

Ecosystem Management

ENV SCI 740 – Spring 2008
Lecture: T 6:00 – 9:00 PM in MAC 224

Instructor:

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Textbook:

Lecture: Chapin III, F.S., P.M. Matson, and H.A. Mooney. 2002. Principles of Terrestrial Ecosystem Ecology. Springer, New York. 436 p.
Assigned readings from primary literature
Lectures and handouts will be provided on D2L

Grade Evaluation:

Assignment	Points	% of Grade
1-hr Midterm	100	20
Cumulative Final	150	30
Reading Summaries	100	20
Presentation	50	10
Research Paper	100	20
TOTAL	500	100

Final Examination: Tue. May. 20, 7:00 to 9:00 PM in MAC 224

Grading Scale: Grades are based on a 90-A, (<90 to 88-AB), 80-B, (<80 to 78-BC), 70-C, 60-D, <60%-F scale, but may be modified at my discretion.

Course Objectives: This course is intended to provide a broad introduction to the field of Ecosystem Ecology. The course consists of three main components: 1) I will provide general overviews to major subject areas within the field; 2) we will collaboratively select, read, and discuss classic and current primary literature for each subject area; and 3) students will apply the basic principles understood by Ecosystem Ecology to land management issues of their choosing. Upon completion of this course I expect that students will have the capacity to approach environmental issues using a systems approach, will have an increased understanding of the movement of matter and energy through natural and managed ecosystems, will be capable of converting the results of primary research into solution strategies for current environmental problems, will have significantly improved their scientific writing and presenting skills.

Exam Policies: There are no makeup exams. If you are unable to attend class on the day of a scheduled exam **I MUST** be contacted prior to class, and I must be provided with valid proof for your absence. Last minute emails do not suffice; a phone call or visit well in advance is

mandatory. All regular exams will consist of a combination of multiple-choice questions, short answer, and essays. The final exam will consist of 100 points of new material and 50 points from cumulative information.

Reading Summaries: The reading load is heavy. In general all topics will include a Chapter from Chapin et al. (2002) to help you understand the basic science. This reading is for your own benefit, but is strongly encouraged. In addition, we will have up to four articles per week from the primary literature. The point of graduate school is become familiar with the primary literature, and as students you have roughly 70 years of literature to catch-up with. **For each assigned article, you are required to hand in a one paragraph summary in class on the night that the paper will be discussed.** Summary should consist of the Paper title and authors, followed by one sentence summarizing the background leading to the paper, one sentence summarizing the main objective of the paper, one sentence summarizing the experimental methods (if applicable), and up to three sentences summarizing the main findings and implications of each paper.

Presentation: **Each student will lead one approximately 40 minute presentation/discussion relating the science of a basic ecosystem ecology topic covered in class to an applied topic.** One to two assigned readings should accompany your presentation. The format of the presentation and discussion is flexible, but at least a brief topic summary in powerpoint format should be included. Grades will be based on a combination of peer review and instructor evaluation.

Research Paper: This paper requires two submissions. **All topics must be approved by me by February 12th.** Manuscripts are expected to average 10 pages of text (1" margins, 1.5 to double spaced, Times New Roman # 12 font), with additional pages for citations, figures, etc. All sources are expected to be from the primary literature. **The first submission should be of final product quality and is due on April 1st.** Your second submission will require extensive improvements upon the first submission, and you can improve your first score by no more than two letter grades. **The second submission is due on May 6th. No partial credit is given for turning in only a single submission.** Writing requirements can be found at http://www.uwgb.edu/nas/docs/Writing_in_Biology.pdf (Recommendations for Student Writing in Biology)

Academic Integrity: There is no single factor more important to science than personal honesty. Scientific investigations, even within large collaborative projects, are largely conducted alone in the field or laboratory, and as such, scientists must be self-regulating. The scientific method is dependent upon this honesty; a lack of integrity directly undermines science. For this reason I will pursue all matters of academic dishonesty to the fullest extent possible.

Plagiarism includes both the use of another individual's ideas or their exact words without crediting them. University policy for student academic dishonesty is found at <http://www.uwgb.edu/deanofstudents/policies/ch14.htm>

Special Needs: It is the policy of the University of Wisconsin-Green Bay to provide appropriate and necessary accommodations to students with documented physical and learning disabilities. This is your right, and I strongly urge any student who suspects that they may have, or are aware of existing disabilities to contact Education Support Services at 465-2671 to make appropriate arrangements to maximize your success.

Tentative Lecture Outline – Spring 2008:

Date	Topic (<i>Student Presentation</i>)	Readings [†]
<u>Background</u>		
Jan. 22	<ul style="list-style-type: none"> • Introduction to Ecosystem Concepts 	Chapter 1; Platt 1964; Chapin et al. 1996
Jan. 29	<ul style="list-style-type: none"> • Introduction continued/ stable isotopes 	Odum 1971; Odum 1982; Vitousek 1994;
<u>Nutrient and Carbon Fluxes</u>		
Feb. 5	<ul style="list-style-type: none"> • Water cycling and Energy balances (<i>Urban plantings/ Green cities</i>)* 	Chapter 4; Postel et al. 1996; Costa and Foley 2000
Feb. 12	<ul style="list-style-type: none"> • Carbon Inputs (<i>Flood mitigation</i>) • Paper Topics Due 	Chapter 5 & 6; Field et al. 1998; Clark et al. 2001
Feb. 19	<ul style="list-style-type: none"> • Carbon Inputs continued (<i>Sustainable Forestry</i>) 	Buynovsky et al. 1987; Finzi et al. 2007
Feb. 26	<ul style="list-style-type: none"> • Carbon Outputs (<i>Carbon Sequestration</i>) 	Chapter 7; Raich and Schlesinger 1992; McCulley et al. 2005
Mar. 4	<ul style="list-style-type: none"> • Terrestrial Nutrient Cycles (start N) (<i>Low-input Agriculture</i>) 	Chapter 9; Perakis and Hedin 2002; Aber and Mellilo 1982; Hofmockel et a. 2007
Mar. 11	<ul style="list-style-type: none"> • Midterm Exam • Terrestrial Nutrient Cycles (end N start P) (<i>Feedbacks with Global Change</i>) 	Aber et al. 1998; Parton et al. 2007
Mar. 18	SPRING BREAK	NO CLASS
Mar. 25	<ul style="list-style-type: none"> • Aquatic Nutrient Cycles (<i>Urban vs. Rural Inputs and correction strategies</i>) 	Chapter 10; Carpenter et al. 1998; Kratz et al. 1997
Apr. 1	<ul style="list-style-type: none"> • Legacy Effects (<i>Ecosystem Restoration</i>) 	Dupouey et al. 2002; Vitousek 2006
<u>The Role of Species</u>		
Apr. 8	<ul style="list-style-type: none"> • Community Feedbacks (<i>Sustainable Biofuels</i>) 	Chapter 12; Hooper and Vitousek 1997; Tilman et al. 2001; Hooper et al. 2005
Apr. 15	<ul style="list-style-type: none"> • Functional Groups/ Species Effects (<i>Species selection</i>) • 1st Draft of Paper Due 	Grime 1977; Pastor et al. 1982; Russell et al. 2007;
Apr. 22	<ul style="list-style-type: none"> • Invasive Species (<i>A systems approach to invasion</i>) 	Vitousek et al. 1987; Ehrenfeld 2003, MacDougall and Turkington 2005
Apr. 29	<ul style="list-style-type: none"> • Terrestrial Foodwebs/ Role of Animals (<i>Trophic losses and gains</i>) 	Chapter 11; Helfield and Naiman 2001, 2003, and Kirchenhoff 2003; Frank et al. 2000
May 6	<ul style="list-style-type: none"> • Aquatic Foodwebs (<i>Great Lakes Fisheries</i>) • Resubmission of Paper Due 	Jackson et al. 2001; Worm et al. 2006; Hilborn 2007
May 13	STUDY WEEK FOR FINALS	NO CLASS
May 20	Final Exam from 7 to 9 PM	

[†] All primary literature should be read prior to attending class.

* All presentation topics (***bold italic***) are suggestions, not requirements, but presentation topics should relate to each date's lecture topic.