GEO 435
Introduction to Groundwater Modeling

Semester Project

A portion 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. Obviously, the topic selected must be related to hydrogeology. Modeling need not be essential, but there must be a quantitative emphasis to the work. Examples of potential studies include:

1. Evaluation of the impact of storms on thermal transport
2. Use of thermal data to determine specific discharge
3. Comparison of numerical solutions to slug test data reduction.
4. Analysis of temporal chemical data.
5. Analysis of the variability in solutions to multiple pumping tests at one location.
6. Flow modeling
7. Thermal modeling

Some important deadlines which must be observed are:

1. Topic Selection – January 29 (5 points)
   Submit a topic by e-mail. All topics must be approved by the instructor by this date.

2. Project Outlines – February 26 (25 points)
   The outline can be up to 2 pages and must provide a statement of the problem to be solved (a hypothesis), a statement of justification, methods and materials that will be used to solve the problem, and a literature review that includes at least five sources from the scientific literature (peer reviewed articles either printed or electronic). Essentially, this outline will be the introduction and methods of the paper but in outline form. All materials and equipment, within reason, will be supplied. The outline will graded using the outline rubric.

3. Final Presentation –April 29 & Assigned Final Exam Time (20 points)
   The oral report will be 15 minutes, which will consist of 12 minutes for the talk and 3 minutes for questions. You will be graded on both the content of the presentation as well as your ability to stay within the time limit (maximum 12 minutes of speaking). The presentations will be evaluated by Dr. Peterson (75% of the presentation grade), your peers, and you using a pre-designed rubric (25% of the presentation grade). The reports will be presented in class on April 29 and May 1. Order of the presentation will be determined at a later date.

4. Final Paper – April 15th (50 points)
   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 must be included in the written report:

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

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

**Introduction:** A brief statement of the purpose and significance of the topic. Question/hypothesis is clearly presented. 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. Academic/Peer-Reviewed References should be cited within the introduction. **If no Peer-Reviewed references are cited a zero will be assigned regardless of how well the section is written.** If you are unsure what qualifies as an Academic/Peer-Reviewed reference, see me.

**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. Be sure to talk about the results in context of the larger geology/hydrologic picture. This requires that you reference Peer-Reviewed work. **If no references are cited a zero will be assigned regardless of how well the section is written.** Results and discussion may be combined into a single section if you wish.

**Conclusion:** A summarization of the major findings of the paper and an addressment of the question presented in the introduction.

**Reference List:** Include all published works that are 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 Peer-Reviewed references within your paper that are from scientific journals, or a grade of zero will be assigned to the interpretation of data section. Follow GSA Bulletin format.**

Typewritten reports are essential. Keep in mind that the salient features of a scientific paper are accuracy, brevity, and clarity. A **paper-grading rubric** will be used to assess your work.

The written report will be submitted electronically by the end of the day (5:00PM) on April 15th. The paper itself must be less than 30 double-spaced pages, including figures, graphs, tables, etc. The font may not be smaller than 10. Please use 1 inch margins.