2010
Biogeochemistry (Ecological)
CIE 457 & 657
(EFB 415 & 610)

Time: Monday and Wednesday 12:45 p.m. to 2:05 p.m.
Place: Marshall 319

Instructors:
C.T. Driscoll and M.J. Mitchell[2][1]
Teaching Assistant:
S. Buckley[3]

Description:

The understanding of biogeochemical relationships as a unifying concept for ecological systems will be emphasized. The importance of biogeochemical relationships in ecosystems and global cycles will be discussed. The interface between the abiotic and biotic components of ecosystems will be explained using examples from both terrestrial and aquatic environments. Recurrent biogeochemical patterns and processes across a spectrum of ecological systems will be used to help develop an understanding of similarities and differences among systems. Conceptual and mathematical models will be employed to describe elemental dynamics of systems. The unique role of man in altering elemental fluxes will be discussed in detail including the application of biogeochemistry within the context of environmental issues. We will be giving particular focus to the influence of atmospheric pollutants and climate change on biogeochemical processes.

Objectives:

1. To explain the principles of biogeochemical cycling in ecological systems.

2. To acquaint the student with the methodology needed to carry out research in biogeochemistry.

Readings:

One book is required in this course: W. H. Schlesinger (1997. Biogeochemistry: an Analysis of Global Change. Second Edition. Academic Press, San Diego, CA. 588 p., Soft-cover, $49.95). This book places special attention on global biogeochemical cycles. The course often uses watersheds as examples for demonstrating biogeochemical principals. One site of notable importance is the Hubbard Brook Experimental Forest (HBEF). This site has the longest record of biogeochemical analysis of any watershed in North America including an extensive record of research and publications. The site characteristics are similar to those found in much of the northern hardwood forest found in eastern North America including portions of New York State. For additional information on the HBEF see on the World Wide Web: http://www.hubbardbrook.org.

Also, you should download the following article that provides a useful overview of climate change in the northeast U.S.:

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NECIA. 2006. Climate Change in the U.S. Northeast. UCS Publications, 2 Brattle Square, Cambridge, MA 02238-9105. 35 pages.
http://www.climatechoices.org/assets/documents/climatechoices/NECIA_climate_report_final.pdf

Additional information on biogeochemistry will be provided in the lectures and supplemental readings. Students will be expected to read all assigned articles and be prepared to discuss them. Lectures and discussion will cover the general area of elemental cycling emphasizing those processes that are most important in regulating fluxes and transformations. We will also have four classes devoted to specific topics associated with biogeochemical analyses and will be in the form of a "workshop" that will included problem solving exercises that will need to be completed by each student working independently.

The lecture notes and most of the readings will be posted on the web for you to download. These posting will be on Myron J. Mitchell's web page located at:

http://www.esf.edu/efb/mitchell/

The actual course material for the course is located under "Teaching" or more specifically under "Biogeochemistry". The course material that is being provided is password protected:

User Name: Biogeochem
Password: Biogeo#2010

Evaluation:

Each student or group of students will be required to develop a proposal for analyzing a question related to biogeochemistry using exiting data available to the student including information available on the web that is very extensive(e.g., NADP, LTER, IPCC, etc.). An oral presentation of this proposal will occur early in the semester. Also a written version of the proposal (maximum length three pages) will be provided to the instructors. A final report will be given orally toward the end of the semester. Also, a written report will be provided to the instructors. The maximum length of the report will be 10 pages of text for single authors with an additional five pages for each additional author.

Students will be evaluated with midterm and final take-home examinations, the proposal, problem sets, class discussion and final report. The examinations will be different for undergraduate and graduate students. It is expected that in answering the exam questions that students will provide literature citations including the class readings that support their answers.

Evaluation:	Proposal	5%
	Midterm	20%
	Participation in Class Discussions	5%
	Workshop problem sets	10%
	Final Presentation	15%
	Final Written Report	25%
	Final	20%