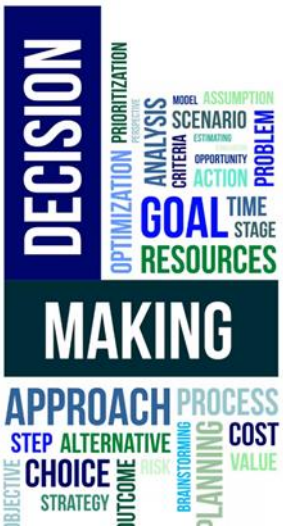
CP 4510-C: Fundamentals of Geographic Information Systems[1]

Summer 2025

Lecture and Lab

Thursday 5:00 - 9:15 pm

Arch W 359/Lectures and Lab Exercises



Instructor

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Course Overview

Many disciplines require information about the location of people, places, activities, and various natural and synthetic resources. City and regional planning, environmental science, real estate, transportation, geography, logistics, politics, and international affairs are just a few disciplines

[1] Note that this syllabus is subject to change. The must p-to-date version will always be posted on Canvas and revision will be announced in class and/or by e-mail

that use this '*spatial*' or location-based information. Effective management and analysis of this information require a Geographic Information System (GIS), a hardware and software system for storage, retrieval, management, and, most importantly, spatial data analysis. GIS systems are used in numerous disciplines and can be helpful for various applications.

Learning objectives

Upon completing this course, students will have acquired new skills through in-class exercises, discussion and debate, detailed analysis and thoughtful reflection in homework/assignment, completion of the static map using ArcGIS desktop, and a final project using ArcGIS online. Specifically, successful students will be able to achieve the goals of the course, which are:

1. To provide students with a firm understanding of the basic principles of GIS and spatial analysis;
2. To give students a solid working knowledge of one GIS software package, ArcGIS Pro;
3. To help students understand the relevance and ubiquity of geospatial information in everyday life;
4. To help students become familiar with data providers and their efforts at various geographic levels (national, state, local);
5. To develop practical graphic presentation skills;
6. To provide the students with a working knowledge of geospatial analytics and visualization tools;
7. To help students apply skills learned in this class to other classes and their professional work.

GIS software packages are continually evolving. Therefore, students need to understand the basic principles of spatial analysis and how geography is represented and manipulated in a computer-based environment. The readings and lectures are designed to serve this purpose. The course will utilize the ArcGIS software suite from market leader ESRI, with ArcGIS Pro being the primary tool throughout the course. The lab sessions will provide students with in-depth, hands-on experience using ArcGIS Pro software. As mapping and location-based analytics are prominent in many businesses, the skills learned in this class can be applied to address broader issues from diverse domains.

Software Availability

ArcGIS Pro 3.x and all available extensions are installed on all College of Design computer labs and clusters. In addition, many virtual machine instances have been configured with ArcGIS software on https://mycloud.gatech.edu. The software has been distributed widely to other campus departments, including OIT-maintained labs. Please get in touch with me if your home unit needs this software for your labs.

The desktop-based ArcGIS software suite is available only on the Windows platform. If you work on a Mac platform, you may have to install ArcGIS in a Windows partition on your hardware or rely on the virtual labs.

In addition to lab computers, students will be given access to ArcGIS Pro and ArcGIS Desktop to install on personally owned computers. The instructor will distribute student license authorization codes valid for one year to class participants.

Students will also be provided credentials to access ArcGIS.com for organization portal access during the semester. This credential is specific to this class and will be revoked at the end of the semester.

Required Book

Maribeth Price, 2020: Mastering ArcGIS Pro – Second Edition. NY: McGraw-Hill
ISBN: 978-1-260-58733-3

The book is available in print and e-book versions from McGraw-Hill and other outlets. The book is also available to rent. Obtain a version that suits your needs. Throughout the semester, you will be required to complete tutorials and exercises from the reader.

Recommended Reading:

- Mark Monmonier, 1996: ***How to Lie with Maps***. University of Chicago Press.
- Bolstad Paul, 2019: ***GIS Fundamentals***. A First Text of Geography Information Systems. Sixth Edition. XanEdu, Ann Harbor, Minnesota.

Additional Course Content

In addition to the required textbook, the instructor will provide additional exercises, references, and reading material.

Academic Integrity

Georgia Tech strives to foster a community founded on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit
http://www.catalog.gatech.edu/rules/18b.php and
http://www.catalog.gatech.edu/genregulations/honorcode.php.
Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, which will investigate the incident and determine the appropriate penalty for the violation.

Accommodations for Individuals with Disabilities

If you are a student with learning needs that require unique accommodations, please contact the Office of Disability Services (often referred to as ADAPTS) at (404) 89-2563 or http://disabilityservices.gatech.edu/ as soon as possible to schedule an appointment to discuss your specific needs and obtain an accommodations letter. Additionally, please email me to arrange a time to discuss your learning needs.

Student-Faculty Expectations

At Georgia Tech, it is important to continually strive for mutual respect, acknowledgment, and responsibility between faculty members and the student body. Please refer to http://www.catalog.gatech.edu/rules/22.php for an articulation of some basic expectations you can have of me and that I have of you. Ultimately, simple respect for knowledge, hard work, and cordial interactions will help build our desired environment. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Student Use of Mobile Devices and Social Media Tools in the Classroom

To ensure a conducive learning environment, mobile phones, Internet browsing not related to class discussions, and social media tools are strictly prohibited during class.

Course Grading:

This course is a hands-on class. Students are expected to attend all classes, complete in-class lab exercises, readings, and homework assignments, take quizzes and take-home exams, and participate in class discussions. Unless otherwise specified, all exercises are to be completed individually.

A = 90-100% ; **B** = 80-89% ; **C** = 70-79% ; **D** = 60-69% ; **F** = <60%

Completion of in-class hands-on exercises (5%)—These are teaching tutorial exercises from the course book. On a typical Thursday, I review concepts and give pertinent demos, aligning with book exercises. After that, students work on tutorial exercises during class time. You may NOT be able to complete them in class due to time constraints, but you will be expected to meet them on time and certify that they are done.

Homework Assignments (40%) - You will be given FOUR more significant homework assignments throughout the semester. These homework assignments will utilize skills you've acquired through the lab exercises and tutorials. You will have approximately 2-3 weeks to complete each homework assignment. Students are expected to adhere to posted submission deadlines. Late submissions will result in a penalty of 10% of the grade per class. Assignments submitted two courses after the deadline will not be accepted.

Interim Quizzes (20%) - There will be two quizzes during the semester—one towards the end of the semester's first half and the second towards the end. Content for the quiz will be derived from lectures, labs, readings, and other review materials assigned. Quizzes will test your understanding of the concepts covered. The format for the examination will be multiple choice, T/F, and fill-in-the-blank, short-sentence questions, and they will be administered on the course Canvas website.

Book Chapter Practice Exercises (15%)—At the end of each chapter of the Mastering ArcGIS Pro course textbook, there are Teaching Tutorials and Practice Exercises. You will complete teaching tutorials in class, which will form the basis for completing practice exercises. You will be asked to complete exercises from **6 selected chapters** and submit

them as deliverables. The instructor may ask you to demonstrate how you arrived at your solutions.

Final Team Project (15%)—Team projects are based on instructor-approved topics, project outlines, and deliverable timelines. The instructor may also assign specific project topics. Deliverables for the team project include a Story Map (7.5%) and a team presentation (7.5%).

Attendance & Class Participation (5%) - Attendance will be noted in each class. You are allowed a maximum of THREE missed classes. Participation in class discussions and motivation may affect your grade and influence any borderline grade. Every class builds on the previous class, so it will be harder to catch up if you miss a class.

Late Submission and Make-Up work

All assignments and homework are due at 11:59 PM on their respective due dates. You may turn in these items after the deadline, but incur a **10% penalty for each late day**. Assignments submitted more than three days late will not get credit. Note also that extensions will not generally be permitted, but if you think you are subject to an exceptional circumstance, please discuss it with me outside of class (and as soon as possible).

Make-up quizzes will be given only for documented reasons, such as illness, family emergency, or participation in approved Institute activities (e.g., field trips and athletic events; see http://catalog.gatech.edu/rules/12/ for more information).

Course content delivery

The Course Canvas website is the primary method for disseminating course content. All assignments, quizzes, submissions, and session recordings will be available in Canvas. Student submissions must be uploaded to the course website.

Submission Requirements

Please submit electronic copies of all assignments to the course Canvas site. **Each assignment must be submitted as a SINGLE PDF file** unless instructed otherwise. You must collate your answers/results into a SINGLE PDF before submitting. Lab computers and virtual lab instances all have Adobe professional software that lets you merge multiple PDF files into a SINGLE file.

Email to instructor

Feel free to email me with questions related to the class. Please ensure your email subject line starts with **"[CP4510-SUMMER25]." I will filter my emails based on the subject line to avoid overlooking** your emails. I will respond within 24 hours of your email. But I will most likely respond much sooner.

Course Expectations and Policies (Summarizing)

Student conduct should be based on the Georgia Tech Honor Code.

Attendance

While attendance during all class periods is highly encouraged, I trust you can manage your time. When attending, please arrive to class on time and stay the entire period unless you've discussed other arrangements with me. Students are responsible for any material missed due to their absence.

Readings

You have one Textbook assigned for this course (Maribeth Price, 2020: Mastering ArcGIS Pro – Second Edition. NY: McGraw Hill). The first three chapters will be available on Canvas before every class. For the next, I encourage you to purchase the textbook. I expect that you will complete the readings before the class or lab to which they are assigned.

Use of laptops, phones, and other devices

Using electronic devices during class (laptops, cell phones, etc.) is generally permitted. You may find it valuable to bring a device to class to follow along with a demonstration of a particular piece of software or a specific data source. Please turn all cell phones to silent (not vibrate) during class time. To avoid distraction and for the benefit of your fellow students, please refrain from using your devices for non-class material during class time.

Disability accommodations

Students with disabilities requiring academic accommodations should provide documentation to the Accessible Disabled Assistance Program for Tech Students (http://www.adapts.gatech.edu/) and bring an ADAPTS accommodation letter to their instructor, indicating the required accommodations. This should be done within the first week of class or as soon as possible after a new disability condition arises.

Plagiarism and cheating

We will be completing writing assignments for this course. Plagiarism involves using another person's words or ideas as your own. It is acceptable to borrow ideas from other scholars — indeed, this is how scholarship advances. But those words and ideas must be appropriately referenced with a citation and page number.

If you are caught plagiarizing or cheating, you will be dealt with according to the Georgia Tech Academic Honor Code. This will usually involve the receipt of a failing grade for the assignment in question. For any questions concerning these or any other Academic Honor Code issues, please consult http://www.honor.gatech.edu or me. Please see me if you need clarification on what constitutes cheating or plagiarism.

Policy on late work

All written work must be turned into Canvas by the **date and time** noted on the assignment prompt. Work submitted late will receive a reduced credit of five points (on a traditional 100-point grading scale) per day or a portion of the day late, unless prior arrangements have been made with the instructor. **No submissions will be accepted after four weeks past the due date**.

No late submissions on Final Projects.

College of Design Faculty Statement on Diversity, Equity, and Inclusion

"*The College of Design (COD) community of faculty, staff, and students aspires to create and nurture an environment that supports all backgrounds where different views and ideas are respected and encouraged. We commit to justice, diversity, equity, and inclusion in all our pursuits regarding race, national origin, language, age, sexual orientation, gender, religion, and ability. Moreover, we will encourage intellectual inquiry and respectful exchange that cements our dedication to these principles*."

Course Topics and Schedule (Version 1.0, updated 05/08/2024)

The following table outlines the course schedule, including labs (yellow), due dates (red), Quizzes (grey), final project (green), readings, and other important events. This schedule is subject to change; the most current version can always be found in Canvas.

Day	Topic	Readings and assignments due
5/15	Course Overview and Critical Perspective	
	Introduction to GIS *Installing ArcGIS on a Laptop*	Introduction, Maribeth Price. Mastering ArcGIS Pro EDITION. NY: McGraw-Hill. Pp 1-10
5/22	What is GIS	Chapter 1, Maribeth Price. Mastering ArcGIS Pro EDITION. NY: McGraw-Hill. Pp 11-24
	Review and Lab	Pp 25-42
	Mapping GIS Data	Chapter 2, Maribeth Price. Mastering ArcGIS Pro EDITION. NY: McGraw-Hill. Pp 45-60
	Review and Lab	Pp 60-74
5/28	***Practice Exercise #2 DUE @ 11:55pm***	
	TBA	
5/29	Presenting GIS Data	Chapter 3, Maribeth Price. Mastering ArcGIS Pro EDITION. NY: McGraw-Hill. Pp 77-94
	Review and Lab	Pp 95-108
	Coordinate Systems	Chapter 4, Maribeth Price. Mastering ArcGIS Pro EDITION. NY: McGraw-Hill. Pp 111-126
	Review and Lab	Pp 127-141
6/4	***Practice Exercise #4 DUE @ 11:55pm***	
	TBA	
6/5	Managing Vector Data	Chapter 5, Maribeth Price. Mastering ArcGIS Pro EDITION. NY: McGraw-Hill. Pp 143-160

	Review and Lab	Pp 161-175
	Managing Raster Data	Chapter 6, Maribeth Price. Mastering ArcGIS Pro EDITION. NY: McGraw-Hill. Pp 177-191
	Review and Lab	Pp 192-209
6/11	***Practice Exercise #6 DUE @ 11:55pm***	
	Practice Exercise #7 DUE @ 11:55pm	
6/12	Attribute Data	Chapter 7, Maribeth Price. Mastering ArcGIS Pro EDITION. NY: McGraw-Hill. Pp 211-226
	Review and Lab	Pp 227-242
	Editing	Chapter 8, Maribeth Price. Mastering ArcGIS Pro EDITION. NY: McGraw-Hill. Pp 245-257
	Editing review and Lab	Pp 258-274
6/16	**QUIZ 1**	
6/17	***FINAL PROJECT ABSTRACT DUE***	
6/19	***Official Institute Holiday***	
6/26	Queries	Chapter 9, Maribeth Price. Mastering ArcGIS Pro EDITION. NY: McGraw-Hill. Pp 277-292
	Queries Review and Lab	Pp 293-306
	Joins and Overlay	Chapter 10, Maribeth Price. Mastering ArcGIS Pro EDITION. NY: McGraw-Hill. Pp 309-323
	Spatial Joins, Model Builder, Area-Weighted Overlay Review, and Lab	Pp 324-335
7/3	***Official School Holiday – No Class***	
7/4	***Independence Day – No Class***	
7/9	***Practice Exercise #9 DUE @ 11:55pm***	

	Practice Exercise #10 DUE @ 11:55pm	
	TBA	
7/10	Raster Analysis	Chapter 11, Maribeth Price. Mastering ArcGIS Pro EDITION. NY: McGraw-Hill. Pp 339-352
	Raster Review and Lab	Pp 353-365
	Sharing GIS	Chapter 12, Maribeth Price. Mastering ArcGIS Pro EDITION. NY: McGraw-Hill. Pp 367-380
	Sharing GIS Review and Lab	Pp 381-404
7/14	**QUIZ 2**	
7/16	**PROJECT DUE & PRESENTATION - THURSDAY, JULY 21 @ 05:30 PM - 09:15 PM**	
7/17	***Final Project Presentation or TBA.***	
7/24	***Final Project Presentation or TBA***	
7/28 **7/29**	**Institute final exam week – NO CLASS**	

Contacting Instructor

The best way to communicate is by email. Please label your emails regarding this class with '[**CP4510-SUM25**]'. The email addresses are below:

Gervais: gwt3@gatech.edu

If you need to reach me by phone, please call 770-771-4117

Other means of contacting: Gmail – gervaistabopda@gmail.com