

Integrative Biology 452 (NRES 462): Ecosystem Ecology Fall 2019 Syllabus

Course Instructor: Dr. Wendy Yang, ib452@life.illinois.edu

Office hours: By appointment in 639 Morrill Hall

Teaching Assistant: Georgia Seyfried, gss3@illinois.edu

Class Meetings: Tuesdays and Thursdays at 11:00 am-12:20 pm in 2020B Natural History Building

Prerequisites: CHEM 102 and CHEM 104; or consent of instructor

Credit Hours: 3

Course Website: "IB 452 1 FA19: Ecosystem Ecology" at <https://learn.illinois.edu>

Textbook: Chapin FS III et al. 2011. Principles of Terrestrial Ecosystem Ecology. Springer-Verlag.

You may purchase any of these options:

1. Free PDF available via University of Illinois Library
2. Hard copy available at bookstore

Course Description

Distribution and structure of ecosystems on earth; integration of multiple disciplines to gain a holistic view of ecosystem function; ecosystem concepts as they apply to understand natural and anthropogenic environmental change; modern techniques for ecosystem studies

Student Learning Outcomes:

1. Understanding of the distribution and structure of ecosystems on Earth
2. Integrative understanding of multiple disciplines to gain a holistic view of ecosystem function
3. Understanding of ecosystem concepts with relevance to natural and anthropogenic environmental change
4. Familiarity with modern techniques for ecosystem studies
5. Improved oral and written skills in science communication

Course Grading

IB 452 is graded on the standard +/- letter grade scale. Grades will not be curved downward but may be curved upward as needed to achieve a class average of at least 75 % for a given component.

Course Grade Component	Point Value	Percent of Course Grade
Class Participation	200	20 %
Paper Discussions	100	10 %
Mid-term Exam	200	20 %
Term Paper	200	20 %
Comprehensive Take-Home Final Exam	300	30 %
TOTAL	1000	100 %

Class Participation

The class participation grade is worth up to 10 points per class session with 5 points for attendance, which is recorded based on minute paper submissions at the end of each class session, and 5 points for active participation in whole-class discussions and small group activities. The first

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class session, midterm class session, and discussion sessions are excluded from this to total 22 class sessions graded for class participation. The maximum points earned for this grade category is 200 point, so students may miss 2 out of the 22 class sessions without penalty. Students should refer to the special accommodations policy to request excused absences without penalty.

Paper Discussions

Four class sessions will be devoted to discussions about assigned primary and secondary literature from peer-reviewed journals. Participation in each of these discussions is worth 25 points for a total of 100 points for this grade category.

Midterm Exam

An in-class midterm exam with short answer questions will be graded out of 200 points. The exam questions will be similar to questions posed during regular class sessions.

Term Paper

Students will individually prepare a term paper due on December 16. The last class session on December 10 will be used for students to provide peer feedback on the term paper drafts. Undergraduate students will be required to write 4-5 pages double-spaced, and graduate students will be required to write 8-10 pages double-spaced (excluding a title page, the bibliography, and any figures or tables). The term paper is worth 200 points or 20 % of the overall course grade.

Comprehensive Take-Home Exam

A take-home exam will be handed out in class on December 5 and due on December 16. Students may use any course materials to complete the exam but may not consult with other students or use internet resources to formulate or check their answers. The final exam is worth 300 points or 30 % of the overall course grade.

Special Accommodations

Make-up exams are generally not given except under exceptional circumstances, such as a death in the immediate family or a serious illness. If you are forced to miss an exam because of these reasons, send an email to Prof. Yang explaining the reason for the absence and supply supporting evidence - a note from the Emergency Dean, for example. If a make-up exam is warranted, it may contain different questions from that of the original exam.

If you miss an exam because of religious beliefs and observances or formal participation in scheduled activities of officially recognized groups, such as field trips in other courses and athletic team competitions, you must inform Prof. Yang of the conflict within one week of being informed of the examination schedule -- that is, within one week of the beginning of the semester since the syllabus with examination dates was available at that time. This is university-policy, and there will be no exceptions.

If you are unable to attend class or complete a course activity because of professional or personal obligations or emergency situations, you should notify Prof. Yang *immediately*. You may be able to receive an excused absence with no class participation penalty or submit the activity after the due date, with decisions made on an individual basis. Do not wait until < 24 hours before an activity is due to notify them unless an emergency prevents you from doing so.

If you need to request disability accommodations, please schedule an appointment with Prof. Yang at the start of the semester.

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Academic Integrity

Academic dishonesty will not be tolerated. Examples of academic dishonesty include the following:

- Cheating
- Fabrication
- Facilitating infractions of academic integrity
- Plagiarism
- Bribes, favors, and threats
- Academic interference
- Examination by proxy
- Grade tampering
- Non-original works

See University policies on Academic Integrity at http://studentcode.illinois.edu/article1_part4_1-401.html. Should an incident arise in which a student is thought to have violated academic integrity, the student will be processed under the disciplinary policy set forth in the Illinois Academic Integrity Policy. If you do not understand relevant definitions of academic infractions, contact the instructor for an explanation within the first week of class. Ignorance of the course or University policies on academic integrity is no excuse.

Class Schedule

Week	Date	Class	Topic	Required Readings
1	Aug 27 (T)	1	Introduction and The Ecosystem Concept	Chapter 1: The Ecosystem Concept, p. 3-22
	Aug 29 (R)	2	Earth's Climate System	Chapter 2: Earth's Climate System, p. 23-61
2	Sept 3 (T)	3	Geology and Soil Development	Chapter 3: Geology, Soils, and Sediments, p. 63-82
	Sept 5 (R)	4	Soil Properties and Ecosystem Functioning	Chapter 3: Geology, Soils, and Sediments, p. 82-89
3	Sept 10 (T)	5	Discussion about Nutrient Limitation	Townsend et al. 2011
	Sept 12 (R)	6	Water and Energy Balance	Chapter 4: Water and Energy Balance, p. 93-99
4	Sept 17 (T)	7	Guest Lecture by Dr. Caitlin Moore about Measuring Ecosystem Fluxes	No reading
	Sept 19 (R)	8	Water Inputs, Movement, and Loss	Chapter 4: Water and Energy Balance, p. 100-121
5	Sept 24 (T)	9	Discussion about Land Cover Change Effects on Water and Energy Balances	Papers TBD
	Sept 26 (R)	10	Photosynthesis and Gross Primary Production	Chapter 5: Carbon Input to Ecosystems, p. 123-129, 134-155
6	Oct 1 (T)	11	Respiration and Net Primary Production	Chapter 6: Plant Carbon Budgets, p. 157-181
	Oct 3 (R)	12	Decomposition	Chapter 7: Decomposition and Ecosystem Carbon Budgets, p. 183-208
7	Oct 8 (T)	13	Ecosystem Carbon Budgets	Chapter 7: Decomposition and Ecosystem Carbon Budgets, p. 208-227
	Oct 10 (R)	14	Stable Isotope Ecology	West et al. 2006
8	Oct 15 (T)	15	MIDTERM	
	Oct 17 (R)	16	Trophic Dynamics	Chapter 10: Trophic Dynamics, p. 297-319
9	Oct 22 (T)	17	Guest Lecture by Dr. Adam von Haden about Origin of Soil Organic Matter	Cotrufo et al. 2013
	Oct 24 (R)	18	Discussion about Mycorrhizal Mediation of Ecosystem Carbon and Nitrogen Cycles	Phillips et al. 2013
10	Oct 29 (T)	19	Plant Nutrient Use	Chapter 8: Plant Nutrient Use, p. 229-257
	Oct 31 (R)	20	Nutrient Cycling, Part I	Chapter 9: Nutrient Cycling, p. 259-281
11	Nov 5 (T)	21	Nutrient Cycling, Part II	Chapter 9: Nutrient Cycling, p. 281-293
	Nov 7 (R)	22	Guest Lecture by Dr. Mark Burnham about Nutrient Cycling in Human-dominated Ecosystems	Chapter 9: Nutrient Cycling, p. 293-295; Galloway et al. 2008
12	Nov 12 (T)	23	Guest Lecture by Dr. William Eddy about Biodiversity and Ecosystem Processes	Chapter 11: Species Effects on Ecosystem Processes, p. 321-335
	Nov 14 (R)	24	Class Discussion about Biodiversity Effects on Ecosystem Processes	Papers TBD
13	Nov 28 (T)	25	Ecosystem Resilience and Change	Chapter 12: Temporal Dynamics
	Nov 30 (R)	26	Human Modification of Global Biogeochemical Cycles	Chapter 14: Changes in the Earth System, p. 401-421
14	Fall Break (Nov 23-Dec 1)			
15	Dec 3 (T)	27	Ecosystem Responses to Global Changes	Leakey et al. 2012
	Dec 5 (R)	28	Managing and Sustaining Ecosystems	Chapter 15: Managing and Sustaining Ecosystems, p. 423-446
16	Dec 10 (T)	29	Discussion about Term Papers	
	Dec 16 (M)		Comprehensive take-home final exam and term paper due at 5 pm	

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