CVEN 658 Civil Engineering Applications of GIS
Fall 2006

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Office hours: Mondays and Wednesdays 10:30 am – 11:30 am

Schedule: Lectures: Mondays and Wednesdays 11:30 am – 12:20 pm at CE 217.
Laboratory: Friday 3:00 pm – 5:50 pm at CE 217.

Objectives: This course discusses the fundamental concepts of geographic information systems (GIS), the methods and software used to implement them, and their applications to solve civil engineering problems. After taking this course, the students will be able to use GIS tools to approach civil engineering problems.

Prerequisite: Graduate standing or instructor’s approval.

Class web page: http://ceprofs.tamu.edu/folivera/GIS-CE/Fall2006/home.htm
The class web page includes an Announcements page in which last-minute information will be posted. Students are expected to access the Announcements page at least each other day.

Textbook: None

Class notes Class notes in Power Point format and tutorial exercises will be posted online.

Grading:

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tr>
<td>Laboratory assignments</td>
<td>10%</td>
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<tr>
<td>Literature and data reviews</td>
<td>10%</td>
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<tr>
<td>GIS database development</td>
<td>10%</td>
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<tr>
<td>Class attendance and participation</td>
<td>10%</td>
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<tr>
<td>Two tests</td>
<td>30%</td>
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<tr>
<td>Term project</td>
<td>30%</td>
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The laboratory assignments grade cannot be more than 1.1 times the average test grade. The literature and data review grade cannot be more than 1.1 times the average test grade. The GIS database development grade cannot be more than 1.1 times the average test grade. The class participation
grade cannot be more than 1.1 times the average test grade. The term project grade cannot be more than 1.2 times the average test grade.

Letter grades will be assigned according to: A (100 – 90), B (89 – 80), C (79 – 70), D (69 – 60) and F (less than 60). Numeric grades will be rounded to the nearest integer.

**Laboratory assignments**
Assignment solutions must be handed-in at the end of the session. All laboratory work will be conducted at TAMU – Department of Civil Engineering facilities where software licenses are available.

**Literature reviews**
Students have to prepare four 300- to 400-word article reviews. At least two of the select articles must be related to the student's term project. Articles published in the previous five years in technical journals and other nationally or internationally recognized periodicals are required. Students should submit a list of complete references of the articles they plan to review by **9/11/06** for approval. An article cannot be reviewed by more than one student. Exceptions to this rule will be considered on a case-by-case basis. Article reviews are due on **9/18/06, 9/25/06, 10/2/05** and **10/9/05**.

**Tests**
Two tests will be given. The first test will cover half the material and the second test all the material discussed in class. Questions related to reading material may also be included. Test 1 is scheduled for **10/27/06**, and Test 2 for **11/17/06**.

**GIS database development**
Develop a database of GIS data of a city, county or hydrologic cataloging unit. In developing the database, stress what is most important in your field (water resources, transportation, public works, urban planning, and regional planning, among others). Prepare color paper maps that display the information. Prepare a list of the data you found including: (1) what it is, (2) who developed it, (3) area covered, (4) scale (i.e., level of detail), (5) map projection, (6) information contained in the attribute table, and any other matter you deem necessary. The GIS data review is due on **10/23/05**.

**Term project**
Prepare a paper on an application of GIS in your field of study. Submit the title and a 150-word description of your proposed term project by **10/16/06** for approval. In your
proposal, indicate the main idea of your project and how GIS is going to be used, the data you plan to use and the methodology to solve the problem. **Be original and creative!!!** Deliver your term project in PDF format by **12/4/06**, ready to be posted in the class web page. The final report should include: *Header* [Texas A&M University, Department of Civil Engineering, Instructor: Dr. Francisco Olivera, CVEN658 Applications of GIS to Civil Engineering, <project title>, <author> and <date>], *Abstract* [Stand-alone 200-word summary of your project], *Introduction* [(1) What is your project about?, (2) Why is your project topic important?], *Literature review* [(1) What has been done in the past?, (2) What is new in your project?], *Methodology* [What are the methods of analysis used in your project? If possible, this section should not be specific to the selected study area], *Application, results and discussion* [(1) What is the study area?, (2) What is the data you used, (3) What are the results of your analysis, (4) What do your results mean?], and *Conclusions* [What has been learned from this project? This section should not include any concept not discussed in any of the previous sections]. Likewise, prepare a poster (**24" x 36" in portrait format**) that summarizes your work. The poster should include a label [Texas A&M University, Department of Civil Engineering, Instructor: Dr. Francisco Olivera, CVEN658 Applications of GIS to Civil Engineering, <project title>, <author> and <date>], maps, tables and text. Feel free to use of charts, tables and/or pictures to better convey the information. Deliver the poster in hard-copy by **12/4/06. Do not laminate it.** Additionally, present your work in a 15-minute presentation at the end of the semester on the day and time assigned. Link your project report to your poster and presentation.

**Final Exam:**
No final exam will be scheduled

**Outline:**

- Class 1 - 3: Introduction to GIS and ArcGIS
- Class 4 - 5: ArcMap and Visualization
- Class 6 - 7: ArcCatalog and Geodatabases
- Class 8 - 9: Map Projections
- Class 10: Getting Data
- Class 11 - 13: Map Analysis with vector Data
- Class 14: Creating and editing feature data
- Class 15: Creating and editing tabular data
- Class 16: Map analysis with raster data
- Class 17 – 18: Map analysis with grid data
Lab: Test 1
Class 19: Map analysis with grid data
Class 20: Map analysis with network data
Class 21 – 24: Student presentations.
Lab: Test 2
Class 25 – 27: Student presentations.
Class 28: Evaluation
Lab: Project submission

It is the student’s responsibility to be fully acquainted and to comply with the University Student Rules (http://student-rules.tamu.edu).

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of student Life, Services for Students with Disabilities in Room 126 of the Koldus Building, or call 845-1637.

“An Aggie does not lie, cheat, or steal or tolerate those who do.” Students are expected to understand and abide by the Aggie Honor Code presented on the web at: http://www.tamu.edu/aggiehonor No form of scholastic misconduct will be tolerated. Academic misconduct includes cheating, fabrication, falsification, multiple submissions, plagiarism, complicity, etc. These are more fully defined in the above web site. Violations will be handled in accordance with the Aggie Honor System Process described on the web site.

Unless specifically allowed in advance by the instructor, all assignments and homework in this class are expected to be completed based on individual effort. Copying the work of others, including homework, is a violation of Texas A&M Aggie Honor Code, Cheating.

The handouts used in this course are copyrighted. By “handouts,” I mean all materials generated for this class, which include but at not limited to syllabi, notes, quizzes, exams, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts unless I expressly grant permission.