
BIOL 399 Special Topics: Research in Biogeochemistry I (3)

Coreq. GEOL 398 - Special Topics: Environmental Geochemistry I
Offered Summer 2017

Instructor: Dr. Garriet Smith; Office, Sci. 203, email, Smithres@usca.edu

Location: Sci. Rm. 213 Mon, Wed., Fri. 1:00-2:30

Course Overview and Objectives: The purpose of this course is to introduce students to Biogeochemistry Research. It is designed to complement the coreq. course, GEOL 398. Students will be taught methods for developing proposals and how to do literature searches. In addition, research techniques used in Biogeochemistry will be taught so that, these methods can be applied to samples obtained from the field site. Soil microbiological methods will be stressed in this course.

GEOL398 (I) and BIOL399 (I) are offered as co-requisites and must be taken together in the same session

BIOL 399 Special Topics: Research in Biogeochemistry II (3)

Coreq. GEOL 398 - Special Topics: Environmental Geochemistry II
Offered Summer 2017

Instructor: Dr. Garriet Smith; Office, Sci. 203, email, Smithres@usca.edu

Location: Sci. Rm. 213 Mon, Wed., Fri. 1:00-2:30

Course Overview and Objectives: This course concentrates on actually doing experiments on samples obtained during GEOL398. Microbial characterization of soil strata will be performed using techniques learned in GEOL 398. In addition, analysis of results will be performed and write-ups using journal formats will be followed. Presentation of final results will be coordinated with data obtained in GEOL 398.

GEOL398 (II) and BIOL399 (II) are offered as co-requisites and must be taken together in the same session.

GEOL 398 – Special Topics: Environmental Geochemistry I (4); Environmental Geochemistry II (4) Summer 2017

Instructors:

Dr. John Dickson (lecture), 302-724-4309 (cell) johnbull.dickson@srnl.doe.gov

Dr. Daniel I. Kaplan (laboratory), 803-761-2672 (office); daniel.kaplan@srnl.doe.gov

Office Hours: Monday - Friday, after class and/or by appointment

Lecture: Mon, Wed, Fri: 8:30 – 10:00 am

Lab: Tue/Thurs: 8:30 – 2:30 pm

Final: Environmental Geochemistry I June 23, 2017

Environmental Geochemistry II July 24, 2017.

Course Goals/Objectives:

1. To provide an understanding of superficial deposit formation, physiochemical properties
2. To apply soil physiochemical concepts to anthropogenic problems in soil and water resource management.

At the completion of this course students will have demonstrated understanding of:

- Key physical, chemical and biological processes occurring in soils (soil formation, horizons, properties)
- Physical properties of soil solids, clay mineralogy and the properties of clays and colloids
- Basic chemical properties of soil including ion exchange capacity and soil pH
- Water and contaminant transport in soils, especially forces driving these processes
- Develop a better understanding of degradation of soil resources through erosion, contamination, and other anthropogenic activities.
- Integrate scientific knowledge with the ability to effectively communicate that knowledge to non-science audience

Required textbooks:

- Nyle C. Brady and Ray R. Weil, *Elements of the Nature and Properties of Soils, 3rd Edition*; Prentice Hall, ISBN: 978-0-13-501433-2
- Lab Notebook: National Brand Computation Notebook, 4 x 4 Quad, Brown, Green Paper, 11.75 x 9.25 Inches, 75 Sheets (43648)

Organization of course:

Course will be offered through a combination of lectures (3 lectures/week, 1.5 hours/lecture), laboratory sessions, and field trips (2 laboratories/week, 6 hours/laboratory). In this class students will not only learn but will gain an appreciation for physical and chemical processes driving geological formations and get hands-on laboratory and field experience in conducting research.

This schedule may change based on students' progress.

Week	Exam	Lecture	Lab/Notes
Session One			
5/26 – 6/2		Introduction – Soil formation processes	Soil sampling, heterogeneity, scaling
5/6 – 5/9	Exam 1	Soil Classification/Soil physical properties	Particle Size Distribution measurements
5/12 – 5/16		Physical properties	pH measurements
5/19 – 5/23	Final Exam	Soil solid phase (minerals Organic Matter) and classification	Iron and organic matter
Session Two			
5/26 – 5/30		Clay minerals – classification, properties	Cation & anion exchange capacity
6/3 – 6/7	Exam 1	Soil chemical properties – organic matter	Contaminant sorption properties
6/10 – 6/14		CEC, pH, sorption	Contaminant sorption properties
6/17 – 6/21	Final Exam	Adsorption, Partitioning coefficient	Data tabulation, presentation, organizing final report

Attendance/Assignment Policy:

For the lecture, attendance is mandatory. Three missed classes will result in withdrawal from the course. To receive credit for attending a lab, students must be on time for all pre-lab meetings (the first 30 minutes of class) and remain for the entire experiment. Arriving late to a pre-lab lecture is cause for dismissal from that day's lab. Lab partners/groups will be assigned at the discretion of the instructor. Any missed lab earns a zero grade and there are no make-up labs. A student can miss up to two labs in a semester. A third missed lab will result in withdrawal from the course. The lowest grade, including missed labs with a grade of zero, will be dropped from the course grade.

Grading Policy:

Lecture Assignments:

Homework is assigned weekly and is due at the beginning of class on the due date.

Homework assignments may include: short reading/writing/critical thinking assignments and/or short problem sets. Late homework will be charged 10% penalty.

Laboratory Reports:

Lab sections are fun, hands on, active, and engaging. The best way to learn science is to do science. Lab grades will consist of written reports or answers to critical questions for each lab, lab quizzes, and a lab notebook for fieldtrips. Lab exercises will be conducted in groups, but individuals will be required to turn in weekly reports as well as a final report.

Exams:

For each course, there will be an exam and a final exam (mostly multiple choice, true/false, label the figure and short answer), covering course lecture materials and exercises. There will be no makeup exams.

Grading:

(Final Grade: A- to A = 86-100; B- to B+ = 76-86%; C- to C+ = 66-76%; D to D+ = 59-66%; F = <59%)

Lecture Exams	20 %
Lecture Homework	10 %
Laboratory weekly report	20 %
Laboratory final report	30 %
Final Exam	20 %
TOTAL	100 %

Disability Statement:

If you have a physical, psychological, and/or learning disability that might affect your performance in this class, please contact the Office of Disability Services, B&E 134, (803) 643-6816, as soon as possible. The Disability Services Office will determine appropriate accommodations based on medical documentation.

Classroom Behavior:

It is the instructor's right to remove from the classroom any student who disrupts or disturbs the proceeding of the class. Use of non-authorized electronic devices is considered a disturbance. In extreme cases the faculty member can request assistance from University Police. If the student who has been ejected causes similar disturbances in subsequent meetings of the class, he/she may be denied admittance to the class for the remainder of the semester and assigned an F grade.

Policy for Portable Electronic Devices:

The use of any portable electronic devices, including cell phones, pagers, MP3 players, iPods, laptops, etc., during class is not allowed for any reason, unless **prior** approval has been given to a student from the instructor or unless required for the course (use of phone for math). If you are planning to have any of these devices in class, they must be turned off and stowed away for the duration of the class period. If you use a portable electronic device during a test, quiz, or other assessment, you are eligible to receive a failing grade on that assignment.