GEOSCIENCES 214: PETROLOGY  
SPRING 2009

Instructor: Mary Keskinen (Reic 340 - X 7769)
Teaching assistants: David McAlpin (Reic 312 - X 7585) & Stephanie Mrozek (Reic 312 - X 7585)

Class meetings: Lecture Monday & Wednesday, 11:45-12:45 (Reic 235) 
Lab Monday/Wednesday, 2:15-5:15 p.m. or 6-9 p.m. (Reic 237)
MK Office Hours: Monday 9:15-10:15; Tuesday 10:30-11:30.

LECTURES

| January   | 26 | Structure and composition of the earth, general characteristics of igneous rocks |
| January   | 28 | Mineralogical classification of igneous rocks                           |
| February  |  2 | Field characteristics of igneous rocks                                |
| February  |  4 | Phase rule and phase diagrams                                         |
| February  |  9 | Binary systems & fractional crystallization                            |
| February  | 11 | Ternary systems & Bowen's Reaction Series                             |
| February  | 16 | Dealing with a more complex system: the real world                   |
| February  | 18 | Chemical classification of igneous rocks                              |
| March     |  2 | Subduction and volcanism                                             |
| March     |  4 | Granites and batholiths                                              |

** SPRING BREAK **

| March     | 16 | The Best Bits of Igneous Rocks                                       |
| March     | 18 | Metamorphic Processes                                               |
|           |    | Petrology Exam                                                       |
| March     | 25 | Facies and Facies Series                                             |
| March     | 30 | Graphical Methods for Metamorphism                                  |
| April     |  1 | -as above-                                                           |
| April     |  6 | Metamorphic Reactions                                               |
| April     |  8 | Quantitative Metamorphic Petrology                                   |
| April     | 13 | Contact Metamorphism and Low P/T Facies Series                       |
| April     | 15 | Regional Metamorphism: Mod P/T Facies Series                        |
| April     | 20 | High P/T Facies Series: Blueschists & Eclogites                      |
| April     | 22 | Ocean-floor and Geothermal Metamorphism                              |
| April     | 27 | Isotopes & Trace Elements in Metamorphic Systems                     |
| May       |  4 | PetroTECTONICS                                                      |

FINAL EXAM: Friday, May 8 - 10:15-12:15

READING ASSIGNMENTS MUST BE COMPLETED BEFORE THE CLASS FOR WHICH THEY ARE ASSIGNED!

GRADING: The course is divided into two units: the first section dealing with igneous rocks, then metamorphic rocks will be covered. The homework assignments and lecture exams will constitute about 60% of your final grade. The laboratory grade is worth approximately 40% of the final grade. Letter grades and +/- grades will be given.

READING ASSIGNMENTS

- Blatt, pp.xvii-10, 136-149.
- Blatt, 20-64.
- Blatt, 10-18, 71-90.
- Blatt, 92-103.
- Blatt, 116-120.
- Blatt, 103-115.
- Blatt, 120-135.
- Blatt, 23 151-167.
- Blatt, 180-189.
- Blatt, 190-211.
- Blatt, 168-180.
- Blatt, 180-189.
- Blatt, 359-379.
- Blatt, 381-394; Best 401-408.
- Blatt, 596-409.
- Blatt, 471-480.
- Blatt, 440-444.
- Blatt, 482-497.
- Hyndman, 657-664.

*hybrid*
REQUIRED TEXTBOOK:

TEXTS FOR SUPPLEMENTARY READING ASSIGNMENTS:

Assigned reading from books other than Blatt, Tracy, & Owens will be xeroxed and made available in the classroom (235).

LAB SCHEDULE FOR IGNEOUS AND METAMORPHIC ROCKS

January
26 Review of Optical Mineralogy
28 Minerals in Thin Section

February
2 Igneous minerals and textures
4 Igneous minerals and the microscope
9 M&M lab exercise, thin section preparation and the electron microprobe
11 Plutonic rocks I
16 Plutonic rocks and microscopes I
18 Plutonic rocks II
23 Plutonic rocks and microscopes II
25 Volcanic rocks in hand specimen

March
2 Volcanic rocks and microscopes
4 Pyroclastic rocks and volcano movie

**SPRING BREAK**

16 Unusual igneous rocks in hand sample and thin section
18 -no lab-
23 Metamorphic Minerals
25 Regional Metamorphic Rocks I - pelitic & carbonate rocks
30 Regional Metamorphic Rocks I - microscopic features

April
1 Regional Metamorphic Rocks II - mafic & ultramafic rocks
6 Regional Metamorphic Rocks II - microscopic features
8 Contact Metamorphism and Unfoliated Metamorphic Rocks
13 -as above-
15 Metamorphic Facies
20 -as above-
22 Igneous, sedimentary, and metamorphic rocks
27 Field Trip
29 Igneous and Metamorphic Rock Lab Exam

COURSE DESCRIPTION:

Petrology and Petrography (Geosciences 214) covers the origin, occurrence, and classification of igneous and metamorphic rocks. The format involves 2 hours of lecture per week, largely devoted to more theoretical aspects of these topics, while laboratory work (6 hours per week) involves hand lens identification and thin section examination of representative igneous and metamorphic rocks.

Disability Services: The Office of Disability Services implements the Americans with Disabilities Act (ADA) and insures that UAF students have equal access to the campus and course materials. This class will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide reasonable accommodation to students with disabilities. Make sure to let the instructor know if there are concerns of this type.