1. Meeting

- Time: Tue/Thurs 1:30-3:00 PM
- Location: Schmitt Academic Center 224 (GIS Lab)

2. Instructors

Sungsoon (Julie) Hwang, Ph.D.
Contact: shwang9@depaul.edu or call (773) 325-8668
Office: Suite 4513, 990 W Fullerton Pkwy, LPC
URL: http://gis.depaul.edu/shwang/
Office hour: Wed 3-5 PM and by appointment

Brian McCormick
(Lab assistant)
Contact: brian_3687@yahoo.com
Lab hour: TBA

3. Course Overview

GIS is a computerized system designed to work with geographically referenced data. GIS can perform a wide range of functions - capturing locational data (GPS, remote sensing), storing and managing geographic databases, displaying geographic data (computerized mapping), and performing spatial analysis. This field is rapidly growing, with great potential to enhance the performance of both practical applications like businesses and scientific applications like climate change research. In 2005, U.S. Department of Labor named geotechnology (that customarily encompasses GIS, GPS, and remote sensing) one of three emerging technologies along with nanotechnology and biotechnology. This course provides an introduction to this field. GEO241 will serve as a foundation for further work in this area. Topics include spatial concepts, database system, GPS, remote sensing, spatial reference system, cartography, and spatial analysis. Students will be involved in numerous computer works, mainly GIS software (ArcGIS 9.3) in and outside of the class. Familiarity with computer and Windows-based software is not required, but will be certainly helpful.

**Prerequisites:** ISP 120 (Mathematical and Technological Literacy I) or instructor’s permission.

4. Required Materials

- A portable USB drive with approximately 50 Mb free space
5. Topics

Part I. Conceptual framework
• Introductions to GIS
• Spatial concepts and GIS

Part II. Understanding characteristics of geographic data
• Database concept
• GIS data model
• Data capture (remote sensing, GPS)
• Spatial reference system

Part II. Adding values to geographic data
• Principles of cartography
• Method of spatial analysis

6. Learning Objectives

Completing this class, students should be able to
• Reflect on unique aspects of geographic problems.
• Comprehend processes through which geographic things, events, and processes are represented in the computer.
• Get familiar with methods of referencing location in GIS.
• Apply cartographic grammars properly to making maps.
• Apply methods of spatial analysis to solve geographic problems.

As overarching goals of the course, I expect students to
• Add spatial or geographic dimensions to the outlook of the world.
• Recognize potentials and limitations of GIS in understanding and operating the world.
• Understand implications of information technology on the scientific inquiry with an emphasis on geographic problems.
• Be more proficient at quantitative reasoning applied to complex problems embodied in geographic problems.

7. Grading

<table>
<thead>
<tr>
<th>Components</th>
<th>Points</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm Exam</td>
<td>15</td>
<td>February 10th unless noted otherwise</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25</td>
<td>March 12th comprehensive</td>
</tr>
<tr>
<td>Project</td>
<td>20</td>
<td>March 17th turn it in through digital dropbox</td>
</tr>
<tr>
<td>5 Group activities</td>
<td>10</td>
<td>See tentative schedules</td>
</tr>
<tr>
<td>5 Labs</td>
<td>10</td>
<td>See tentative schedules</td>
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<tr>
<td>4 Homework</td>
<td>10</td>
<td>See tentative schedules</td>
</tr>
<tr>
<td>Participation</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
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</table>
Exams: Exams will be drawn from all topics covered by the time unless otherwise noted. Midterm covers the first half, and final covers all. Study guides will be provided in advance.

Project: create maps that visualize toxic levels in your home County. Guidance will be provided at various stages in the class. The stages consist of (1) acquiring and processing spreadsheet data (2) geocoding the data (3) making maps. At the end of the quarter, you should submit a report in which you should write an essay on geographic distribution of toxins in your home county, and lessons learned from each stage of processes you will have gone through. This is an individual work, and should be turned in digitally (blackboard digital dropbox) by March 17th 5 PM.

Activity: The format varies from group discussion, outdoor activity, to GIS software exercises depending on the subject at hand.

- Activity1: discuss on classifying geographic problems
- Activity2: collect location data with a GPS receiver
- Activity3: explore map projection in ArcGIS
- Activity4: make thematic maps in ArcGIS
- Activity5: perform query and measurement in ArcGIS

Lab: You will learn GIS software ArcGIS 9.3 with lab. All labs will be completed in the class with the help of instructors. If you can’t complete labs in time, you are expected to do remaining work on your own outside of the class. A lab assistant will be available in GIS lab during her lab hours. All labs are group work except for Lab1.

- Lab1: introduction to ArcGIS
- Lab2: explore geographic data (Yellowstone)
- Lab3: make vector-based thematic maps (US)
- Lab4: identify snail habitat affected by vehicle emissions (Blackhill)
- Lab5: make raster-based thematic maps (Chernybol)

Homework: Individual homework can be completed at home with internet access except for homework4.

- Homework1: write a short essay on GIS case studies
- Homework2: find out data collection method through USGS geospatial data tour
- Homework3: design toxic maps for final project
- Homework4: make toxic maps for final project

Participation: Students are highly encouraged to participate in the class discussion. A sign-up sheet will be circulated to check attendance during the class.
### 8. Tentative schedules

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>In-class activities</th>
<th>Homework</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/6</td>
<td>Course overview</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/8</td>
<td>Introduction to GIS</td>
<td>A1. Geographic problems</td>
<td>1. GIS case studies</td>
</tr>
<tr>
<td>1/13</td>
<td>GIS as software</td>
<td>L1. Introduction to ArcGIS</td>
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<tr>
<td>1/15</td>
<td>Spatial concepts</td>
<td>Reflection on Homework 1</td>
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</tr>
<tr>
<td>1/20</td>
<td>Database concept</td>
<td>Project Overview &amp; Stage 1</td>
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<tr>
<td>1/22</td>
<td>Geographic representation</td>
<td>Project Stage 1</td>
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</tr>
<tr>
<td>1/27</td>
<td>GIS data model</td>
<td>L2. Yellowstone</td>
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<tr>
<td>1/29</td>
<td>Data collection</td>
<td></td>
<td>2. USGS data tour</td>
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<tr>
<td>2/3</td>
<td>Georeferencing</td>
<td>A2. GPS</td>
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<tr>
<td>2/5</td>
<td>Georeferencing</td>
<td>A3. Map projection</td>
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<tr>
<td>2/10</td>
<td><strong>Midterm</strong></td>
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<tr>
<td>2/12</td>
<td>Georeferencing</td>
<td>Project Stage 2</td>
<td></td>
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<tr>
<td>2/17</td>
<td>Cartography</td>
<td>A4. Thematic mapping</td>
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<tr>
<td>2/19</td>
<td>Cartography</td>
<td>L3. US population</td>
<td>3. Toxic map design</td>
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<tr>
<td>2/24</td>
<td>Spatial analysis</td>
<td>A5. Query and measurement</td>
<td></td>
</tr>
<tr>
<td>2/26</td>
<td>Spatial analysis</td>
<td>L4. Save snails!</td>
<td></td>
</tr>
<tr>
<td>3/3</td>
<td>Spatial analysis</td>
<td>L5. Chernobyl</td>
<td>4. Toxic map making</td>
</tr>
<tr>
<td>3/5</td>
<td>Final project help</td>
<td>Project Stage 3</td>
<td></td>
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<tr>
<td>3/10</td>
<td>Final project help</td>
<td>Project Stage 3</td>
<td></td>
</tr>
<tr>
<td>3/12</td>
<td><strong>Final exam</strong></td>
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<td></td>
</tr>
<tr>
<td>3/17</td>
<td><strong>Final project due</strong></td>
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</tbody>
</table>

Schedules are subject to change.

**Reading assignment**

1/8  Longley (text) section 1.1-1.5
1/13 Longley 7.1, 7.2, 7.6
1/15 Golledge 2003, Goodchild and Janelle 2004
1/20 Longley 10.1-10.3
1/22 Longley 3.1-3.7
1/27 Longley 8.1-8.2.3
1/29 Longley 9.1, 9.2, 5.8, 5.9, 9.4
2/3  Longley 5.1-5.4, Kimerling 2005a
2/5  Longley 5.7
2/12 Longley 5.9 including technical box 5.3
2/17 Kimerling 2005b, Slocum 2005
2/19 Dent 1999
2/24 Longley 14.1-14.3
2/26 Longley 14.4.1-14.4.3
3/3  Longley 14.4.4
9. Miscellaneous

ArcGIS (Desktop GIS Software)

ArcGIS is installed in GIS lab (SAC224) and Quantitative Reasoning Center (SAC 268) ONLY, meaning that this software is not available elsewhere.

If you would like to run ArcGIS 9.3 in your computer, you can order free 60-day evaluation copy at [http://www.esri.com/software/arcgis/arcview/eval/evalcd.html](http://www.esri.com/software/arcgis/arcview/eval/evalcd.html). The CD will be delivered to you at no cost. Expect more than two weeks to receive the CD.

GIS Lab

Printing policy: Students can print out up to 100 pages upon DePaul ID verification.

Operation hours: 9-9 M-Th, 9-5 F, and 12-4 Sat/Sun

Access policy: Students can use equipments in GIS lab during operation hours. However, GIS lab is occupied by quantitative reasoning classes most of the time. Therefore, students are advised to check class schedules posted on the door before the visit. Open lab hours during this quarter are as follows:

- Tue 8:30-10:00 am
- Tue 4:40-5:45 pm
- Thurs 8:30-10:00 am
- Thurs 4:40-9:00 pm
- Fri 3:30-5:00 pm
- Sat 12-4 pm
- Sun 12-4 pm

If you have any technical difficulties in GIS lab which is not related to generic GIS problems (e.g., access to X drive, errors in printing account), please contact a QRC lab manager Jennifer Galka by phone (773) 325-4663 or by e-mail JGALKA1@depaul.edu. Her office is located in QRC (SAC 268).

Grading Scale

<table>
<thead>
<tr>
<th>Points earned</th>
<th>Letter grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>93-100 points</td>
<td>A</td>
</tr>
<tr>
<td>90-92.99 points</td>
<td>A-</td>
</tr>
<tr>
<td>87-89.99 points</td>
<td>B+</td>
</tr>
<tr>
<td>83-86.99 points</td>
<td>B</td>
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<tr>
<td>80-82.99 points</td>
<td>B-</td>
</tr>
<tr>
<td>70-79.99 points</td>
<td>C</td>
</tr>
<tr>
<td>60-69.99 points</td>
<td>D</td>
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</table>
10. Academic Integrity

Work done for this course must adhere to the University Academic Integrity Policy, which you can review in the *Student Handbook* or by visiting [http://studentaffairs.depaul.edu/homehandbook.html](http://studentaffairs.depaul.edu/homehandbook.html).