



UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF GEOSCIENCE
COURSE OUTLINE
WINTER 2016

1. **Course:** Geology 323, Geochemical Processes

Lecture Sections:

L01: MWeFri, 14:00-14:50, MFH 160

For a listing of all lab sections corresponding with this course, please see the following link:

http://geoscience.ucalgary.ca/geoscience_info/courses/w16

Instructor, Dr. Rajeev Nair, Office ES 152, Tel. No. 403-220-4823, e-mail address, mair@ucalgary.ca,
Office Hours: By appointment

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

2. **Prerequisites:** Geology 313; Chemistry 201 or 211; Chemistry 203 or 213. 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)

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:

Laboratory Assignments	20%
Lecture Mid-term Exam 1	15% (Feb. 12, 2015; 18:00-20:00)
Lecture Mid-term Exam 2	25% (Mar. 11, 2015; 18:00-20:00)
Lecture Final Exam	40% (To be scheduled by the Registrar)

All lecture exams are mostly short answer type questions including numerical calculations from the lab. Note that all the materials covered in the labs are fair game for the lecture exams. **Students need to successfully complete (obtain >50%) all components (lab and lecture) to get a passing grade.**

Each piece of work (laboratory report, exam) submitted by the student will be assigned a percentage score. The student's average percentage score for the various components listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade, bearing in mind that an F grade will result if the student does not pass the Final Examination. The conversion between course percentage and letter grade is given below.

Letter Grade	Percent
A+	>93
A	86-92.9
A-	82-85.9
B+	77-81.9
B	74-76.9
B-	71-73.9
C+	67-70.9
C	62-66.9
C-	58-61.9
D+	54-57.9
D	50-53.9
F	<50

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. **Scheduled out-of-class activities:**
Mid-term Exam 1- February 12, Friday, 6-8 pm
Mid-term Exam 2- March 11, Friday, 6-8 pm

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY. 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.

6. **Course Materials:**
Recommended Textbook: Introduction to Geochemistry: Principles and Applications (2012; 1st Edition) by Kula Misra; Wiley-Blackwell

Instructor will regularly use supplementary materials outside of this textbook for discussions during lecture time.
7. **Examination Policy:** All exams are closed book. Non-programmable calculators will be required during the exams. Students should also read the Calendar, [Section G](#), on Examinations.
8. **Writing across the curriculum statement:** In this course, the quality of the student's writing in the lecture exam will be a factor in determining the grade for the exams. See also [Section E.2](#) of the University Calendar.
9. **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 [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) **Student Accommodations:** Students needing an Accommodation because of a Disability or medical condition should contact Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities available at http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf. Students needing an Accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Associate Head of Geoscience, Dr. E.S. Krebs by email krebs@ucalgary.ca or phone 403-220-5850.
 - (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: 403 220-3911 Email: suypaca@ucalgary.ca
SU Faculty Rep. Phone: 403 220-3913 Email: science1@su.ucalgary.ca, science2@su.ucalgary.ca and science3@su.ucalgary.ca;
Student Ombuds Office: 403-220-6420 Email: ombuds@ucalgary.ca; <http://ucalgary.ca/provost/students/ombuds>
 - (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: ORIGINAL SIGNED

Date: December 15, 2015

Associate Dean's Approval for
out of regular class-time activity: ORIGINAL SIGNED

Date: December 16, 2015

GLGY323 Winter 2016 Lec(MWF)-Lab-Exam Schedule (Tentative)

Week	Date	Lecture number	TOPIC	LABS
1	11-Jan	1	Introduction	No Labs
	13-Jan	2	Geochemical Approach: an Introduction	
	15-Jan	3	Electronic structure of atoms, ionic radii	
2	18-Jan	4	Ionic Substitution, Goldschmidt's classification	LAB 1 Chemistry review
	20-Jan	5	Analytical methods in geochemistry I	
	22-Jan	6	Analytical methods in geochemistry II	
3	25-Jan	7	Analytical methods in geochemistry III	LAB 2 Mineral chemistry
	27-Jan	8	Chemical Equilibrium; Acids and Bases	
	29-Jan	9	Aqueous geochemistry: salts and their solubility	
4	1-Feb	10	Thermodynamics I	LAB 3 Mineral and Whole-rock Geochemistry
	3-Feb	11	Thermodynamics II	
	5-Feb	12	Thermodynamics III	
5	8-Feb	13	Thermodynamics IV	LAB 4 Aqueous Geochemistry
	10-Feb	14	Thermodynamics V	
	12-Feb	15	Mineral Stability Diagrams I	
6	14-Feb		No lecture - Reading Week	No labs
	16-Feb		No lecture - Reading Week	
	18-Feb		No lecture - Reading Week	
7	22-Feb	16	Mineral Stability Diagrams II	LAB 5 Thermodynamics I
	24-Feb	17	Oxidation-reduction reactions I	
	26-Feb	18	Oxidation-reduction reactions II	
8	29-Feb	19	Oxidation-reduction reactions III	LAB 6 Thermodynamics II
	2-Mar	20	Cosmochemistry I-nucleosynthesis	
	4-Mar	21	Cosmochemistry II-meteorites	
9	7-Mar	22	Cosmochemistry III- cosmic abundance patterns	LAB 7 Mineral stability Diagram I
	9-Mar	23	Element Fractionation- Major elements I	
	11-Mar	24	Element Fractionation- Major elements I	
10	14-Mar	25	Element Fractionation- Major elements I	Lab 8 Mineral Stability Diagrams II
	16-Mar	26	Using trace elements: Partitioning	
	18-Mar	27	REE Diagrams	
11	21-Mar	28	Multi-element Diagrams	LAB 9 Redox Reactions
	23-Mar	29	Radiogenic Isotope Geochemistry I	
	25-Mar		No lecture - Good Friday	
12	28-Mar	30	Radiogenic Isotope Geochemistry II	Lab 10 Minor, Major, Trace elements
	30-Mar	31	Radiogenic Isotope Geochemistry III	
	1-Apr	32	Radiogenic Isotope Geochemistry IV	
13	4-Apr	33	Radiogenic Isotope Geochemistry V	Lab 11 Isotope Geochemistry
	6-Apr	34	Radiogenic Isotope Geochemistry VI	
	8-Apr	35	Stable Isotope Geochemistry I	
14	11-Apr	35	Stable Isotope Geochemistry II	No labs
	13-Apr	36	Stable Isotope Geochemistry III	
			EXAM SCHEDULE	Time
	12-Feb	Friday	Mid-Term Exam 1*	6-8 pm
	11-Mar	Friday	Mid-Term Exam 2*	6-8 pm
	TBA	TBA	FINAL	TBA

*-Scheduled out of class time. Plan your semester around these dates.