GEO 444
Applied Groundwater Modeling

Semester Project

Thirty-five percent (35%) of the final grade for the course will be based upon a semester project of your choice. Projects must represent new work areas, but may be related to thesis research or an addition/extension to an existing project. Modeling will be at the heart of the project, and there must be a quantitative emphasis to the work. Examples of potential studies include:

1. Evaluating the flow of an area in response to a flood.
2. Comparison of simulated flow in response to different hydraulic parameters (i.e. a sensitivity analysis).
3. Predicting the movement of a chemical plume.

Some important deadlines that must be observed are:

1. Topic Selection – September 7, 2011 (10%)
   The instructor must approve all topics by this date.

2. Project Proposal – October 7, 2011 (25%)
   The proposal should be well written and will serve as a professional document. The proposal will follow National Science Foundation (NSF) requirements. Page limit is 15 pages including body, figures, and tables; references are not included in the 15 pages. Text will be single-spaced and at a font no smaller than 10 point. Page margins will be 1 inch. The proposal should have the following: a statement of the problem to be solved (a hypothesis); a brief literature review that includes a statement of justification; methods and materials that will be used to solve the problem; the anticipated outcomes of the project; and the broader impacts of the project. At a minimum, you will need to cite 7 published articles in your proposal or you will receive an automatic zero.

   The proposals will be reviewed by your peers, so be sure that they are high quality and support the proposed work. The reviewer will examine the soundness and scientific merit of the proposals.

   All materials and equipment, within reason, will be supplied. Computer accounts are available on the ISU servers.

   The proposal will be submitted electronically by the end of the day (5:00PM) on October 7.

3. Peer Review of Proposals – October 21, 2011 (15%)
Everyone will be given the opportunity to review a number of proposals. The reviews will be anonymous, and are intended to be both critical and constructive of the proposal. Students will be graded on the assessment of their proposal reviews. As a reviewer you will evaluate the technical and scientific merit of the proposed work.

4. Final Reports – Last week of class (written—Dec 2nd and oral—during final exam time)

The reports will consist of a 15-minute oral presentation (20%) and a written report (30%). The oral report should follow the format used by GSA. The reports will be presented during the last week of class. Order of the presentation will be determined at a later date. The presentation will be reviewed by both Dr. Peterson and your peers following a pre-established grading rubric.

The format of the paper should follow the general publication instructions for manuscripts submitted in journals in the hydrogeology field (if you need a reference see the Journal of Hydrology, Hydrogeology Journal, Ground Water, or Water Resources Research). The following items will be included in the written report:

**Title Page:** should include student, title, and an abstract (see below)

**Abstract:** A brief summary of the work, limit 250 words (included on the Title Page).

**Introduction:** A brief statement of the purpose and significance of the topic along with the questions being addressed. This section will also provide a scientific background discussing the work done by others in a similar area/topic and how it relates to your work.

**Methods/Materials:** Description of how the question was answered.

**Results:** Report the outcome from the methods/materials used. Whenever and wherever possible, present you data in tables and graphs. Avoid lengthy discussion of results unless explanation is essential.

**Discussion:** Discuss, interpret, and evaluate your data. Compare your findings with the findings reported in recent scientific papers by citing the work of others. Results and discussion may be combined into a single section if you wish.

**Reference List:** Include all published works cited in the text and (or) figure captions. The reference list may be single-spaced and written in a smaller font. **As a minimum, you will need to cite 10 references within your paper that are from scientific journals, or a grade of zero will be assigned to the interpretation of data section.**

Typewritten reports are essential. Keep in mind that the salient features of a scientific paper are accuracy, brevity, and clarity.

The written report will be submitted electronically by the end of the day (5:00PM) on Dec. 2. The paper itself must be less than 30 double-spaced pages, including figures, graphs, tables, etc. The font may not be smaller than 12. Please use 1-inch margins.