

BROOKLYN COLLEGE Fall 2023

EESC 3600

HYDROGEOLOGY OF WATER RESOURCES

Tuesday and Thursday 9:05 – 10:45 AM

Instructor:

Prof. Zhongqi (Joshua) Cheng

Office: Ingersoll 5135

Phone: 908-764-8689 (cell)

Office Hours: Wednesdays 3-4 pm or by appointment

Email Address: zcheng@brooklyn.cuny.edu

COURSE DESCRIPTION

This course will cover hydrology and hydrogeology, the presence and movement of water both above ground and underground. The course will emphasize concepts, numerical calculations and problem solving skills. Case studies and fieldwork will be used to promote real world understanding of the subjects covered. Specific topics will include:

- The hydrologic cycle
- Interactions of water, atmosphere, plants, and soils
- Surface flow
- Groundwater storage and supply
- Groundwater flow
- Groundwater contamination

COURSE OBJECTIVES

- Students will be able to explain and calculate major fluxes of the hydrologic cycle
- Manipulate and analyze basic hydrologic data
- Relate soil and site characteristics to the distribution of groundwater
- Discuss and quantitatively model how and why groundwater moves
- Apply quantitative skills for evaluating groundwater resources and problems
- Evaluate groundwater supplies in terms of both quantity and quality

COURSE STRUCTURE

This is a 3 credit course with 2 hours of lab and 2 hours of lecture. Typically, Tuesdays will be dedicated to lectures to learn new material and Wednesdays will be dedicated to labs or exercises to apply the material. All lectures and labs will be in person.

MATERIALS

There is no required textbook for the course. You can find the Open Education Resource (OER) site for this course at <https://eesc3600.commonsc.gc.cuny.edu/>

All course materials (including lectures, reading materials, homework, labs, etc.) will be posted in blackboard.

If you would like to look at textbooks as a reference, here are some suggestions:

Fetter, C. (2001). Applied Hydrogeology, Fourth Edition. New Jersey, Prentice Hall, 598 p.

Dunne, T. and L. Leopold (1978). *Water in Environmental Planning*. New York, W.H. Freeman and Company, 818 p.

Ward, A. and S. Trimble (2004). *Environmental Hydrology, Second Edition*. Boca Raton, FL, CRC Press, LLC, 504 p.

Suggested supplies for the course include pencils, a ruler, a good eraser, a scientific calculator, a notebook.

GRADES

Final grades will be based on:

Participation and attendance: 10%

In class quiz: 10%

Homework: 10%

Labs & field trip reports: 20%

Midterm: 20%

Final: 30%

In person attendance is mandatory. Please arrive on time - plan ahead and consider extra time needed for travel. If you have to miss the class for some reason, please make sure to email me to explain the reason. If no emails with reasons given, it will be counted as absence.

There will be two quizzes, one before the midterm, and one before the final exam. NO makeup quizzes.

Homework exercises will be assigned each week and is essential practice for understanding the course material. Labs will be completed during class time, and students will work together on labs. There will be discussions when all groups come together before, during and after the lab is done. Homework or labs should be submitted in Blackboard and will be graded. We will go over all the homework in class. Keys to homework and lab will be posted on Blackboard. NO late submissions of homework, lab or field reports will be accepted. NO excuses.

*****Extra Credit Opportunity *****

Gain up to 3 points in your final grade (out of 100) by attending two hydrogeology related seminars. Each 1.5 points. The seminars will be announced during the semester.

Your letter grade will be based on your final cumulative points as follows: A+ (98 - 100), A (93 - <98), A- (90 - <93), B+ (87 - <90), B (83 - <87), B- (80 - <83), C+ (77 - <80), C (73 - <76), C- (70 - <73), D+ (67 - <70), D (63 - <67), D- (60 - 63), F (<60)

CLASSROOM DECORUM

It is important to come to class on time. Attendance will be noted no later than 5 minutes after the class started. I often make important announcements at the beginning or end of class. If you arrive late to class, or miss a class, it is your responsibility to contact the instructor and make up what you missed.

Your active participation in discussions and raise questions are highly encouraged and will be awarded points (up to 10 points).

Discussion with anyone else during exams are not permitted and will be treated as cheating.

Tentative SCHEDULE

Week	Lecture	Lab or Field Trip
1	Watersheds and Water Mass Balances	Lab: Watershed
2	Precipitation, Measurement, and Historical Data	<i>Weekend field trip to the Old Croton Dam and Aqueduct</i>
3	Evaporation, Transpiration, Evapotranspiration	Water budget of Mono Lake 1
4	(Quiz #1) Infiltration, Water at the Land-Surface	Water budget of Mono Lake 2
5	Runoff Processes, Infiltration and Saturation Excess Flows	Lab: infiltration
6	Streamflow, Hydrographs, Land Use Change	Lab: stream flow
7	Flood Prediction and Flood Frequency Analysis	Lab: flood frequency
8	<u>Midterm Exam</u>	<i>Green Infrastructure Field Trip</i>
9	Porous Media	Lab: Porosity, specific yield, specific retention
10	Basics of Groundwater flow	Lab: Groundwater Hydrology Part B
11	Darcy's Law	Lab: Groundwater Hydrology Part A
12	(Quiz #2) Flow Modeling, Wells, and Pumping Tests	Lab: Darcy's law
13	Water Quality and Groundwater Contamination	Lab: water quality data and pollution sources
14	Groundwater Remediation	Review
15	<u>FINAL EXAM</u>	

Class Citizenship, Rules of Conduct and College Policies

Email Correspondence: I will send class emails through the BC portal. Therefore, make sure that the email address you have listed there is indeed the correct address, and that you check your email regularly. You need to practice professional communications no matter what your future career will be. Therefore, I insist on the following email rules:

- ALWAYS begin your email or text with “Dear Prof. Cheng: I am a student (or you can use your name here) in your EESC 3600 class” so that I know it is for me and not sent by mistake. ALWAYS end your email with your signature (i.e. your name) so that I know who the message is from.
- Email is a formal means of communication in the context of school or work; Use polite language, complete sentences, capital letters, punctuation, greetings and salutations. Please avoid abbreviations, slang and cuteness.

Policy on Academic Integrity: The faculty and administration of Brooklyn College support an environment free from cheating and plagiarism. Each student is responsible for being aware of what constitutes cheating and plagiarism and for avoiding both. The complete text of the CUNY Academic Integrity Policy and the Brooklyn College procedure for implementing that policy can be found at this site: <http://www.brooklyn.cuny.edu/bc/policies>. If a faculty member suspects a violation of academic integrity and, upon investigation, confirms that violation, or if the student admits the violation, the faculty member MUST report the violation.

Statement Regarding the Center for Student Disability Services: In order to receive disability-related academic accommodations students must first be registered with the Center for Student Disability Services. Students who have a documented disability or suspect they may have a disability are invited to set up an appointment with the Director of the Center for Student Disability Services, Ms. Valerie Stewart-Lovell at 718-951-5538. If you have already registered with the Center for Student Disability Services please provide your professor with the course accommodation form and discuss your specific accommodation with him/her.

Nonattendance because of religious beliefs: The New York State Education Law provides that no student shall be expelled or refused admission to an institution of higher education because he or she is unable to attend classes or participate in examinations or study or work requirements on any particular day or days because of religious beliefs. Students who are unable to attend classes on a particular day or days because of religious beliefs will be excused from any examination or study or work requirements. Faculty must make good-faith efforts to provide students absent from class because of religious beliefs equivalent opportunities to make up the work missed; no additional fees may be charged for this consideration.