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BIOE 447.01: Ecosystem Ecology

Benjamin P. Colman

University of Montana, Missoula

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Syllabus

BIOE 447: Ecosystem Ecology

Spring 2019: Tues/Thurs, 12:30 PM-1:50 PM, LA 243

Instructor information:

- Instructor: Ben Colman
- Email: ben.colman@umontana.edu
- Phone: (406) 243-6315
- Office Hours, Clapp 449: W, 9-10 am; Th, 2-3 pm; or by appointment

Overview:

In this course on Ecosystem Ecology, we will explore: an introduction to systems thinking; the “ecosystem” concept; water, energy, carbon, and nutrient cycling; the role of disturbance in ecosystems; trophic dynamics; and species effects on ecosystem function. All concepts will be explored across both terrestrial and aquatic ecosystems by using a blend of readings, lectures, discussions, problem-solving, and field trips.

Outcomes:

1. For an ecosystem, students will be able to identify its structure, function, dynamics, and controls
2. Students will be able to compare top down and bottom up controls on ecosystem structure and function
3. Students will be able to construct a mass balance for nutrients and water of an ecosystem given basic information on ecosystem pools and fluxes
4. Students will be able to compare and contrast energy and nutrient cycling in aquatic and terrestrial ecosystems

Class format:

Class will be conducted largely through regularly scheduled class periods and supplemented with two integrative field trips in late March/early-April (dates TBD in class). Assignments must be submitted through the Moodle learning management software interface. Moodle will also be used for distribution of feedback on assignments, distribution of supplemental reading assignments, and documenting modifications to the course, if any are required. If you have any questions about how to use Moodle, it is your responsibility to ask me, your colleagues, or call/email the [UM Online help staff](#).

There will be two fieldtrips during the course of the semester, one focusing on factors driving the structure and function in aquatic ecosystems, and one focusing on the same in terrestrial ecosystems. Due to the nature of spring in Montana, these trips will necessarily be pushed into April, will be full day trips, and will require some flexibility on the part of students and the instructor. Attendance for field trips is advisable, but optional. That being said, students will be responsible for making up field trips independently.

Assessments:

There are several types of assessments and assignments in this class, including quizzes on assigned readings and lectures, field journals, and a review paper. Detailed descriptions of expectations and

rubrics for grading these assignments will be posted on the Moodle site for this course, and a detailed assignment description and rubric will be handed out in class for the review paper. Assignments must be turned in prior to the start of class by using Moodle.

Course guidelines and policies:

Grading:

Rubrics for each assignment will be discussed in class and posted on Moodle along with the descriptions of those assignments. The overall distribution of points is summarized in the table below. My goal will be to return all assignments and quizzes no later than a week after receiving them.

Assignment	Points	Description
Field journals	30	4 points for each of 5 regular FJs, 5 points for 2 field trip FJs
Quizzes	30	6 quizzes, five points each
Synthesis project	30	Paper proposal, annotated bib (3 ea.); rough draft & final draft (9 ea.), peer review (6)
Attendance & participation	10	Be present and you will participate

Academic Honesty:

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. I can honestly say that if you email me and tell me of a time that you were honest, and put "honest" as the subject, I will give you a point in extra credit. All students should read and be familiar with the policies contained in the [Student Conduct Code](#).

Adjustments for Students with Disabilities:

Students with disabilities may request reasonable modifications by contacting me; know that I required modifications when I was in college. The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students. "Reasonable" means the University permits no fundamental alterations of academic standards or retroactive modifications. [Disability Services for Students](#) will assist in the accommodation process.

Communication:

All course communications outside of class will be sent to students' University of Montana email accounts. It is your responsibility to regularly check your University account. In an average semester, I get around 100 emails a day with over half requiring replies. If you do not hear from me within 24 hours (except on the weekend) feel free to email again, or call me in my office.

Illness policy:

If you come down with symptoms including either fever or vomiting, please do not come to class unless you are free of fever or vomiting for 24 hours prior to class time. Do email me, as per the schedule and attendance policy.

Syllabus, BIOE 447, Ecosystem Ecology

Schedule and attendance policy:

We will meet every Tuesday/Thursday from 12:30-1:50. Because of the nature of this class, attendance is mandatory and points will be deducted for absences. I may excuse brief and occasional absences for reasons of illness, injury, family matters, religious observance, or participation in a University or community sponsored activity. (University sponsored activities include for example, field trips, ASUM service, music or drama performances, and intercollegiate athletics.) I will also excuse absences for reasons of military service or mandatory public service. Requests for excused absences require an email before class with "BIOE 447 absence" in the email subject, and a description of why you will be absent.

Wk	Date	Readings	Assignments	Class
1	Jan 10	None		Overview, introductions
2	Jan 15	Ch 1	Field journal 1	Ecosystem concept and history
2	Jan 17	Ch 2		Primary producers I, Reading primary lit
3	Jan 22	Paper 1		Primary producers II
3	Jan 24	Ch 3	Quiz 1	Secondary production, bibliography software
4	Jan 29		Field journal 2	Consumer energetics and importance
4	Jan 31	Ch 4		Organic matter decomposition
5	Feb 5	Ch 5	Paper proposal due	Element cycling
5	Feb 7	Ch 6	Quiz 2	The carbon cycle I
6	Feb 12	Paper 2	Field journal 3	The carbon cycle II
6	Feb 14	Paper 3		The carbon cycle II
7	Feb 19	Ch 7	Annotated bibliography due	The N cycle I
7	Feb 21	Paper 4	Quiz 3	The N cycle II
8	Feb 26	Ch 8	Field journal 4	The P cycle I
8	Feb 28	Paper 5		The P cycle II
9	Mar 5	Ch 9	Rough draft of paper due	Revisiting the Ecosystem concept
9	Mar 7	Ch 10	Quiz 4	Ecosystems in a heterogeneous world
10	Mar 12	Ch 11-12	Field journal 5	Ecosystem Structure, function, sustainability
10	Mar 14	Ch 13-16	Peer review of paper due	Four case studies
11	Mar 19	Ch 17		Frontiers in ecosystem science
11	Mar 21	Paper 6	Quiz 5	Biodiversity and ecosystem function
Nope	Mar 26	None	Spring break!	Spring Break!
Nope	Mar 28	None	Spring break!	Spring Break!
12	Apr 2	Paper 7		Disturbance, resistance, resilience
12	Apr 4	Paper 8		FIRE!
13	Apr 9	Paper 9		Stream continuum concept
13	Apr 11	Paper 10	Quiz 6	Floodplain mosaic
14	Apr 16	Paper 11	Field (trip) journal 6	Revisiting nutrient limitation
14	Apr 18	Paper 12		Revisiting the state factor model
15	Apr 24		Final draft of paper due	Final presentations
15	Apr 25		Field (trip) journal 7	Final presentations