

Spring Session, 2008  
**Using Urban Geographic Information Systems for Planning**  
Urban Planning 945-792  
(as of 1/14/08)

Days/Time: Thursdays 5:30-8:10 PM

Location: AUP Room 194

Instructor: **Eric Fowler, GISP**  
Email: [emfowler@uwm.edu](mailto:emfowler@uwm.edu)

Textbook: *Modeling Our World*  
Zeiler, Michael, ESRI Press (1999)  
ISBN: 1-879102-62-5

### **Course Description**

This is an advanced course in geographic information systems that focuses on some advanced GIS concepts. It emphasizes GIS skills on a Windows platform, using ArcGIS, the Network Analyst extension, Spatial Analyst extension and the 3D Analyst extension of ArcGIS, Model Builder, and Microsoft Access and SQL Server.

This is a hands-on computer course. Students are expected to spend a lot of time on the computer – including time outside of class. The course will end with a one-week period of laboratory work on a comprehensive project. The last session will consist of a presentation of the student projects. Grading will be based upon the quality of the lab assignments each week and the final culminating project.

## Course Schedule

### **Week 1 (Jan 24)      DATABASE MANAGEMENT CONCEPTS AND DEFINITIONS**

Readings: Chapter 1, Chapter 4 and Handout.  
Topics: Flat Files vs. Relational Databases  
Normal Forms  
Parent Child Relationships  
Lab: Familiarity with Microsoft Access work environment  
Import Data into Access  
Primary Keys  
Joining Tables  
Text vs. Numeric data types

### **Week 2 (Jan 31)      DATABASE QUERIES**

Readings: Handout.  
Topics: Flow charting/diagrams  
Conditional Logic Statements  
Data transformation commands  
Dataset normalization using Primary Keys  
ODBC  
Lab: Building Queries on joined tables  
Adding Fields  
Structured Query Language (SQL) commands  
Logical IF/AND/OR  
SELECT vs. MAKE TABLE Queries  
Aggregation Strategies (e.g., Counts and Crosstabs)

### **Week 3 (Feb 7)      GEODATABASE CONCEPTS AND DEFINITIONS**

Readings: Chapter 5, Chapter 7  
Topics: Transaction Management  
Geographic Data Modeling Types  
Object Oriented GIS Concepts, Versioning

### **Week 4 (Feb 14)      INTRODUCTION TO CLIENT DATA SET**

Readings: Handout  
Topic: Description of Existing Client Data Set

**Week 5 (Feb 21) CLIENT PRESENTATION**

Topic: Our client, American Transmission Co., will present their business needs. The goal for the course is to interpret those needs and create a GIS based on this information.

**Week 6 (Feb 28) DATABASE DESIGN**

Topics: Purpose and use of database design. Conceptual, logical, and physical designs.

**Week 7 (Mar 6) DATABASE DESIGN**

Topics: Modify conceptual designs. Implement design to a physical Geodatabase.

**Week 8 (Mar 13) DATABASE WORKSHOP**

Topics: Build and Test Geodatabase based on Database Design.

**March 20 Spring Break**

**Week 9 (Mar 27) MODEL BUILDER**

Readings: Chapter 12  
Topics: Using Model Builder. Creating and Using a model in ArcToolbox.

**Week 10 (Apr 3) NETWORK ANALYSIS**

Due: **1 page paper due on project idea(s)**  
Readings: Handout  
Topics: Hands-on exercises on Network Analyst extension, including path finding, package delivery routing, and service area determination.

**Week 11 (Apr 10) RASTER and 3D GIS**

Readings: Chapters 3, 9 and 10  
Topics: A comparison of Raster and Vector data models.

The Raster data model:

- Interpolation
- Spatial Analysis:
  - Deriving information
  - Identifying spatial relationships
  - Finding suitable locations
  - Density
  - Distances
  - Contours and surfaces

Uses of 3D Analyst. Data sets. Creating and analyzing surface models. Creating and using TIN surfaces. Working with 3D data.

**Week 12 (Apr 17) Benchmark**

Topics: Test student progress.  
Due: 5 minute presentation on project idea

**Week 13 (Apr 24) LINEAR REFERENCING DYNAMIC SEGMENTATION AND NETWORK MODELS**

Readings: Chapter 6, 8 and 11 and Handouts  
Topics: The theory, data models, and applications of data structures and data models that describe linear features and networks.

**Week 14 (May 1) WORK ON PROJECTS**

**Week 15 (May 8) STUDENT PROJECT PRESENTATIONS**

**Week 16 (May 15) PAPER DUE**

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**Grading:**

- Assignments 30%
- Project 50%
- Benchmark 20%