

GEOGRAPHY AND PLANNING

GPHY 345: Spatial Analysis



Contact Time	Two-hour lecture and two-hour lab per week	
Format	Lectures, lab assignments, class presentation and a final project – In person delivery	
Class Assessment	Lab assignments	40%
	Quizzes	30%
	Seminar and project proposal presentation	10%
	Final Project Report	15%
	Class participation and discussion	5%

COURSE OVERVIEW

This course extends the basic knowledge and skills of GIS covered in GPHY 243 by examining key techniques used in spatial geodatabase and spatial processes for geospatial data. It combines lectures with a substantial practical component. The lectures cover technical issues related to geodatabase design, network analysis, location-allocation modeling, retail modeling, spatial pattern analysis, data classification, and spatial regression. The practical component will involve lab assignments and a final project. The hand-on part of this class will mainly be based on ArcGIS Pro with a small portion of the class involving the Google Maps and online GIS. For the class project, students will be required to apply techniques and methods in more depth to different applications.

LEARNING OUTCOMES

Those who successfully complete the course will be able to

- Explore the basic interface structure of different functions, operations and tools in ArcGIS.
- Understand the data structure and model of geodatabases and know how to set up a geodatabase, build topology class and geometric network to store geospatial information for different applications.
- Apply different vector-based functions and extensions including network analysis, facility location, spatial pattern analysis, spatial regression, and retail marketing applications.

COURSE TOPICS

Geodatabase structure and design, geocoding, topology, geometric networks, network analysis, location-allocation problem, retail modeling, spatial patterns and clusters, spatial regression and statistical tools.

COURSE READINGS

- Arctur, D.M. Zeiler. 2004. Designing Geodatabases: Case studies in GIS data Modeling. ESRI press, 408p.
- Bailey, T.C, A.C. Gatrell 1995. Interactive spatial data analysis. John Wiley & Sons, Inc. 413p.
- Maguire, D.J., M.F. Goodchild, M. Batty. 2005, GIS, Spatial Analysis, and Modeling.
- Mitchell, A. 2020. The ESRI Guide to GIS Analysis, Vol. 1: Geographic Patterns and relationships. ESRI Press.
- Mitchell, A. 2020. The ESRI Guide to GIS Analysis, Vol. 2: Spatial Measurements and Statistics. ESRI Press.
- Longley, P.A., M.F. Goodchild, D.J. Maquire, D.W. Rhind, 2017. Geographic Information Science and Systems, John Wiley & Sons.
- Lo, C.P., A.K.. Yeung. 2006. Concepts and Techniques of Geographic Information Science. Prentice Hall.
- Smith, M. J de, M.F. Goodchild, P.A. Longley. 2018. Geospatial analysis: a comprehensive Guide. 6th edition. 618p.