Geog406 Advanced Geographic Information Systems

Instructor: Dr. Yifei Sun  
Assistant professor  
Department of Geography  
California State University, Northridge

Telephone: (818) 677-3529  
E-mail: yifei.sun@csun.edu  
Office: Sierra Hall 130E  
Meeting room: Sierra Hall 107

Prerequisite:  
Geog306 Intermediate GIS

Textbook  

Course Goals and Outcomes

Goals  
This course assumes that the students understand the basic concepts in GIS and are proficient in using ArcGIS basics. The students will be exposed to advanced GIS topics such as: raster data modeling and analysis, image analysis, spatial analysis, linear reference system, on-line GIS and GIS project management. In addition to working with tutorial materials on advanced operations in ArcGIS, students need to work on a major project. They will be responsible for setting up the research question, collecting the data, conducting the analysis, and reporting the results.

Outcomes  
After taking this class, students are expected to be able to work independently with ArcGIS. They should be able to come up with their own questions and answers using GIS. Labs are designed to help students get familiar with ArcGIS.

Since this is a three-credit course with a “2+1” split between lecture and lab, it is necessary to have some degree of flexibility in lecture/lab combinations. Lectures and labs will not be separated completely. Lab time is allocated to get students familiar with the techniques and to work on their exercises and projects. The instructor will be in the lab to answer your questions during lab time. If you cannot finish your work during the assigned time, you need to find your own time to finish the assignments.
Tentative Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture Topics</th>
<th>Lab Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction and web design</td>
<td>Lab 1: Web design</td>
</tr>
<tr>
<td>2</td>
<td>GIS Review</td>
<td>Lab 2: On-screen digitizing</td>
</tr>
<tr>
<td>3</td>
<td>Spatial Modeling</td>
<td>Lab 3: Modeling</td>
</tr>
<tr>
<td>4</td>
<td>Raster Data Structure</td>
<td>Lab 4: Raster data analysis</td>
</tr>
<tr>
<td>5</td>
<td>Raster Data Analysis</td>
<td>Lab 4 cont</td>
</tr>
<tr>
<td>6</td>
<td>Terrain Analysis</td>
<td>Lab 5: 3D Analysis</td>
</tr>
<tr>
<td>7</td>
<td>Monday, Oct. 10th, <strong>Mid-term Exam</strong></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Lab 6: Mini-Project I</td>
</tr>
<tr>
<td>9</td>
<td>Image Analysis</td>
<td>Lab 7: Image analysis</td>
</tr>
<tr>
<td>10</td>
<td>Spatial Interpolation</td>
<td>Lab 8: Geostatistics</td>
</tr>
<tr>
<td>11</td>
<td>Network Analysis</td>
<td>Lab 9: Linear reference system</td>
</tr>
<tr>
<td>12</td>
<td>Global Positioning Systems</td>
<td>Lab 10: Mini Project II</td>
</tr>
<tr>
<td>13-14</td>
<td>On-line GIS</td>
<td>Lab 10 Cont.</td>
</tr>
<tr>
<td>15</td>
<td>Working on individual projects</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Presentation and poster</td>
<td></td>
</tr>
</tbody>
</table>

**Final Exam: Dec. 14\textsuperscript{th} 15:00 pm – 17:00 pm**

5:00 pm Dec. 16\textsuperscript{th}: Project poster due

Grading Policies and Requirements

Grading for lectures and labs will be combined. The grading items and grading system are listed as below.

1) **Grading items**

   - Mid-term Exam 20%
   - Final exam 20%
   - Lab assignments 30%
   - Student project 20%
   - Attendance and participation 10%

The grading items for the project will include:

- Poster 70%
- Project presentation 30%

Final grades will depend on the students’ absolute performance. In other words, the students’ scores will not be curved. Therefore, there is no limit of “A’s”. However, to
pass the course, all students MUST complete the final project AND both the exams. Otherwise, the students may be assigned a grade “I”.

2) **Exam (40%)** Each exam will counts 20% for the final grade and the final exam will be non-cumulative. No make-up exams will be given except in extremely unusual situation.

3) **Lab assignments (30%)**. Students are expected to post all of their assignments on their homepages before the due date. Late submission of assignments will get a 10% penalty for each day late. Assignments late more than a week without the instructor’s approval will not be accepted.

4) **Student project (20%)**. Students are expected to work on a project of their own and there are no restrictions on the topics for the project. However, the project should involve some major functions of spatial analyses and simply creating a few maps is not qualified as a project. Students are more than welcome to combine the project with assignments from other courses. The project will be evaluated based on the poster and the project presentation. Students are required to create a poster, which should be well designed and organized.

5) **Presentations**. Each student is expected to give a 10-minute presentation on the project, followed by questions and comments from the class. The class and the instructor will judge the quality of the presentation, which will be incorporated into the final grading.

7) **Attendance and participation (10%)**. Students need to come to class on a regular basis. Each student is allowed three absences without approval, after which ten points will be deducted from the final grade. The approved absences are only granted when the instructor is notified and agrees in advance.

8) **Academic honesty**

   Each student is expected to work independently and cheating could lead to a grade of “F”.

**Note:** this syllabus is tentative and subject to change. It is the students’ responsibility to be aware of all the changes that are announced in class.