



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

1. **Course:** Geology 333, Igneous, Metamorphic and Ore Rocks and Processes

Lecture Sections:

L01: MoWeFr, 12:00-12:50, 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](http://geoscience.ucalgary.ca/geoscience_info/courses/w16)

Instructor, Dr. J. Cuthbertson, Office ES 520, Tel. No. 403-220-4709, e-mail address, [cuthberj@ucalgary.ca](mailto:cuthberj@ucalgary.ca),  
Office Hours: by appointment

Geoscience Department ES 118, 403-220-5841, geoscience.ucalgary.ca, [geoscience@ucalgary.ca](mailto: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](http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html))

**Antirequisite:** Credit for both Geology 333 and 311 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:

Labs	10%
Lab Midterm	20%
Lecture Midterm	20%
Final Lab Examination	25%
Final Lecture Examination	25% (To be scheduled by the Registrar)

Students must pass ( $\geq 50\%$ ) both the lab portion (labs + lab midterm + final lab exam) and the lecture portion (lecture midterm + final lecture exam) individually in order to pass this course.

Letter Grade	Percent
A+	94-100
A	88-94
A-	83-88
B+	78-83
B	73-78
B-	69-73
C+	65-69
C	61-65
C-	56-61
D+	53-56
D	50-53
F	0-50

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. **Course Materials:** The D2L website will be used throughout the course to make announcements and distribute lecture notes, laboratories, assignments, and other supplementary materials. Please check the course website regularly. Students are strongly encouraged to print the necessary materials and bring them to the lectures and labs.

**Recommended Textbook**

Nesse, William D., 2000. Introduction to Mineralogy. Oxford University Press. ISBN: 0-19-510691-6.

### Recommended Textbook

Winter, J.D., 2009. Principles of Igneous and Metamorphic Petrology.  
Prentice Hall. ISBN-10: 0321592573, ISBN-13: 978-0321592576

6. **Examination Policy:** Non-programmable or programmable calculators may be used on exams. Study sheets may be allowed on laboratory exams. Students should also read the Calendar, [Section G](#), on Examinations.
7. **Writing across the curriculum statement:** In this course, the quality of the student's writing in laboratory reports will be a factor in the evaluation of those reports.

### 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 [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](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](mailto: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](mailto:suypaca@ucalgary.ca)  
SU Faculty Rep. Phone: 403 220-3913 Email: [science1@su.ucalgary.ca](mailto:science1@su.ucalgary.ca), [science2@su.ucalgary.ca](mailto:science2@su.ucalgary.ca) and [science3@su.ucalgary.ca](mailto:science3@su.ucalgary.ca);  
Student Ombuds Office: 403-220-6420 Email: [ombuds@ucalgary.ca](mailto: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](http://www.ucalgary.ca/usri)). Your responses make a difference – please participate in USRI Surveys.

GLGY 333 Lec-Lab Schedule W2016

Week	Date (M-W-F)	Topic	Lab
1	Jan 11	Introduction, course overview	<b>No lab</b>
	Jan 13	Review of mineral properties	
	Jan 15	Silicates I.	
2	Jan 18	Silicates II.	1. Minerals in hand specimen
	Jan 20	Silicates III. Start of Optics I – relief, relative RI.	
	Jan 22	Optics II – polarization, ray splitting, int. colours.	
3	Jan 25	Optics III – retardation, birefringence, colour chart.	2. Petrographic microscope review
	Jan 27	Igneous processes	
	Jan 29	Igneous I – classification, phaneritic rocks.	
4	Feb 1	Igneous II – triangular diagrams, paragenetic seq.	3. Phaneritic Igneous Rocks I
	Feb 3	Igneous III – aphanitic, glassy, pyroclastic rocks.	
	Feb 5	Igneous IV – magma, Bowen's Reaction Series.	
5	Feb 8	Igneous phase diagrams I. Equilibrium xtalliz'n.	4. Phaneritic igneous rocks II
	Feb 10	Igneous phase diagrams II. Fractional xtalliz'n.	
	Feb 12	Igneous phase diagrams III. Fo-Qtz system.	
6	Feb 15	<b>Reading Week</b>	<b>No Lab</b>
	Feb 17	<b>Reading Week</b>	
	Feb 19	<b>Reading Week</b>	
7	Feb 22	Igneous phase diagrams IV. Plagioclase system.	5. Aphanitic Igneous Rocks
	Feb 24	Igneous processes recap	
	Feb 26	<b>Lecture Midterm</b>	
8	Feb 29	Metamorphic processes	6. Regional Metapelites
	March 2	Metamorphic I – bulk compositions, rxns, isograds.	
	March 4	<b>Lecture Midterm post-mortem</b>	
9	March 7	Metamorphic II – petro grid for metapelites.	<b>LAB MIDTERM</b>
	March 9	Metamorphic III – petrogenetic grid, migmatites.	
	March 11	Metamorphic IV – metabasites, marbles.	
10	March 14	Metamorphic V – metamorphic facies, textures.	7. Contact Metapelites
	March 16	Metamorphic VI – textures, cataclastic rocks.	
	March 18	Metamorphic VII – P-T paths.	
11	March 21	Metamorphic processes recap	8. Metabasites and Calc-silicates
	March 23	<b>Lab Midterm post-mortem</b>	
	March 25	<b>Good Friday – no lecture</b>	
12	March 28	Ore rocks I – concentration factors, igneous ores.	9. Ore Minerals
	March 30	Ore rocks II – diamonds	
	April 1	Ore rocks III – gem deposits	
13	April 4	Ore rocks IV – VMS, SEDEX, MVT deposit-types	<b>FINAL LAB EXAM</b>
	April 6	Ore rocks V – uranium	
	April 8	Ore rocks VI – tectonic settings	
14	April 11	Global synthesis – igneous rocks	<b>No Lab</b>
	April 13	Global synthesis – metamorphic rocks	