

ERTH 3205A PHYSICAL HYDROGEOLOGY – WINTER 2019

INSTRUCTOR: Angela L. Gulley, P.Geo.

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Office Hours: Monday 10:30 am – 11:30 pm (or by appointment), Room TBA.

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CLASS SCHEDULE:

Lectures: Monday, 8:35 - 10:25, Rm. 3120 Herzberg
Labs: A01 Monday, 11:35 - 2:25, Rm. 2130 Herzberg
A02 Monday, 11:35 - 2:25, Rm. 2110 Herzberg

RECOMMENDED TEXTBOOK: Freeze, R.A. and Cherry, J.A., 1979, *Groundwater*, Prentice Hall.

Freeze and Cherry is still considered the definitive textbook of hydrogeology and is the one book that will always be found on a consultant's or researcher's book shelf. Other useful reading resources are listed below.

PURPOSE AND OBJECTIVES: This course is an introductory examination of the physical principles of groundwater flow through the subsurface. It builds on the student's basic knowledge of bedrock and surficial geology and introduces how a fluid can exist within and flow through earth materials. Students will also learn how to quantify and measure groundwater flow, to determine potential groundwater yields, and manage groundwater as a resource.

SCHEDULE: Lecture topics will focus on the physical hydrogeology chapters of the textbook and will follow the order listed below. Laboratory assignments are designed to reinforce the theoretical material covered in the lectures by providing practical problems. These assignments will be split between field-oriented exercises and problem sets.

Lecture	Topic	Chapter
1	Introduction / Hydrologic Cycle	1
2, 3, 4, 5, 6	Physical Properties & Principles of Groundwater Flow	2, 5, 6
7	Groundwater Geology	4
8, 9, 10, 11	Groundwater Resource Evaluation	8

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EVALUATION:

Laboratory Assignments	40%
Midterm Test	15%
Final Exam	45%

Laboratory assignments will range from 1 to 3 weeks in duration and will be due at the beginning of the next lab. The midterm and the final exam cover both lecture and laboratory material. The midterm will be held during the *lecture portion* of the day on **Monday, February 25th**. The final exam will be scheduled within the regular examination period in April.

Late Policy: The late policy for this class is designed to be fair to students who hand their work in on time. Without a legitimate excuse, **all late submissions will be penalized 10% per day** and will not be graded after the assignment is returned to the remainder of the class.

ADDITIONAL READINGS:

Freeze and Cherry is a well-written textbook that is relatively easy to follow. The following are materials that you may find useful as supplementary sources of information, and the two journals listed are for those interested in more in-depth research of certain hydrogeologic topics.

Handbooks:

Driscoll, F.G., 1986. Groundwater and Wells, Second edition. Published by Johnson Division, St. Paul, Minnesota.

Kruseman, G.P. and de Ridder, N.A., 1990. Analysis and Evaluation of Pumping Test Data. International Institute for Land Reclamation and Improvement, Netherlands.

Other textbooks such as:

Domenico, P. A. and Schwartz, F. W., 1990. Physical and Chemical Hydrogeology, John Wiley and Sons.

Fetter, C. W., 2001. Applied Hydrogeology, 4th Edition, Prentice Hall.

Journals such as:

Groundwater (Journal of the National Groundwater Association)

Hydrogeology Journal (Official Journal of the International Association of Hydrogeologists)

CENTRE FOR STUDENT ACADEMIC SUPPORT

The Centre for Student Academic Support (CSAS) is a centralized collection of learning support services designed to help students achieve their goals and improve their learning both inside and outside the classroom. CSAS offers academic assistance with course content, academic writing and skills development. Visit CSAS on the 4th floor of MacOdrum Library or online at: carleton.ca/csas.

ACADEMIC INTEGRITY

It is your responsibility to review Carleton's policy on Academic Integrity - Section 14 of the Calendar.

<http://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/acadregsuniv14/>

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Plagerism

The instructor is required to report all incidents (or suspected incidents) of plagiarism to the Dean. All work handed in must be your own. Plagiarism and cheating are viewed as being particularly serious and the sanctions imposed are accordingly severe. Students are expected to familiarize themselves with and follow the Carleton University Student Academic Integrity Policy. The Policy is strictly enforced and is binding on all students. Plagiarism and cheating – presenting another's ideas, arguments, words or images as your own, using unauthorized material, misrepresentation, fabricating or misrepresenting research data, unauthorized co-operation or collaboration or completing work for another student – weaken the quality of the graduate degree. Academic dishonesty in any form will not be tolerated. Students who infringe the Policy may be subject to one of several penalties including: expulsion; suspension from all studies at Carleton; suspension from full-time studies; a refusal of permission to continue or to register in a specific degree program; academic probation; or a grade of Failure in the course.

Course Outline (Syllabus) Information on Academic Accommodations

Requests for Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

Pregnancy obligation

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

Religious obligation

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

Academic Accommodations for Students with Disabilities

If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. carleton.ca/pmc

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and is survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: carleton.ca/sexual-violence-support

Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

For more information on academic accommodation, please contact the departmental administrator or visit: students.carleton.ca/course-outline