CVEN 658 Civil Engineering Applications of GIS  
Fall 2009

Instructor: Francisco Olivera, Ph.D., P.E.
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Office hours: Wednesdays and Fridays 2:40 pm – 3:40 am

Schedule: Lectures: Wednesdays and Fridays 1:50 pm – 2:40 pm at CE 217.
Laboratory: Monday 1:50 pm – 3:40 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 address civil engineering problems.

Prerequisite: Graduate standing or instructor’s approval.

Class web page: http://ceprofs.tamu.edu/folivera/GIS-CE/Fall2009/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 homework exercises will be posted online.

Grading: Homework assignments 10%
Article summaries 10%
GIS database development 10%
Class participation 10%
Two tests 40%
Term project 20%

The grade in homework assignments, article summaries, GIS database development, class attendance and participation and term project grades cannot be more than 1.05 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.

**Homework assignments**

Homework assignment must be handed-in at the end of the Monday sessions. All homework work can be conducted at TAMU – Department of Civil Engineering computer labs where software licenses are available.

**Article summaries**

Students have to prepare four 300- to 400-word article reviews. Only articles that discuss GIS theory or applications and that have been published in the previous five years in technical journals and other nationally or internationally recognized periodicals will be accepted. Students should submit a list of the articles they plan to review by 9/7/09 for approval. Use the ASCE style for listing references. An article cannot be reviewed by more than one student unless an exception is requested. Article reviews are due on 9/14/09, 9/21/09, 9/28/09 and 10/5/09.

**Tests**

Two tests will be given. The first test will cover half the material and the second test all the material discussed in class. Both test will be given I the month of November.

**GIS database development**

Develop a database of GIS data of a region. 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 11/23/09.

**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 10/12/08 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 a hardcopy and an electronic copy (in PDF format) of your term project by 12/7/08. 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].

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 charts, tables and/or pictures to better convey the information. Deliver the poster in hard-copy by 12/1/08. Do not laminate it.

Give 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 is 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 – 19: Map analysis with raster data
Class 20: Map analysis with network data
Class 21: Interaction with GoogleEarth.
Class 22 – 27: Student presentations.
Class 28: Evaluation
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.” Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. For additional information please visit: http://www.tamu.edu/aggiehonor/

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.

Cheating on quizzes and exams will not be tolerated. Cheating will be reported and handled in accordance with the Aggie Honor System Process. Some or all examinations will be closed book; “looking at another student's examination or using external aids (for example, books, notes, calculators, conversation with others, or electronic devices)” during these examinations is a violation of Texas A&M Aggie Honor Code.

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.