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| CAMOSUN COLLEGE | ***School of Arts & Science***<br>***CHEMISTRY AND GEOSCIENCE DEPARTMENT***<br>**GEOS 250-001**<br>**Introduction To Mineralogy**<br>**Semester/Year, Winter 2016** |

# COURSE OUTLINE

**The Approved Course Description is available on the web @**
**http://camosun.ca/learn/calendar/current/web/geos.html**

Ω *Please note: this outline will be electronically stored for five (5) years only. It is strongly recommended students keep this outline for your records.*

## 1. Instructor Information

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| (a) | Instructor: | Dr. Tark Hamilton | | |
| (b) | Office Hours: | 10:30-11:20 M, W, Th; 1:30-2:20 Tue or *By Appt. Only*: | | |
| (c) | Location: | Young 200 (far West end of Young) | | |
| (d) | Phone: | 250-370-3331 | Alternative Phone: | 250-216-6448 FTr. |
| (e) | Email: | hamilta@camosun.bc.ca , Read: Tues-Fri | | |
| (f) | Website: | https://faculty.camosun.ca/tarkhamilton/ | | |

## 2. Intended Learning Outcomes

*(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO for approval.)*

Upon completion of this course the student will be able to:

1. Identify over 50 common rock and ore-forming minerals in hand specimen by their physical properties.
2. Explain optics, the nature of light and the interactions of light with physical matter.
3. Use a polarizing microscope to identify minerals in grain mounts and thin sections.
4. Use symmetry elements and angles to analyze point and space groups.
5. Use stereo nets, read crystallographic projection diagrams, and apply miller indices to crystal structures.
6. Identify crystal forms and classify minerals by crystallography.
7. Conceptualize and draw in 3 dimensions.
8. Apply Pauling's rules to the analysis of crystal structures.
9. Use Goldschmidt's rules to predict the placement of minor and trace elements in minerals.
10. Apply the phase rule and read and construct phase diagrams for 2-, 3- and 4-component systems and apply them to mineral stability and mineral chemical reactions.
11. Describe the uses, values and hazards of particular minerals.
12. Distinguish various semiprecious and precious gems.
13. Apply various tools of mineralogy to modern synthetic materials.

## 3. Required Materials

- Text: The Manual of Mineral Science, (Dana's Mineralogy) 23rd ed., Case Klein & Barb Dutrow, Wiley 2008
- Lab Manual: Minerals and Rocks: Exercises in Crystal and Mineral Chemistry, Crystallography, X-ray Powder Diffraction, Mineral and Rock Identification 3rd Edition., C. Klein, Wiley 2008
- Mineralogy, 2nd ed. Dexter Perkins, Prentice Hall, 2002 (alternative)
- Minerals in Thin Section, Dexter Perkins and Kevin Henke, 2nd ed., 2004 (reference, for petrographic microscope work)

(b) Other: hand lens, knife, magnet

## 4. Course Content and Schedule

*Class hours E348: 12:30-1:20 Mon, Wed & Thur*

*Lab hours: F300: 2:30-5:20 Thur*

*Important Dates:* ***Feb 18, 19 Reading Break*** *and Monday March 28 College Closed for Easter Monday.*

*No lab Thursday Feb 18, instead the time should be used to finish the course term paper on a mineral of your choice. A completed 1st draft is due Monday Feb 22 in Lecture.*

*Lab exercises are based in part on Klein's Rocks and Minerals manual, and weekly assignments based on our own minerals collection and microscope materials. Some of this is in-lab activities and others are take home exercises. Exercises will generally be handed out in Monday lecture period. The first week will be a review period of what minerals are, physical properties tests and an introduction to our lab equipment and materials.*

*Out of class homework handouts, field trips and your course mineral collection projects are part of the total lab marks:*

*1 weekend half day FIELD TRIP* Sunday Mar 27 for the low tide at Sooke on the Easter Long Weekend (*announced 2 weeks in advance) these and any in lab field trips require your signed wavier to participate*

*Your own MINERAL COLLECTION of 15 different minerals from local beaches or outcrops or from away if you travel this semester. Correctly identify the mineral by name, composition, form, and habit and describe how it formed from its texture and association. The collection should be submitted 2 weeks before end of term (March 31) with labeled specimens: TH1, TH2 etc. use your own initials and a summary table and a 1 page key describing your particular specimen.*

## 5. Basis of Student Assessment (Weighting)

*(Should be linked directly to learning outcomes.)*

*25 %: 10 labs & homework or prelab assignments*

*40%: 2 midterm tests and 2 lab practicums during lab periods. Crystallography, Practical Physical Mineralogy, Optical Mineralogy, Mineral Groups: Elements, Oxides, Silicates,*

*Carbonates, Sulfates, Sulfides, Phosphates etc. Particular emphasis will be placed on the important rock forming silicate minerals. Modern instrumental methods including: XRD, SEM, EMP, etc.are also covered. Week 6 Feb 13 & Week 12 Mar 26. 1 page cheat sheet allowed, 1 test forgiveness policy. 1 later better test score can replace 1 earlier lower test score.*

*15%: 1 term paper on a mineral commodity, its primary mineral ores, geological setting, paragenesis, environmental and or health issues, consequences for Canadian Economy. For example: Canada produces and exports Copper. It comes from large porphyry deposits in B.C. and volcanogenic massive sulfide deposits in B.C. Ontario, Quebec and New Brunswick. Most copper comes from the mineral chalcopyrite but…. This paper is due in draft form on 22 Feb and in completed written and power point form by the start of week 12. Earlier submissions get free guidance and feedback. You also need a 3-5 slide power point talk to present in </= 10 minutes to the class. The paper will follow a scientific article format. The slides and the talk will all be marked.*

*20%: Written final exam as scheduled by Registrar between April 18-26. Do not plan to travel until after this period. Only Medical excuses apply. (e.g. I was hit by an octahedrite meteorite consisting of the minerals Kamacite and Taenite belonging to the cubic crystal system and containing 7% Ni. Just kidding!)*

## 6. Grading System

*(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO for approval.)*

### Standard Grading System (GPA)

| Percentage | Grade | Description | Grade Point Equivalency |
|---|---|---|---|
| 90-100 | A+ | | 9 |
| 85-89 | A | | 8 |
| 80-84 | A- | | 7 |
| 77-79 | B+ | | 6 |
| 73-76 | B | | 5 |
| 70-72 | B- | | 4 |
| 65-69 | C+ | | 3 |
| 60-64 | C | | 2 |
| 50-59 | D | Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite. | 1 |
| 0-49 | F | Minimum level has not been achieved. | 0 |

### Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy E-1.5 at **camosun.ca** for information on conversion to final grades, and for additional information on student record and transcript notations.

| Temporary Grade | Description |
|---|---|
| **I** | *Incomplete*: A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family. |

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| **IP** | *In progress*: A temporary grade assigned for courses that, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. *(For these courses a final grade will be assigned to either the 3rd course attempt or at the point of course completion.)* |
| **CW** | *Compulsory Withdrawal:* A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement. |

## LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College calendar, at Student Services or the College web site at camosun.ca.

## STUDENT CONDUCT POLICY

There is a Student Conduct Policy **which includes plagiarism**.
It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, at Student Services and on the College web site in the Policy Section.