9-2003

GEOL 531.01: Advanced Environmental Geochemistry

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Geology 531
Advanced Environmental Geochemistry
Fall 2003 Preliminary Syllabus

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PREFACE

Advanced environmental geochemistry in the Fall semester will cover the geochemical and hydrologic processes/mechanisms important in releasing and fixing metals and metalloids in aquatic environments. The emphasis will be on understanding the basic principles causing metal/metalloid contamination in rivers, lakes and groundwater around the world. The course will use readings and discussion of the recent literature, and examination of existing data, to examine the processes controlling the transport and fate of contamination in various environments. This year we will also attend the River Center's fieldtrip and conference on "Restoring Rivers Impacted by Mining" September 25 and 26. Registration for the meeting is required; please see Loreene in the main office to register. The fieldtrip costs will be paid for by the fieldtrip fee required for the course, so when you register do not pay for the fieldtrip. The first three weeks of the course will be spent on reviewing basic concepts and reading papers to prepare us for the meeting and fieldtrip. After that, we will read papers on various aspects of environmental geochemistry covering metals and metalloid mobility and contamination. You will be expected to interact in class and participate in the discussion of the readings. You will also write a term paper on a topic of your choice approved by me and give a short (15 minute max.) presentation to the class about your topic. Your paper can be a review of a topic or if you would like you can work out a field/lab project with me on a specific topic. All readings for the class will be on either ERes (details in class) or traditional reserve in the library.

PREREQUISITES FOR THE COURSE

Graduate standing in geology, chemistry or biology, and a year of chemistry or consent of instructor.

GRADING

Your grade for the course will be determined by the following:

Term Paper – 50%
Presentation – 25%
Class interaction/preparation – 25%

SCHEDULE

Week	Topic
9/2	Introduction and geochemical fundamentals (lecture and discussion)
9/9	Geochemical fundamentals and sediment transport concepts (lecture and discussion)
9/16	Mining wastes and rivers (discussion of readings)
9/23	River Center Conference – attend fieldtrip and talks 9/24 and 9/25
9/30	Review/discussion of meeting and fieldtrip and restoration of mining-contaminated rivers (bring ideas based on reading and meeting)
10/7	Basic geochemical environments (discussion of readings, D.O.R.)
10/14	Mineralogical controls on metals and metalloid concentrations (D.O.R)
10/21	Adsorption processes for metals and metalloids (D.O.R)
10/28	Diagenesis effects on the historical records of metal contamination (D.O.R)
11/4	Geochemistry of arsenic contamination in groundwater (D.O.R)
11/11	Veteran's Day Holiday, no class
11/18	Mobilization/fixation of metals and metalloids by acid rock drainage (D.O.R)
11/25	Toxicology of metals and metalloids
12/2	Review of major concepts and discussion of important research needs
12/9	Term Paper Presentations (Term papers due in class)
12/16	Final Exam week Term Paper Presentations