Geo 2303W, Spring 2008
Geochemical Principles, 3 credits

Course Description: This course is designed as part of the core curricula for Geology and Geophysics majors but will be useful to anyone studying geochemistry and the Earth Sciences. The course will cover the origin of elements, thermodynamics as applied to earth materials, phase diagrams of earth materials, solution chemistry of natural waters, and principles of stable and radiogenic isotope geochemistry; i.e., the course will introduce the basic tools that geochemists use to understand processes that take place on and within the earth.

Class Schedule:
Lectures: Mondays and Wednesdays, 10:10-11:00, 110 Pillsbury Hall
Recitations: Tuesday 9:05-11:00, 125 Pillsbury **or** Tuesday 12:20-2:15, 125 Pillsbury

Professor: Larry Edwards
427 Shepherd Laboratories
612-626-0207
edwar001@umn.edu
office hours: after lecture classes by request

Teaching Assistants: Ben Hardt (discussion section leader)
475 Shepherd Labs
612-624-9598
bhardt at umn.edu
office hours: Tues 2:15-3:30, or by request

Megan Kelly (writing assignments)
433 Shepherd Labs
612-626-7663
Kell0738@umn.edu
office hr: by request

Required Text: Gunter Faure, *Principles and Applications of Geochemistry*, 2nd edition, Prentice Hall

Grading: Midterm exam - 20%
Homework problems - 25%
Final exam - 30%
Term paper and writing assignments - 25%

Because this is a writing intensive class, **students must earn a passing grade on the term paper** in order to pass the course.

Short writing assignments: There will be two short writing assignments during the first half of the course. For each of these assignments, you will be asked to write a 1 to 2 page summary of an article from journals *Science, Nature, or Geology* (published in 2000 or after). These summaries are due in discussion section on **Feb. 12** and **Feb. 26**.

Term Paper: Each student will write a term paper. The first step is choosing a topic. A title and a paragraph about the subject, along with some references are due in class on **Wednesday, March 5**. After each topic is approved, the student should research the topic and prepare an 8 to 15 page draft of a paper with abstract, figures, citations and a reference list. The draft is due on **Wednesday, April 9.** The draft will be reviewed and returned with comments for preparation of a revised final draft of the paper. The final 15-page version of the term paper is due, along with the edited copy of the draft on **Wednesday, April 30.**

Homework problems: Homework problems will be assigned most weeks in discussion sections. Homework problems will be discussed during the discussion sections. They will be due the following Wednesday (8 days later) in Ben's mailbox in 108 Pillsbury Hall by 4:30 p.m.

Lecture Schedule

Week of	Topics	Readings
Jan. 21	Basic nomenclature	Ch. 6
28	Organization of matter	Ch. 7
Feb. 4	Organization of matter	Ch. 8
11	Origin of the Universe	Ch. 2
18	Origin of the Elements/Nucleosynthesis/Origin of Solar System	Ch. 2, Ch. 3 (p22-26 only)
25	Origin of the Elements/Nucleosynthesis/Origin of Solar System	Ch. 2, Ch. 3 (p22-26 only)
Mar. 3	Differentiation of the Earth	Ch. 4
	Term paper topics due Wednesday March 5	
10	Thermodynamics **Midterm Monday March 10**	Ch. 11
17	*Spring Break!*	
24	Thermodynamics	Ch. 11
31	Thermodynamics	Ch. 11
Apr. 7	Thermodynamics	Ch. 11
	Term paper drafts due Wednesday April 9	
14	Exchange reactions	Ch. 9, 10
21	Aqueous chemistry/carbonate equilibria	Ch. 9,10
28	Stable isotope geochemistry	Ch. 17
	Term paper final version due Wednesday April 30.	
May 5	Isotopic geochronometers	Ch. 16
	Final Exam: 8:00 a.m. to 10:00 a.m., Saturday, May 17	
	110 Pillsbury Hall	

Recitation Schedule

Date	Topics
Jan. 22	Housekeeping, Accuracy, precision, and significant figures
29	Mean and standard deviation, short writing assignments discussion
Feb. 5	Error propagation
12	Discussion
19	Isotope ratio mass spectrometers principles, topics for term paper and short writing assignments discussion
26	Isotope ratio mass spectrometers demonstration
Mar. 4	Discussion, Review for midterm
11	Discussion, term paper writing/format discussion
18	*Spring Break!*
25	Discussion
Apr. 1	Discussion, term paper discussion
8	Discussion
15	Discussion
22	Discussion
29	Discussion
May 6	Discussion, Review for final