Spring Session, 2011
Using Urban Geographic Information Systems for Planning
Urban Planning 945-792

Days/Time: Thursdays 5:30 - 8:10 pm
(01/27/11 - 05/19/11)

Location: AUP Room 194

Instructors: Ken Jenkins, GISP  jenkins2@uwm.edu
Diana Hu  huj@uwm.edu

Office Hours: Thursdays 4:30 – 5:30 pm by appointment

Textbook: Modeling Our World (MOW)
Zeiler, Michael, ESRI Press (1999)

Course Description
This is an advanced course in Geographic Information Systems (GIS) that focuses on some advanced GIS concepts. It emphasizes GIS and database skills on a Windows Platform, using ArcGIS 9.3 (introduction to ArcGIS 10) and Microsoft Access XP/2010.

This is a hands-on computer course. Students are expected to keep pace with reading and lab/homework assignments, take sufficient notes and spend a lot of time on the computer – including time outside of class. The course will end with a two-week period of laboratory work on a comprehensive project. The last two sessions will consist of a presentation of the student projects.

Finally, GIS is only a tool, albeit a powerful one; in order to maximize its utility, a GIS analyst must be creative. Demonstration of creativity may influence scoring provided quality remains uncompromised.

Grading:
- Project 40%
- Assignments 20%
- Challenge I 10%
- Challenge II 10%
- Journals 10%
- Attendance / Participation 10%

*Late assignments will not be accepted (0 credit). Challenges I & II will be allowed a second try if requested, averaging the two scores for a final grade.
** Double asterisked items are included as part of the Project (40%) portion of final grade.
***Journals need to be submitted every week
Week 1

27 January 2011

Topics:

GIS CLASS OVERVIEW
Attendance and Homework
  o Attendance counts for 10%
  o Homework submitted on D2L
    o Due prior to class on due date
    o First initial and last name plus week due in assignment name ("KJenkins_Week3")

Final Project Expectations
  o Demonstrate grasp of course material
  o Final Folder with your name containing
    ➢ Relative path mxd
    ➢ Geodatabase
    ➢ Final Report PDF
    ➢ Other relevant material

Syllabus Content

FINAL PROJECT INTRODUCTION
Concepts: Sustainable City
  ▪ Social
  ▪ Environmental
  ▪ Financial

REVIEW OF GIS BASICS (In-class exercise)
  Raster v Vector
  Projections and Coordinate Systems
  Data Import/Export
  Customizing MXDs
    ▪ Custom Toolbars
    ▪ Bookmarks
    ▪ Extents
    ▪ Joins
    ▪ Symbology
    ▪ Definition Queries

Map Musts
  ▪ Overall Aesthetics
  ▪ Title
  ▪ Legend
  ▪ North Arrow
  ▪ Appropriate Scale
  ▪ Scale bar
  ▪ Labels / Symbology

A LOOK AT DATASETS IN GIS (In-class exercise)

Assignment 1:  ** Proposal for Final Project (Due: Week 4)
**Week 2**

3 February 2011

Readings:  
* MOW- Ch 2: How maps inform, Ch 3: GIS data representations

Topics:  
* DISCUSS READINGS

INTRODUCTION TO DATABASE – ACCESS XP

DATABASE MANAGEMENT CONCEPTS AND DEFINITIONS
* Flat Files vs. Relational Databases
* Normal Forms
* Parent Child Relationships
* Dataset Normalization using Primary Keys

DATABASE QUERIES (In-class exercise)
* Flow charting/diagrams
* Conditional Logic Statements
* Data transformation commands

Familiarity with Microsoft Access XP work environment
* Import Data into Access
* Primary Keys
* Joining Tables
* Text vs. Numeric data types

Building Relational Queries
* Adding Fields
* Structured Query Language (SQL) commands
* Logical IF/AND/OR
* SELECT vs. MAKE TABLE Queries
* Aggregation Strategies (e.g., Counts and Crosstabs)

Assignment 2:  
* Relational Database Exercise I (Due: Week 3)

**Week 3**

10 February 2011

Topics:  
* ACCESSING DATASETS (In-class exercise)
  * MPROP
  * Census Data

ACCESS 2010

Familiarity with Microsoft Access 2010 environment
* Import Data into Access
* Building Queries

Assignment 3:  
* Relational Database Exercise II (Due: Week 4)

CHALLENGE I:  
* GIS & DATABASE (Due Week 5)

**Week 4**

17 February 2011

Guest:  
* Donna Genzmer, UWM Director of Cartography and GIS Center

Topic:  
* CARTOGRAPHY

Assignment 4:  
* Basic Map Design (Due: Week 5)
Week 5

24 February 2011

Readings: Chapter 1, Chapter 4, *Database Design and Modeling Fundamentals*

Topics: **MODEL BUILDER**
- Using Model Builder
- ArcToolbox
- Creating and Using a Model in ArcToolbox
- Customizing ArcGIS

Assignment 5: Gnatcatcher Habitat Suitability (*Due: Week 6*)
- ArcToolbox exercise (*Due: Week 6*)
- **Final Project Idea 5-Minute Presentations (*Due: Week 6*)

Week 6

3 March 2011

Topics: **FINAL PROJECT IDEA 5-MINUTE PRESENTATIONS**

Week 7

10 March 2011

Readings: Chapter 12

Topics: **GEODATABASE CONCEPTS AND DEFINITIONS**
- GEODATABASE DESIGN I (In-class exercise)
  - Geographic Data Modeling Types
  - Purpose and use of database design.
  - Conceptual, logical, and physical designs.

Assignment 6: Data Modeling Exercise (*Due Week 8*)

Week 8

17 March 2011

Readings: Chapter 5, Chapter 7

Guest: Kurt Meingast

Topics: **INTRODUCTION TO ARCGIS SERVER** (In-class exercise)

Week 9

24 March 2011

SPRING BREAK

Week 10

31 March 2011

Topic: **GEODATABASE DESIGN II** (In-class exercise)
- Implement Design to a Physical Geodatabase

CHALLENGE II: **GEODATABASE DESIGN (*Due Week 12*)**

Week 11

7 April 2011

Topics: **PROJECTION METADATA**
- What it is
- Templates
- XML
- Living document
- Next generation GIS
Assignment 7: Create metadata for at least 3 data sets using an appropriate standard template of your choice + stand-alone XML files.  
(Due: Week 12)

Week 12
14 April 2011
Meet in Lab AUP Room 158

Topic: INTRO TO ARCGIS 10 (In-class exercise)

Week 13
21 April 2011

Readings: Chapters 3, 9 and 10
Topics: RASTER and 3D GIS
A comparison of Raster and Vector data models.
The Raster data model:
• Interpolation
• Spatial Analysis:
  o Deriving information
  o Identifying spatial relationships
  o Finding suitable locations
  o Density
  o Distances
  o Contours and surfaces
• Uses of 3D Analyst.
  o Data sets.
  o Creating and analyzing surface models.
  o Creating and using TIN surfaces.
  o Working with 3D data.

Week 14
28 April 2011

Topic: FLEXVIEWER AND ARCGIS
CREATIVE APPLICATIONS OF GIS

Week 15
5 May 2011

Topic: GIS PRESENTATION SKILLS
Conveying information via GIS to audience
Basic Presentation Skills

MANDATORY PROJECT MEETINGS

Week 16 – 17
12 & 19 May 2011
FINAL PRESENTATIONS I & II