



# Geography 440/640 Applied GIS: Applications For Business and Industry

## I. Course Justification

Geographical Information Systems (GIS) software is rapidly becoming one of the major tools used by geographers to solve applied locational questions. Nearly every geography graduate is expected by potential employers to have a working knowledge of GIS. Nowhere is this more true than in the area of business geographics, a newly emerging field that applies traditional geographic and spatial decision-making models to business problems. The primary goal of this course is to provide the student with the necessary training to use the latest GIS software and data to solve business and industry problems using GIS.

## II. Relationship to Program Objectives

The proposed course will most directly affect the techniques track currently offered by the geography department. In particular the course will build on and enhance student skills acquired in the required Introduction to Mapping course, and would complement Economic Geography, Geographic Information Systems and Urban Geography.

A current emphasis in the geography program is to develop applied internship opportunities for students in private sector employment. All recent private sector internships created require students to possess a strong working knowledge of GIS, particularly the ability to combine internal data (corporate data) with external data (socio-economic, demographic, transportation, etc.) resources to map target markets or business expansion opportunities. Examples of these internships include positions as GIS specialist or Business Geographers with American Family Insurance, Johnson Controls and Verlo Mattress.

## III. Budgetary Impact

The proposed course is anticipated to have little short-term impact on the college or departmental budget. In fact, the proposed course will leverage recent hardware purchases in the geography department with donated software and data to more efficiently utilize existing departmental resources. There is no need for additional staff.

## IV. Programs Affected in Other Academic Units

None. No other similar courses are offered within the Geography Department or at UWW.

## V. Course Description

This course will provide the background necessary to apply Geographic Information Systems software to solve applied business problems. The specific educational objectives of this course are:

1. To gain a conceptual understanding of Geographic Information Systems.
2. To provide the student with "hands on" problem solving skills emphasizing, site location, target marketing, sales territory development and network routing.

3. To work with the most widely used Business GIS software package, ArcView GIS and its major extensions, Network Analyst, Business Analyst, 3D Analyst and Image Analysis.

## VI. Requisites

Prerequisites : 722-270 Introduction to Mapping, 722-370 Geographic Information Systems, and 722-340 Economic Geography or permission of the instructor.

## VII. Course Syllabus

Required Text: *Getting to Know ArcView GIS: The Geographic Information System (GIS) for Everyone*, 2<sup>nd</sup>. Edition, (New York: Prentice Hall, 1998). This book will be used as a reference for each of the projects.

Additional Reading: Selected readings will be placed on reserve in the library.

### Tentative Schedule of Topics to be Covered

#### **Week 1 - Introduction to Geographical Information Systems**

Reading Assignment - Chapter 1 - "Why study retail location?" (*The Retail Environment*) and selected readings from *Profiting From a Geographical Information System*.

#### **Weeks 2-3 – Introduction to Using ArcView GIS Software**

Reading Assignment - *Selected Readings from Getting to Know ArcView: The GIS System for Everyone* and *Beyond Mapping: Concepts, Algorithms and Issues in GIS*.

Project #1 – Locational Audit™ of UW System Undergraduate Attendance Patterns

- ArcView Introduction
- Adding Themes
- Creating Thematic Maps
- Using Thiessen Polygons
- Customizing ArcView

#### **Week 4 – 5 – Trade Area Analysis**

Reading Assignment – "Trade Area Analysis" from *The Retail Environment*.

Project #2 – Fast Food Trade Area Analysis

- Generation of Simple Trade Areas
- Market Area Statistics
- Use of Average Daily Traffic Counts (ADT)
- Report Generation in ArcView GIS

## **Week 6 – Multiple Market Area Analysis**

Reading Assignment- “Identifying Your Trade Area”, from *Location, Location, Location*

Project #3 – Multiple Market Areas – Identifying New Expansion Sites for a Fast Food Chain

- Generation of multiple market areas around store locations
- Capture of statistics for multiple market areas
- Simple spatial queries
- Enhanced report presentation skills

## **Week 7 – Creating Marketing Territories**

Project #4 – Creating Claims Territories for a Major Insurance Company

- Generation of “equal competition” around point locations
- Estimation market areas for major cities
- Creating PowerPoint Presentations

## **Week 8 – Drive Time Polygons**

Project #5 – Using Drive Time Polygons to Estimate Branch Bank Market Areas

- Using Network Analyst
- Network typology and CFCC codes
- Trade area cannibalization
- Extracting data directly into Excel spreadsheets

## **Week 9 – Transportation Routing**

Project #6 – Routing

- Explore advanced functionality of Network Analyst
- Using routing algorithms

## **Week 10 - 11 – Huff Modeling: Sales Estimation for New Retail Locations**

Reading Assignment “Site Selection” from *The Retail Environment*.

Project #7 – Estimating Sales for a New Supermarket Location

- Using Huff models for spatial location modeling
- Estimating consumer spending at the block group level
- Calculating market area “leakage”
- Measuring store attractiveness
- Creating probability contour maps

## **Week 12 – Site Analysis and Fieldwork**

### **Project #8 – Site Analysis Fieldwork**

- Creating field evaluation forms
- Creating a retail database
- How to conduct site analysis fieldwork
- Geocoding

## **Week 13-14 – Using Business Analyst**

### **Project # 9 – Using Business Analyst to Analyze Video Stores And Their Customers**

- Primary market analysis
- Market penetration mapping
- Market area reports

## **Week 15 – Target Marketing**

### **Project #10 – Target Marketing Using Business Analysis**

- Customer prospecting
- Target marketing

### **Grading:**

The only effective way for students to learn GIS is for them to maximize their “hands-on” experience with the GIS software, data collection, data analysis, map design, and writing project summaries. Each project will begin with a conceptual and technique lecture, followed by a student project. All projects will be collected, critiqued and graded in draft form. The students will then be responsible for correcting their draft maps and analysis and placing them into a portfolio of work to be graded the last week of the course.

#### **Undergraduate:**

10 projects @ 5 % each	50 %
Final Portfolio	50 %
Total	100%

#### **Graduate:**

In addition to the above requirements all graduate students will be expected to complete a major case study on a topic of their own choice. The results will be presented to the class in the form of an executive briefing.

10 projects @ 2.5 % each	25 %
Final Portfolio	50 %
1 major case study and oral report	25 %
Total	100%

## BIBLIOGRAPHY

(All books and journal are currently available in the UWW Library or are currently on order.)

### MAJOR JOURNALS:

*BUSINESS GEOGRAPHICS*  
*GIS WORLD*  
*GEO-INFO SYSTEMS*  
*APPLIED GEOGRAPHY*

### TEXTS:

Bernhardsen, Tor, *Geographic Information Systems*, (New York: Wiley, 1996).

Berry, Joseph, *Beyond Mapping: Concepts, Algorithms and Issues in GIS*, (New York: Wiley, 1996).

Berry, Joseph, *Spatial Reasoning For Effective GIS*, (New York: Wiley, 1996).

Birkin, Mark, *Intelligent GIS: Location Decisions and Strategic Planning*. (New York: Wiley, 1996).

*Business Geographics for Educators and Researchers*. (Fort Collins, CO: GIS World, 1996).

Castle, Gil, *Profiting From A Geographical Information System*, (Fort Collins, CO: GIS World, 1994).

Chrisman, Nicholas, *Exploring Geographical Information Systems*, (New York: Wiley, 1997)

DeMers, Michael, *Fundamentals of Geographical Information Systems*, (New York: Wiley, 1997)

Fenker, Richard, *The Site Book: A Field Guide to Commercial Real Estate Evaluation*, (Fort Worth: Mesa House, 1996).

*Getting to Know ARCVIEW GIS: The Geographical Information System for Everyone*, (New York: Prentice Hall, 1997).

Grimshaw, David, *Bringing Geographical Information Systems Into Business*. (New York: Wiley, 1996).

Hohl, Pat and Brad Mayo, *Arcview GIS Exercise Book*, (New York: OnWord Press, 1997).

Hutchinson, Scott and Larry Daniel, *Inside ArcView GIS*, (New York: OnWord Press, 1996).

Longley, Paul, *GIS for Business and Service Planning*. (New York: Wiley, 1996).

Maguire, David et. al., *Geographical Information Systems: Principles and Applications*. (New York: Wiley, 1991).

Salvaneschi, Luigi, *Location, Location, Location: How to Select the Best Site for Your Business*, (Grants Pass, Oregon: Oasis Press, 1996)