Hydrogeology (ENV 301 & GEO 331)

Professor: Rhawn Denniston Office: 202 Norton Phone: x4306 E-mail: RDenniston Office Hrs: 8:45-9:15; 11:15-11:30; 3:00-3:30

Text, Readings, and Materials There is no textbook for this course. You will read *The Control of Nature* by John McPhee, chapters from *Applied Hydrogeology* by Fetter, a selection from *Cadillac Desert* by Marc Reisner, and assorted articles. You should bring a calculator to each class.

Course Meeting Times 9:15 – 11:15 am and 1:15 – 3:00 pm Monday - Friday (except as scheduled)

Grading Scheme 20% McPhee Paper; 25% Problem Sets; 25% Final Exam; 20% Paper Analysis; 10% Attendance/Participation

Policy on Late Work Homework assignments, papers, and exams are to be completed within the scheduled time frame. You will be penalized 25% for every day that the assignment is late. If you have a college-sanctioned excuse for missing class or an assignment deadline, notify me immediately.

Course Description and Goals This course will investigate the ways in which geology and society interact. To that end, we will discuss the movement of groundwater and surface water and how these interact with wells, wastewater treatment plants, and landfills. You will develop skills involving (1) analysis of data and (2) integration of scientific, economic, and political systems.

Reading and Writing In addition to a field project and time in lecture, you will do a good deal of reading in this class. You are expected to read everything I assign, and to do so carefully and on time. As for your papers, I expect you to write well, and I am happy to help you refine your writing and editing skills. As I will expand on later, a grade of "C" will be assigned to a paper with some misspellings, awkwardly worded sentences, mediocre structuring, poor word choices, an abundance of passive verbs, etc. In order to achieve grades above "C", you must have a minimum of grammatical/spelling errors, write cleanly and clearly, and articulate your thoughts well. The grade of "A" is reserved for exceptionally well-constructed papers without spelling or grammatical errors, and, just as importantly, solid, well-backed arguments. The same holds for your presentations. The grade of “A” is reserved for well-informed and polished presentations of appropriate length. You will also be graded on your ability to answer questions following your talk.

Final Exam Information covered in reading assignments, fieldtrips, videos, problem sets, and in lecture is fair game for the test.

Academic Honesty Cornell College expects all members of the Cornell community to act with academic integrity. An important aspect of academic integrity is respecting the work of others. A student is expected to explicitly acknowledge ideas, claims, observations, or data of others, unless generally known. When a piece of work is submitted for credit, a student is asserting that the submission is her or his work unless there is a citation of a specific source. If there is no appropriate acknowledgment of sources, whether intended or not, this may constitute a violation of the College's requirement for honesty in academic work and may be treated as a case of academic dishonesty. The procedures regarding how the College deals with cases of academic dishonesty appear in *The Compass*, our student handbook, under the heading "Academic Policies – Honesty in Academic Work."

Students with Disabilities Students who need accommodations for learning disabilities must provide documentation from a professional qualified to diagnose learning disabilities. For more information see cornellcollege.edu/disabilities/documentation/index.shtml. At the beginning of each course, the student must notify the instructor within the first three days of the term of any accommodations needed for the duration of the course.

Cell Phones and Laptops – I have a **zero** tolerance for texting or talking on cell phones during class. Cell phones should be turned off during class periods. Texting on, talking into, or in any other way interacting with a cell phone during class hours will result in your immediate expulsion from the course and a grade of F. You may turn them on before class, at break, and after class. Similarly, if you have a legitimate need to take notes on your laptop, you should present your rationale to me. However, if you use your laptop during class hours for anything other than course-related work, you will be (1) excused from the class for the rest of the day, and (2) not allowed to use your laptop again in class.

Monday	Tuesday	Wednesday	Thursday	Friday
9:00 – Introductory Geology 10:00 – Excel (Library 212) 1:15 – papers assigned for poster session; how to read a peer-reviewed paper; rock and mineral ID HW- Intro geo & Excel questions Read- McPhee; proj paper	9:15 – **Intro geo/Excel questions due**; Topographic maps, contouring exercise, watershed boundaries; water budgets 1:15 – dendritic drainage, incision vs aggradation, river systems, flood control; rating curve; impacts of dams, Manning equ, Reynolds numbers HW- Manning, topo problems Read- McPhee; WaPo article	9:15 – **Manning, topo questions due**; basin characteristics, recurrence intervals, infiltration 1:15 – infiltration exercises, groundwater to river (decay equation) HW- infiltration, flood recession, rating curve calcs Read- McPhee; Fetter 6.1-6.5, 6.7	9:15 –aquifers; porosity; K; Darcy's Law; hydraulic head 1:15 – **HW due**; groundwater flow HW- gw flow probs Read- McPhee; Fetter 3.2, 3.3, 3.4, 3.7, 4.6	9:15 – (un)confined aquifers 1:15 – **HW due**; Leaky Aquitard exer HW- gw problems Read- McPhee; Fetter: 3.7, 3.10
9:15 – **1st draft of McPhee paper due;** total stress, effective stress, and fluid P; subsidence; blow out exercise 1:15 – **HW due**; fractures HW- subsidence etc problems Read- Subsidence	9:15 – 3:00 - paper conferences (mandatory and by appointment HW- work on McPhee paper Read- none	9:15 – measuring K at different scales (permeameter; slug test; pumping tests); Transmissivity 1:15 – **HW probs due**; Groundwater Chemistry (cont'd); soil and water remediation HW- pumping wells exercise; finish McPhee paper Read - none	9:15 –**2nd draft McPhee paper due; well probs due**; discuss McPhee 1:15 – GW Chem, Landfill design; Waste and Drinking Water Plant Designs HW- TBD Read - Fetter 3.5	7:15 – 3:00 – Fieldtrip: Iowa City Wastewater and Drinking Water Plants, Landfill, Dubuque Street flood control HW-Fieldtrip report; work on presentation Read- Fetter Ch. 7; Cadillac Desert (sections TBD)

10:00 –Iowa Geological Survey Hydrologist guest speaker 1:15 –Groundwater Chemistry HW – Problem Set 7 Read **-** Cadillac Desert; Orange River Runs Through It; Gulf Hypoxia	9:15 –Gabriele Villarini 1:15 – no class; write report on one of Villarini's papers HW – Villarini paper summary Read – Villarini paper; Cadillac Desert	8:00– 3:30 – **PS 7 due; Villarini paper due**; **Big Spring Lock & Dam 11 fieldtrip** HW- Big Spring fieldtrip report Read- Cadillac Desert	9:15 – 3:00 **-** Meetings on paper presentations (mandatory and by appointment) HW – prep paper presentation Read **-** Cadillac Desert	9:15 – **Big Spring fieldtrip report due; Paper Analysis presentations** 1:15 – **Paper Analysis presentations** HW- none Read- Cadillac Desert
7:45 – 2:30 - Fieldtrip to Iowa City drinking water and waste water plants and Dubuque Street flood control HW – Annotated schematics of wastewater and drinking water plants Read - none	8:30 - 12:00 **– Iowa City water plants' schematics due; Cadillac Desert quiz;** Cadillac Desert videos 1:15 – Cadillac Desert videos/review session HW – study for final exam Read – none	8:30 - **Final Exam**		

THE ABOVE SCHEDULE SHOULD BE VIEWED AS A GUIDE AND IS SUBJECT TO REGULAR CHANGES.