

UP 418 GIS for Planners

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

Online Lectures: Wed 1:00-2:20 pm, click [here](#) to join

In-person labs: Fri 1:00-2:20 pm, 101 901 W Oregon

Office Hours:

Monday 9:00 am – 11:00am in zoom, click [here](#) to join

Thursday 9:00 am – 11:00am in person, TBH 232

TA: Leo Torres Beltran (ltorre37@illinois.edu)

Office hour: Mon 12:30 to 2:30 PM



Course Description:

UP 418: GIS for planners (4 credits): 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 weekly face to face (in-person) 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 Learning Outcomes:

1. Build a solid basis for the critical principles of GIS.
2. Apply GIS knowledge and skills to solve real-world problems in urban planning issues and for policymaking.
3. 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.
4. Master software by using the help documentation and electronic users' manuals to find analysis and mapping functions in any GIS software package.
5. Recognize how geospatial technologies have changed and continue to change our daily lives.

Course Engagement:

- This is a 16-week hybrid mode 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 50 points.

- **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 in person labs: e.g. in-class discussion, in-class exercise, in-class group work, in-class presentation, reading reflections, short essay summary etc. The in-class activities for online lectures will be posted via these platforms but not limited to: 1) shared google documents/sheets (Click [here](#) for an example); 2) Google Jamboard (Click [here](#) for an example); 3) Padlet online (See example below, where students are asked to work on a shared online map to mark their study area for the final project. Click [here](#) for an example). Bonus credits will be allotted for some of the in-class exercise: either essay questions for reading discussions, or mini GIS project, 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.
- On campus instruction under COVID: For in person meetings, in order to implement COVID-19-related guidelines and policies affecting university operations, **students will be asked to show their Building Access Status in the Safer Illinois app or the Boarding Pass**. Student can enter the classroom only with a granted building access status. All students, faculty, staff, and visitors are required to wear face coverings in classrooms and university spaces. This is in accordance with CDC guidance and University policy and expected in this class. Following University policy, all students are required to engage in appropriate behavior to protect the health and safety of the community. Students are also required to follow the campus COVID-19 protocols. Students who feel ill must not come to class. In addition, students who test positive for COVID-19 or have had an exposure that requires testing and/or quarantine must not attend class. The University will provide information to the instructor, in a manner that complies with privacy laws, about students in these latter categories. These students are judged to have excused absences for the class period and should contact the instructor via email about making up the work. Students who fail to abide by these rules will first be asked to comply; if they refuse, they will be required to leave the classroom immediately. If a student is asked to leave the classroom, the non-compliant student will be judged to have an unexcused absence and reported to the Office for Student Conflict Resolution for disciplinary action. Accumulation of non-compliance complaints against a student may result in dismissal from the University.

Required Textbooks:

1. GIS Tutorial 1 for **ArcGIS Pro 2.4**: 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 2.6/7/8 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.

Learning Assessment:

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

The midterm (during the week of Oct 11th) 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.

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 Canvas 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 Sep 3rd will be due Sep 10th at 1 pm. You should submit lab assignment as Word documents on Canvas 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 Canvas. **For any technical issues in Canvas/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 **Oct 20th 11:59 pm**. A final report is required as delivery by **11:59 PM, Dec 8th**.. The details and requirements will be posted later in Canvas.

Weekly reading discussion:

This is an initial content engagement discussion forum. You are invited to think about what you already might know about a new idea, concept, problem or closely related concept about GIS applications in urban planning. You need first finish the readings below and submit at least one initial post and two response posts. Some suggested questions (but not limited to) will be available for you to answer.

You should finish reading the required articles **before each lecture starts on Wed 1 pm** in order to participate in the in-class discussion. Your timely online posts and reading reflections (**due on each Friday before lab starts**) in Canvas are required, which worth 100 points total (10*10). Each reading assignment is worth 10 points: 6 for your initial post and 2 for each response post. Any plagiarism is found in any posts will receive a "0".

Initial Post

Your initial post is your opportunity to engage with the prompt in a way that is unique to you. In composing your response, consider how your individual experiences influence your take on the prompt and the course material or articles covered during this module.

An acceptable initial post must meet the following requirements:

- Include at least 8 sentences, excluding any references.
- You are encouraged to 1) study with other students together 2) check out other articles of publications. However, this should never involve 1) one student having possession of a copy of all or part of posts done by someone else; 2) using or copying and pasting others' published and unpublished sentences or words and presenting them as new and original.

Response Posts

Post at least 2 responses in the same thread. Your replies should stimulate more in-depth discussion about the topic. Some ways to accomplish that include:

- Clarify and/or extend your peers' line of thinking.
- Compare/contrast their views on the topic with your own.
- Suggest/question what explanation(s) you think your peers might be missing that could strengthen their arguments.
- End your response with a question to further the dialogue.

Your response posts should meet the following requirements:

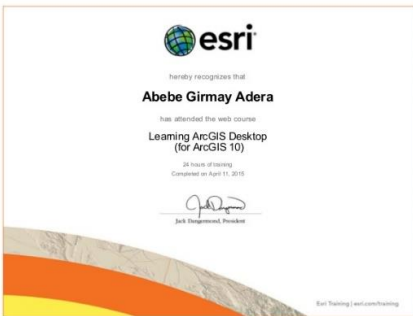
- Include at least 50 words, excluding references.
- Use of appropriate evidence from the readings and lessons to support your claims and judgments.
- Any simply or low-quality replies e.g. "I agree with Andrew" or "The article is very interesting" will NOT be accepted.

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, Oct 8th**. Graduate student must finish the project as an individual project.

Bonus points:

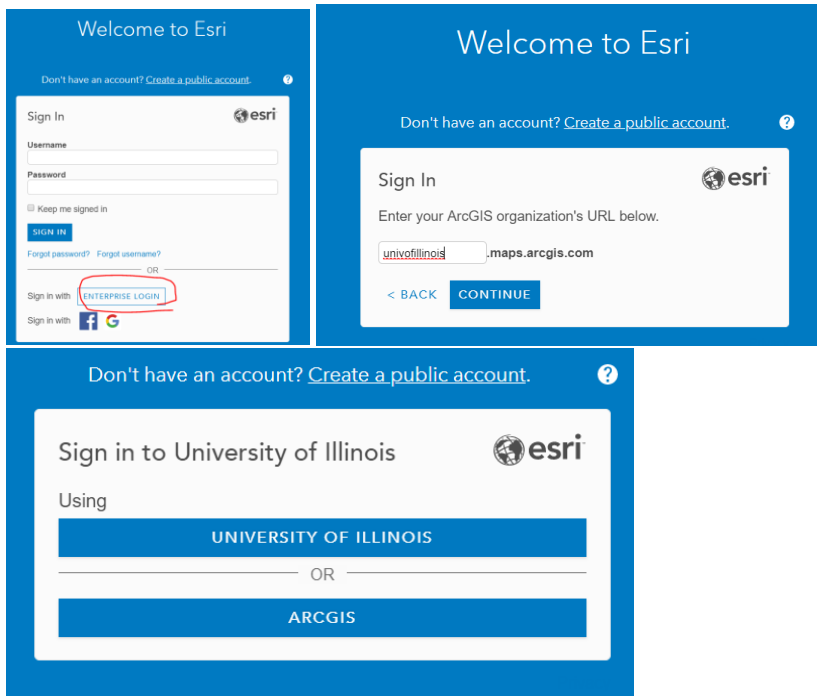
You can earn up to 40 bonus points this semester. Please visit the [ESRI training](#) website to finish any of the courses. You will have a digital certificate for each course. Please submit the certificates (.PDF) to Canvas site (10 bonus points each) before **Dec 8th 1 pm. No late submission will be 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 with participation | 50 Points |
| Reading reflections*10 | 100 Points (10 points each) |
| Lab assignment *10 | 400 Points (40 points each) |
| Mid-term Exam | 200 Points |
| Final project | 250 Points (50 points for proposal, 30 points for the presentation, 20 points for slides, 150 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
- Facilitating infractions of academic integrity
- Plagiarism
- Bribes, favors, and threats
- Academic interference
- Examination by proxy
- Grade tampering
- Non-original works

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.

Run > Hide > Fight

Emergencies can happen anywhere and at any time. It is important that we take a minute to prepare for a situation in which our safety or even our lives could depend on our ability to react quickly. When we're faced with almost any kind of emergency – like severe weather or if someone is trying to hurt you – we have three options: Run, hide or fight.



Run

Leaving the area quickly is the best option if it is safe to do so.

- ▶ Take time now to learn the different ways to leave your building.
- ▶ Leave personal items behind.
- ▶ Assist those who need help, but consider whether doing so puts yourself at risk.
- ▶ Alert authorities of the emergency when it is safe to do so.



Hide

When you can't or don't want to run, take shelter indoors.

- ▶ Take time now to learn different ways to seek shelter in your building.
- ▶ If severe weather is imminent, go to the nearest indoor storm refuge area.
- ▶ If someone is trying to hurt you and you can't evacuate, get to a place where you can't be seen, lock or barricade your area if possible, silence your phone, don't make any noise and don't come out until you receive an Illini-Alert indicating it is safe to do so.



Fight

As a last resort, you may need to fight to increase your chances of survival.

- ▶ Think about what kind of common items are in your area which you can use to defend yourself.
- ▶ Team up with others to fight if the situation allows.
- ▶ Mentally prepare yourself – you may be in a fight for your life.

Please be aware of people with disabilities who may need additional assistance in emergency situations.

Other resources

- ▶ police.illinois.edu/safe for more information on how to prepare for emergencies, including how to run, hide or fight and building floor plans that can show you safe areas.
- ▶ emergency.illinois.edu to sign up for Illini-Alert text messages.
- ▶ **Follow the University of Illinois Police Department** on Twitter and Facebook to get regular updates about campus safety.

Reading list**Week 2 Aug 30**

- 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.
- Kent, R. B., & Klosterman, R. E. (2000). GIS and mapping: Pitfalls for planners. *Journal of the American Planning Association*, 66(2), 189-198.

Week 3 Sep 6

- 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 Sep 13

- GIS Fundamentals. Chapter 4: Maps Data Entry, Editing and Output. P123-P133
- Logan, J. R. (2012). Making a place for space: Spatial thinking in social science. *Annual review of sociology*, 38, 507-524.

Week 5 Sep 20

- 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 Sep 27

- 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.
- Glick, J. (2008). Gentrification and the racialized geography of home equity. *Urban Affairs Review*, 44(2), 280-295.

Week 7 Oct 4

- 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.
- Hertel, K., & Sprague, N. (2007). GIS and census data: tools for library planning. *Library hi tech*.

- 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 Oct 18

- GIS Fundamentals. Chapter 6: Aerial and Satellite Images P211-P253
- Schaller, J. (1992). GIS application in environmental planning and assessment. *Computers, environment and urban systems*, 16(4), 337-353.

Week 10 Oct 25

- 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 Nov 1

- 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 12-13 Nov 8 & Nov 15

- 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.
- 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.
- Ortega, E., Monzón, A., & López, E. (2018). The influence of spatial data allocation procedures on accessibility results: The case of high-speed rail networks. *Applied Geography*, 94, 241-250.

Course schedule

| | Week | Lecture | Lab |
|----|-------------|---|--|
| 1 | 23-Aug | Introduction to GIS | Lab0: Arcgis Preps |
| 2 | 30-Aug | Digital Cartography | Lab1: Get started with ArcGIS Pro |
| 3 | 6-Sep | Datums and map projections | Lab2: Mapping planning districts in Chicago |
| 4 | 13-Sep | GIS data management and Spatial Data Construction | Lab3: Geodatabase and GIS Data management |
| 5 | 20-Sep | Data editing, digitizing and georeferencing | Lab4: Retail Market Analysis and Georeferencing |
| 6 | 27-Sep | Vector data analysis: geoprocessing | Lab5: Propose a commercial development zoning area |
| 7 | 4-Oct | Spatial analysis- Distance and statistics | Lab6: Understand census data |
| 8 | 11-Oct | Review&Exam | |
| 9 | 18-Oct | Geospatial Data-raster | Lab7: Landscape development and historic sites Pittsburgh City |
| 10 | 25-Oct | GIS in environmental planning | Lab8: Urban Terrian analysis by tracts |
| 11 | 1-Nov | Multiple Criteria Evaluation for Planning & Public Policy | Lab9: Urban Agriculture Suitability Analysis |
| 12 | 8-Nov | Measuring Network Distance and Cost | Lab10: Emergency Response Planning |
| 13 | 15-Nov | Network analysis 2 | Lab11: Hospital service in the Adirondack Park |
| 14 | 22-Nov | Fall Break | |
| 15 | 29-Nov | Final project presentation | |
| 16 | 6-Dec | Project report | |