Introduction to Geographic Information Systems
GEOL 4385/5315
Spring 2014
CRN: UG 27491-001, GR 27492-002

Instructor: Dr. Deana Pennington
Office: Classroom Bldg C401/Geo x (Cyber-Share)
Hours: W 9:30-10:30 am (after class) or by appointment
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Phone: 747-5867

TA: Yvette Pereyra
Email: ypereyra@miners.utep.edu

TIMES
W Lecture 8:30-9:20 am Geo 302
F Lecture 12:30-1:30pm Geo 409
F Lab 1:30-3:20 pm Geo 409
Open access to lab 8-5 M-F

DESCRIPTION
This course introduces students to the fundamentals of geographic information systems using a combination of lectures and hands-on computer exercises using ESRI ArcGIS 10.1 software. The lectures focus on the science behind the software, the issues surrounding the use of the software, and the fundamental nature and analytical use of spatial information in various forms. For some students, the laboratory exercises will be considerably easy. For others, the laboratory exercises will be very challenging. This course seeks to serve a broad enrollment of student backgrounds and experiences.

LEARNING OBJECTIVES
Students will gain a basic understanding of fundamental GIScience concepts and basic skills in the use of the ArcGIS software including:

- Understanding GIS capabilities
- Understanding GIS data
- Capturing and integrating GIS data
- Conducting spatial analysis
- Creating visualizations that communicate spatial information
- Conducting and documenting GIS projects

REQUIRED MATERIALS
The text includes content for both the lecture and the lab. You must have the text in hand on Fridays in order to complete the lab.

Blackboard: All additional course materials and announcements will be provided through Blackboard. Students should verify as soon as possible that the course is available to them in Blackboard, and check Blackboard regularly for new additions.
Lecture notes: Lectures will build on and go deeper than the information provided in the text. Tests will include information provided only in the lecture. Hence, you are required to attend both lecture and lab. Lecture slides and notes will be made available.

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**GRADING**

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Exams (100 points each)</td>
<td>200</td>
<td>40%</td>
</tr>
<tr>
<td>1 Lab Exam</td>
<td>100</td>
<td>20%</td>
</tr>
<tr>
<td>14 Labs (5 points each)</td>
<td>70</td>
<td>14%</td>
</tr>
<tr>
<td>1 Project</td>
<td>100</td>
<td>20%</td>
</tr>
<tr>
<td>30 Forum posts (1 point each)</td>
<td>30</td>
<td>6%</td>
</tr>
<tr>
<td>Total</td>
<td>500</td>
<td>100%</td>
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</tbody>
</table>

Extra credit: 30 points possible

Letter grades:
A >= 90%
B >= 80%
C >= 70%
D >= 60%
F < 60%

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**EXAMINATIONS**

Two lecture exams will occur. The first will cover lecture material from weeks 1-7. The second will cover lecture material from weeks 9-13. Lecture material for weeks 14-16 will be incorporated into the student’s final project described below. There will be a final lab exam in week 16. There will not be a final exam.

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**LABS**

Your work in the lab may require substantial time, depending on your level of computer expertise. The textbook includes lab exercises at the end of each chapter with step-by-step instructions, as well as a DVD with video tutorials. The teaching assistant will be available throughout the lab to assist as needed. You are required to attend lab and conduct your work during that time. There are several reasons for this:

- The TA has specifically set aside time to help you during this period. It is an abuse of her time to ask questions about the lab throughout the week.
- All of the resources that you will need are available in the lab.
- We can verify that you have done your own work.

Lab exercises are due the following Friday at the beginning of class at 12:30. 20% will be deducted each day of delay, counting weekend days. Late labs will not be accepted after 8:30 am the following Wednesday (beginning of lecture).

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**WEB SITE OF THE WEEK**

On Monday of each week (except week 16) I will post a new website that has an interesting geospatial application. Spend some time looking at the website and testing its functionality. Then, go to the Blackboard forum about that website. I will provide some starting discussion threads about the website. Post at least two comments in the forum about the website. You may reply to my posts, other students’ posts, or start a
new discussion thread. The posts must be made sometime that week (by 11:59 pm Sunday night) in order to receive credit.

**Extra credit:** Each student may submit up to two websites of interest along with three suggested forum threads for each. I will assess these for relevance. They must provide some kind of GIS functionality (websites that show regular maps will not be accepted). Each accepted website/forum thread set will earn 10 points of extra credit. If I select your submission as a website of the week, you will earn an additional 5 points of extra credit. ***NEW: The extra credit websites must be submitted by midnight, Friday April 18 to receive credit.

**PROJECT**

Information regarding project expectations will be provided during lectures. Parts of the project will be due throughout the semester, culminating in the full project due date at the end of the semester. The project will be graded as follows:

- **5 Goals and objectives**
  - **UG:** 2 examples of similar projects – 1/2 page description
  - **GRD:** 5 examples of similar projects – 1 page description
- **5 Literature review**
  - **UG:** 2 examples of similar projects – 1/2 page description
  - **GRD:** 5 examples of similar projects – 1 page description
- **5 Conceptual model**
- **5 Data types, sources, and accuracy assessment**
  - **UG:** list at least 3 relevant sources
  - **GRD:** written assessment of more than 5 sources including why they are to be trusted
- **20 Methods**
  - **UG:** 1 page description (single spaced)
  - **GRD:** 2 page description (single spaced)
- **20 Findings**
  - **UG:** 1 page description (single spaced)
  - **GRD:** 2 page description (single spaced)
- **30 Map presentation**
- **10 Metadata**

100 Total

**POLICIES**

Assignments.

All assignments are expected to be on time. There will be a 20% penalty each day that an assignment is late, up to a maximum of 5 days, including weekends. No assignments may be submitted more than 5 days beyond the due date.

The lab is an open environment and students are encouraged to discuss their issues and collaborate. However, expository assignments must be written by each individual student, and be a product of their own work.

The projects must be unique for each student. While multiple students may choose similar problems to work on, the many alternative solutions provided by GIS make it
unlikely that data sources and solutions will be duplicated, and the many alternative presentation mechanisms guarantee that each final product will be unique. Duplicate content across multiple students’ projects will result in a 0 grade for those students. Blackboard provides functionality that checks student submissions for matches in a variety of sources on the web, and can identify similar text. Do not extract text from the Web. Cite anyone else’s work that you incorporate into your own.

Scholastic dishonesty will not be tolerated. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

Attendance. Lecture and lab attendance is mandatory. Assignments must be turned in promptly at the beginning of class on the day they are due. Recurrent late show-ups will have an adverse effect on your grade (20% reduction each day an assignment is late, beginning immediately after the start of class). You must be present in the lab and complete the work during the allotted time in order to receive any credit for that lab (automatic zero lab grade for non-attendance). Students may not leave the lab with the intent to finish it at another time. If you have an illness or another emergency, notify me as soon as possible and provide written documentation. Three unexcused absences will result in a student being dropped from the course.

Classroom. All students are expected to be attentive during lectures. Electronic devices (cell phones, tablets, iPods) may not be used, and will be confiscated. Any disruption of class or interference with other students will not be tolerated.

Students with disabilities. If you have a documented disability and require specific accommodations, please see me personally and contact the Disabled Student Services Office located in the East Union Building, Room 106, http://www.utep.edu/dsso, as soon as possible to ensure accommodations are provided in a timely manner.
### REVISED SCHEDULE MARCH 13, 2014

<table>
<thead>
<tr>
<th>DATE</th>
<th>WED LECTURE GIS THEORY</th>
<th>FRI 12:30-1:30 DEVELOPING APPLICATIONS</th>
<th>1:30 LAB</th>
<th>DUE</th>
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</thead>
<tbody>
<tr>
<td>W1 Jan 22, 24</td>
<td>Lecture: Introduction</td>
<td>Maps and meaning</td>
<td>Intro</td>
<td></td>
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<tr>
<td>W2 Jan 29, 31</td>
<td>Lecture: CH 1 GIS data</td>
<td>GIS project planning overview</td>
<td>1</td>
<td>ArcMap document WSW forum</td>
</tr>
<tr>
<td>W3 Feb 5, 7</td>
<td>Lecture: CH 2 Mapping</td>
<td>Goals &amp; objectives</td>
<td>2</td>
<td>Lab 1 WSW forum</td>
</tr>
<tr>
<td>W4 Feb 12, 14</td>
<td>Lecture: CH 11 Coordinate systems</td>
<td>Lit review, constructing conceptual models</td>
<td>11</td>
<td>Lab 2 WSW forum Project: Goals &amp; objectives</td>
</tr>
<tr>
<td>W5 Feb 19, 21</td>
<td>Lecture: CH 4 DBMS and Attributes</td>
<td>Survey of applications</td>
<td>4</td>
<td>Lab 11 WSW forum Project: Lit review (2 articles)</td>
</tr>
<tr>
<td>W6 Feb 26, 28</td>
<td>Lecture: CH 14 Data models &amp; structures</td>
<td>Review for exam</td>
<td>14</td>
<td>Lab 4 WSW forum</td>
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<tr>
<td>W7 Mar 5, 7</td>
<td>Class cancelled</td>
<td>Class cancelled</td>
<td>Lab 14 WSW forum</td>
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<tr>
<td>W8</td>
<td>Spring break</td>
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<tr>
<td>W9 Mar 19, 21</td>
<td>Lecture: Modeling data</td>
<td>EXAM 1: GIS DATA</td>
<td>12</td>
<td>WSW forum</td>
</tr>
<tr>
<td>W10 Mar 26, 28</td>
<td>Lecture: Queries, joins, &amp; vector analysis</td>
<td>(2 labs – no application work)</td>
<td>5, 6</td>
<td>Lab 12 WSW forum Project: Conceptual model</td>
</tr>
<tr>
<td>W11 Apr 2, 4</td>
<td>Lecture: Raster analysis</td>
<td>Project requirements; Constructing logical analytical models</td>
<td>7</td>
<td>Lab 5, 6 Project: List of data types &amp; sources</td>
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<tr>
<td><em>W12 Apr 9, 11</em></td>
<td>No class</td>
<td></td>
<td>8</td>
<td>Lab 7 Project: Logical analytical model</td>
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<tr>
<td>W13 Apr 16, 18</td>
<td>Lecture: Spatial problems EXAM 2: SPATIAL ANALYSIS</td>
<td>No lab</td>
<td>Extra credit websites</td>
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<tr>
<td>W15 Apr 30, 2</td>
<td>Lecture: Future of GIS</td>
<td>Work on projects</td>
<td>Lab 3, 15</td>
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<tr>
<td>W16 May 7, 9</td>
<td>No class</td>
<td>Work on projects</td>
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<tr>
<td>W17</td>
<td>FINAL PROJECT DUE SATURDAY MAY 17 AT NOON – upload to Blackboard</td>
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Dr. Pennington is out of town these weeks