

UP 418 GIS for Planners

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

Lectures: Mon 03:30PM - 04:50PM 225 Temple Hoyne Buell Hall

Labs: Wed 03:30PM - 04:50PM 70B Wohlers Hall

Office Hours:

Wed 10:00 am – 12:00 pm TBH 232, or by appointment

TA: Shiva Sheikhsarshi (shivas4@illinois.edu) Office hour: Mon 9-11am, TBH 224 or by appointment

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 lectures will guide students through a comprehensive overview of the concepts and principles used in GIS. The weekly 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 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 in person.
- **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. 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.

Recommended 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 3.1 on their personal computers for free through the University's Webstore: webstore.illinois.edu.

Option 2: Students can get access to ArcGIS Pro in room 227 in TBH or ACES lab.

Option 3: UIUC Anyware: Click [here](#) for more info.

Learning Assessment:

Grading for this class will consist of one midterm exam, attendance, 11 labs, and a final project. The midterm (during the week of Oct 9th) 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 3:30 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 13 11:59 pm**. A final report is required as delivery by **11:59 PM, Dec 6th**. 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 Mon 3:30 pm** in order to participate in the in-class discussion. Your timely online posts and reading reflections (**due on each Wed 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:

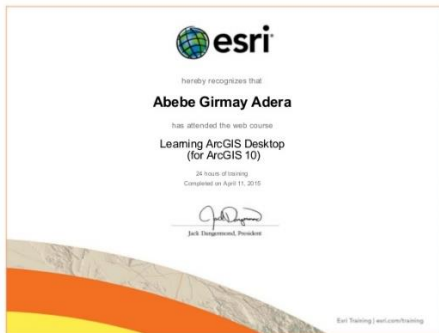
- Include at least 50 words, excluding references.
- Use of appropriate evidence from the readings and lessons to support your claims and judgments.
- Any simply or low-quality replies e.g. “I agree with Andrew” or “The article is very interesting” will NOT be accepted.

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 1st**. Graduate student must finish the project as an individual project.

Bonus points:

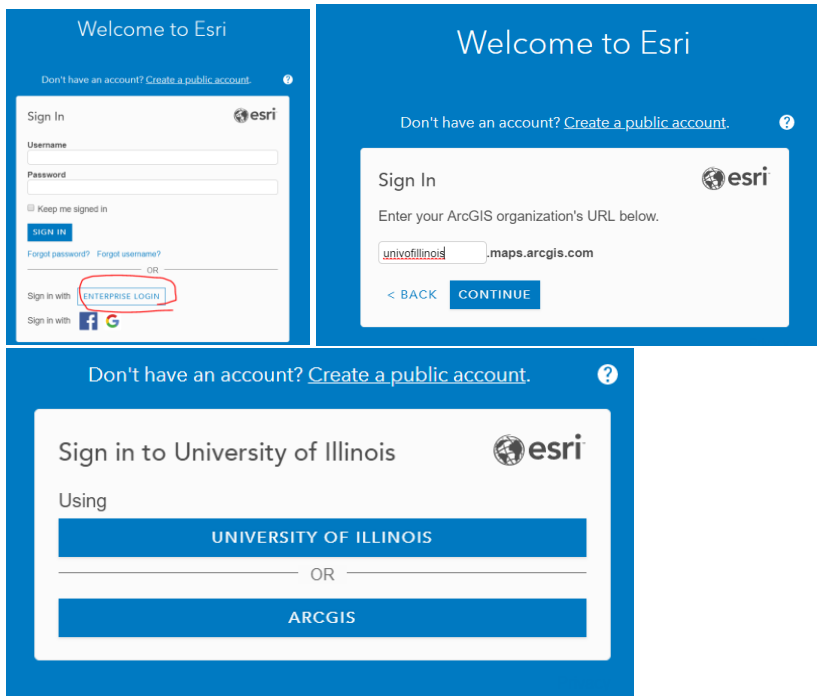
You can earn up to 40 bonus points this semester. Please visit the [ESRI training](#) website to finish any of the courses. You will have a digital certificate for each course. Please submit the certificates (.PDF) to CANVAS site (10 bonus points each) before **11:59 PM, Dec 6th**. **No late submission 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.

Reading list**Week 2 Aug 28**

- 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 4

- 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 11

- 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 18

- 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 25

- 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 2

- 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 16

- 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 23

- 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 Oct 30

- 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 6 & Nov 13

- 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	21-Aug	Introduction to GIS	Lab0: Arcgis Preps
2	28-Aug	Digital Cartography	Lab1: Get started with ArcGIS Pro
3	4-Sep	Datums and map projections	Lab2: Mapping planning districts in Chicago
4	11-Sep	GIS data management and Spatial Data Construction	Lab3: Geodatabase and GIS Data management
5	18-Sep	Data editing, digitizing and georeferencing	Lab4: Retail Market Analysis and Georeferencing
6	25-Sep	Vector data analysis: geoprocessing	Lab5: Propose a commercial development zoning area
7	2-Oct	Spatial analysis- Distance and statistics	Lab6: Understand census data
8	9-Oct	Review&Exam	
9	16-Oct	Geospatial Data-raster	Lab7: Landscape development and historic sites Pittsburgh City
10	23-Oct	GIS in environmental planning (Project proposal)	Lab8: Urban Terrian analysis by tracts
11	30-Oct	Multiple Criteria Evaluation for Planning & Public Policy	Lab9: Urban Agriculture Suitability Analysis
12	6-Nov	Measuring Network Distance and Cost	Lab10: Emergency Response Planning
13	13-Nov	Network analysis 2	Lab11: Hospital service in the Adirondack Park
14	20-Nov	Fall Break	
15	27-Nov	Final project presentation	
16	4-Dec	Project report	