Course Syllabus

URBAN 574/IPM 504 - *Applied Geospatial Analysis*

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Course Description

Over the last two+ decades geographic information systems (GIS) have emerged as powerful tools to perform complex spatial data analysis. These systems are widely used in hazard analysis, emergency management, infrastructure management, and for climate change applications. In this course, students gain theoretical and practical skills needed to use GIS for analyzing spatial phenomena on the urban and regional scale. You will learn to define and answer advanced spatial questions and resolve complex spatial analytical problems. Knowledge gained from this course will allow you to make well-informed decisions as a strategic planner while utilizing geospatial tools.

Course Introduction

Welcome to IPM 504. Applied Geospatial Analysis is designed to teach you GIS analysis with an emphasis on how GIS is used and applied to infrastructure planning and management. GIS is an important tool to both analyze complex spatial relationships and visually display geospatial information. This course is intended to teach you how to conduct spatial analysis as well as present the results of your analysis to help answer questions to critical problems.

Learning Objectives

By the end of the course, you will be able to

- Apply geospatial tools to various infrastructure management topics
- Locate and utilize geospatial datasets from various sources
- Perform GIS analytical tasks such as spatial and attribute queries, geoprocessing tools, table summaries, etc. using ArcGIS products
- Produce maps, tables and data to clearly display spatial relationships and patterns
- Explain how GIS is used to address issues in specific disciplines dealing with climate change, risk assessment, and emergency management
- Develop and execute methods to answer complex spatial problems

About the Course

The course has four main components:

- weekly GIS lessons and exercises
- Weekly readings and videos
- participation in course discussion forums; and
- Final GIS project

There are no prerequisites for this course.

A book is not required for the course. All materials will be provided in Canvas.

You are required to use ArcGIS Pro software for this course. ArcGIS Pro will only work on a Windows machine. Instructions have been provided to download the required software via e-mail and in Canvas. To view the computer requirements for the software please go here: https://pro.arcgis.com/en/proapp/get-started/arcgis-pro-system-requirements.htm In addition to using a Windows machine for the course I strongly recommend having a separate monitor in addition to your laptop screen and use a mouse (outside of the mouse pad on the laptop).

GIS exercises /quizzes

The first GIS exercise requires you to take three online courses through ESRI to give you some basic background/skills in GIS. Additional GIS exercises have been developed for you which focus on various topics such as emergency management, planning, social equity, and various other topics. Each week you will perform an exercise using ArcGIS Pro. The exercises will start out with step-by-step instructions but will then have less step-by-step instructions and focus more on tasks as you move through the course. The exercises will include questions which you will need to write down. The answers to the exercise questions will be captured in the quiz. The quiz will include the same questions from your exercise as well as questions from your readings. You will be required to create maps or upload data to an online map viewer for three of your exercises which count for additional points.

Readings/Videos

Required weekly readings will focus on how GIS is used in specific disciplines within Infrastructure Planning and Management; these readings will be available on the course web site as PDFs or web links. The intent of the readings is to provide you with exposure to real-world applications that use GIS. The readings will help provide important context to the skills you will be learning each week and will also provide methodological and analytical insight into infrastructure related research and applications.

Videos will also be required to view which will highlight various GIS tools and analytical capabilities with an emphasis on infrastructure management, urban planning, and emergency management.

Discussions

You are required to participate in four discussion forums in the course. For the discussions I will post specific questions about the readings/exercises/videos to help as starting points, but the discussions are open-ended, as long as they are related to the discussion topic. A response to someone else's post is perfectly fine- the point is to generate some on-line discussion about the subject matter.

In addition to the discussion topics there is a general discussion board. Please use this to post questions about the course and any technical issues you might be having. If you have questions that you don't want to discuss with the entire class, you may e-mail your instructor and TA directly, using the e-mail address shown in the instructor/TA profile. Discussion threads have also been created each week to address any questions regarding the weekly exercise. Students are encouraged to share lessons learned regarding the exercises. This discussion board will also be monitored by the instructor/TA.

Your instructor reserves the right to post your direct questions—anonymously—on the discussion board if the questions seem important or representative enough that the entire class would benefit from them.

Final GIS Project

The final GIS project will allow you to create your own GIS project focusing on your area of interest and will utilize the skills you have learned in the class. The final project is an opportunity for you to complete a project using GIS and various analytical techniques to inform a problem relating to infrastructure management, urban planning, emergency management or other topics.

Please submit a proposal detailing your research topic, the questions your analysis will attempt to answer, and your data sources by the end of week 5. The proposal should include a description of how you will use GIS and what data sources you will need to complete the analysis. The aim of the research project is to reinforce course content and challenge you to design and execute an analytical strategy, just as you might in your professional life. The project proposal and the final project will be shared as a storymap in ArcGIS Online.

The final project is due by the end of the quarter and can be turned in early. You will be creating an interactive storymap for the final project which will include the following:

- Overview of the problem/issue
- research question
- the methodology of your analysis, including data sources
- findings, including maps and figures to support findings; and
- discussion of findings, including any recommendation or policy implications

The research project will account for more than 30% of your grade, so I encourage you to start on the project early and work on it throughout the quarter.

Course Organization/Grading

This course is organized into 9 lessons. All include GIS tutorials and exercises/quizzes. Each week we will also have readings/videos focusing on applying GIS to various disciplines. Discussions will focus on taking what has been learned in the exercises/readings/videos and applying that knowledge to various topics.

There are three types of assignments in this course:

- GIS Exercises/Quizzes (Each week you will have a quiz based on your exercise. For some exercises you will need to provide your maps for grading).
- Postings to the four discussion forums in the course
- Final GIS Project

Your grade will total 1,000 points as shown below.

Table 1. —Assignments and Percentage of Grade

	Quiz & Map	**Discussion**	**Final**
Week 1	50	30	
Week 2	50	30	
Week 3	80		
Week 4	70	30	
Week 5	80		
Week 6	80		

Week 7	50			
Week 8	50	30		
Week 9	50			
Total	**560**	**120**	**320**	**=1000**

You will also have the opportunity to receive up to 100 extra credit points throughout the course.

You can calculate your final score by dividing your total score by 1,000. The percentages shown in your grades in Canvas are generally not correct, so it is encouraged you calculate the grade manually. The following GPA scale is used for the course:

Percentage	**Numeric**	**Percentage**	**Numeric**
95-100%	**4.0**	77%	2.2
94%	**3.9**	76%	2.1
93%	**3.8**	75%	2.0
92%	**3.7**	74%	1.9
91%	**3.6**	73%	1.8
90%	**3.5**	72%	1.7
89%	**3.4**	71%	1.6
88%	**3.3**	70%	1.5
87%	**3.2**	69%	1.4

86%	**3.1**	68%	1.3
85%	**3.0**	67%	1.2
84%	**2.9**	66%	1.1
83%	**2.8**	65%	1.0
82%	**2.7**	64%	0.9
81%	2.6	63%	0.8
80%	2.5	62%	0.7
79%	2.4	61%	0.6
78%	2.3	60%	0.5

The graduate school considers passing to be 2.7 and above. You are required to monitor your grades throughout the course to ensure you are meeting the minimum 2.7 GPA requirement. If your final grade is below a 2.7 GPA you will not pass the course since the course is required for your degree.

Late Assignments and Incompletes

It is expected that all assignments will be submitted on time. If you are going to be late on an assignment, please let your Instructor/TA know before the assignment is due. If approval is given to submit an assignment late, then you will not be deducted points if turned in within a reasonable amount of time determined by the instructor/TA. If late assignments are turned in without prior approval, then 10%/day from the total points for that assignment will be deducted. If the assignment is turned in more than 1 week late you will not receive any points for that assignment unless prior approval is given.

If you feel you may need additional time to complete the course work before the quarter is complete you can coordinate with your instructor at least two weeks before the end of the quarter to ask for an incomplete. If an incomplete is granted the instructor will work with the student to develop a schedule and plan to finish the course work.

If you are struggling in the course or feel you might need additional time, please let your instructor/TA know early on so we can provide you with additional support. Do not wait to ask for assistance or if

you feel you might be late with any assignments. Your instructor/TA are here to help you succeed in the course and are here as a resource for you.

Course Schedule

All weekly materials are due Monday night by midnight. You can work ahead in the course, but grading will not be completed until after the due date. Grading will be completed within 1 week of the due date.

Week 1 – ArcGIS Pro Introduction Courses - due Jan. 13th
Week 2 - GIS Data and Analysis - due Jan. 20th
Week 3 - GIS for Planning - due Jan. 27th
Week 4 – ArcGIS Online - due Feb. 3rd
Week 5 - GIS for Emergency Management/Network Analyst - due Feb. 10th
Week 6 – Introduction to Hazus - due Feb. 17th
Week 7 – GIS for Floodplain management - due Feb. 24th
Week 8 – Introduction to Remote sensing and LiDAR - due Mar 3rd
Week 9 - Other Mapping Tools - due Mar. 10th
Week 10 - Final Project - due Mar. 21st

ChatGPT Guidance

ChatGPT or any other language model can be helpful when doing GIS and learning the software. You are encouraged to use ChatGPT to help determine appropriate steps you should take for various GIS processes. For example, you could ask ChatGPT “how do I create a buffer in ArcGIS Pro 3.1”. ChatGPT will then walk you through the tools/steps on how to do this. You will then follow those instructions in the software. Please note that ChatGPT is a few years out of date, so the instructions might vary slightly due to the version used. Most of the exercises have step by step instructions, but ChatGPT could be helpful if you need additional guidance. You most likely would want to utilize ChatGPT for your final project to help determine the types of analysis you should do. ChatGPT should not be used to create maps or written material for your assignments. The tool should only be used to guide you on how to run various types of analysis. For more information regarding using ChatGPT in Academia please refer to **What it is, what it isn’t and what you need to know** .

Religious Accommodation

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW’s policy, including more information about how to request an accommodation, is available at **Religious Accommodations Policy (https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/)** .

Accommodations must be requested within the first two weeks of this course using the **Religious AccommodationsRequestform (https://registrar.washington.edu/students/religiousaccommodations-request/)** ."

Access and Accommodations

Your experience in this class is important to us, and it is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. The **Disability Services Office** (DSO) provides accommodation, referral information, and assistance for students with a documented physical, mental, or sensory disability.

If you have already established accommodations with DSO, please communicate your approved accommodations to your instructor at your earliest convenience so we can discuss your needs in this course. If you have not yet established services through DSO, but have a temporary or permanent disability that requires accommodations (this can include but not limited to; mental health, attentionrelated, learning, vision, hearing, physical or health impacts), you are welcome to contact DSO at 206-543-6450 or **dso@uw.edu** or via their **Contacts page**.

Student Conduct Code

The University of Washington's **Student Conduct Code** applies to all students. Students are expected to maintain the highest standards of **academic responsibility**. Plagiarism and other kinds of academic misconduct are considered serious offenses at the UW. Plagiarism is using someone else's words or ideas without proper citation. It can range from failure to credit a single sentence or paragraph to passing off an entire article, speech or another student's paper as one's own.

You may also download the entire syllabus here: **IPM504_CourseSyllabus_2025.pdf**