

GEOLOGY 4250 – HYDROGEOLOGY (3 credits)
Fall 2012, MWF 8:00-8:55am

Instructor: Dr. Kallina Dunkle

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Office Hours: Tuesday & Thursday 1:30-3:00pm or by appointment

COURSE DESCRIPTION

Occurrence, movement, and properties of subsurface water with special emphasis on geological aspects of ground water. Secondary emphasis is placed on ground-water flow evaluation and ground-water contamination, flow-net analysis, and pump test.

COURSE OVERVIEW

Hydrogeology will introduce the concepts related to the occurrence and movement of groundwater, as well as evaluation of groundwater resources. Major topics of the course include examination of governing equations, analyses of aquifer properties, regional groundwater flow, groundwater contamination, and field methods. The history of hydrogeology will be discussed throughout the semester. Final projects will give students the opportunity to investigate a specific problem, site, or historical figure related to hydrogeology.

PRE/COREQUISITES

Prerequisite: MATH 1720 or higher with a minimum grade of D

Corequisite: GEOL 4251, Hydrogeology Lab

TEXTBOOK/READINGS

Fetter, C.W., 2001. Applied Hydrogeology, 4th edition, Prentice-Hall, Inc., New Jersey.

Note that you will need the CD, which comes with the book, for certain assignments.

Additional journal articles will be assigned throughout the semester and will be available on AP-Online (D2L).

GRADING

Final grades will be based on the following:

30% Midterm Exam (Note that this exam will be taken during lab on Oct. 18)

30% Final Exam

30% Final Project (15% each for paper and presentation)

10% Four Problem Sets (2.5% for each)

Grading scale for the course:

90-100% = A

80-89% = B

70-79% = C

60-69% = D

Less than 60% = F

COURSE POLICIES

Students are expected to attend all classes and to be on time. If you are absent you are expected to get notes from another student and catch up on your own. Students are expected to conduct themselves appropriately at all times. Academic and classroom misconduct will not be tolerated. Students should read the “Code of Student Conduct” in the new Student Handbook for an understanding of what will be expected of them within the academic setting. Cell phones must be off or on silent and put away in your pocket, backpack or purse. They should not be visible during class. Audio and/or visual recording devices including, but not limited to, computers, personal digital assistants (PDA’s), ipods, tape recorders, and cameras are not permitted to be on—they should be turned off and put away in your pocket, backpack or purse. Failure to comply with these policies will result in exclusion from the class.

ALL work, including units, should be shown on problem sets and exams. On problem sets, clearly label the problem number and draw a box around your final answer. A penalty of 10% per day will be assigned to late problem sets and final projects.

Exams may not be taken prior to or after the scheduled date of the exam. If a student misses an exam he/she will receive a zero for that exam. Make-up exams will only be allowed if the student can document hospitalization, involvement in an accident, or death of a family member. A letter of proof from the proper authority will be required, and such letters/documentation will be verified by the instructor. Forgery and or falsification of documents will result in severe academic disciplinary action(s).

DISABILITY ISSUES

Any student who has a condition that may affect his/her academic performance is encouraged to make an appointment with the instructor and/or the Office of Disability Services, located in Morgan University Center, Room 114, phone 221-6230.

POLICY ON MINORS

Minors (any non-student under the age of 18) accompanying staff, faculty, students or visitors on campus are not permitted in the classroom.

FINAL PROJECT DETAILS

Students will work in pairs to research, write a paper, and present the results to the class. Selection of topics will be discussed in lab (GEOL 4251) later in the semester. Presentations will occur during the final week of classes (Dec. 3-5) and the paper will be due at 5pm on Wednesday, December 5. The following guidelines should be used for the papers:

- Double-spaced
- 10 or 12 point font
- Times New Roman or Arial font
- One inch margins on all sides
- All pages numbered at the bottom right of the page
- 10-15 pages in length, not including references

Presentations should be 10-12 minutes in length, with each student presenting approximately half of the material. Presentations must be done using PowerPoint. Guidelines for presenting will also be discussed during lab later in the semester.

TENTATIVE SCHEDULE (Note * indicates days additional readings will likely be assigned)

Week	Day	Topic	Reading	Assignments
1	27-Aug	Intro/Hydrologic Cycle	Ch 1 & 2	
	29-Aug	Hydrologic Cycle	Ch 1 & 2	PS1 assigned
	31-Aug	Porosity/Permeability/Darcy	Sections 3.1-3.5;*	
2	3-Sep	NO CLASS-LABOR DAY		
	5-Sep	Aquifers/Aquitards	Sections 3.6-3.12	
	7-Sep	Aquifers/Aquitards	Sections 3.6-3.12	
3	10-Sep	Hydraulic Head	Sections 4.1-4.5	
	12-Sep	Groundwater Flow Equations	Sections 4.6-4.8	PS1 due
	14-Sep	Grad h and steady flow	Sections 4.9-4.10; 4.13-4.14	PS2 assigned
4	17-Sep	Flow nets	Sections 4.11-4.12	
	19-Sep	Wells: drawdown	Sections 5.1-5.4;*	
	21-Sep	Wells: pumping tests	Sections 5.5; 5.7-5.10	
5	24-Sep	Wells: pumping tests	Sections 5.5; 5.7-5.11	
	26-Sep	Wells: slug tests	Section 5.6	
	28-Sep	Unsaturated Zone	Ch 6	
6	1-Oct	Regional Groundwater Flow	Sections 7.1-7.5; 7.7; *	PS2 due
	3-Oct	Regional Groundwater Flow	Sections 7.1-7.5; 7.7	PS3 assigned
	5-Oct	Regional GW Flow: Case Studies	Section 7.6, *	
7	8-Oct	Geology & Groundwater: Seds/Rocks	Sections 8.1-8.4	
	10-Oct	Geology & Groundwater: Regions	Sections 8.5-8.10	
	12-Oct	Groundwater Modeling	Ch 13, *	PS3 due
8	15-Oct	NO CLASS-FALL BREAK		
	17-Oct	<i>Exam Review</i>		
	19-Oct	Groundwater Modeling	Ch 13	
9	22-Oct	Groundwater Modeling	Ch 13	
	24-Oct	Water Chemistry I	Sections 9.1-9.8	Final Project Topic Due 5pm
	26-Oct	Water Chemistry II	Sections 9.9-9.14	PS4 assigned
10	29-Oct	Mass Transport	Section 10.6	
	31-Oct	Groundwater Contamination	Sections 10.1-10.2; 10.7, *	
	2-Nov	GW Monitoring and Remediation	Sections 10.3-10.5; 10.8-10.10	
11	5-Nov	WORK DAY (GSA)-FINAL PROJECTS		
	7-Nov	WORK DAY (GSA)-FINAL PROJECTS		
	9-Nov	Safe Yield/Water Law	Sections 11.1-11.6	
12	12-Nov	NO CLASS-VETERAN'S DAY		
	14-Nov	Water Mgmt./Protection & Global Issues	Sections 11.7-11.11	
	16-Nov	Intro to Field Methods/Site Evaluation	Sections 12.1-12.2; 12.5-12.7	PS4 due
13	19-Nov	Geophysics	Sections 12.3-12.4	
	21-Nov	Geophysics	Sections 12.3-12.4	
	23-Nov	NO CLASS-THANKSGIVING		
14	26-Nov	Special Topics	to be determined	
	28-Nov	Special Topics	to be determined	
	30-Nov	Special Topics	to be determined	
15	3-Dec	<i>Final Project Presentations</i>		
	5-Dec	<i>Final Project Presentations</i>		Final Project Paper Due 5pm
	7-Dec	10:30 a.m.-12:30 p.m. FINAL EXAM!!!		

CAVEAT

The above schedule and procedures are subject to change in the event of extenuating circumstances.