Course Syllabus

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USP 436/536: GIS for Planners

Nohad A. Toulan School of Urban Studies & Planning

Portland State University

Winter 2026

Hours: Tuesdays and Thursdays from 3:30 pm to 5:10 pm.

Location: This class meets in person at Fariborz Maseeh Hall, B152 (in the basement).

Instructor: Yu Xiao, Ph.D., AICP., Associate Professor Email: yxiao@pdx.edu (mailto:yxiao@pdx.edu)

Office Hours: by appointment

Teaching Assistant: Gabriel Quiñones - Zambrana Email: ggq@pdx.edu

Office Hours: 2:00–3:00 PM on Tuesdays and Thursdays

Before Monday January 19, available via Zoom.

After Monday January 19, available in URBN 350D or via Zoom

Credits: 4 credit hours

Course Website: This class uses Canvas (canvas.pdx.edu) in support of learning. You can log in with your Odin username and password.

Class Description and Objectives

USP 536 is a required core course for graduate students in the Master of Urban and Regional Planning (MURP) program, while USP 436 is one of the core skill courses for BA/BS in Community, Urban Studies, and Planning. The course is designed for both undergraduate and graduate students interested

in urban issues who want to learn the theoretical foundations of spatial thinking and the practical applications of GIS software commonly used in the field.

The course is designed for students interested in the theoretical foundations and practical applications of spatial analysis. The course will provide the framework for meeting several learning objectives through in-class discussions, 'take-home' exercises, and participant presentations. You are expected to develop critical thinking skills to evaluate spatial analytical methods and representations of spatial data. As future planners, critically examining spatial data will be important for addressing challenges in urban and regional planning. Other skills you will develop in this course include:

1. Understand basic GIS core concepts, theories, components, and its applications in urban studies and planning, including developing spatial reasoning, thinking, and data analysis techniques.

2. Use GIS software to create and manage data, perform spatial analysis, and communicate spatial analysis processes and results effectively through writing, mapping, and relevant descriptive statistics.

3. Develop spatial and quantitative analysis skills to effectively study issues in urban studies and planning; develop problem-solving and communication skills to address these issues within your field of study.

4. Through individual or group final projects, go through the process of crafting and implementing a plan to use spatial data and analysis and answer a specific research problem in your field of study, and effectively present the results in written, graphical, and verbal formats.

5. Develop peer-learning and interpersonal communication skills in a group learning environment.

6. Gain awareness of data quality, availability, and suitability for the planning problem at hand, as well as the limitations and social implications of using GIS. **(Graduate students only)** Critically analyze maps considering map-makers' positionality.

7. **(Graduate students only)** Provide students with real-world data, critical thinking skills, and the ability to visualize and advocate for a more sustainable future through GIS applications in climate change adaptation, sustainable urbanism, or green infrastructure planning.

MURP Student Learning Outcomes: This course aims to equip students with a foundational understanding of Geographic Information Systems (GIS) and their applications. The specific learning outcomes include the following:

SLO 8. MURP students will collect and analyze information relevant to plan making. Students will collect data and information relevant to planning problems through appropriate primary and secondary sources, and utilize quantitative and qualitative analysis techniques to translate data and information into planning knowledge. This includes the utilization of spatial information and analysis (i.e., GIS), design analysis techniques, and equity impact analyses.

SLO 9. MURP students will communicate plans and planning knowledge effectively and persuasively.
Students will write memos and reports, make oral presentations, and display information at a professional-quality level. This involves taking complex and often technical material and rendering it understandable and persuasive in a manner appropriate to diverse audiences.

SLO 10. MURP students will work effectively in collaborative and team-based contexts.
Students will establish practices for organizing and completing planning tasks and fostering collective decision-making in a collaborative and professional manner. This includes the ability to negotiate and mediate conflict and demonstrate leadership.

Text Books

Required textbook for lab sessions:

Wilpen L. Gorr, Kristen S. Kurland, *GIS Tutorial for ArcGIS Pro 3.1*. Available from: VitalSource Bookshelf. Esri Press, 2023.

Additional Textbook (open access): Yiping Fang, Vivek Shandas, and Eugenio Arriaga. ***Spatial Thinking in Planning Practice: An Introduction to GIS*** **(http://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1004&context=pdxopen)** . **http://pdxscholar.library.pdx.edu/pdxopen/4/ (http://pdxscholar.library.pdx.edu/pdxopen/4/)**

Other reading materials will be provided by the instructor on the Canvas course website.

Computer/Software Access

Signing In ArcGIS Pro

If you already have a PSU ArcGIS Online account and a valid ArcGIS Pro license through the PSU AGO, then follow the steps below to sign in to ArcGIS Pro. If you don't have a PSU ArcGIS Online account or a valid ArcGIS Pro license, then see the "Activating an ArcGIS Pro License" section below.

1. Start ArcGIS Pro.
2. Click on "Your ArcGIS organization's URL" link on the logon dialog window.
3. Enter "**pdxedu**" as the prefix to the ArcGIS organization's URL. Click "CONTINUE."
4. Click on "PORTLAND STATE" button and log on with your PSU ODIN account credential.

Activating an ArcGIS Pro License

ArcGIS Pro is currently authenticated through PSU ArcGIS Online Portal. Users need to logon to PSU ArcGIS Online to activate their ArcGIS Account. See **the ArcGIS Online page (https://sites.google.com/pdx.edu/gis-software/arcgis-online)** for information about using the PSU ArcGIS Online Portal.

PSU ArcGIS Online account activated after July 1, 2019 will have access to ESRI E-Learning and an ArcGIS Pro license assigned to the account automatically. There is no need to submit further requests. If your PSU ArcGIS Online account was activated before July 1, 2019 and that you have verified that you don't have an ArcGIS Pro license attached to your PSU ArcGIS Online account, then, after your AGO account is activated, please send your PSU ArcGIS Account ID (i.e., odin ID with _pdxedu suffix) to Geoffrey Duh (jduh@pdx.edu) to request an ArcGIS Pro license.

Access ArcGIS Pro via Virtual Computer Lab (VLAB): Please follow the directions to access VLAB: **VLAB Overview. (https://portlandstate.atlassian.net/servicedesk/customer/portal/1014/article/3119611969)**

Install ArcGIS Pro on your own computer (for Windows Operating System Only): You can download ArcGIS Pro installation programs **here. (https://drive.google.com/drive/folders/1sTTxVTUpS8Z_zoJAWjBO5RHPyudRFuoG?usp=sharing)** You need to log on to your PSU ODIN account to access the Google share folder. Go to ArcGISPro -->Version 3.3.x (current PSU version) --> ArcGISPro_33_190016.exe. Download the file and install it.

Additional GIS Resources for PSU Students: GIS Software (google.com) (https://sites.google.com/pdx.edu/gis-software/)

COURSE WORK

In general, the course will take the form of lectures plus lab sessions. Lectures will be on Tuesdays, and Thursdays will provide lab-time for hands-on use of software. There are a series of activities that are expected to be completed in this course including assigned readings, lectures, lab exercises & assignments, a midterm exam, and a final project. The following is a general introduction of each activity.

Class Participation: Lectures on each Tuesday provide an opportunity for students to learn about the theoretical foundations, historical developments, and applications of geographic analysis to community development. It encourages a collaborative learning environment among the group.

Labs: Lab tutorials and assignments enable students to work directly with the software and address 'real-world' problems. Each student will follow the book *GIS Tutorial for ArcGIS Pro 3.1*. in the lab sessions. You need to go through the tutorial in the workbook to finish the assignments. While you might have an opportunity to work on assignments during the lab sessions, in most cases you will be expected to complete the assignments using outside-class hours. The submission of the assignments are due on the Canvas website.

Data for the labs are stored at:
https://drive.google.com/drive/folders/1AILWUUUJo0wTIN0AfOMopBdDWwzguvov (https://drive.google.com/drive/folders/1AILWUUUJo0wTIN0AfOMopBdDWwzguvov). Please download the data to your local drive to complete the tutorials.

From a PSU computer or via VPN, you can also download the data from:
I:\Students\Data\GIS\ArcTutor\GIS_Tutorial_for_ArcGIS_Pro_3_X\ArcGIS Pro 3.1

You can also download the data directly from ESRI: **https://links.esri.com/GISTforPro3.1Data (https://links.esri.com/GISTforPro3.1Data)**

Midterm Exam: One online exam will be conducted through the Canvas website. The midterm exam will test the major concepts you've learned in class, and also require that you apply what you've learned in the assignments. If you've come to class, paid attention, and done well on all the assignments you will have little trouble with the exam. The exam is designed to ensure that you are on track with the basic principles of GIS so that you will be prepared to complete the project and can stay on schedule for the remainder of the class.

Final Project: You will work either individually or in teams to solve problems with the knowledge and skills you acquired in this class. The details of this project will be given in the sixth week.

Grading

This class is cumulative skill learning, assuming that the effort you put into completing all the assignments and exercises will be helpful in passing the midterm exam and completing the final project.

Grading Rubric

	USP 436 Undergraduate students	USP 536 Graduate students
Lab Assignments	60%	50%
Midterm	20%	20%
Final Project	20%	30%
Total	100%	100%

Course grades will be assigned on a criterion-reference scale as follows:

A: 93-100% A-: 90-92%
B+: 87-89% B: 83-86% B-: 80-83%
C+: 77-79% C: 73-76% C-: 70-72%
D+: 67-69% D: 63-66% D-: 60-62%
F: <60%

In case that a grade is on the borderline, classroom participation will be used to determine the final grade.

COURSE POLICIES

Attendance

Students are expected to attend every class. To be excused the student must notify the instructor in writing (acknowledged e-mail message is acceptable) prior to the date of absence if such notification is feasible. In cases where advance notification is not feasible (e.g. accident, or emergency) the student must provide notification by the end of the second working day after the absence. This notification should include an explanation of why notice could not be sent prior to the class. Students must provide additional documentation substantiating the reason for the absence that is satisfactory to the instructor, within one week of the last date of the absence. The instructor will either provide the student an opportunity to make up any graded activities or provide a satisfactory alternative to be completed within 30 calendar days from the last day of the absence.

Classroom participation

Students are encouraged to come to class prepared, make thoughtful contributions to class discussions, respect others' views, and help each other out in collaborative learning groups.

Assignment guidelines

Students are encouraged to have study groups and help each other with the assignment. However, the work submitted must be individual work. Plagiarism will be prosecuted.

Late Submission Policy

In fairness to all students, especially those who work hard to meet deadlines, late assignments will be penalized 5% per day. Assignments more than 7 days late will not be accepted.

Academic Integrity Statement

PSU's Student Code of conduct prohibits "All forms of academic dishonesty, cheating, and fraud, including but not limited to: (a) plagiarism, which includes, but is not limited to, word for word copying, using borrowed words or phrases from original text into new patterns without attribution, or paraphrasing another writer's ideas; (b) The buying and selling of all or any portion of course assignments and research papers; (c) Performing academic assignments (including tests and examinations) for other persons; (d) Unauthorized disclosure and receipt of academic information; and (e) Falsification of research data."

Access and Inclusion for Students with Disabilities

PSU values diversity and inclusion; My goal is to create a learning environment that is accessible, equitable, inclusive, and welcoming. I am committed to fostering mutual respect and full participation for all students. If any aspects of instruction or course design result in barriers to your inclusion or learning, please notify me. Additionally, the Disability Resource Center (DRC) provides reasonable accommodations for students who encounter barriers in the learning environment. The DRC works with students who have physical, learning, cognitive, mental health, sensory, and other disabilities.

If you have, or think you may have, a disability that may affect your work in this class and feel you need accommodations, contact the Disability Resource Center to schedule an appointment and initiate a conversation about reasonable accommodations.

If you already have accommodations, please contact me to make sure that I have received your faculty notification letter from the DRC so we can discuss your accommodations.

The DRC is located in 116 Smith Memorial Student Union, Suite 116. You can also contact the DRC at 503-725-4150 or, **drc@pdx.edu (mailto:drc@pdx.edu)** . Visit the DRC online at **https://www.pdx.edu/disability-resource-center (https://www.pdx.edu/disability-resource-center)** .

Title IX Reporting Obligations

Portland State is committed to providing an environment free of all forms of prohibited discrimination and sexual harassment (sexual assault, domestic and dating violence, and gender or sex-based harassment and stalking). If you have experienced any form of gender or sex-based discrimination or sexual harassment, know that help and support are available. Information about PSU's support services on campus, including confidential services and reporting options, can be found on PSU's Sexual Misconduct Prevention and Response website at: http://**www.pdx.edu/sexual-assault/get-help (http://www.pdx.edu/sexual-assault/get-help)** or you may call a confidential IPV Advocate at 503-725-5672 or schedule Online at **https://psuwrc.youcanbook.me (https://psuwrc.youcanbook.me/)** . You may report any incident of discrimination or discriminatory harassment, including sexual harassment, to:

- PSU's Title IX Coordinator: Julie Caron by calling 503-725-4410, via email at titleixcoordinator@pdx.edu or in person at Richard and Maureen Neuberger Center (RMNC), 1600 SW 4th Ave, Suite 830
- Deputy Title IX Coordinator: Yesenia Gutierrez by calling 503-725-4413, via email at yesenia.gutierrez.gdi@pdx.edu or in person at RMNC, 1600 SW 4th Ave, Suite 830

Please be aware that all PSU faculty members and instructors are required to report information of an incident that may constitute prohibited discrimination, including sexual harassment and sexual violence. This means that if you tell me about a situation of sexual harassment or sexual violence that may have violated university policy or student code of conduct, I have to share the information with my supervisor,

the University's Title IX Coordinator or the Office of the Dean of Student Life. However, the Title IX Coordinators will keep the information confidential and refer you to a confidential advocate.

Submitting work online

For assignments that require uploading files to Canvas, it is the student's responsibility to verify that (1) all files are submitted in Canvas prior to the deadline and (2) all submitted files are those that the student intends to be graded for the assignment. Submitting the "wrong" file by accident is not acceptable grounds for a deadline extension. Assignment grades will be based on the file submitted prior to the posted deadline. Files submitted in a format that cannot be accessed by the instructor cannot be graded and will therefore receive a 0. Acceptable file formats are MS Office formats (e.g. Word, Excel, PowerPoint) or PDF files. Individual assignment instructions may contain a required file format.

Technology access

Proficiency in the use of Canvas, PSU email, and other computer tools such as Zoom or part of google suite is required for this course. This course requires consistent access to functioning computer equipment and Internet access throughout the length of the course. Reliance on a cellular connection may not provide reliable and fast access to online learning resources.

CALENDER AND READINGS

Week	Tuesdays (Lecture)	Readings	Thursdays (Labs)	Assignm Due at 3 before TI Lab
1	**(1/6) GIS in Community Development**	**The unlikely history of the origins of modern maps (https://www.smithsonianmag.com/history/unlikely-history-origins-modern-maps-180951617)**	**(1/8) Chapter 1 Introducing GIS** Assignment 1-1	
2	**(1/13) Map Design I**	**Chapter 1: Defining a Geographic Information System (https://content.library.pdx.edu/files/PDXScholar/spatial-thinking/4/)**	**(1/15) Chapter 2 Map Design**	Assignm 1-1 due

3	**(1/20) Map Design II**		**(1/22) Chapter 3 Map for end users** Assignment 3-1	
4	**(1/27) Types of GIS Data, Topology**	**Chapter 3: Topology and Creating Data (https://content.library.pdx.edu/files/PDXScholar/spatial-thinking/4/)**	**(1/29) Chapter 4 File Geodatabase** Assignment 4-2	Assignm 3-1 due
5	**(2/3) Map Projection, Census Data**	**Chapter 2: Coordinate Systems and Projecting GIS Data (https://content.library.pdx.edu/files/PDXScholar/spatial-thinking/4/)** and **Chapter 4: Mapping People With Census Data (https://content.library.pdx.edu/files/PDXScholar/spatial-thinking/4/)**	**(2/5) Chapter 5 spatial data** Assignment 5-1	Assignm 4-2 due
6	**(2/10) Geoprocessing** **Discuss final project**		**(2/12) Chapter 6 Geoprocessing** Assignment 6-1 (for undergrads) Assignment 6-2 (for grads)	Assignm 5-1 due
7	**(2/17) Data Collection and Geocoding** **Midterm Exam [on Canvas]**		**(2/19) Chapter 7 Digitizing and Chapter 8 Geocoding** Assignment 8-2	Assignm 6-1 (undergr or 6-2 (grads) c

8	**(2/24) Spatial Analysis** Final project work plan due		**(2/26) Chapter 9 Spatial Analysis** Assignment 9-1	Assignm 8-2 due
9	**(3/3) Advanced GIS Analysis**		**(3/5) Work on Final Project**	**Assignr 9-1 due**
10	**(3/10) Other Issues in GIS**		**(3/12) Work on Project**	
11	**(3/17) Project Presentation** USP 536: Final project presentation slides due on 3/17 USP 436: Final project report due on 3/18			USP 536 Final pro report du Friday, 3

Course Summary:

Date	Details	Due

Date	Details	Due
Thu Jan 15, 2026	Assignment 1-1: Analyze housing statistics by US counties (https://canvas.pdx.edu/courses/111632/assignments/1140325)	due by 3pm
Thu Jan 29, 2026	Assignment 3-1: A healthy transportation to work layout (https://canvas.pdx.edu/courses/111632/assignments/1140326)	due by 3pm
Thu Feb 5, 2026	Assignment 4-2: Prepare data for comparing serious violent crime with poverty in Pittsburgh (https://canvas.pdx.edu/courses/111632/assignments/1140327)	due by 3pm
Thu Feb 12, 2026	Assignment 5-1 Compare heating fuel types by US counties. (https://canvas.pdx.edu/courses/111632/assignments/1140328)	due by 3pm
Tue Feb 17, 2026	Assignment 6-1 and 6-2 (https://canvas.pdx.edu/courses/111632/assignments/1140329)	due by 3pm
Sun Feb 22, 2026	Midterm Exam (20 multiple choice and true/false questions plus a bonus question) Once you start this exam, you have one hour to complete it. (https://canvas.pdx.edu/courses/111632/assignments/1140336)	due by 11:59pm
Thu Feb 26, 2026	Assignment 8-2: Geocode condemned buildings by street address (https://canvas.pdx.edu/courses/111632/assignments/1140330)	due by 3pm
Thu Mar 5, 2026	Assignment 9-1: Analyze geographic access to Federally Qualified Health Centers and shelters (https://canvas.pdx.edu/courses/111632/assignments/1140331)	due by 3pm
Wed Mar 18, 2026	USP 436 Class Project (https://canvas.pdx.edu/courses/111632/assignments/1157497)	due by 11:59pm
	USP 536 Class Project Description (https://canvas.pdx.edu/courses/111632/assignments/1157499)	

Date	Details	Due
	USP 536 Class Project Preference (https://canvas.pdx.edu/courses/111632/assignments/1157515)	