

URP 520

Introduction to Geographic Information Systems (GIS)

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Instructor

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This course provides an introduction to the theory and application of geographic information systems (GIS) technology, with particular emphasis on application to urban planning problems. The emphasis is on learning fundamental principles and concepts and gaining broad exposure to GIS applications such as assessing spatial relationships between people and places, and in policy and planning settings involving community development, land use, infrastructure, and environmental planning. Topics include spatial analysis techniques, the evolution of the current theories behind GIS technology, spatial data types, projections, geoprocessing, geocoding, among others. Students will learn through a variety of practical examples of GIS implementation and employ spatial data visualization techniques and cartography. Weekly lab exercises will enforce software and processing skills. The course will culminate in a final project where student groups will use GIS tools to convey a research goal or idea spatially.

This course will use **QGIS** (<https://qgis.org>), a free and open-source GIS tool that is becoming very reliable, thanks to the work of a community of open source contributors. QGIS is a cross-platform software supporting Windows, Mac, and Linux, and it is free, meaning you will not need to purchase it after you graduate and you will be able to work with a community group and make maps without restrictions.

Learning Goals

- Create and manipulate vector and raster data within GIS to visualize urban phenomena
- Create maps which conform to accepted cartographic standards to ensure clear communication
- Design and conduct analysis which use GIS functionality to answer spatial questions
- Perform dataset conversions including projection and formatting
- Work with various Census data
- Visualize data distributions using graphs, histograms, colors, symbols, and annotation
- Combine spatial data using techniques such as clip, intersect, union, identity, join, buffer, merge, zonal statistics, geocoding, among others
- Apply GIS to a real-world question or problem by completing a GIS mapping project