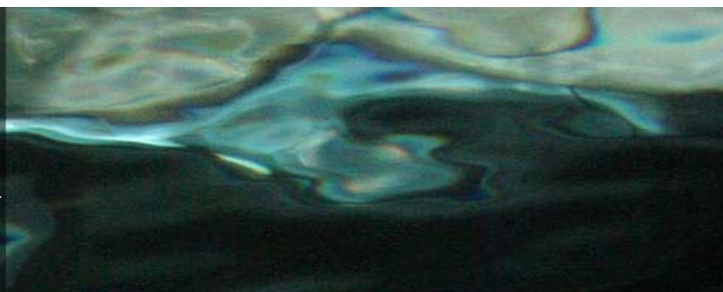


GEO 346C

Introduction to Physical & Chemical Hydrogeology



Introduction to Physical and Chemical Hydrogeology Lecture: TTH 11:00a – 12:30p, JGB 3.116 (27705)

GEO 346C introduces concepts from the Geological Sciences with a focus on groundwater. During the semester, we will introduce students to key physical and chemical topics in hydrogeology and use the knowledge base to quantitatively solve applied problems. This course is intended for science majors and pre-professional students but it is open to all students who meet the pre-requisite requirements, which include completion of introductory geology, calculus and inorganic chemistry.

Dr. Suzanne A. Pierce, Instructor

Office: JGB 2.314 (EPS Feb. 2011)

Email: suzpierce@jsg.utexas.edu

Office hours:

TTH, 12:45pm - 1:45pm

or by appointment

Jennifer Cessna, Teaching Assistant

Office: EPS 3.110

Email: jcessna@mail.utexas.edu

Office hours:

MW 3:00pm – 4:00pm

or by appointment

Required Materials: Applied Hydrogeology, 4th edition, by C.W. Fetter (2001) available at the University Co-op, or online (Amazon.com). You will also need to purchase an iClicker (also available at the University Co-op) for in-class participation to help me determine if everyone is on the same page or if I need to go over a concept again. **Register your iClicker on Blackboard no later than Tuesday, Jan 25th.**

Attendance: Attendance is expected and a portion of your final grade will be determined through in-class participation points (via iClicker). If you miss a class, you are responsible for assuring you obtain the course information.

Participation grading: One point will be given for each correct answer and a half point will be given for an incorrect response. (In the event of technical difficulties, you will get full credit for each answer that you attempt). Survey questions (no correct answer) will receive one point for any response. There will be no make-ups offered for missed lecture questions, but you will not be penalized if you have an excused absence. It is your responsibility to make sure that 1) your answer is recognized by the system, 2) your points are correctly posted on Blackboard, 3) your iClicker has battery power. Please notify us within one week if your iClicker point value is incorrect on Blackboard. Points will NOT be modified after this time.

Class Conduct Policy: I value your time and I want to engage with you in a productive learning process. At the same time, I expect you to value the time of your classmates, T.A. and Instructor by refraining from any distracting behavior (unnecessary talking, texting, etc.). I will promptly invite you to leave the class should I deem your behavior inappropriate and I will likely call you out for it rather publicly.

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Laptops, cell phones, iPads, and non-essential electronic devices: Are not welcome in this classroom. Please leave unnecessary devices outside of the class. Recognizing how important it is for you to have access to class notes and lecture materials. I will upload information prior to classes and, if possible, I will upload video files of lectures (this is pending technical feasibility testing).

Blackboard: Grades, lecture notes and announcements will be posted under the course title in Blackboard. Login via: https://courses.utexas.edu/webapps/login/?action=portal_direct_entry or access it from the University of Texas at Austin home page (www.utexas.edu). Check Blackboard regularly for updates and announcements.

Lecture Q&A Forum: A Discussion Board forum has been created on Blackboard called 'Lecture Q&A forum'. This is a space where students can help each other understand the course material by posting questions and answering other students' questions. This space will be moderated, but I will not answer questions here. This is a space for student interaction. Participation is voluntary. However as incentive, if you have posted substantively 10 or more times throughout the semester, your participation will be considered in your final grade.

Additional Considerations: For **students with disabilities**, please provide proper documentation from the SSD Office at the beginning of the semester. Policies outlined by the University at <http://www.utexas.edu/diversity/ddce/ssd/index.php> will be followed in this course.

Making up work or missed exams:

Academic Dishonesty: Of course, you are all upstanding citizens of the UT community. But just in case you need a reminder: academic dishonesty will not be tolerated. Any evidence of cheating or plagiarism may result in a failing grade for the course and/or disciplinary action. Please read the UT [Academic Policy](#) for more information.

Important Dates: **February 2nd** last day to drop without academic penalty.
 March 28th last day to withdraw or change to pass/fail.

Grading:

Participation (iClickers)	2.5 %	Attendance/participation
	2.5 %	In-class performance
Homework Assignments	30 %	Assignments
Exam 1	20 %	Material from Classes No. 1 - 9
Exam 2	20 %	Material from Classes No. 11 -18
Exam 3	25 %	Comprehensive Final Exam
		Material from Classes No. 1-30
	100 %	

Late work will receive a 10% penalty for the assignment per day late. Exams must be taken on the scheduled date unless prearranged with the instructor – not rescheduling will only be completed for significant and unavoidable reasons.

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Schedule by Topic

Week	Class No.	Date	Topic	Topics	Assignments & Reading ¹	Work Due
1	1	Tu, January 18	Introduction	Objectives, Grading, History of Hydrogeology	Ch. 1	
	2	Th, January 20	Introduction	Properties of Water, Hydrologic Cycle, Budget Components	Ch. 2 HW-1	
2	3	Tu, January 25	Groundwater Flow	Principles, Concepts, 'Energy', Solution Methods	Ch. 3 & 4	³ P- 1
	4	Th, January 27	Groundwater Flow	Fluid Potential and Kinetic Energy	Ch. 4 HW-2	HW-1
3	5	Tu, February 1	Groundwater Flow	Boundaries, Flow Nets, Conservation of Mass, Bernoulli Equation	Ch. 5	
	6	Th, February 3	Porous Media	² Role of Geology in Permeability, Porosity, Saturated/Unsaturated Zones	Ch. 3 HW-3	HW-2
4	7	Tu, February 8	Aquifer Tests	Storage, Elasticity, well hydraulics	Ch. 4 & 5	
	8	Th, February 10	Aquifer Tests	Analytical solutions, Numerical Methods, and Models	Ch. 5	HW-3
5	9	Tu, February 15	Aquifer Tests	Review ² online or guest lecture	Ch. 5	
	10	Th, Feb. 17th	²EXAM #1			
6	11	Tu, February 22		² No class/ Optional Video		
	12	Th, February 24	Groundwater Flow Systems	EXAM Review Characteristics, Models, and Parameters	Ch. 9 HW-4	
7	13	Tu, March 1	Aqueous Chemistry	Water Molecule and Major Constituents	Ch. 9 & 10	
	14	Th, March 3	Aqueous Chemistry	Major Constituents and Graphical Tools	Ch. 9 HW-5	HW-4
8	15	Tu, March 8	Aqueous Chemistry	Mass Transport and Characterization	Ch. 9	
	16	Th, March 10	Aqueous Chemistry	Processes and Water Quality Evolution	Ch. 10 HW-6	HW-5
***** Spring Break*****						

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9	17	Tu, March 22	Aqueous Chemistry	² Online or guest lecture		HW-6
	18	Th, March 24	Aqueous Chemistry	Groundwater Contamination and Pre-test review	Ch. 10	
10	19	Tu, March 29	EXAM #2			
	20	Th, March 31		Exam Review		
11	21	Tu, April 5	Surface & Unsaturated Zones	Surface Water, base flow, unsaturated flow	Ch. 2 & 6	
	22	Th, April 7	Groundwater Non-porous flow	Fracture flow and influence Subsidence	Ch. 12 HW-7	
12	23	Tu, April 12	Geology of Groundwater	Regional Groundwater Flow	Ch. 7	
	24	Th, April 14	Geology of Groundwater	Groundwater Occurrence	Ch. 8	HW-7
13	25	Tu, April 19	Geology of Groundwater	Hydrogeology of the US and Texas	HW-8	
	26	Th, April 21	Groundwater and Society	Texas Aquifers and Water Law	Ch. 11 Mace , 2003	HW-8
14	27	Tu, April 26	Groundwater and Society	Groundwater Management (optimization)	Ch. 11 & 13 HW-9	
	28	Th, April 28	Groundwater Field Methods	Groundwater monitoring, observations, Models and Case Studies	Ch. 12 & 13	
15	29	Tu, May 3	Modeling Case Studies	Groundwater Modeling and Case Studies (practical uses of what we've learned)	Ch. 13	HW-9
	30	Th, May 5		Final Review – Class Survey		
Friday, May 6th last class day for Spring semester [No class days – May 9-10, & 15]						
16	31	Thursday May 12 2:00p – 5:00p	FINAL EXAM (Comprehensive)			

Notes:

- 1 - Reading will be in Fetter. Additional reading will be assigned via Blackboard.
- 2 - Dr. Pierce on Travel – Class will be via either guest lecture or online video/Skype
- 3 – ‘P’ stands for participation. For the first class paper handouts were used instead of iCickers

I reserve the right to adjust course dates as needed and, if a change is necessary, I will notify the class via Blackboard as quickly as possible.

University of Texas Honor Code

The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.

The value of a university degree depends on the absolute integrity of the work done by each student. With that in mind, I expect a high standard of individual honor and respectful interactions in my courses. Unless a project is specifically designated as a group assignment, all work handed in is considered to be prepared by the student without assistance.

Breach of the standards of academic conduct, for example through plagiarism, will not be tolerated. If a student presents work that is not their own, they will receive a failing grade for the entire course.

Here is a statement from The University of Texas at Austin about plagiarism and the consequences of plagiarizing. <http://www.lib.utexas.edu/services/instruction/faculty/plagiarism/preventing.html>

If you are unsure what constitutes plagiarism please visit the following online learning module. <http://www.lib.utexas.edu/services/instruction/learningmodules/plagiarism>

Use of E-Mail for Official Correspondence to Students

E-mail is recognized as an official mode of university correspondence; therefore, you are responsible for reading your e-mail for university and course-related information and announcements. You are responsible to keep the university informed about changes to your e-mail address. You should check your e-mail regularly and frequently—I recommend daily, but at minimum twice a week—to stay current with university-related communications, some of which may be time-critical. You can find UT Austin's policies and instructions for updating your e-mail address at (www.utexas.edu/its/policies/emailnotify.php).

Religious Holy Days

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, I will give you an opportunity to complete the missed work within a reasonable time after the absence.

Behavior Concerns Advice Line (BCAL)

If you are worried about someone who is acting differently, you may use the Behavior Concerns Advice Line to discuss by phone your concerns about another individual's behavior. This service is provided through a partnership among the Office of the Dean of Students, the Counseling and Mental Health Center (CMHC), the Employee Assistance Program (EAP), and The University of Texas Police Department (UTPD). Call 512-232-5050 or visit <http://www.utexas.edu/safety/bcal>

Emergency Evacuation Policy

Occupants of buildings on the UT Austin campus are required to evacuate and assemble outside when a fire alarm is activated or an announcement is made. Please be aware of the following policies regarding evacuation:

- Familiarize yourself with all exit doors of the classroom and the building. Remember that the nearest exit door may not be the one you used when you entered the building.
- If you require assistance to evacuate, inform me in writing during the first week of class.
- In the event of an evacuation, follow my instructions or those of class instructors.
- Do not re-enter a building unless you're given instructions by the Austin Fire Department, the UT Austin Police Department, or the Fire Prevention Services office.

Acknowledgement: This syllabus has been created with the support of resources and examples from the Center for Teaching and Learning Website (<http://www.utexas.edu/academic/ctl/>) and modeled after the BIO 311C course for the Fall 2010 semester taught by Dr. Moon.