

## ***E Sci 741/841 Introduction to Geochemistry Fall 2007***

Tu-Th 9.40 – 11 AM James 116  
Lab Th 2.10 – 4 pm James 116

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**Objective:** This course focuses on the principles of geochemistry. We will learn about geochemical tools (such as thermodynamics and kinetics, trace elemental and isotopic partitioning), and we will examine the solar system, Earth's lithosphere, hydrosphere and atmosphere from a geochemical perspective.

**Office Hours** by appointment – best contact: julie.bryce(at)unh.edu

### **Useful Text**

G. N. Eby, *Principles of Environmental Geochemistry*, Thomson/Brooks/Cole, 2004, ISBN 0-12-229061-5

### **Very Useful online material:**

White, Bill, <http://www.geo.cornell.edu/geology/classes/geo455/Chapters.HTML>

### **Other useful texts:**

Albarède, Francis (2003) *Geochemistry: An Introduction*, Cambridge Univ. Press, ISBN 0521891485.  
(on reserve – Dimond library Reserve desk Call No. QE515 .A52713 2004)

### **Evaluation**

Quizzes	30%
Problemsets	30%
Executive Summaries and Newscasts (5) and Final Element Project (35%)	40%

Quizzes are glorified problemsets. They *must be* worked upon *independently*, the only allowable consultations are with yours truly. They will count twice that of other problem sets, and may include cumulative material. At least 20% of each quiz, problem set will require essay-type responses (as opposed to problem-solving).

**Plan of Attack** – *subject to change and please note that dwell time may vary somewhat. . . Lab period will be used for hands-on demonstrations of lecture-related material and/or problem-solving exercises in the first part of the course. In the second part of the course, we will use lab time to work on projects.*

<b>Dates</b>	<b>Topics</b>	<b>Reading</b>
4/6 Sept.	Fundamentals of Geochemistry; Geochemical Systems	(A Ch 1; W Ch. 1 + A Ch 6)
11/13 Sept.	Elements and Bonding	E Ch 1 (A Ch 1, W, Ch 1)
18/20 Sept.	Essentials of Thermodynamics	E Ch. 2; W Chs. 2-4; A. App C
25/27 Sept.	Aqueous Geochem	E Chs 3-4 and W Ch. 3
2/4 Oct.	Organic Geochemistry <b>Project Update #1 (topic) due 2 Oct.</b>	E Ch. 5; W Ch. 14
9/11 Oct.	<b>Take-home Quiz 1 out 11 Oct</b> Isotope Geochemistry	E Ch. 6; W Ch 8-9
16/18 Oct.	<b>Kinetics</b> <b>Quiz #1 due 19 October</b>	W Ch. 5

Dates	Topics	Reading
23/25 Oct.	Geochemistry of minerals	E Ch. 7
30 Oct./1 Nov.	The Atmosphere	E Ch. 8
6/8 Nov.	Solid Earth Geochemistry <b>Project Outline due 9 Nov.</b>	W Chs. 11 - 12
--/15 Nov.	Continental Environmental Geochemistry	E Ch. 9
20, 27/29 Nov.	Above cont'd and Marine Geochemistry <b>Take-home Quiz 2 out 27 Nov.</b> <b>Project drafts due (ESci 741 enrollees- 29 Nov.)</b>	E Ch. 10
4/6 Dec.	Cosmochemistry <b>Quiz 2 due 6 December</b>	W Ch. 10 and A Ch. 9
11/13 Dec.	Project reports <b>Final Project Due 13 December</b>	

A = Albarède; E = Eby; W = White

#### Other course requirements:

\* the "News" – every week someone will deliver a "newscast" which summarizes a recent discovery made (1) in the field of geochemistry or (2) through the application of the tools of geochemistry to another scientific discipline (e.g., anthropology or archeology). Good sources for these newscasts are recent articles in *Nature* and *Science*. Newsworthy studies are also frequently written up in the *New York Times* Science Times (Tuesday section).

**Writing assignments** – Geochemistry satisfies a writing-intensive requirement for those taking ESci 741. Writing is also good practice for those enrolled in ESci 841. Accordingly there are assignments devoted towards the development of writing skills.

1. Executive summaries- "informal" writing, students should pick 5 newscasts and write a short (couple of paragraph) summaries of the major findings of the reported study. These abstracts will be evaluated informally and corrected for grammar and style (complete/do over/zero). The essays are due within two weeks of the newscasts, and together with one's own newscast, will count towards 5% of the project grade.

2. Project –investigation of rare earth elements in Earth, marine, environmental or atmospheric sciences. The element paper is completed in stepwise fashion – with deadlines throughout the course. Laboratory periods starting in November will be devoted towards the acquisition of data for the project.

**Environmental Sciences colloquium**- Several fall speakers in the joint colloquium series held between Earth Sciences, EOS and Natural Resources will be speaking on topics of geochemical interest. Barring class conflicts, attendance is expected at these talks (mark 1 November right now!).

**Late papers policy:** Late papers will be severely penalized- **15% off per day**, auto-removal rules apply.