GLOBAL BIOGEOCHEMISTRY
BIOL 456

Fall 2022

Instructor:	Dr. Britt Hall
Office:	LB 243
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Lecture time:	T/H 10:00-11:15
Location:	RI 209
Prerequisites:	BIOL275

This course will be a face-to-face class with the possibility of mandatory masking.

Course description/rationale

Biogeochemistry is the interdisciplinary science examining the behaviour of elements in the lithosphere, atmosphere, and biosphere. The course will present an in-depth examination of elemental cycles within the context of global change. Topics will include the biogeochemical properties of water, carbon, nitrogen, sulphur, phosphorus, and some contaminants and the ways in which anthropogenic activities have altered the behaviour and movement of these elements.

The University of Regina has identified the environment as a major focus of its strategic plan. As such, the Department of Biology has worked to increase the offering of environmental courses. Global Biogeochemistry fits nicely into both the department's and university's support of environmental programs. It is impossible to fully understand ecology and the environment without understanding biogeochemical cycles. Many ecological issues related to ecological degradation are as a result of human disruptions of natural biogeochemical cycles such as water, nutrients, toxic metals, and other pollutants. To fully appreciate current global change, biogeochemistry must be considered.

Course objectives

1. To learn fundamentals in Biogeochemistry. Emphasis will be placed on elemental cycling and changes due to human activities. This objective will be met through class lectures, presentations, and student led discussions and exams.

2. To explore current research in the field of biogeochemistry. This objective will be met through required readings of recent examples of biogeochemical research in the peer-reviewed literature.

3. To develop critical thinking skills. This objective will be met through reading assignments designed to foster critical thinking.

Components

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Component	Due Date	Grading
Assignments (due in class)	All term	5% each, 35% total
Participation	All term	10%
Presentation	All term	15%
Exam	October 18, 2022	20%
Exam	December 8, 2022	20%

LATE ASSIGNMENTS WILL NOT BE ACCEPTED
(Grade will be zero)

The assignments will be submitted via Turnitin.com. The class ID is **35129575** and the password is **cycles**. You should set up an account promptly.

THE TAKE HOME EXAM WILL ALSO BE TURNED IN ON THE turnitin.com SITE USING THE SAME LOG IN INFORMATION.

PLEASE NOTE: In all assignments do not include direct quotes from electronic sources (i.e., cut and paste text transfers). The presence of such passages will be considered plagiarism, and will result in an automatic grade of 0%. All students are responsible to ensure that their assignments are unique. Turnitin.com is able to determine if there is overlap with electronic sources of information as well as overlap with other students' work.

Tentative Class Schedule: Global Biogeochemistry

Date/Day		Subject
01 Sept	H	Course Introduction, Intro. to biogeochemistry
06-Sep	T	Earth's origins, re-dox refresher
08-Sep	H	The atmosphere
13-Sep	T	The lithosphere
15-Sep	H	The hydrosphere
20-Sep	T	Oceans
22-Sep	H	Presentation / discussion: Immerzeel et al. 2019 (water tower vulnerability)
27-Sep	T	The biosphere I: Photosynthesis, decomposition, nutrient uptake
29-Sep	H	C biogeochemistry
04-Oct	T	Presentation / discussion: Schmitz et al. 2018 (impact of animals on carbon cycling)
06-Oct	H	
11-Oct	T	The biosphere II: N/P biogeochemistry
13-Oct	H	Presentation / discussion: Dror et al. 2022 (Human impacts on soil)
18-Oct	T	EXAM
20-Oct	H	S/Fe cycles
25-Oct	T	Presentation / discussion: Meyer-Jacob et al. 2019. (Browning of lakes due to acid recovery and climate change)
27-Oct	H	Contaminants, Mercury
01-Nov	T	Presentation / discussion: Huang et al. 2022 (Hg)
03-Nov	H	Kidd talk – Endocrine disruptors (video lecture)
08-Nov	T	Break
10-Nov	H	Break
15-Nov	T	Presentation / discussion: Dutton et al. (Hippos and biogeochemistry)
17-Nov	H	Climate change I – History to where we are now
22-Nov	T	Presentation / discussion: Kraemer et al 2021 (Climate change)
24-Nov	H	Climate change II- deniers, Littlemore talk
29-Nov	T	Presentation / discussion: Poore and Nemecek 2018 (reducing impact of food)

01-Dec	H	Geoengineering
06-Dec	T	EXAM released
08 Dec	H	Exam Due - noon

Reading assignments/pre-class expectations

Eight times over the course of the term, you will be assigned an article chosen from the recent scientific literature pertaining to the topic discussed during a previous lecture period. Prior to each discussion period, you will be expected to thoroughly read the article and arrive at class prepared to discuss it.

In addition, you will write weekly reading reports, due at the beginning of class the day the papers is being discussed, according to the following format:

- Give the title, author(s), date, and source of each reading. Citation style will be that used in the journal *BioScience* (see below)
- State the senior author's position and affiliation (e.g., Associate Professor, Department of Biology, University of Regina)
- In 3 sentences, summarize the main point(s) of the reading
- In 1-2 sentences EACH, describe:
  - The major strength of the reading
  - The major weakness of the reading
  - Your overall opinion/evaluation of the reading
- In 1-2 sentences, state why you think that the reading was assigned

These weekly reading assignments are designed to foster critical thinking and analysis of current literature. Each report should be NO MORE than 12 sentences. Grammar, spelling, sentence structure will count towards your grade. I will read and comment on each of your weekly assignments, and you will receive a grade between 0 and 5, corresponding to the following categories:

- 0 (report not handed in)
- 1 (inadequate)
- 3 (acceptable)
- 4 (very good)
- 5 (exceptional)

You will hand in 7 out of 8 assignments during the semester, each worth 5% of your overall grade, totaling **35% of your final grade**.

LATE ASSIGNMENTS WILL NOT BE ACCEPTED
(Grade will be zero)

Presentation

In addition to the reading reports, you be will be randomly assigned to a group which will be required to present ONE paper (chosen at random in the second lecture period) to the class during the discussion period. This presentation (~12-15 minutes in length) will describe the study in general and highlight the important findings of the paper. I will facilitate the discussion periods, but the presenters will be expected to contribute to the facilitation of the discussion following the presentation. This assignment will make up 1**5% of your final grade**.

Exams

The will be two exams each worth **20% of your final grade** given in class. The exams will be short and long answer exams and will include questions from both lectures and discussions.

Instructions:
The final exam will be a take home exam. You must submit your finished copy to Turnitin.com. If you are late handing in your test, 5% will be deducted for each additional hour. Each answer should be the line length indicated on the exam and formatting must be followed exactly. You must use the exam document as a template i.e. fill your answer in directly after the question. Since this is a take home exam you can only ask me questions for clarification. You can use ***all*** resources available to you, but they **must** be properly referenced alphabetically in a separate citation list at the end of the exam (format of your choice). You need NOT reference lecture material. Remember, most websites are **not** peer reviewed! If there is any indication that you have worked together (i.e. you have the same WRONG answer, identical answers etc.), or that your work is not original, a mark of zero will be given for the examination. *Please note that Turnitin.com is able to determine if there is overlap with electronic sources of information as well as overlap with other students' work.*

Participation

Participation in this class is very important. During lecture periods, students will be required to work together in small groups to participate in information sharing pertaining to lecture topics. As well, participating in discussion periods will be necessary.

UR Courses

Go to the University of Regina UR Courses site:
https://urcourses.uregina.ca/login/index.php

Click on the link:
Login to UR Courses

Type in your UserName and Password

Click on the link:
Global Biogeochemistry

Getting Help with UR Courses

There are several ways to receive general help with UR Courses.

- https://www.uregina.ca/urcourses/about/index.html
- E-mail: IT.Support@uregina.ca
- Phone: 306-585-4685

NOTE: There are machines available for student use on campus (for locations see: http://www.uregina.ca/compserv/helpdesk/labs.shtm). The computers in these rooms are equipped with browsers which are compatible with UR Courses. For off-campus students, you should have access to computer labs and the internet at all Regional College sites in the province, or at your local library.

Other information

Optional textbook: Biogeochemistry: An analysis of global change. William H. Schlesinger. 2nd Edition.

Office hours:

- Drop-In: Anytime the door to LB 260 is open.
- By appointment: If you would like to schedule a Zoom meeting, please e-mail me.

Plagiarism Policies:

Plagiarism (from the Undergraduate Calendar): Plagiarism is a form of academic dishonesty in which one person submits or presents the work of another person as his or her own, whether from intent to deceive, lack of understanding, or carelessness. Unless the course instructor states otherwise, it is allowable and expected that students will examine and refer to the ideas of others, but these ideas must be incorporated into the student's own analysis and must be clearly acknowledged through footnotes, endnotes, or other practices accepted by the academic community. Students' use of others' expression of ideas, whether

quoted verbatim or paraphrased, must also be clearly acknowledged according to acceptable academic practice. It is the responsibility of each student to learn what constitutes acceptable academic practice. The Department of English Style Guide is available inexpensively from the University Bookstore. Students may also consult on-line resources such as the University of Toronto Writing Centre's "How Not to Plagiarize": www.utoronto.ca/writing/plagsep.html.

Plagiarism includes the following practices:

- not acknowledging an author or other source for one or more phrases, sentences, thoughts, code, formulae, or arguments incorporated in written work, software, or other assignments (substantial plagiarism);
- presenting the whole or substantial portions of another person's paper, report, piece of software, etc. as an assignment for credit, even if that paper or other work is cited as a source in the accompanying bibliography or list of references (complete plagiarism). This includes essays found on the Internet.

Students who are uncertain what plagiarism is should discuss their methodology with their instructors.