



UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF GEOSCIENCE
COURSE OUTLINE
WINTER 2015

1. **Course:** Geology 609, Advanced Contaminant Hydrogeology

Lecture Sections:

L01: TuTh, 14:00-15:15, TRA 101

Instructor, Dr. L. Bentley, Office ES 262, Tel. No. 403-220-4512, e-mail address, lbentley@ucalgary.ca,

Office Hours: 1530-1630 Thursdays

Course website or Desire 2 Learn (D2L) GLGY 505 Contaminant Hydrogeology

Geoscience Department ES 118, 403-220-5841, geoscience.ucalgary.ca, geoscience@ucalgary.ca

2. **Prerequisites:** Consent of the Department. See section 3.5.C in the Faculty of Science section of the online Calendar (www.ucalgary.ca/pubs/calendar/current/sc-3-5.html)

Antirequisite: Credit for both Geology 609 and Geology 505 will not be allowed.

3. **Grading:** The University policy on grading and related matters is described sections [F.1](#) and [F.2](#) of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Assignments & Labs (7)	25%
Project	20%
Midterm test	20% (March 5, 2015)
Final Examination	35% (To be scheduled by the Registrar)

Percentage	Grade
95	A+
85	A
82	A-
78	B+
75	B
72	B-
68	C+
65	C
60	C-
55	D+
50	D
<50	F

4. **Missed Components of Term Work:** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize himself/herself with these regulations. See also [Section E.6](#) of the University Calendar

5. **Course Materials:** On reserve in Gallagher Library: Appelo and Potsma (2005) Geochemistry, Groundwater and Pollution; Hiscock (2005) Hydrogeology: Principles and Practice; Domenico and Schwartz (1998) Physical and Chemical Hydrogeology

6. **Examination Policy:** Non programmable calculators needed for examinations. Students should also read the Calendar, [Section G](#), on Examinations.

7. **Writing across the curriculum statement:** e.g. In this course, the quality of the student's writing in laboratory reports will be a factor in the evaluation of those reports. See also [Section E.2](#) of the University Calendar.

8. **Human studies statement:** indicating whether students in the course may be expected to participate as subjects or researchers. See also [Section E.5](#) of the University Calendar.

9. **OTHER IMPORTANT INFORMATION FOR STUDENTS:**

- (a) **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties.
- (b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).
- (c) **Academic Accommodation Policy:** Students with documentable disabilities are referred to the following links: Students with Disabilities: <http://www.ucalgary.ca/pubs/calendar/current/b-1.html> [B.1](#) and Student Accessibility Services: <http://www.ucalgary.ca/access/>.
- (d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- (e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information see also <http://www.ucalgary.ca/secretariat/privacy>.
- (f) **Student Union Information:** VP Academic Phone: 220-3911 Email: suvpaca@ucalgary.ca.
SU Faculty Rep. Phone: 220-3913 Email: sciencerep@su.ucalgary.ca; [Student Ombudsman](#)
- (g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.
- (h) **U.S.R.I.:** At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses (www.ucalgary.ca/usri). Your responses make a difference – please participate in USRI Surveys.

Department Approval: Signed Original

Date: December 22, 2014

GLGY609 LECTURE - LAB SCHEDULE
WINTER 2015
SUBJECT TO CHANGE (last edit December 22, 2014)

Week of:		Labs/Tutorials (Mon 8am or 11am, ES254)	Lecture topics (Tue, Thu @ 2pm, TRA 101)	Assignments ^a		
				Lab Location	Distributed	Due
12-Jan	Mon	No lab				
13-Jan	Tues		Intro to Course (1)			
15-Jan	Thur		Review of GW flow (2)			
19-Jan	Mon	Prob Set 1	GW contaminant sources and types (3)	ES254	Prob Set 1	--
20-Jan	Tues		GW quality regulations and risk (4)			
22-Jan	Thur					
26-Jan	Mon	Laboratory 1 - Coliform Enumeration (Malekani) Bring lab coats and protective eye wear if possible. Max of 16 students in lab.			Lab 1	Prob Set 1
27-Jan	Tues		Solute mass transport processes (5)			
29-Jan	Thur		Mechanical dispersion and diffusion (6)			
02-Feb	Mon	Laboratory 2 - Column breakthrough experiment		ES920	Lab 2	Lab 1
03-Feb	Tues		Dispersion processes 2 (6)			
05-Feb	Thur		Modelling solute dispersion (7)			
09-Feb	Mon	Problem Set 2 - Model Column breakthrough		ES254	Prob Set 2	Lab 2
10-Feb	Tues		Real plumes and scale effects of dispersion (8)			
12-Feb	Thur		Reactive transport, sorption and retardation (9)			
16-20 Feb		Reading Week				
23-Feb	Mon	Laboratory 3 - Literature search		ES254	Lab 3	Prob Set 2
24-Feb	Tues		Midterm Review			
26-Feb	Thur		Midterm Exam			
02-Mar	Mon	No Lab				
03-Mar	Tues		Transformations, degradation and decay (10)			
05-Mar	Thur		Oxidation-reduction processes and denitrification (11)			
09-Mar	Mon	Problem Set 3 Diffusion and Dispersion		ES 254	Prob Set 3	Lab 3
10-Mar	Tues		Transport in fractured media (12)			
12-Mar	Thur		Inorganic contaminants and metals (13)			
16-Mar	Mon	Problem Set 4 (1) Organic Contaminants, NAPLs and multiphase flow (1 of 2)		ES254	Prob Set 4	Prob Set 3
17-Mar	Tues		Biological organisms; Radionuclides and emerging contaminants (14)			
19-Mar	Thur		Organic contaminants (15)			
23-Mar	Mon	Problem Set 4 (2) Organic Contaminants, NAPLs and multiphase flow (2 of 2)		ES254		
24-Mar	Tues		Contaminated site assessment (17)			
26-Mar	Thur		Multiphase flow and NAPLs (16)			
30-Mar	Mon					Prob Set 4
31-Mar	Tues		Site investigation and monitoring techniques (18)			
02-Apr	Thur		Remediation methods (19)			
06-Apr	Mon	Presentations				
07-Apr	Tues		DNAPLs and the Superfund (20)			
09-Apr	Thur		GW - surface water interaction in sAB Rivers (21)			
13-Apr	Mon	Presentations				
14-Apr	Tues		Last class - self assessment and peer evaluations for group work			

Final Exam scheduled by Registrar

^aAll assignments will be available on D2L and usually due at the beginning of the subsequent lab period