

UNIVERSITY OF CALGARY
DEPARTMENT OF GEOSCIENCE
COURSE OUTLINE

1. Course: GEOLOGY 505 – CONTAMINANT HYDROGEOLOGY

Lecture Section: L01 TR 14:00-15:15 ST 061 WINTER 2014

Instructor(s): Dr. Cathy Ryan ES 268 220-2793 cryan@ucalgary.ca

D2L Course websites: <https://d2l.ucalgary.ca/d2l/home/16201>

Geoscience Department ES 118; (403) 220-5841; geoscience.ucalgary.ca

2. PREREQUISITE(S): Geology 401, or 601 and 503

ANTIREQUISITE(S): Credit for both Geology 505 and Geology 609 will not be allowed.

See section 3.5.C in the Faculty of Science section of the online Calendar (<http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html>)

3. **GRADING:** The University policy on grading and related matters is described in “Academic Regulations, sections F.1 and F.2” of the online University Calendar (<http://www.ucalgary.ca/pubs/calendar/current/f-1.html> and <http://www.ucalgary.ca/pubs/calendar/current/f-2.html>) In determining the overall grade in the course the following weights will be used:

Labs and problem sets	32%
Term project & presentation	10%
Midterm test	20% (March 4 2014)
Final Examination	38% (To be scheduled by the Registrar)

Students must pass all components of the course to pass the course as a whole. Individual elements of the course (i.e., assignments, exams) will be marked as percentages. Final grades will be assigned based on the weighting scheme described above and will be converted to letter grades as follows: >95 = A+; 88-95 = A, 83-87 = A-; 78-82 = B+; 74-77 = B; 70-73 = B-; 66-69 = C+; 62-65 = C; 58-61 = C-; 54-57 = D+; 50-53 = 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: <http://www.ucalgary.ca/pubs/calendar/current/sc-3-6.html>. It is the student's responsibility to familiarize himself/herself with these regulations. See also <http://www.ucalgary.ca/pubs/calendar/current/e-3.html>.

5. **REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY.** N/A
If you have a clash with this out-of-class-time-activity, please inform your instructor as soon as possible so that alternative arrangements may be made for you. **No** class exercises held will be held outside of class hours

Department Approval: ORIGINAL SIGNED Date: December 23 2013

6. **EXAMINATION POLICY:** No electronic or written aids (eg. cell phones, tablets, computers, PDAs, notes, textbooks) will be allowed during writing of any exams. Non-programmable calculators will be permitted to answer quantitative questions on exams, if applicable, and permission to do this will be clearly indicated on the examination paper.

Students should also read the Calendar, Section G, on Examinations: <http://www.ucalgary.ca/pubs/calendar/current/g.html>.

7. In this course, the quality of the student's presentation and writing in laboratory reports will be a factor in the evaluation of those reports. See also <http://www.ucalgary.ca/pubs/calendar/current/e-2.html>.

8. OTHER IMPORTANT INFORMATION FOR STUDENTS:

- (a) **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 K. Student Misconduct (<http://www.ucalgary.ca/pubs/calendar/current/k.html>) 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 at <http://www.ucalgary.ca/emergencyplan/assemblypoints>.**
- (c) **ACADEMIC ACCOMMODATION POLICY.** Students with documentable disabilities are referred to the following links:
Calendar entry on students with disabilities: <http://www.ucalgary.ca/pubs/calendar/current/b-1.html>
Student Accessibility Services: 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:** suypaca@ucalgary.ca.
SU Faculty Rep. **Phone:** 220-3913 **Email:** sciencerep@su.ucalgary.ca Website <http://www.su.ucalgary.ca/home/contact.html>.
Student Ombudsman: www.ucalgary.ca/provost/students/ombuds; ombuds@ucalgary.ca 220-6420
- (g) **INTERNET and ELECTRONIC COMMUNICATION DEVICE Information.** You can assume that in all classes that you attend, **your cell phone should be turned off.** 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.

UNIVERSITY OF CALGARY
DEPARTMENT OF GEOSCIENCE
COURSE OUTLINE

GEOLOGY 505
CONTAMINANT HYDROGEOLOGY

TERM:	Winter 2014			
PREREQUISITE(S):	Geology 401 or 601 and 503.			
ANTIREQUISITE(S):	Credit for both Geology 505 and Geology 609 will not be allowed.			
LECTURER(S):	Dr. C. Ryan	ES 268	220-2793	cryan@ucalgary.ca
LECTURE :	L01	TR	14:00-15:15	ST 061
LABS:	B01, 02	M	08:00, 11:00	ES 254

TEXTBOOK: Hiscock (2005) and Domenico and Swartz (1998) are available to you electronically from the University of Calgary's library. Your 'Apello and Postma' text from GLGY503 is also recommended.

RESERVE READING ROOM: N/A

MARK DISTRIBUTION: A. Composition of Final Grade

Labs, Problem Sets, Term Project and Presentation, and Exams

Problem Set 1	4%
Coliform enumeration lab	3%
Breakthrough expt lab	4%
Dispersivity lab	4%
Problem set 2	4%
Literature review	4%
Problem set 3	6%
Problem set 4	3%
Term project and presentation	10%
Midterm Examination	20% (March 4 2014)
Final Examination*	38%

Students who are absent from the midterm exam or final laboratory exam because of illness or other unforeseen circumstances may be granted an excused absence by the Course Coordinator (midterm exam) or Lab Coordinator (final laboratory exam) upon presentation of adequate documentation (a completed Physician/Counselor Report form <<http://www.ucalgary.ca/registrar/PDFs/phycoun.pdf>> for illness; equivalent documentation for other circumstances). There will be no "make-up" examinations for excused absences. The weight assigned to the midterm examination will be transferred to the final examination.

Similarly, students who are unable to submit laboratory reports or assignments on time because of similar circumstances will be required to submit the same type of documentation to the TA in order to be considered for a time extension.

B. Final Exam

There will be a final examination scheduled by the Registrar's Office.

C. Components of Course for Which a Passing Grade is Essential

Students must achieve a passing grade (minimum of D) on both the lecture portion of the course (average of the midterm and final exams) and the laboratory portion of the course to qualify for a passing grade overall.

D. Grading Scheme

A+	95 – 100%
A	88 – 94%
A-	83 – 87%
B+	78 – 82%
B	74 – 77%
B-	70 – 73%
C+	66 – 69%
C	62 – 65%
C-	58 – 61%
D+	54 – 57%
D	50 – 53%
F	<50%

GL GY506 LECTURE - LAB SCHEDULE
WINTER 2014
SUBJECT TO CHANGE (last edit Dec 15, 2013)

Week of:	Lab/Tutorials (Mon 8am or 11am, ES254)	Lecture topics (Tue, Thu @ 2pm, ST 063)	Lab Location	Assnments ^a Distributed	Due
06-Jan	No lab	Intro to course(1)	--	--	--
13-Jan	Problem Set 1 - GW Flow and Hydrogeologic Conceptual Model (4%)	Review of GW flow (2) GW contaminant sources and types (3)	ES254	Prob Set 1	--
20-Jan	Laboratory 1 - Coliform Enumeration (Malekani) Bring lab coats and protective eye wear if possible. Max of 16 students in lab (3%)	GW quality regulations and risk (4) Solute mass transport processes (5)	EEEL	Lab 1	Prob Set 1
27-Jan	Laboratory 2 - Column breakthrough experiment (4%)	Mechanical dispersion and diffusion (6) Dispersion continued (7)	ES920	Lab 2	Lab 1
03-Feb	Laboratory 3 - Analytical models to determine dispersivity (4%)	Modelling solute dispersion (8) Real plumes and scale effects of dispersion (9)	ES254	Lab 3	Lab 2
10-Feb	Problem Set 2 - Diffusion and Dispersion (4%)	Reactive transport, sorption and retardation (10) Midterm Tutorial	ES254	Prob Set 2	Lab 3
17-Feb		Reading Week			
24-Feb	No lab in midterm week	Midterm Exam (Tues Mar 4th in class) Transformations, degradation and decay (11)	ES254	--	Prob Set 2
03-Mar	Laboratory 4 - Literature search and short review (4%)	Oxidation-reduction processes and denitrification (12) Transformations, degradation and decay (13)	ES254	Lab 4	--
10-Mar	Problem Set 3 - Organic contaminants, NAPLs and multiphase flow (1 of 2)	Transport in fractured media (14) Inorganic contaminants and metals (15)	ES254	Prob Set 3	Lab 4
17-Mar	Problem Set 3 - Organic contaminants, NAPLs and multiphase flow (8%; 2 of 2)	Biological organisms; Radionuclides and emerging contaminants; Org contaminants (16); NAPLs (18)	ES254	Prob Set 3	--
24-Mar	Problem Set 4 - Remediation evaluation (3%)	Contaminated site assessment (18) Site investigation and monitoring techniques (19)	ES254	Prob Set 4	Prob Set 3
31-Mar	(details will be circulated after the midterm)	Remediation methods (20) DNAPLs and the Superfund (21)	TBA	ppis	--
07-Apr	(details will be circulated after the midterm)	GW - surface water interaction in SAB Rivers (22) Review (22)	TBA	ppis	--

Final Exam scheduled by Registrar

^aAll assignments will be available on T21 and usually due at the beginning of the subsequent lab period