



UNIVERSITY OF CALGARY

DEPARTMENT OF GEOSCIENCE COURSE OUTLINE

1. **Course:** GLGY 527, Ore Deposits

Lecture Sections:

L01: MoWeFr, 09:00-09:50, SS 113

Labs:

B01	08:00 – 09:50	Th	ES 002c
B02	11:00 – 13:50	Th	ES 002c
B03	14:00 – 16:50	Th	ES 002c
B04	17:00 – 19:50	Th	ES 002c
B05	11:00 – 13:50	Tu	ES 002c

Tutorials:

To be arranged with TAs

Dr. Dave (Prof. David RM Pattison), Office: ES 154, Ph. 403-220-3263, pattison@ucalgary.ca, Office Hours: Open-door policy or by appointment

The course website can be found on D2L

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

2. **Prerequisites:** Geology 443. See also Geology [Course Descriptions](#) of the University Calendar.

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:

Lab Assignments (11)	40%
Lab Final	30% (Th Dec. 4, 2014, ES002c)
Final Examination	30% (To be scheduled by the Registrar)

The lab final will involve examination of minerals, rocks, polished mounts and thin sections. It is an open book exam. The lecture final will consist of written long-answer questions.

Each piece of work (laboratory report, 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. Letter grade conversions are listed below. The Instructor may shift the numerical cut-off levels down, based on how hard the TAs mark, how hard the exams are, etc., but they will not be shifted up.

Letter Grade	Percent	Letter Grade	Percent
A+	90-100	C+	66-68.9
A	82-89.9	C	62-65.9
A-	79-81.9	C-	59-61.9
B+	76-78.9	D+	56-58.9
B	72-75.9	D	50-55.9
B-	69-71.9	F	0-49.9

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:**

Textbooks: There is no required textbook for this course, although all students should have a set of mineral identification tables for both the hand sample component and reflected light microscopic component (especially) of the course. Your Glgy 311 text (Nesse) is a good start for the first. The books listed below are recommended.

Lab: Spry, P.G. & Gedlinske, B.L., 1987. Tables for the determination of common opaque minerals. *Economic Geology Publishing Co.*, New Haven CT, 52 pp.

New for 2014! The excellent textbook *Craig, J.R. & Vaughan, D.J. (1994) Ore microscopy and ore petrography* (Wiley), ideally suited for the microscope labs, is available for **free** on-line, courtesy of Mineralogical Society of America. Download it! The web link is:

http://www.minsocam.org/MSA/OpenAccess_publications.html?p=Craig_Vaughan This book also has reflected light mineral identification tables, although students seem to like the Spry & Gedlinske tables.

Lecture: Evans, A.M., 1993. Ore geology and industrial minerals - An introduction. 3rd edition. *Blackwell*: Oxford.
Roberts, R.G. & Sheahan, P.A., 1988. Ore deposit models. Vol I. *Geoscience Canada Reprint Series 3*.
Sheahan, P.A. & Cherry, M.E., 1993. Ore deposit models. Vol. II. *Geoscience Canada Reprint Series 6*.
Goodfellow, W.D. (ed.) 2007. Mineral deposits of Canada. *Geological Association of Canada Mineral Deposits Division Special Publication 5*, 1061 pp with DVDs.

The two 'Ore Deposit Models' softback books are excellent books that are good value. I refer to these two books, especially the first one, quite a bit throughout the course. Evans is a very good, clearly written introductory text that will be useful for this course and as a general reference beyond your BSc program. For the Canadian slant, Goodfellow '07 is a comprehensive review that is good value in addition to including a DVD of all diagrams, maps and papers.

Resource Materials: A list of books on reserve in the Gallagher Library is appended separately.

6. **Examination Policy:** Aids allowed: non-programmable calculator and, if needed, a ruler. 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. See also [Section E.2](#) of the University Calendar.

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) **Academic Accommodation Policy:** Students with documentable disabilities are referred to the following links: [Calendar entry on students with disabilities](#) and [Student Accessibility Services](#).

(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; [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) 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: September 5 2014

Tentative Lecture-Lab schedule for GLGY 527 Fall 2014

Week	Lec date (M-W-F)	Topic	Lab (Thursday)
1	Sep 8	Introduction to course.	1. Minerals and rocks in hand specimen
	Sep 10	Steps to establish mine.	
	Sep 12	Factors of ore - geological.	
2	Sep 15	Factors of ore – economic. Ores as concentrations	2. Mineral chemistry; grade and tonnage estimate
	Sep 17	Ore fluids: pH, redox, Eh-pH diagrams.	
	Sep 19	Eh-aO ₂ , complexes, S species.	
3	Sep 22	Deposition. Boiling.	3. Introduction to reflected-transmitted light microscope
	Sep 24	Physical aspects of fluids.	
	Sep 26	Modern ore fluids. Ore classification.	
4	Sep 29	Ultramafic chromite-PGE 1	4. Ultramafic Cr- PGE ores; anorthosite Fe-Ti-V oxide ores
	Oct 1	Ultramafic chromite-PGE 2.	
	Oct 3	No lecture – Pattison on Glgly 707 field trip.	
5	Oct 6	PGE. Podiform Cr. Anorthosite Fe-Ti-V.	5. Gabbroid-associated Ni-Cu-Fe-PGE sulphide ores
	Oct 8	Mafic Fe-Ni-Cu-S ores	
	Oct 10	Mafic Fe-Ni-Cu-S ores 2.	
6	Oct 13	No lecture – Thanksgiving.	6. Cu-Mo porphyry ores
	Oct 15	Felsic intrusion-assoc hydrothermal ores (granites).	
	Oct 17	Cu-Mo porphyry 1.	
7	Oct 20	No lecture – Pattison at GSA.	7. Skarn Cu-Fe ores; Mesothermal Au-Cu ores
	Oct 22	Cu-Mo porphyry 2. Climax Mo, Greisen.	
	Oct 24	Skarn. Vein ores – zoning.	
8	Oct. 27	Vein ores – zoning, Cl/HS, mesothermal veins.	8. Epithermal Au-Ag ores; Archean lode Au ores
	Oct. 29	Vein ores – epith; invis gold.	
	Oct. 31	Epith veins – Carlin.	
9	Nov 3	Vein ores – Archean.	9. 'VMS' Cu-Zn-Pb-Ag ores; 'Sedex' Zn-Pb-Ag ores
	Nov 5	Archean veins 2.	
	Nov 7	Volcanic-hosted Cu-Zn-Pb-Ag ores.	
10	Nov 10	No lecture – Reading Days	10. Fe-formation; Paleoplacer Au ores; 'MVT' Zn-Pb ores
	Nov 12	VMS2.	
	Nov 14	Sedex ores. Sed ores.	
11	Nov 17	Banded Iron Formation I.	11. Diamonds, kimberlites and mantle xenoliths
	Nov 19	BIF 2.	
	Nov 21	Paleoplacer Au-U.	
12	Nov 24	MVT 1.	Review
	Nov 26	MVT 2. Diamonds 1.	
	Nov 28	Diamonds 2. Uranium.	
13	Dec 1	Uranium 2. Supergene processes. Metamorphism.	Lab final Th Dec. 4, 2014
	Dec 3	Metallogeny – tectonic controls in space and time.	
	Dec 5	Bre-X lecture. End of term.	