CP 4510: Fundamentals of GIS

Instructor: Tony Giarrusso

Course Dates and Times: TTH 9:30 am – 10:45 am

Classroom: 101, College of Computing

Office: Center for Spatial Planning Analytics and Visualization, 217D, Center for GIS, 760 Spring St

Office Hours: Thursdays 11:00 am – 12:00 pm (All by appointment only – other times possible)

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Overview

Many disciplines require information about the location of people, places, activities, and various resources, both natural and synthetic. City and regional planning, environmental science, real estate, transportation, geography, logistics, politics and international affairs are just a few disciplines that make use of this 'spatial' or location based information. Effective management and analysis of this information requires a Geographic Information System (GIS); a system of hardware and software used for storage, retrieval, management and, most importantly, analysis of spatial data. GIS systems are used in numerous disciplines and can be helpful for a variety of applications.

Objectives

The goals of this course are:

1. To expose students to ArcGIS
2. To provide students with a working knowledge of ArcGIS PRO, ESRI Story Maps and ArcGIS Online basics
3. To help students apply skills learned in this class towards other classes and/or their professional work.

GIS software packages change continually. Therefore, it is extremely important for students to understand the basics 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 lab sessions will provide students with hands-on experience using ArcGIS PRO and ArcGIS Online, arguably the most widely used GIS software in the world. The skills learned in this class can be applied in other classes (maps for papers, spatial analysis, etc) or in a professional setting. By the end of the course, students are expected to understand the basic components of a geographic information system and to be proficient using ArcGIS Desktop and ArcGIS Online.

Required Readings and Materials

Laptop Computer – this class is not held in a computer lab. Therefore, you will be required to bring a laptop computer to class for lab sessions on Thursdays.

Mastering ArcGIS Pro – 2nd EDITION by Maribeth Price - McGraw Hill
ISBN10: 1264091206
ISBN13: 9781264091201
Order electronic version: https://www.mheducation.com/highered/product/mastering-arcgis-pro-price/M9781264091201.html#interactiveCollapse

Course Delivery Format

This course will alternate between lecture and lab. Tuesdays will be lectures and Thursdays will be explanations on the tutorials/homework. Students are expected to read the required readings prior to lecture. During the lab sessions, students will work on the weekly tutorials (Mastering the Skills) from the book. These tutorials will prepare you for the weekly hws. Do not overlook these tutorials as this is the bulk of the learning for the class and is self-led. The majority of work required for the class (homework assignments) will be accomplished outside of class time. Success in this course depends heavily on student participation (doing the tutorials and homeworks).

Student Evaluation

Students are expected to attend all classes and labs, participate in class discussions, and complete the required readings, homework assignments, and any required exams. Unless otherwise specified, all exercises are to be completed individually, not collaboratively. Students may discuss general concepts related to their homework, but the assignments must be completed individually.

A = 90-100%
B = 80-90%
C = 70-80%
D = 60-70%
F = <60%

Course Grade Breakdown

(45%) Weekly HWs: See Canvas for official assignment(s) details, due dates and times. All Weekly HWs are due either Tuesday or Thursday before class at 9:30 am. You must complete a weekly hw to have it replaced with an extra credit.

(30%) Exam: Chapters 1 – 10 short answer, definitions, practical questions, etc.

(20%) Final Project: Using ArcGIS Online students will describe, analyze, and present topic of interest via an ESRI Story Map. See Assignment on Canvas for details.

(5%) Class Participation: <u>Attendance is mandatory</u> -- roll will be taken. Four absences are permitted. However, more than 4 absences require documented approval for all absences. Check Canvas for your attendance grade, which is updated weekly. The fifth absence lowers your class participation grade by 2.5%. The sixth absence results in 0% participation grade. ***Policy effective beginning Week 2.***

<u>Extra Credit</u>

There are plenty of opportunities for extra credit (weekly hws and/or class participation). See Canvas for assignments and details. You cannot replace a 0 or incomplete hw with an extra credit

Policies

Student conduct should be based on the Georgia Tech Honor Code. The Institute policy regarding student plagiarism will be strictly enforced. Any student found to violate the policy on plagiarism will receive a failing grade for the assignment and will be subject to disciplinary action as outlined within the Georgia Tech Academic Honor Code (http://www.catalog.gatech.edu/rules/18b.php) and Student Code of Conduct (http://www.catalog.gatech.edu/rules/19b.php).

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

Assignments will be submitted via the Canvas website for the course.

Late HW Policies: -10 points per week for any Weekly HW submitted after due date. Maximum of -25 points deducted for being late.

Affiliation with Serve-Learn-Sustain

This course is part of Georgia Tech's Serve-Learn-Sustain (SLS) initiative. SLS works with all six colleges to offer students courses and other academic and extra-curricular opportunities that prepare them to work with diverse collaborators - from the community, nonprofit, government, academic, and business sectors - to "create sustainable communities," where humans and nature flourish, now and in the future. More information about SLS can be found at www.serve-learn-sustain.gatech.edu. Visit the website to sign up for the SLS Email List, learn about SLS' signature programs, and find links to Facebook, Instagram and Twitter.

This course is an elective for the Sustainable Cities minor. The SLS learning outcomes of this class are

1. Students will be able to identify relationships among ecological, social and economic systems.

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 is supportive of all backgrounds where different views and ideas are respected and encouraged. In all our pursuits, we commit to justice, diversity, equity, and inclusion with regard to 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

Week 1 – Course Intro
Tuesday 8/19: Welcome and Overview
Thursday 8/21: Intro to VLAB - Installing ArcGIS Software on laptop

Week 2 – Intro to GIS (Chapter 1) Lab and Mapping GIS Data (Chapter 2) Lecture
Tuesday 8/26: Chapter 1 – Intro to GIS LECTURE
Thursday 8/28: Chapter 1 – Intro to GIS LAB

Week 3 – Mapping GIS Data (Chapter 2)
Tuesday 9/2: Chapter 2 – Mapping GIS Data LECTURE
Thursday: 9/4: Chapter 2 - Mapping GIS Data LAB

Week 4 – Presenting GIS Data (Chapter 3)
Tuesday 9/9: Presenting GIS Data LECTURE
Thursday 9/11: Presenting GIS Data LAB

Week 5 – Coordinate Systems (Chapter 4)
Tuesday 9/16: Map Projections and Coordinate Systems LECTURE
Thursday 9/18: Coordinate Systems LAB

Week 6 – Managing Vector Data (Chapter 5)
Tuesday 9/23: Managing Vector Data LECTURE
Thursday 9/25: Managing Vector Data LAB

Week 7 – Managing Raster Data (Chapter 6)
Tuesday 9/30: Managing Raster Data LECTURE
Thursday 10/2: Managing Raster Data LAB

Week 8 – FALL Break and Census Data
Tuesday 10/7: FALL BREAK
Thursday 10/9: Census Data and Social Explorer

Week 9 – Tabular Data (Chapter 7)
Tuesday 10/14: Tabular Data LECTURE
Thursday 10/16: Tabular Data LAB

Week 10 –Editing (Chapter 8)
Tuesday 10/21: Editing LECTURE
Thursday 10/23: Editing LAB

Week 11 – Queries (Chapter 9)
Tuesday 10/28: Queries LECTURE
Thursday 10/30: Queries LAB

Week 12 – Spatial Joins and Overlays (Chapter 10)

Tuesday 11/4: Spatial Joins and Overlays LECTURE
Thursday 11/6: Spatial Joins and Overlays LAB

Week 13 – Exam

Tuesday 11/11: Exam review
Thursday 11/13: Exam

Week 14 – ArcGIS.com (Maps)

Tuesday 11/18: ArcGIS.com - Overview LECTURE / LAB
Thursday 11/20: ArcGIS.com - Overview LECTURE / LAB

Week 15 – ArcGIS.com (Apps)

Tuesday 11/25: Story Maps and Applications LECTURE / LAB
Thursday 11/27: Thanksgiving Break

Week 16 – ArcGIS.com (Maps and Apps)

Tuesday 12/2: Work on Project– Last Day of Classes

Week 17 – ArcGIS.com (Maps and Apps)

Thursday 12/11: Final project and extra credits due

Assignments: Overviews and Due Dates – See Canvas for Assignment Details

1. **Weekly HW 1:** Chapter 1 Exercises ***(Due Tuesday 9/2).***
2. **Weekly HW 2:** Chapter 2 Exercises ***(Due Tuesday 9/9)***.
3. **Weekly HW 3:** Chapter 3 Exercises ***(Due Tuesday 9/16)***
4. **Weekly HW 4:** Chapter 4 Exercises ***(Due Tuesday 9/23)***
5. **Weekly HW 5:** Chapter 5 Exercises and Online Data Exercise ***(Due Tuesday 9/30)***
6. **Weekly HW 6:** Chapter 6 Exercises **(*Due Tuesday 10/14*)**
7. **Weekly HW 7**: Chapter 7 Exercises ***(Due Tuesday 10/21)***
8. **Weekly HW 8:** Chapter 8 Editing Map ***(Due Tuesday 10/28)***
9. **Weekly HW 9:** Chapter 9 ***(Due Tuesday 11/4)***
10. **Weekly HW 10:** Chapter 10 Exercises (***Due Thursday 11/11)***
11. **EXAM: Thursday 11/13**
12. **. Final Project Abstract:** ***(Due Tuesday 11/18)***
13. **Weekly HW 11:** ArcGIS.com Map ***(Due Tuesday 11/25)***
14. **Weekly HW 12:** ArcGIS.com Application and Story Map ***(Due Tuesday 12/2)***
15. **Extra Credits Due -** ***(Due Thursday 12/11)***
16. **FINAL Project Due –** ***(Due Thursday 12/11)***