Public Policy Analytics MUSA 508 / CPLN 592

Lecture – Fridays, 9am–10.30am; Zoom
Lab - 11am–12.30pm – Zoom

Instructors:

Name	Email	Office Hours
Ken Steif, Ph.D	ksteif@upenn.edu	Wed. 2-5pm, Calend.ly
Michael Fichman	mfichman@upenn.edu	TBD
Matt Harris	matthew.harris@micadatalabs.com	Wed. 9pm, Calend.ly
TA: Tyler Bradford	tybradf@upenn.edu	Wed. 9am , Calend.ly

Course Resources:
Piazza page - https://piazza.com/class/kdae6bghn3qk6
Course text - https://urbanspatial.github.io/PublicPolicyAnalytics/ pw: kens_book

Course Description: This course teaches advanced spatial analysis and an introduction to data science/machine learning in the urban planning and public policy realm. The class focuses on real-world spatial analysis applications and, in combination with introductory statistics, provides students a framework for understanding how to efficiently allocate limited resources across space.

The format of the class includes weekly lectures/in-class demos and labs. There are six required assignments, including two projects. Prerequisites include either CPLN503, the summer GIS course or prior experience with GIS in a formal setting.

Grading: The grading breakdown is as follows: 50% for homework; 20% for project 1; 20% for project 2; and 10% for participation. Your homework/project grade is dependent on your ability to motivate your analysis and communicate empirical results to a non-technical audience using maps and data visualization. Your participation grade is a function of both in-class participation and Piazza participation. The University's Code of Academic Integrity will be *strictly* enforced (https://catalog.upenn.edu/pennbook/code-of-academic-integrity/).

Homework: Homework is due on the dates indicated on the schedule below. Late homework will be accepted but penalized. Please prepare all homework as an R Markdown. You are encouraged welcome to work in groups, but **you must submit a homework assignment that is uniquely yours.** You are also encouraged to ask and answer questions on Piazza.

Readings: The course text includes all the code you will need for the course. I urge you to run through the code/analysis in each chapter of the book as the course progresses.

Software: This course will be taught using R and R Studio.

Date	Lecture	Lab	Readings	Assignment due
4-Sep	Introduction to Public Policy Analytics	Collaborating on data science projects w/ Github	Read book introduction	
11-Sep	Why start with Indicators?	Introduction to the Tidyverse, Tidycensus, sf & ggplot	Ch 1: Indicators for Transit Oriented Development	
18-Sep	Data-driven Comprehensive Planning	Geoprocessing	Ch 2: Planning Urban Growth Area expansion	
25-Sep	Project 1 - Predictive modeling competition: Intro to geospatial Modeling	Intro to ML	Ch 3: Intro to Geospatial Machine Learning	TOD Assignment
2-Oct	Project 1 - Predictive modeling competition: Modeling the spatial process	The role of spatial ML	Ch 4: Geospatial ML; modeling the spatial process	
9-Oct	NO CLASS - Musa Master Class - Network analysis in R w/ Kyle Walker			
16-Oct	Geospatial risk prediction - Predictive Policing	Local Morans I; Spatial cross-validation	Ch 5: Predictive Policing	Predicting home prices midterm project
23-Oct	Churn Prediction	Logistic regression; confusion metrics; cost/benefit analysis	Ch 6: Bounce to Work!	Predictive Policing
30-Oct	Data privacy, Disparate Impact, algorithmic fairness & predicting recidivism	Memo-writing	Ch 7: Recidivism	Housing subsidy algorithm
6-Nov	Space/time rideshare trip prediction	time lags; gganimate; purrr	Ch 8: Predicting ride share demand	
13-Nov	Data governance - Dennis Culhane talk/Final Project work	Final Project	Final project	Either recidivism memo OR bike share prediction
20-Nov	Developing a GitHub.io portfolio / Final project work	Final Project	Final project	
27-Nov	NO CLASS Thanksgiving		Final project	
4-Dec	Final presentations - 9am to noon - No lab			Final project