
2. Each classroom entrance is equipped with hand sanitizer and surface wipes.
 - a. Use hand sanitizer as you deem appropriate.
 - b. Wipe down your personal space prior to class and throw the used wipes away on the way out of class or take them with you.
3. Contact tracing is an important part of containing any COVID spread. The following practices will facilitate effective contact tracing implementation should the need arise.
 - a. Students should sit in the same seat for each class period to minimize potential contacts.
 - b. We ask students to know the names of each of the people sitting closest to them, their nearest neighbors.
4. UNH has developed “Wildcat Pass,” a web and mobile app to help each of us keep track of the requirements for compliance with necessary testing, isolation, and quarantine rules that will help to keep our community healthy.
 - 4.1. Log into your Wildcat Pass each day before coming to campus or leaving your residence hall.
 - 4.2. Be prepared to show your mobile device or a computer printout of your daily Wildcat Pass if asked by a university representative.

Changes to campus mode of operation and instructional modality.

This class is beginning the semester operating in face-to-face operations with a mask requirement in place. If your health and safety require shifting to additional precautions such as social distancing, the modality and schedule of this course may change.

During a shift to online or hybrid class, students must learn how to access this course in all possible formats. a. Ensure that you have all necessary technology to participate in this course remotely. b. Consult with the instructor and/or with UNH IT for Students <https://www.unh.edu/it/students> with questions. Your classroom is equipped with technology that will provide remote access to class instruction. Because of the need to accommodate potential isolation and quarantine due to the COVID pandemic, lectures or other class meetings for this course may be recorded by the university using UNH media platforms. Such recordings may be available for educational use (including both for instruction and as a review tool) by students enrolled in the class, the course instructor(s), and other university officials who support course instruction. Your voice or image may be captured on the recordings, and by enrolling in this course you are consenting to such recording for these purposes. The University and

Zoom have FERPA-compliant agreements in place to protect the security and privacy of UNH Zoom accounts. You may not share recordings outside of this course. Doing so may result in disciplinary action. Students are expected to adhere to the attendance policies specific to this course as outlined.

Do not attend class if you have any symptoms of illness or if your daily Wildcat Pass does not show that you are cleared to participate in classes and other campus activities. Inform the instructor in advance, if possible, that you will be absent from a scheduled in-person class. It is ultimately your responsibility to keep up with all course expectations. When appropriate, accommodations will be made. If this class either begins with, or is forced by conditions to adopt, a rotational attendance component, you must only attend in- person on your assigned day(s) and may not switch days with other students or make other modifications to faculty instructions for in-person attendance.Attendance (including Rotational) for In-Person Modalities.

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Syllabus Changes

The professor reserves the right to make changes to the syllabus, including project due dates and test dates, when unforeseen circumstances such as a surge in COVID cases or snowstorms. These changes will be announced as early as possible so that students can adjust their schedules.

Course Schedule

Date	Topic	Due Dates
Aug 31	Chapter 1: ArcGIS Platform Get an introduction to the ArcGIS platform. Get an introduction to the ArcGIS Pro user interface. Learn to navigate maps. Work with tables of attribute data. Get an introduction to symbolizing and labeling maps. Work with side-by-side 2D and 3D maps. Publish a map to ArcGIS Online. Configure maps in ArcGIS Online. Use Explorer for ArcGIS on a mobile device.	
Sep 7	Chapter 2: Map Design	

	<p>Symbolize maps using qualitative attributes and labels. Use definition queries to create a subset of map features. Symbolize maps using quantitative attributes. Learn about 3D maps. Symbolize maps using graduated and proportional point symbols. Create normalized maps with custom scales. Create density maps. Create group layers and layer packages.</p>	
Sep 14	<p>Chapter 3: Map Outputs for GIS projects Learn about alternatives for sharing maps and information from GIS projects. Build map layouts. Add visibility ranges for interactive map use. Build story maps. Make professional-quality tables and charts in Microsoft Excel.</p>	Assignment #1
Sep 21	<p>Chapter 4: File Geodatabases Import data into file geodatabases. Modify attribute tables and fields. Use Python expressions to calculate fields. Join tables. Get an introduction to SQL query criteria. Carry out attribute queries. Aggregate point data to polygon summary data.</p>	
Sep 28	<p>Project Proposal</p>	Assignment #2
Oct 5	<p>Chapter 5: Spatial Data Work with world map projections. Work with US map projections. Work with projected coordinate systems (PCS). Learn about vector data formats. Download US Census map layers and tabular data. Explore, download, and process data from Living Atlas of the World. Explore sources of spatial data from government websites. Explore maps from a university's web service.</p>	
Oct 12	<p>Chapter 6: Geoprocessing Dissolve block group polygons to create neighborhoods and fire battalions and divisions. Extract a neighborhood using attributes to form a study area. Extract features from other map layers using the study area. Merge water features to create a single water map. Append separate fire and police station layers to one layer. Intersect streets and fire companies to assign street segments to fire companies. Union neighborhood and land-use boundaries to create detailed polygons of neighborhood land-use characteristics. Apportion data between two polygon map layers whose boundaries do not align.</p>	Assignment #3
Oct 19	<p>Chapter 7: Digitizing Edit, create, and delete polygon features. Extract features from other map layers using the study area.</p>	

	<p>Create and digitize point and line features. Use cartography tools to smooth features. Work with CAD drawings. Spatially adjust features.</p>	
Oct 26	<p>Chapter 8: Geocoding Get an overview of the geocoding process. Geocode using ZIP Codes. Geocode addresses using streets. Use alias tables for place-name geocoding.</p>	Assignment #4
Nov 2	<p>Chapter 9: Spatial Analysis Use buffers for proximity analysis. Use multiple-ring buffers to estimate a gravity model of demand versus distance from nearest facility. Estimate service areas of facilities using ArcGIS® Network Analyst. Optimally locate facilities using Network Analyst. Carry out cluster analysis to explore multidimensional data.</p>	
Nov 9	<p>Chapter 10: Raster GIS Extract and symbolize raster maps. Create hillshade maps. Smooth point data with kernel density smoothing. Build a raster-based risk index. Build a model for automatically creating risk indices.</p>	Assignment #5
Nov 16	<p>Chapter 11: 3D GIS Explore global scenes. Learn how to navigate scenes. Create local scenes and TIN surfaces. Create Z-enabled features. Create 3D buildings and bridges from lidar data. Work with 3D features. Use procedural rules and multipatch models. Create an animation.</p>	
Nov 23	Thanksgiving, no class	Assignment #6
Dec 30	Final Presentation	
Dec 7	Final Presentation	