

UP 418 GIS for Planners

Instructor: Dr. Fang Fang (fangf@illinois.edu)

Online Lectures: Mon 9:00-10:20 am

Online labs: Wed 9:00-10:20 am

Office Hours CST (online): Monday 3:00pm -4:00 pm Thursday 9:00 am – 10:00am

TA: Leo Torres **Office hours (online) CST : Mon** 2:30 pm to 4:30 pm

Course Overview:

GIS consists of the technology and systems that create, manage, analyze, and visualize geographic information. This course is designed to be an introduction to the principles, techniques, and applications of Geographic Information Systems (GIS) primarily for planners. The online synchronous lectures will guide students through a comprehensive overview of the concepts and principles used in GIS. The online lab explores geographic information systems software ArcGIS Pro and basic principles of mapping and analysis of geographic information.

This syllabus is subject to change by the instructor.

Course Outcomes:

1. Build a solid basis for the critical principles of GIS.
2. Develop a basic knowledge of spatial analysis using ArcGIS Pro.
3. Apply GIS knowledge and skills to solve real-world problems in urban planning issues.
4. Use GIS software to examine a problem that interests you especially for students from other programs, such as discovering and interpreting disease patterns, mapping facilities in cities, and locating areas for potential economic development.
5. Master software by using the help documentation and electronic users' manuals to find analysis and mapping functions in any GIS software package.
6. Recognize how geospatial technologies have changed and continue to change our daily lives.

Course Structure/Philosophy/Engagement:

- This is a 16-week online course. Each student is expected to devote 1-2 hours per week learning the lecture contents, and 1-2 hours for labs exercise per week. All the lectures and labs are delivered synchronously online in zoom.
- Attendance: Your full participation and presence in all classes are expected. Please contact me/TA prior to the course session which you are absent from. You get three "free" absence for the entire semester. Attendance are calculated as a percentage of number of classes attended (excluding excused absences) and scaled out of 100 points. Recordings will be available for students with excused absences prior to class.

- Engagement: I firmly believe that students learn via engagement and by doing. As a result, this will not be a pure lecture-based course. It is important to engage yourself during this class. I will do my best to help you learn; however, it is imperative that you take ownership of your education. Feel free to email me if you need help. The engagement is demonstrated in various ways for online lectures and labs: e.g. in-class discussion, in-class exercise, in-class group work, in-class presentation, reading reflections, short essay summary etc. Students are also expected to complete the assigned readings prior to class and to come to lectures prepared for thoughtful participation and discussion.
- All the assignments, exams, and labs are mandatory. Please contact the instructor asap for any unavoidable circumstances e.g. due to COVID-19. Excused absences, asynchronous participation etc will be granted on a case-by-case basis.
- Instructions for this course will be in synchronous, online-only format. Students are expected to keep videos ON during the class session especially for breakout rooms. Cell phone use of any kind will not be tolerated.

Required Textbooks:

1. GIS Tutorial 1 for **ArcGIS Pro 2.5**: A Platform Workbook from ESRI Press. Click [here](#). You can get a hard copy or a digital version of the tutorial.
2. GIS Fundamentals: A First Text on Geographic Information Systems, Paul Bolstad, 3rd edition

Software:

Option 1: Students can install ArcGIS Pro 2.4 on their personal computers for free through the University's Webstore: webstore.illinois.edu.

Option 2: ACES/DUPR/ICS Remote desktops: Click [here](#) for more info. Please follow the instructions in the webpage to get connected.

Grading:

Grading for this class will consist of one online-exam, attendance, 11 labs, and a final project.

The midterm online-exam (during the week of March 15th) will be a combination of multiple-choice, true-and-false, and short answer questions. Instead of regurgitating facts, my tests are designed so that you think about the key concepts of the topics we have covered. The exam cannot be re-taken.

The exams will be offered online and proctored through the service of Proctorio. See the [link](#) here for more information.

In addition to the exam, you will be asked to complete 11 lab assignments (the lowest score of the lab will be dropped). Note the dates of these assignments in the schedule on the last page. **Assignments must be turned in via Compass submission. You will receive a zero on the assignment if it is not submitted.** You have 7 days to finish each lecture and lab assignment. For example, assignment which is posted on Feb 10th will be due Feb 17th at 9 am. You should submit lab assignment as Word documents on Compass website. An assignment, **including lab assignments, mid-term exam,**

discussion, project proposal, and final project, submitted 24 hours or less after the due date will only be eligible for 80% of the maximum number of points allotted. Assignments submitted more than 24 hours but less than 48 hours after the due date will only be eligible for 60% of the maximum number of points allotted, and so on. Assignments submitted **more than 120 hours (or 5 days)** after the due date **will NOT be accepted and you will receive a zero on that assignment**. If you experience extenuating circumstances (e.g., you are hospitalized) that prohibit you from submitting your assignments on time, please let me know. I will evaluate these instances on a case-by-case basis. You are responsible to confirm each submission in Compass. **For any technical issues in Compass/Netid, you need to contact me in advance or email your assignment to me ASAP by the deadline. Otherwise, the late work policy will be strictly enforced.**

Error/warning messages are common in ESRI products (e.g. invalid tool settings), and these are NOT the valid excuses for late submission.

Final project:

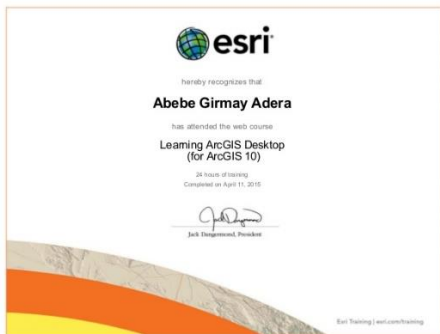
All the students need to conduct a final project using GIS. The project can describe the role of GIS in their capstone/workshop. A project proposal is due by **March 29th 9 am**. A final report is required as delivery by **May 12th 9 am**. The details and requirements will be posted later in Compass.

Undergraduate and Graduate Students’ Workload:

- Note for undergraduate students a final project can be finished as a group. You should email the instructor about the group info by **11:59 PM, March 8th**. Graduate student must finish the project as an individual project.

Bonus points:

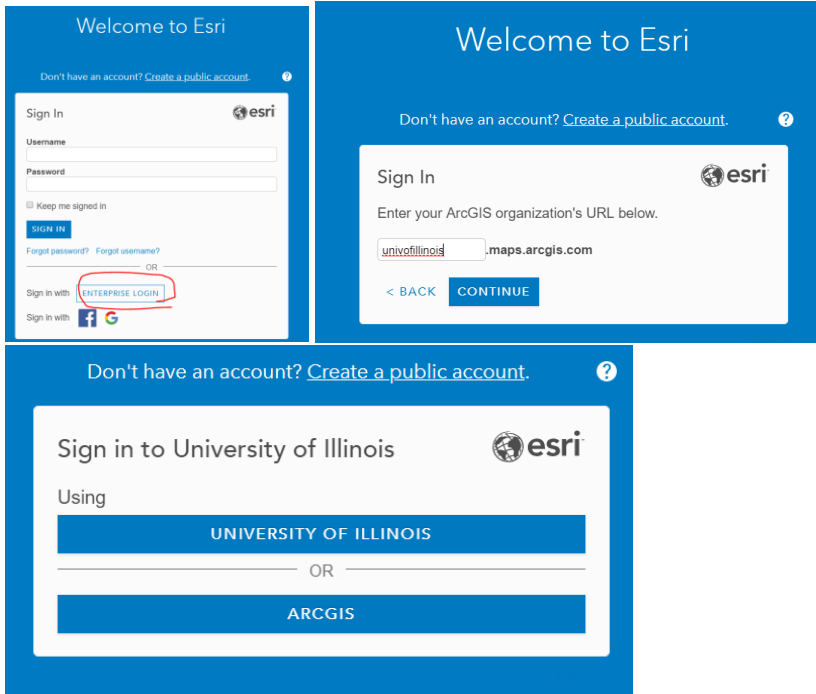
You can earn up to 40 bonus points this semester. Please visit the [ESRI training](#) website to finish any of the courses. You will have a digital certificate for each course. Please submit the certificates (.PDF) to COMPASS site (10 bonus points each) before **4 PM, Dec 7th**. **No late submission will be accepted.**



Certificate sample

How to log in Esri Training:

1. Click on Sign in; 2. Select ENTERPRISE LOGIN; 3. Type univofillinois; 4. Select University of Illinois



Grade Point Distribution:

Attendance	100 Points
Lab assignment *10	40 each, 400 Points Total
Mid-term Exam	200 Points
Final project	300 Points (50 points for proposal, 50 points for the presentation, 200 points for the report)
Total	1000 Points

Grade Scale:

Letter grade	Percentage	Points
A+	97–100%	>970
A	93–96.99%	>930
A–	90–92.99%	>900
B+	87–89.99%	>870
B	83–86.99%	>830
B–	80–82.99%	>800
C+	77–79.99%	>770
C	73–76.99%	>730
C–	70–72.99%	>700
D+	67–69.99%	>670
D	63–66.99%	>630

D-	60–62.99%	>600
F	0–59.99%	<600

Academic Integrity:

We will follow Articles 1-401 through 1-406 of the [Student Code](#). The provisions of the Student Code are applicable to this course. This rule defines infractions of academic integrity, which include but are not limited to cheating, fabrication, and plagiarism. You are responsible for following these guidelines. If you have any questions about whether something would be an infraction, consult with the instructor before proceeding.

Special Accommodations:

We will accommodate students with documented disabilities. Please be familiar with the services and resources provided by Disability Resources and Educational Services (DRES) and visit (<http://disability.illinois.edu/disability-resource-guide>) for more information. Please inform the instructor of any requests at the beginning of the semester.

Feedback Response Time:

I generally reply to email and discussion posts within 48 hours, except during holidays. I often reply much more quickly, but you should not count on a same-day reply. Please plan accordingly so that you don't miss deadlines! I generally return assignments within one week of when a discussion or assignment closes. If you would like to get help on an assignment ahead of the deadline, please email me! I'm happy to give preliminary feedback or answer questions.

Emergency Response Recommendations:

Emergency response recommendations can be found at the following website:

<http://police.illinois.edu/emergency-preparedness/>. I encourage you to review this website and the campus building floor plans website within the first 10 days of class.

<http://police.illinois.edu/emergency-preparedness/building-emergency-action-plans/>.

Family Educational Rights and Privacy Act (FERPA)

Any student who has suppressed their directory information pursuant to Family Educational Rights and Privacy Act (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course. See <https://registrar.illinois.edu/academic-records/ferpa/> for more information on FERPA.

Sexual Misconduct Policy and Reporting

The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University's Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options.

Tips for Succeeding in this Course

1. Get help early on if you are having difficulties. If my office hours don't work for you, we can work something out.
2. Start early when working on assignment. Last minute work will not be considered as valid excuse for late submission.
3. If I give bonus opportunities, take advantage of them.
4. If I give study guides, take advantage of them.
5. If a book is required, get the book and use it.
6. Your goal should not be to pass; shoot for an A.
7. If I give a writing assignment it will have a rubric attached. Use this rubric because this is what I'm looking for.
8. If I give a writing assignment, don't hesitate to get help.
9. Be open-minded. I understand that this class may not be within your subject of interest, but that doesn't mean you can't take an interest. It's easier to learn something you have an interest in.

Reading list

Week 1 25-Jan

- Goodchild, M. F. (2009). Geographic information systems and science: today and tomorrow. *Annals of GIS*, 15(1), 3-9.

Week 2 1-Feb

- GIS Fundamentals. Chapter 1: An introduction to GIS. P1-P20
- Yeh, A. G. O. (1999). Urban planning and GIS. *Geographical information systems*, 2(877-888), 1.
- Logan, J. R. (2012). Making a place for space: Spatial thinking in social science. *Annual review of sociology*, 38, 507-524.
- Storymap: The Cherry Blossoms of Washington, D.C. Click [here](#)

Week 3 8-Feb

- GIS Fundamentals. Chapter 3: Map Projections and Coordinate Systems. P69-P116
- Janssen, V. (2009). Understanding coordinate reference systems, datums and transformations. *International Journal of Geoinformatics*, 5(4), 41-53.

Week 4 15-Feb

- GIS Fundamentals. Chapter 4: Maps Data Entry, Editing and Output. P123-P133
- Story map: The lines that shape our cities. Click [here](#).

Week 5 22-Feb

- GIS Fundamentals. Chapter 4: Maps Data Entry, Editing and Output. P133-P159
- Hillier, A. (2010). Invitation to mapping: how GIS can facilitate new discoveries in urban and planning history. *Journal of Planning History*, 9(2), 122-134.

Week 6 1-Mar

- Schaller, J., & Mattos, C. (2009). GIS model applications for sustainable development and environmental planning at the regional level. In *GeoSpatial Visual Analytics* (pp. 45-57). Springer, Dordrecht.

Week 7 8-Mar

- Ayhan, I., & Cubukcu, K. M. (2010). Explaining historical urban development using the locations of mosques: A GIS/spatial statistics-based approach. *Applied Geography*, 30(2), 229-238.
- Tatem, A. J., Adamo, S., Bharti, N., Burgert, C. R., Castro, M., Dorelien, A., ... & Balk, D. (2012). Mapping populations at risk: improving spatial demographic data for infectious disease modeling and metric derivation. *Population health metrics*, 10(1), 8.

Week 9 22-Mar

- GIS Fundamentals. Chapter 6: Aerial and Satellite Images P211-P253

Week 10 29-Mar

- Zhang, H., Li, Y., Liu, B., & Liu, C. (2014). The Application of GIS 3D Modeling and Analysis Technology in Real Estate Mass Appraisal-Taking landscape and sunlight factors as the example. *The International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences*, 40(4), 363.
- Zhang, W., Li, W., Zhang, C., Hanink, D. M., Li, X., & Wang, W. (2017). Parcel-based urban land use classification in megacity using airborne LiDAR, high resolution orthoimagery, and Google Street View. *Computers, Environment and Urban Systems*, 64, 215-228.

Week 11 5-Apr

- GIS Fundamentals. Chapter 13: Spatial Models and Modeling, P477-P507.
- Nikuze, A., Sliuzas, R., & Flacke, J. (2018). Towards Equitable Urban Residential Resettlement in Kigali, Rwanda. In *GIS in Sustainable Urban Planning and Management*

(Open Access) (pp. 325-344). CRC Press.

- Bunruamkaew, K., & Murayama, Y. (2012). Land use and natural resources planning for sustainable ecotourism using GIS in Surat Thani, Thailand. *Sustainability*, 4(3), 412-429.

Week 12 12-Apr

- GIS Fundamentals. Chapter 9: Basic Spatial Analysis., P362-P370.
- La Rosa, D. (2014). Accessibility to greenspaces: GIS based indicators for sustainable planning in a dense urban context. *Ecological Indicators*, 42, 122-134.

Week 13 19-Apr

- Comber, A., Dickie, J., Jarvis, C., Phillips, M., & Tansey, K. (2015). Locating bioenergy facilities using a modified GIS-based location–allocation-algorithm: Considering the spatial distribution of resource supply. *Applied Energy*, 154, 309-316.

	Week	Lecture	Lab
1	25-Jan	Introduction to GIS	Lab0 preps
2	1-Feb	Digital Cartography	Lab1: Get started with ArcGIS Pro
3	8-Feb	Datums and Projections	Lab2: Basic map design and projections
4	15-Feb	Geo database	Lab3: Getting start with the geodatabase
5	22-Feb	Geospatial Data-vector 1 editing and geocoding	Lab4: Geocoding and Georeferencing
6	1-Mar	Geospatial Data-vector 2 geoprocessing	Lab5: Geoprocessing and things you need before creating a map
7	8-Mar	Spatial analysis- Distance and statistics	Lab6: Tracking and spatial distribution of population
8	15-Mar	Review&Exam	
9	22-Mar	Geospatial Data-raster	Lab7: Explore landscape in suburbs around Pittsburgh
10	29-Mar	Terrain and 3D GIS (Project proposal)	Lab8: Terrain analysis for downtown historic sites in Pittsburgh
11	5-Apr	Spatial analysis-raster MCE	Lab9: Urban Agriculture Suitability
12	12-Apr	Network analyst 1	Lab10: Emergency Response Planning
13	19-Apr	Network analyst 2	Lab11: Solving location-allocation problems: hospital service in the Adirondack Park
14	26-Apr	Review	
15	3-May	Final project presentation	
16	10-May	Project report	