COURSE INFORMATION
GEO 435 Introduction to Groundwater Modeling
Spring 2016

Instructor: Dr. Eric Peterson  E-mail: ewpeter@ilstu.edu
Office: 439 Felmley Science Annex  Office Hours: 9:00-10:00 MW or by appointment

Purpose of the Course:
1. At the end of the semester, students will be able to develop a model solution to a given problem.
   Including: designing a conceptual model, formulating the boundary conditions, applying the appropriate equation, and analyzing the results.
2. At the end of the semester, students will be able evaluate hydrogeologic situations to predict how altering given parameters will effect a system.

Suggested Text:

Reference Texts: See course webpage for link to the list

COURSE POLICIES

Academic Honesty: Any form of academic dishonesty will result in a zero for that exam or assignment, as well as possible disciplinary action. See your student handbook for University guidelines

Participation in Lecture: Students are responsible for all material covered in class, and thus your attendance is expected at all lecture sessions. Repeated unexcused absences will affect your Homework/Participation score. Students that have prior knowledge of absences on lecture, exam, or field trip dates owing to religious, athletic, band, or other legitimate ISU sponsored activities should give Dr. Peterson at least one-week prior notice of the absence.

GRADING:

There are three grading mechanisms in this class; an exam (which reflect an individual's ability to understand the conceptual, mathematical, and practical material), a project (which reflects your ability to develop a research project and see the process through completion), and homework/participation (which reflects an individual's ability to handle practical and theoretical calculations and interpret and summarize geologic data).

Examination (~March 2-4) 25%
Homework/Participation 35%
Project 40%
100%

Grading is done via a broken curve. That is, instead of following a normal curve with predetermined grade cut-offs, I look for natural breaks in the final grade distribution. These breaks become the dividing lines between letter grades, but shall under no circumstances result in grade cut-offs higher than the classical 90-80-70-60 levels.
Homework assignments will be given regularly and will cover material discussed in class. You will have at least one week to complete the assignment. Additional reading assignments will also be made that will be discussed in class. Everyone will lead at least one paper review over an additional reading (see Paper discussion Assignment). The review and discussion of the reading assignments will be part of the participation score. Each assignment will be weighted equally, despite differences in the points awarded per assignment.

The project will be modeled after a research project. Specifics of the project are discussed in a subsequent handout.

**DEADLINES ARE TAKEN SERIOUSLY IN THIS CLASS.** Think of it this way, in the environmental consulting field, companies are penalized (they pay penalties and/or fines) for missing deadlines. You could cost your company thousands of dollars by missing a deadline and may even lose your job. Think of this class as practice. PLAN AHEAD. Each assignment will be due by 5:00 PM on the date specified. Late assignments are accepted, but will be penalized 10% per day it is late. The date your assignments are due will be either provided in the upper corner of the assignment or posted clearly on the board. READ IT and HEED IT.

Tentative Course Schedule: (Schedule may be adjusted as needed)

Week 1: Review of Darcy’s Law and Conservation of Mass equation  
Week 2: Introduction to modeling – Why model?  
Week 3 and 4: LaPlace Equation  
Week 5: Boundary Conditions  
Week 6: Iterative Methods  
Week 7 and 8: Poisson’s Equation  
EXAM  
Week 9: Spring Break  
Week 10: Unconfined Aquifer – DuPuit Assumptions  
Week 11: Validity of Numerical Solution  
Week 12: Transient Flow  
Week 13: Explicit Approximation  
Week 14: Implicit Approximation  
Week 15: Calibration and Validation