

There are four questions on this exam. They are of equal credit. Do all four questions, preparing a 2-page typed theme paper for each. *Staple all four solutions together in the order of the questions*, and turn in the result to the CEE secretary in EC211 by 5PM on Friday, December 13. This is a take-home exam. You are honor bound not to discuss this exam with your colleagues in the class. Your answers should be the result of your work and thought alone. Be assured that if essentially the same idea appears in answers from more than one person, it is fairly easy to recognize that when the grading is being done. If that happens, it is not clear from whom the idea originated and who is just using somebody else's knowledge. So, keep your ideas to yourself!

The term papers that you choose to describe in answering Questions 1 and 2 should be mutually exclusive, that is, if you focus on a particular term paper in answering one of the questions, don't focus on the same paper when answering the other question. The Texas class term project listing can be found at:

<http://www.ce.utexas.edu/prof/maidment/giswr2002/docs/termprojlist.htm>

The Utah class term project listing can be found at:

<http://ceefs.cee.usu.edu/>

You can use projects from either location in preparing your answers.

What I am looking for in grading your answers is:

- **Knowledge of the facts.** Make sure you lay out the facts of what has actually been done before you start offering opinions about what could have or should have been done. This particularly applies to the discussion of term papers. Make sure you discuss what was actually done in the term paper not just about the general subject itself.
- **Thoughtful evaluation.** How do you evaluate the advantages and limitations of the principles, methods and data that have been used? How does the knowledge you've learned in this class relate to the world around us? I am looking for a sense of reflection here, of seeing you set individual situations and facts in a larger context in an intelligent way.

Questions

1. Summarize and Critique a GIS in Water Resources Application

Choose a single term paper (not your own!) that you think is interesting and effective. Summarize the content of the paper, describing the nature of the problem examined by the author, how the investigation was carried out, and what results were achieved. Explain why this paper appeals to you. Why is the problem it addresses important? What insights or new knowledge does this paper contribute? What makes the investigation described by this paper an effective implementation of GIS technology? What makes the presentation of the paper effective in terms of communication? How could the paper

have been improved? What are the advantages and limitations of the methods used in the paper?

2. Compare and Contrast Two Applications Dealing with the same Theme

Choose two term papers that deal with the same or similar themes or topics. These papers should be different than the paper you chose to answer Question 1, and neither of them should be your own term paper. Briefly summarize the contents of the papers (the problem examined, the method of analysis, the results achieved). Compare and contrast the approaches to the problem that the two papers took. Which technical approach do you think was more effective? Why? Which paper does a more effective job of communicating its results? Why? Suppose you were undertaking a study of this same subject. Having studied these two papers, what have you learned about how to go about your investigation effectively? What would you do differently from what the authors of these papers did?

3. Fundamental Principles of ArcHydro

GIS in Water Resources is a constantly evolving subject because of advances in available technology and data. One of the most recent advances that you learned about in this class was **ArcHydro**. All intellectual knowledge must be built on enduring principles, which are stable even while technology and data evolve. Think back to your work with ArcHydro and identify what you consider to be the **four** most important principles or ideas that you learned. These principles should not overlap with one another and they should span the different uses of ArcHydro. Taken together, they should be the things that if you were talking to somebody about ArcHydro you might say: "The most important thing to understand about ArcHydro is ...". Use about half a page to outline each principle or idea, describing why you think it is important, and give an example of its application from the course itself or one of the term papers that may have used it. You can use a diagram in your description of a principle or idea if you want to do so.

4. Assess the State of GIS Technology in a Particular Application Area

The term papers that have been presented in class are in five subject areas (water quality, water resources, marine and coastal systems, groundwater and geology, and spatial analysis). You may also choose a group of term papers from those presented at Utah State University if you would like to do that. Choose one of these subject areas and make an assessment of the state of GIS technology for solving problems in this area. This can be the area in which your term paper was presented. What problems can we solve effectively today? What are the strong points of data presentation and analysis in GIS? What data are available? What data would it be useful to have available that we don't have now? What limitations are apparent? What problems that we would like to solve are as yet unsolved? What advances do you think can be made within the next year? What problems remain so far out of reach that they are unlikely to be solved for a number of years? Where is progress limited by a lack of knowledge and understanding rather than technology?