

UNIVERSITY OF CALGARY
DEPARTMENT OF GEOSCIENCE
COURSE OUTLINE

1. Course: GEOLOGY 523 – ADVANCED MINERALOGY

Lecture Section: L01 TR 09:30-10:45 SA 249 WINTER 2014

Instructor(s): Dr. S.M. Antao ES 532 220-3083 antao@ucalgary.ca

Desire 2 Learn

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

2. PREREQUISITE(S): Geology 423

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:

Lab. Assignments	40%
Midterm (March 4)	10%
Project (report-30%, seminar-20%)	50%

Each piece of work (assignment, laboratory report, midterm test or final examination) 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.

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. Dates and times of class exercises held outside of class hours None

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. **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 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 (FOIPPA). 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 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.

Department Approval: ORIGINAL SIGNED Date: January 9 2014

UNIVERSITY OF CALGARY
DEPARTMENT OF GEOSCIENCE
COURSE OUTLINE

GEOLOGY 523
ADVANCED MINERALOGY

TERM:	Winter 2014			
PREREQUISITE(S):	Geology 423			
LECTURER(S):	Dr. S.M. Antao	ES 532	220-3083	antao@ucalgary.ca
LECTURE :	L01	TR	09:30-10:45	SA 249
LAB(S):	B01	F	13:00-15:50	ES 924

TEXT: Recommended reference books (available in the Gallagher Library):

Klein, C. and Dutrow, B. (2007) Manual of Mineral Science (23rd edition). John Wiley and Sons, Inc., New York, NY.

Klein, C. and Hurlbut, C.S. (1998) Manual of Mineralogy (revised 21st edition). John Wiley and Sons, Inc., New York, NY.

Cullity, B.D. (1978) Elements of X-ray Diffraction. Addison-Wesley Publishing Company, Inc., USA.

Parise, J.B. (2006) Introduction to Neutron Properties and Applications. In Neutron Scattering in Earth Sciences (H-R Wenk, ed.). Reviews in Mineralogy and Geochemistry, 63, 1-25.

RESERVE READING ROOM: N/A

MARK DISTRIBUTION: A. Composition of Final Grade

Lab. Assignments	40%
Midterm (March 4)	10%
Project (report-30%, seminar-20%)	50%

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/Counsellor 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 Lab Coordinator in order to be considered for a time extension.

B. Final Exam

There will be no 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

Letter Grade	Percent	Letter Grade	Percent
A+	95-100	C+	64-67
A	89-94	C	60-63
A-	84-88	C-	56-59
B+	78-83	D	50-55
B	73-77	F	0-49
B-	68-72		

E. Tentative Lecture and Lab. Schedule

Week	Lecture topics	Lab. topics
1	Lattices (1 and 2 dimensions)	No Lab.
2	Lattices (3 dimensions), symmetry elements I, introduction to "Powder Cell" for XRD and neutron traces	Lab 1: X-ray and Neutron Powder Diffraction Traces (Calculations)
3	Unit-cell indexing, symmetry elements II, space groups	Lab 2: Bravais Lattices, Unit-Cell Parameters, and Indexing Powder XRD Traces
4	Data collection by diffraction methods	Lab 3&4: X-ray Data Collection and Mineral Identification
5	Mineral identification using XRD data, introduction to cell and structure refinement methods	Lab 3&4: X-ray Data Collection and Mineral Identification
6	LeBail and Rietveld refinements, introduction to "GSAS" for structure refinement	Lab 5&6: LeBail and Rietveld Refinement using Conventional X-ray Diffraction Data
7	READING WEEK	READING WEEK
8	Structure refinement and the use of constraints	Lab 5&6: LeBail and Rietveld Refinement using Conventional X-ray Diffraction Data
9	MIDTERM, introduction to "Crystal Maker" and "GRETEP"	Lab 7: Two-Phase Rietveld Refinement using Synchrotron High Resolution Powder X-ray Diffraction (HRPXRD) Data
10	Understanding crystal structure data and presentation of mineralogical results	Lab 8: Rietveld Refinement Using Constant Wavelength and Time-of-flight Neutron Diffraction Data
11	Seminar: Students present their original data and analyses on different minerals	Lab 9: Visualizing and Displaying Crystal Structure
12	Seminar: Students present their original data and analyses on different minerals	Lab 10: <i>Farbenzentre</i> in Alkali Halides and the Sample Displacement Effect
13	Seminar: Students present their original data and analyses on different minerals	No Lab.

CLASSROOM PERFORMANCE SYSTEM: N/A.