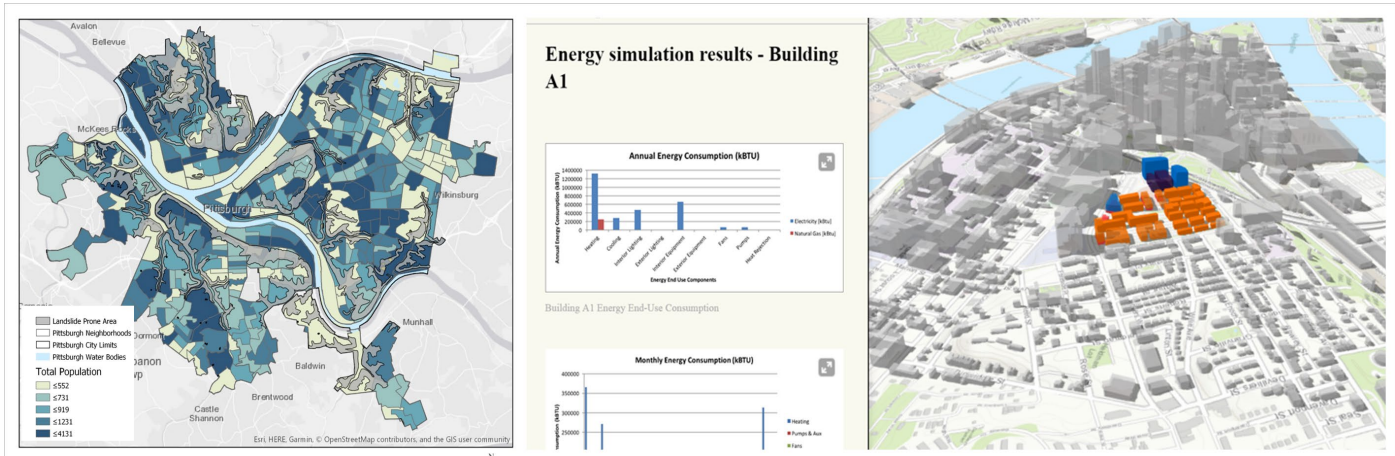


Courses 48-569 and 48-781



Geographic Information Systems

A geographic information system (GIS) provides storage, retrieval, and visualization of geographically referenced data as well as design and analysis of spatial information. GIS provides unique analytical tools to investigate spatial relationships, patterns, and processes of cultural, biological, demographic, economic, social, environmental, health, criminal, and other phenomena. The course includes lectures, computer labs, and a project using the leading desktop GIS software, ArcGIS Pro, from Esri, Inc. Subject areas include:

- *Geographic concepts* (world coordinate systems, map scale/projections, elevation),
- *Government-provided map infrastructure* (TIGER maps, census data, satellite and aerial photo images, local government data, cadastral maps),
- *Map design* (cartographic principles, interactive maps, map animations, and Web-based GIS),
- *Geodatabases* (importing spatial and attribute data, geocodes, table joins, data aggregation, and map queries),
- *Creation of new spatial data* (digitizing, integrating BIM and GIS, and geocoding vector features),
- *Spatial data processing* (clipping, merging, appending, joining, dissolving),
- *Spatial analysis* (proximity analysis, risk surface, site suitability, spatial data mining),
- *Macros and tasks* (form-based tools, flowchart-based design, user interface),
- *3D GIS* (3D surface modeling, draping/extruding features, fly throughs, line-of-sight analysis, procedural rules),
- *Raster GIS* (hill shade, kernel density estimation, risk index modeling, raster queries),
- *Spatial Statistics* (space time pattern mining, spatial regression, hot spot analysis)
- *Data mining and cluster analysis* (multivariate analysis using centroid models and k-means algorithm),
- *Network analysis* (traveling salesman problem, multi-vehicle routing problem, Huff gravity model location of facilities), and
- *Operations Management* (tasks for daily operations, automated models, Dashboard and Collector Apps)

Computer Aided Facility Management

Facilities management is the practice of coordinating the physical workplace with the people and work of the organization. Computer Aided Facilities Management (CAFM) and Integrated Work Management (IWMS) integrates software tools to streamline operations, boost productivity and develop strategic planning goals for an organization. Lectures covering space management, asset management, building operations, emergency preparedness, environmental health and safety, telecommunications, and real property and lease management will help students understand how organizations use these tools for these infrastructure management issues. Software from Archibus, Inc. will be briefly reviewed.