GEOL 451 Groundwater
Syllabus

Instructor

Dr. Wen-lu Zhu
Department of Geology
Office: CHEM 1210A
Tel: 5-1831
email: wzhu@umd.edu
The best way to contact me is by email (wzhu@umd.edu). I will response ASAP.

Office hours

Location: CHEM 1210A
Time: Mondays, 10:00-11:00 AM

Lectures

Location: PLS 1119
Time: Mondays/Wednesdays/Fridays, 9:00 – 9:50 AM

Class description and outline

An introduction to the basic geologic parameters associated with the hydrologic cycle. Problems in the accumulation, distribution, and movement of groundwater will be analyzed.

Reference books

1. "Fundamentals of Groundwater" by F. W. Schwartz and H. Zhang, ISBN 0-471-13785-5, Wiley.
2. “Groundwater” by R.A. Freeze and J.A. Cherry, ISBN 0-13-365312-9, Prentice-Hall.

Expectation of students

Prerequisites: MATH140, GEOL100 or GEOL120, GEOL110 and one of the following: (CHEM131 and CHEM132), (CHEM135 and CHEM136), or CHEM103; or permission of department. Junior standing.

Academic integrity

The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://www.shc.umd.edu.

To further exhibit your commitment to academic integrity, remember to sign the Honor Pledge on all examinations and assignments: "***I pledge on my honor that I have not given or received any unauthorized assistance on this examination (assignment)***."

Textbook and online resources

Lecture notes will be posted online. Students are expected to follow the assignments to familiarize the material to ensure better learning outcomes.

Attendance

Students are expected to attend classes regularly. University Policy, www.testudo.umd.edu/soc/atedasse.html, provides several cases for which student absence is excused. Note that the student must request to be excused in writing and supply appropriate documentation.

Posted web notes are intended as a synopsis of lecture material only. If you miss a lecture you must get full notes from a colleague. Only students with written, excused absences are entitled to a make-up exam, and that should be at a time convenient for the instructor and student.

If the campus is closed for any reason during a scheduled lecture, the material of that day will either be incorporated with future lectures or left as reading in the textbook. If the campus is closed for any reason during the midterm exam, it will be rescheduled to a future lecture time.

Special needs

I will make every possible effort to accommodate your request for special accommodations, when justified. However, any requests must be submitted as soon as possible but **no later than Feb. 5, 2013**. *Do not wait!*

Students with disabilities

If you have a documented disability, you should contact Disability Support Services 0126 Shoemaker Hall. Each semester students with documented disabilities should apply to DSS for accommodation request forms, which you can provide to your professors as proof of your eligibility for accommodations. The rules for eligibility and the types of accommodations a student may request can be reviewed on the DSS web site.

Religious observances

The University System of Maryland policy provides that students should not be penalized because of observances of their religious beliefs, students shall be given an opportunity, whenever feasible, to make up within a reasonable time any academic assignment that is missed due to individual participation in religious observances. *It is the responsibility of the student to inform the instructor of any intended absences for religious observances by* ***Feb. 5, 2013.***

Grading

There will be 8 homework assignments.

There will be 4 in-class quizzes in lieu of the midterm and final exams.

The final grade will be based on homework sets (40% total) and the quizzes (60%).
Quiz I will take place on Monday, February 18, from 9 to 9:50 am, in PLS 1119.
Quiz II will take place on Monday, March 11, from 9 to 9:50 am, in PLS 1119.
Quiz III will take place on Monday, April 8, from 9 to 9:50 am, in PLS 1119.
Quiz IV will take place on Monday May 6, from 9to 9:50 am in PLS 1119.
Extra credits: 1) Class participation (pop quiz occasionally); 2) Online course evaluation survey.

.

Website

A website for the class is available through the University ELMS/blackboard system.
Follow the link to https://elms.umd.edu/, enter your directory ID and password.
If you are registered, you should be able to see GEOL 451 in your list of classes.

Course evaluation

CourseEvalUM will be open for students to complete their evaluations for Spring 2013 courses between Thursday, April 25, and Friday, May 10. Students can go directly to the "http://www.courseevalum.umd.edu" website to complete their evaluations, beginning April 25. You will be alerted about these dates and provided more information closer to that time, and students will be alerted via their official university e-mail account.

Students who complete evaluations for all of their courses in the previous semester (excluding summer), can access the posted results via Testudo's CourseEvalUM, reporting link for any course on campus that has at least a 70% response rate. You can find more information, including periodic updates, at the "https://www.irpa.umd.edu/Assessment/CourseEval/fac_faq.shtml" course evaluation website.

The expectation is that all students will complete these. This is YOUR chance to anonymously evaluate this class: please use this opportunity!

Schedule

Note: this schedule is subject to change. Depending on how each lecture goes, and on possible University closing, updates will be posted in the website.

Date	Lectures	Remarks
1/23/13	1. Introduction: What is Groundwater?	
1/25/13	2. Hydrologic Cycle	
1/28/13	3. Porosity	Homework #1
1/30/13	4. Specific Discharge	
2/01/13	5. Darcy's Law	
2/04/13	6. Hydraulic Head	
2/06/13	7. Hydraulic Conductivity	
2/08/13	8. Permeability	HW#1 Due /HW #2
2/11/13	9. Aquifers	
2/13/13	10. Hydraulic Conductivity of Heterogeous Aquifer	
2/15/13	11. Hydraulic Conductivity of Anisotropy Aquifer	
2/18/13	**Quiz I**	
2/20/13	12. Specific Storage and Effective Stress	HW#2 Due /HW #3
2/22/13	13. Storativity and Transmissivity	
2/25/13	14. Governing Equations for Groundwater Flow	
2/27/13	15. Steady State and Diffusion Flow Equations	
3/01/13	16. Concepts of Flow Nets	
3/04/13	17. Applications of Flow Nets	HW#3 Due /HW #4
3/06/13	18. 1-D Steady State Flow Equation	
3/08/13	19. Steady State Radial Flow	
3/11/13	**Quiz II**	
3/13/13	20. Transient Flow Equation	
3/15/13	21. Aquifer Test Methods I	HW#4 Due /HW #5
3/18/13	*Spring Break*	
3/20/13	*Spring Break*	
3/22/13	*Spring Break*	
3/25/13	22. Aquifer Test Methods II	
3/27/13	23. Testing with Single Well	HW#5 Due /HW #6
3/29/13	24. Testing with Multiple Wells	
4/01/13	25. Numerical Methods	
4/03/13	26. Groundwater Flow Model	
4/05/13	27. Solute Transport: Advection	
4/08/13	**Quiz III**	
4/10/13	28. Solute Transport: Advection-Dispersion	HW#6 Due /HW #7
4/12/13	29. Diffusion: Fick's Law	
4/15/13	30. Dispersion in 1-D Column	
4/17/13	31. Solute Transport: Governing Equation	
4/19/13	32. Fickian Model of Dispersion	
4/22/13	33. Reactive Transport	HW#7 Due /HW #8

4/24/13	34. Tracers and Tracer Test	
4/26/13	35. Seawater Intrusion	
4/29/13	36. Key Reactions in Groundwater	
5/01/13	37. Geochemistry of Natural Water System	
5/03/13	38. Contaminant Hydrology I	HW#8 Due
5/06/13	**Quiz IV**	
5/08/13	39. Contaminant Hydrology II	