ESM 202 Environmental Biogeochemistry

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OH: open door policy/email appt.

Lectures: Via Zoom, 9:30 to 10:45 am Tuesday and Thursday

The goal of this course is to provide you with a scientific basis to understand:

- Major disturbances to cycling of elements in the environment
- Pollution and its implications
- A range of approaches to understand and develop solutions to these problems
- How this is relevant in your daily life as well as for your career

**LECTURES**

**Week 1**  Why is biogeochemistry relevant for solving environmental problems?
Understanding water quality: Part I

**Week 2**  Understanding water quality: Part II
Eutrophication and P cycle

**Week 3**  N Cycle – sources, processes and effects
Understanding Air quality

**Week 4**  Sulfur cycle – sources, processes and effects
Acid mine drainage

**Week 5**  Carbon cycle dynamics (major drivers of emissions)
Terrestrial and oceanic carbon processes

**Week 6**  Wetland biogeochemistry
MIDTERM (take home)

**Week 7**  Trace elements – sources, processes and effects
Life-cycle assessment & biogeochemistry

**Week 8**  Lead and mercury
Emerging organic pollutants

**Week 9**  Micro and nano pollutants
Ecotoxicology

**Week 10**  Modeling Biogeochemistry to Inform Policy Decisions
Synthesis and interactions

**March 16**  FINAL EXAM (8-11 am, take home)
DISCUSSIONS
TAs:  Qian Gao (Bren Hall 2326)
      Violaine Desgens-Martin (Bren Hall 2422)

Week       Topics
1          Chemistry boot camp
          (Or what I really need to know to make the most of this course)
2          Water quality concepts
3          N & P biogeochemistry
4          Air quality concepts & Sulfur cycle
5          Carbon cycle
6          Review for midterm
7          Trace elements
8          Emerging pollutants
9          Open topic
10         Review for final

GRADING
• Assignments: 3 x 15% each (#1 Due Week 4, #2 Due Week 8, #3 Due Week 10, on Mondays)
  ▪ The assignments are INDIVIDUAL, and be careful when using information from a published source to express it in your own words after you analyze it
• Midterm: 20%
• Final: 35%

Reading Materials
Textbook:  Biogeochemistry : An Analysis of Global Change, by Schlesinger and Bernhardt

Week       Readings
1          Chapters 1 and 8 & Article on Water Quality
2          Chapters 6 and 12
3          Chapter 3 & Article on Air Quality
4          Chapter 13
5          Chapters 5, 9 and 11
6          Chapter 7
7          Article on Trace Elements
8          Article on Emerging Contaminants
9          Article on Ecotoxicology
10         Chapter 14

Articles will be posted to the course website in Gauchospace.
Homework assignments will be posted to Gauchospace.