

# APPLIED PROJECTS IN URBAN GEOGRAPHIC INFORMATION SYSTEMS

Urban Planning 793

## *Objectives of the Course*

1. Experience the **PROCESS** of completing a complex GIS project for a real client.
  - Conceptual Model
  - Project Scope
  - Data Model
  - Implementation Workplan
  
2. Experience the use of **REAL DATA** from local government for use in GIS.
  - Attribute Data from various sources
  - Parcel/Segment Maps
  - Digital Orthophotos, LiDAR, etc.
  - Other Related Data/Maps (as appropriate)
  
3. Gain additional exposure to the **TECHNOLOGY** needed to complete a GIS project.
  - ESRI Products
  - Internet GIS (if required)
  - Database Management Systems
  - Others as required

**URBAN PLANNING 793**  
**APPLIED PROJECTS IN URBAN GEOGRAPHIC INFORMATION SYSTEMS**

This course is offered as a "capstone" course in a four-course series of GIS courses. The objective of this course is to immerse the student in GIS software and real geographic data in order to solve a problem or address an issue that is needed by a local organization. It therefore allows the students to apply their understanding of GIS technology to a real problem with authentic data from local government. In addition, it provides them with a structured approach to a GIS project, introducing them to GIS management techniques that are necessary to manage a project from its conception through final completion.

It uses Esri GIS software products (which have been introduced to the students in the previous courses in the series), authentic map and attribute data, and a client - a local organization that requires GIS services to solve a problem.

Students, working in teams of three to five, are required to interview people and research the client agency and its problems; prepare a Strategic Plan Document describing the problem and how it will be solved; develop an Implementation Work Plan defining the necessary tasks, timing of those tasks, and personnel task assignments; report progress and problems on a weekly basis; and then produce a final product (defined by the client), including documentation of the work and a final presentation to the client.

Below is a summary of past accomplishments of student projects in the course:

In the Fall 1996 course, the students were published in *GIS: Our Common Language, ESRI Map Book - Volume Twelve* (Environmental Systems Research Institute, Inc., Redlands, CA, 1997, p. 106) for the project, "**GIS Assists Neighborhood Strategic Planning in Milwaukee**".

In the Fall 1995 course, the students also entered their work in a national GIS competition at the Annual Conference of the Urban and Regional Information Systems Association (URISA '95) in Salt Lake City and won an award for "Best Map" in the conference *Project Showcase* for the project, "**GIS Role in the Neighborhood Strategic Planning Process**".

In the Fall 1993 course, the students received a "**Best View**" award at the 1993 International ESRI User Conference in Palm Springs, California, for the project, "**Marketing Milwaukee's Northwest Industrial Corridor**".

After completing their Fall 2004 project, entitled, "**Creating Developable, Contiguous Parcels**", students Ahmed Abubaker, Sutapa Chatterjee, Marc Gelenian, and Diana Hu found themselves winning one award after another in local, state, and international competitions in geographic information systems projects:

In February, 2005, the project won **Best Student Award** in the Map Gallery Competition at the annual conference of the Wisconsin Land Information Association (WLIA) in Green Bay. (Prize: a blue ribbon)

Then, in May, 2005, the project won **First Place** in the Student GIS Project Competition awarded by the UWM GIS Council (see: <http://www.uwm.edu/Dept/GIS/competition2005.html>) (Prize: \$300.)

Finally, in July, 2005, they scored a **Third Place** in an international student competition, Best Practices in Science Modeling Challenge, sponsored by the Environmental Systems Research Institute (ESRI). This competition attracted entries from universities all over the world and independent judges from the academic community reviewed them based on innovation, usability, and functionality. (Prize: \$500).

Other past projects include:

"**Homelessness Prevention**" for an area in Milwaukee about to experience gentrification.

"**Housing Survey and Analysis**" for Milwaukee's Metcalfe Park Residents Association.

"**Breast Cancer Awareness**" for the City of Milwaukee Health Department.

"**An Evaluation of the African-American Immersion Program**" for two Milwaukee central city schools.

"**An Analysis of the Impact on Property Values Surrounding Proposed Light Rail System Stops**" in Milwaukee.

"**Commuter Information System**" for the City of Milwaukee employees.

"**Milwaukee's CDBG Target Area: An Analysis of Housing Indicators**" for the City of Milwaukee Block Grant Administration.

"**Milwaukee Community Development Block Grant Assessment**", evaluating the effect of public and private investment on neighborhood housing quality in Milwaukee.

"**City of Cudahy Geographical Information Needs Analysis**"

"**A Geographical Information System Needs Assessment for the City of Oak Creek, Wisconsin**"

"**Using GIS in Park Planning for the Town of Cedarburg**"

"**Development of a GIS for the Mid-Town Neighborhood Association**"

"**Village of Elm Grove GIS Needs Analysis**"

"**City of Greenfield GIS Needs Analysis**"

"**The Lindsay Heights Internet GIS Model**"

"**Federal Rental Assistance in the City of Milwaukee**"

"**GIS Implementation for the Community Partners Program**", an enhancement of the collection, analysis, and distribution techniques of data collected by the Community Partners organization.

"**City of South Milwaukee GIS Needs Analysis**"

"**The Wehr Nature Center GIS**"

"**Statistical Profiles of Milwaukee Aldermanic Districts**", a web site displaying statistical data about crime in Milwaukee Aldermanic Districts.

"**GIS Database and Preliminary Analysis for Green Infrastructure Planning: Fond du Lac and North Neighborhood**", identifying underutilized properties in a Milwaukee neighborhood for potential locations of parks and other green space.

"**GIS Database Development for Milwaukee's Urban Ecology Center**", a basemap and databases of scientific data for Milwaukee's Riverside Park for land stewardship planning, research, and educational opportunities.

"**Safe Routes to School Bicycle Crash Mapping and Routing**", bicycle routing analysis in a neighborhood school attendance area to identify street segments having the safest record of crashes, traffic volume, speed limit, crime incidents, etc. to encourage students to exercise by riding their bicycles to school.

"**Groundwork Milwaukee's Potential Greenspace Opportunities for Neighborhoods**" – the identification of all underutilized parcels in Milwaukee that are not within ¼ mile of an existing park and "bundling" those that are adjacent for the purpose of suggesting locations for new green space in Milwaukee.

"**Creating Developable Contiguous Parcels for the City of Milwaukee**" – the identification of all underutilized land parcels in the city that can be used by the City's Department of City Development to bundle together so that it can better market them for economic development purposes.

"**Milwaukee River Revitalization: A Geospatial Perspective to Environmental Protection and Public Access Improvement**" – development of a viewshed analysis along the Milwaukee River to protect views from the river from encroaching development and also identify locations for public access.

"**Lead poisoning on Milwaukee's South Side: A Geographic Strategy for Maximizing Referrals in the 16<sup>th</sup> Street Community Health Center's Lead Outreach Program**" – the development of walking routes for door-to-door canvassing by identifying hot spot neighborhoods/census tracts and individual properties that meet criteria for high potential for lead poisoning.

"**Johnsons Park Health Alliance Community Food Assessment**" This community food assessment developed an understanding of neighborhood access to and geographic distribution of food resources with the intention of continuing efforts in the enhancement of the community's health.

"**GIS for the Southeast Wisconsin Invasives Cooperative**" - enhanced access to high quality geographic information about invasive species in SE Wisconsin by connecting a patchwork of disparate data sources. This allows the native environment to regain its foothold and future generations the opportunity to enjoy the natural landscape of Wisconsin.

- “Milwaukee Inner City Analysis”** - Generating awareness of the plight of Milwaukee’s inner city through the creation of comprehensive socio-economic, demographic and housing trend analyses and visual aids, with the intent to secure political interest and funding support.
- “Neighborhood Indicators for the Zilber Initiative”** – The development of indicators of quality of life in two Milwaukee neighborhoods: Lindsay Heights and Clarke Square, for the Zilber Initiative to help in identifying long term investment and improvements needed in those areas.
- “Riverworks Neighborhood Indicators”** – The development of neighborhood indicators for the Riverworks neighborhood in Milwaukee to help make workforce, economic and real estate development, and planning and revitalization decisions more beneficial for neighborhood residents.
- “Milwaukee Shines – The Solar Initiative”** - The identification of buildings in Milwaukee that have rooftops with the greatest potential for successful installation of a solar energy system based upon having an adequate solar time window, rooftop suitability, and responsible property owners.
- “Quantifying the Cost of Home Foreclosures to the City of Milwaukee”** – An investigation into the spatial patterns of home foreclosures and their fiscal impacts such as decreased property tax revenue and increased police and fire services.
- “Using GIS to Rate Milwaukee’s Neighborhood Quality”** – The development of the Neighborhood Quality Index that can be used by the City for capital improvement and service planning and by its citizens for Researching and understanding trends in their neighborhoods.
- “City of Milwaukee Alleys Project”** – The development of a methodology to improve the management of the City of Milwaukee alley data by geocoding all of the alley centerlines in the city.
- “Interpreting the Effects of Community Block Watches on Crime in Milwaukee”** – An analysis of the effects of block watches on crime in Milwaukee for the Milwaukee Homicide Review Commission.
- “Mapping and Analyzing the Relationship between Sexual Assault, Residential Mobility, and Neighborhood Deprivation in Milwaukee”** – An analysis of neighborhood conditions leading towards sexual assault for the Medical College of Wisconsin.
- “Restoring Washington Park”** – Assisting the Urban Ecology Center in developing a plan to restore this urban park to its original natural state over the next 100 years.
- “Milwaukee Historical Streams”** - The results of this project allows the Milwaukee Metropolitan Sewerage District to determine whether historical water features are related to basement backups during flood events within the Lincoln Creek Subwatershed.”
- “Downtown Milwaukee: reanimate”** - finding solutions to eliminating the isolation that often exists between downtown businesses and individuals.
- “Impact of Green Infrastructure on Property Values in the Lincoln Creek Area”** - Measuring what, if any, changes in property value occurred as a result of the concrete removal in Lincoln Creek.
- “Milwaukee Economic Gateway (MEGA)”** - Centralize economic data available on the existing website of the UWM Center for Economic Development to include information that will facilitate development in the community.
- “Wisconsin Off-Leash Opportunity Finder (WOOF)”** – The identification of several potential locations for an off-leash dog park that serves Milwaukee County residents who cannot easily access the current dog parks. ROMP will be able to approach the County park system to propose creating new dog parks based on data used to conduct a site suitability analysis.
- “Biking on Milwaukee’s West Side”** – An historical analysis of bicycle shops near Washington Park for Milwaukee Bicycle Works to determine whether or not there has been a change in both access to and use of bicycles in the area surrounding Washington Park.
- “Land Worth Protecting: Identifying Potential Land Conservation Easements in Northeastern Walworth County”** – The creation of a database of the assets within natural areas in Walworth County and location of parcels of land that could be attained by the Kettle Moraine Land Trust using a suitability analysis.
- “Advancing Conservation in Northwest Walworth County”** – The development of the capability for the Kettle Moraine Land Trust to identify parcels of land that are valued by the residents of northwestern Walworth County for possible recreational sites.

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Day/Time: Mondays, 5:30 – 8:10 PM  
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Textbook: *Managing GIS Projects* (Huxhold and Levinsohn), Oxford University Press, 1995.  
(ISBN 0-19-507869-1)  
[http://www.amazon.com/Managing-Geographic-Information-Projects-Spatial/dp/0195078691/ref=sr\\_1\\_1?s=books&ie=UTF8&qid=1295499115&sr=1\\_1](http://www.amazon.com/Managing-Geographic-Information-Projects-Spatial/dp/0195078691/ref=sr_1_1?s=books&ie=UTF8&qid=1295499115&sr=1_1)  
**NOTE: This book is available on the D2L site in digital form.**

**Course Outline**  
(as of Jan 20)

***INTRODUCTORY MATERIAL:***

Jan 26: Preview of the course  
Review of Obstacles to and Maxims for Success  
Presentation of work from previous years  
**Assignment for next week: Read Chapters 1-2**

Feb 02: Management Perspective on GIS  
Systems Development Methodology  
Development of the Conceptual Model of the Organization  
**Assignment for next week: Homework #1  
Read Chapter 3**

Feb 09: Strategic Planning for GIS  
- Vision  
- Comprehensive Approach  
- Formal Plan  
- Management Framework  
**DUE: Homework #1  
Assignment for next week: TBA**

Feb 16: Introduction to the projects  
Client Presentations  
**Assignment for next week: Homework #2 (Project Vision)  
Read Chapter 4**

## ***PROJECT PLANNING:***

Feb 23: Planning for Implementation  
- Situational Analysis  
- Project Scope  
Form Project Teams

**DUE: Homework #2 - Strategic Plan**

**Assignment for next week: Homework #3 (Team Project Strategic Plan)  
Read Chapter 5**

Mar 02: System Design  
- Needs Analysis  
- Data Model

**DUE: Homework #3 – Team Project Strategic Plan**

**Assignment for next week: Read Chapter 6**

Mar 09: Project Workplan

**Assignment for next week: Homework # 4 (Project Implementation Plan)  
Read Chapter 7**

Mar 16: ***SPRING BREAK***

Mar 23: Implementation Management

**DUE: Homework #4 - Project Implementation Plan**

## ***PROJECT IMPLEMENTATION:***

Mar 30: **Work on Project**

Apr 06: “

Apr 13: “

Apr 20: “

Apr 27: “

May 04: **Complete Project**

May 11: **Presentation of Project to the Clients**

# Grading Criteria

## *Individual Homework Assignments (10%)*

1. Homework #1 – Obstacles to Success
2. Homework #2 – Strategic Plan

## *Team Products Produced (20%)*

1. Homework #3 - Strategic Plan:
  - Project Scope:
    - Project Name
    - Client Identification & Mission
    - Vision Statement
    - Project Scope & Objectives
  - Conceptual Model:
    - Entities & Activities of Client
  - Data Model:
    - Spatial Entities
    - Feature Attributes
2. Homework #4 - Implementation Plan:
  - Tasks/Assignments
  - Schedule
  - Products

## *Products Expected by the End of the Semester (70%)*

1. Project Report:
  - Project Title
  - Project Scope
  - User Analysis
  - Map Usage Matrix (if appropriate)
  - Data Model
  - Data Dictionary (Metadata)
  - GIS Applications
  - Recommendations
  - Map Samples
2. Presentation of Results to the Client:
  - PowerPoint Presentation or Live Demonstration
  - Hardcopy Handouts (Maps & Data)
  - Training (if applicable)