Welcome to:
Ground Water Engineering  GEGN467
Eileen Poeter inside.mines.edu/~epoeter

Schedule Notes and Other Materials Posted:
inside.mines.edu/~epoeter/467/

Let’s Look Now --- WATCH FOR UPDATES!
inside.mines.edu/~epoeter/OfficeHours.htm

MON and WED 10-10:45
Any Time: epoeter@mines.edu
(Lab TA Tess Weathers tweather@mines.edu)

Supporting Materials:
* Applied Hydrogeology, 4th Edition
* Hydrogeology Laboratory Manual, 2nd Edition
* Internet
* Computers for use on class exercises
  please do not surf or email during class

Ground-Water Engineering
Geohydrology Hydrogeology
Groundwater-Hydrology
The Study of the Occurrence, Nature, Distribution, and
“Nature, to be commanded, must be obeyed” Francis Bacon
Geohydrologists
Are Problem Solvers and Decision Makers

Basic Tasks:
Identify Problem
Define Data Needs
Design/Conduct Study
Propose Alternative Solutions
Implement Preferred Solution

General Problems:
Water Supply
Waste Disposal
Environmental Planning
Construction
Solution Mining

Types of Employers:
Government
Industry
Research
Consulting
FORMAT

Recent Educational research has shown that ACTIVE LEARNING is the most Effective technique for understanding and retaining topic material.

It is best to cover less material, but understand it (and associated implications and problems) better.

Your instructor is a guide and a resource, not a "talking head". Studies have shown that "talking heads" (i.e. a lecturing professor) do not promote effective learning.

Other studies have shown that interaction with other students enhances the learning of all students.

The material for this class is not difficult for a CSM student.

TO LEARN, YOU MUST PARTICIPATE with GENUINE INTEREST.

One does not fully grasp concepts until they use them.

Confucius:
“I hear and I forget,
I see and I remember,
I do and I understand.”
Participation

means that you **review the class materials after each class** and make calculations (i.e. you **DO**!) as you explore the material.

Many materials are available to help you with this:
- CLASS EXERCISES & SOLUTIONS course web pages
- EXAM PROBLEMS FROM PREVIOUS YEARS & SOLUTIONS course web pages
- TEXT PROBLEMS & SOLUTION MANUAL (ed4) on reserve in library

Whenever you have trouble understanding concepts you can contact me at: office hours, by phone-mail, fax, or by email. **Email is the most effective and the most quickly answered.**

Class discussion is welcome at any time, as are questions pertinent to the subject matter. Sometimes the best lectures are those impromptu expositions that stem from your questions.

**Participation is a must** … this includes attendance, asking & answering questions, engagement in the demonstrations, involvement in the class exercises, working problems on your own, working with your classmates, and staying to work in the lab.

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Let’s take a minute for a photo so I can learn who you are
Exams
SEE EXPECTATIONS on Course web page

There will be 3 exams, 2 during the semester and a final.

Subject matter is Cumulative

A calculator is a necessity during exams

You may bring 3 pieces of paper with you to the exam with as much written on them as you wish, both sides, small print etc. (you can bring 3 new sheets to each exam + the sheets from the previous exam)

Creating such a sheet helps you study and provides the equivalent of an “open-book” exam without spending too much time paging through the book.

GRADING:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Lab</td>
<td>30%</td>
</tr>
<tr>
<td>Best of Exam I / II</td>
<td>30%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100%</td>
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</tbody>
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Homework must be turned in at the next class period unless I note differently. It must go in the HW box by the classroom door. Late homework will not be evaluated. Homework key will be posted by the day that the homework is returned.

If you miss one of the exams (I or II), the other exam is used for your exam score (NO MAKE UP EXAMS). If you miss the final, I offer a more challenging final during the last 2 hrs before formal recess for semester break.

In the event of H1N1 flu symptoms, [http://inside.mines.edu/Flu](http://inside.mines.edu/Flu), USE the STUDENT SELF-REPORT and we will work something out

Labs are due at the start of the next lab period unless an alternate time is specified. Grades on late lab work decrease 50% per day, so turning it in more than 24 hours late is only useful for getting feedback, not for earning class points. Therefore plan to complete your lab early so you aren’t caught with an unfinished lab if it turns out that you are not feeling well or some other crisis occurs the day or so before the lab is due.
LABS

Unless otherwise announced, labs are turned in at the start of the lab period the week following each assignment. Labs turned in later in that period until 12:30 Thursday are 1 day late and will have the score reduced by 50%. Labs turned in after that time will receive feedback but will not earn credit.

TEXT for the labs should be word processed but hand written calculations, graphs, data etc are appropriate as long as they are NEAT.

In your reporting, illustrate the tenets of engineering practice: neat, accurate, concise.

Fundamental Canons for Engineers
* hold paramount public safety, health and welfare including sustainable development
* perform services only in areas of competence
* issue public statements only in an objective truthful manner
* act as faithful agent or trustee for employer
* avoid conflicts of interest
* build professional reputation on merit (do not compete unfairly)
* uphold and enhance honor, integrity, and dignity of the engineering profession
* continue professional development throughout career and provide opportunities for the professional development of engineers under supervision

http://inside.mines.edu/~epoeter/_GW/ASCE_CodeofEthics.pdf
DEVELOPMENT OF GROUNDWATER THEORY

Ancient Philosophy

- Springs - gifts of gods / sites of temples
- All thought earth too impermeable and rainfall to little to supply rivers
- Water was thought to be sucked up from the earth to supply rivers

1600’s

- Perrault & Mariotte - Measured rainfall and estimated discharge from Seine, found it was only 1/6 of rainfall
- Perrault - Capillary experiments (<1m rise in sand)
- Mariotte - Measured seepage in cellar, found it varied proportionally with rainfall.
- Concluded springs fed by infiltration

- Halley - Crude evaporation tests in Mediterranean indicated evaporation was high enough to account for all water flowing to the sea

GENERAL CONCLUSION - EARTH IS LIKE A SPONGE

AS WE KNOW TODAY, GROUNDWATER IS EVERYWHERE, IT MAY NOT YIELD TO WELLS, BUT IT DOES NOT FLOW IN UNDERGROUND PIPES AND RIVERS!

DARCY - first to state the simple law describing groundwater flow in 1856