

Introduction of physical and chemical hydrogeology

GEO 346C, Fall 2013

Class details

Class room:	JGB 3.116
Undergrad computer lab:	EPS 2.103
Class time:	11:00 to 12:30
Unique:	27545
Prerequisite:	Chemistry 302 with a grade of at least C-
Description:	Basic concepts of fluid flow, surface and subsurface hydrology, aqueous geochemistry, and fluid-rock interaction. Additional topics include isotope hydrogeology, evolution of seawater, and mineral-solution equilibrium.

Instructors

Instructor:	Dr. Marc Hesse
Office:	EPS 3.152
Office hours:	Tuesday & Wednesday 5 to 6pm
Email:	mhesse@jsg.utexas.edu
html:	http://www.jsg.utexas.edu/hesse
Teaching assistant:	Lauren Andrews
Office:	EPS 3.122
Office hours:	TBD
Email:	lauren.c.andrews@gmail.com

Assessment

Grading: In this class we will use a \pm grading scale for the final grade. The final grade will be computed as follows:

Homeworks:	40%
1 st midterm:	15%
2 nd midterm:	15%
Comprehensive final:	25%
Class participation:	5%

Individual homeworks may be weighted according to length and difficulty.

Collaboration/Academic dishonesty: Homeworks can/should be discussed amongst students, but the solutions have to be written up individually. If you have discussed your homework with other students please note their names at the top of the homework (This will not affect your grade!). All students are expected to obey the UT Honor Code (<http://registrar.utexas.edu/catalogs/gi09-10/ch01/index.html>).

Late policy: Homeworks are (usually) due in class on Thursdays. Homeworks not received before the end of class are considered late. The score on late homeworks will be reduced by 10 percent for every week it is late. The *last chance* to hand in a homework to receive credit is the following midterm. If you know you won't be able to hand in your homework, due exceptional personal reasons, let me know as early as possible, at least a class before the homework is due.

Religious holidays By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Emergency evacuation The recommendations for emergency evacuation from the Office of Campus Safety and Security, 512-471-5767, (<http://www.utexas.edu/safety/> and <http://www.utexas.edu/emergency/>):

- Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.
- Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.
- Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class.
- In the event of an evacuation, follow the instruction of faculty or class instructors.
- Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.

Quantitative Reasoning flag

This course carries the Quantitative Reasoning flag. Quantitative Reasoning courses are designed to equip you with skills that are necessary for understanding the types of quantitative arguments you will regularly encounter in your adult and professional life. You should therefore expect a substantial portion of your grade to come from your use of quantitative skills to analyze real-world problems.

Course materials

No textbook is required, students will take notes in class. If you would like to look a textbook, *Applied Hydrogeology* by C.W. Fetter covers most of the materials in class and is on reserve in the Geology Library. Course materials will be posted on backboard <https://courses.utexas.edu/webapps/login/>.

Syllabus

week	dates	topics	homework
1	29 Aug	Introduction, Hydrologic cycle	HW 1
2	3 Sep, 5 Sep	Hydrologic balance, infiltration	HW 2
3 ¹	10 Sep, 12 Sep	Rivers: hydrographs and hydraulics	HW 3
4	17 Sep, 19 Sep	Porous media and Darcy's law,	HW 4
5	24 Sep, 26 Sep	Flow potential, heterogeneity	HW 5
6	1 Oct, 3 Oct	Darcy's law in 2D & 3D, gradients, contacts	
7	8 Oct, 10 Oct	review, 1st midterm exam	
8	15 Oct, 17 Oct	Streamlines, flow nets, regional flow	HW 6
9	22 Oct, 24 Oct	Wells, well testing	HW 7
10	29 Oct, 31 Oct	Capture zones and examples	HW 8
11	5 Nov ² , 7 Nov	Law of mass action, activity, aqueous complexing	
12	12 Nov, 14 Nov	review, 2nd midterm exam	
13	19 Nov, 21 Nov	Dissolution and precipitation of minerals	HW 9
14	26 Nov, (28 Nov)	Ion exchange and surface complexation	HW 10
15 ¹	3 Dec, 5 Dec	Contaminant transport, review	
16	11 Dec, 9:00 to 12:00 noon	Comprehensive final exam	

¹I am travelling, and lecture will be recorded.

²Election day